



A CMS Energy Company

May 30, 2014

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Michigan Public Service Commission  
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**RE: Case No. U-17601 – In the matter of the application of Consumer Energy Company for Authority to Reconcile Its 2013 Energy Optimization Plan Costs Associated With the Plan Approved in Case Nos. U-16670 and U-17138.**

Dear Ms. Kunkle:

Included in this electronic file is Consumers Energy Company's **"Application and Testimony and Exhibits of Company witnesses Alfred A. Alatalo, Katherine L. Allen, Robert D. Bordner, Laura M. Collins, M. Sami Khawaja, Richard A. Morgan, Benjamin M. Ruhl, James P. Schwanitz, and Theodore A. Ykimoff."** Also included is a Proof of Service showing electronic service upon the parties to Case Nos. U-16670 and U-17138. This is a paperless filing and is therefore being filed only in a PDF format.

Sincerely,

Kelly M. Hall

cc: Parties to Case No. U-16670 and U-17138 per Attachment 1 to Proof of Service

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**APPLICATION**

Consumers Energy Company (“Consumers Energy” or the “Company”) respectfully requests that the Michigan Public Service Commission (“MPSC” or the “Commission”) review and approve the Company's implementation of its 2013 Energy Optimization (“EO”) Plan and find that the Company has complied with the energy savings targets imposed by 2008 PA 295; MCL 460.1001 *et seq.* (“Act 295”), and approve the reconciliation of Consumers Energy’s 2013 EO Plan with the surcharges collected during that period. The Company also requests that the Commission determine that the Company has earned the incentive payment set forth in Act 295 for 2013. In support of this Application, Consumers Energy states as follows:

1. Consumers Energy is, among other things, engaged as a public utility in the business of generating, purchasing, distributing, and selling electricity to approximately 1.8 million retail customers and natural gas to approximately 1.7 million retail customers in the State of Michigan. The retail electric and gas systems of Consumers Energy are operated as a single utility system.

2. Consumers Energy’s retail electric and natural gas business is subject to the jurisdiction of the Commission pursuant to various provisions of 1909 PA 106, as amended, MCL 460.551 *et seq.*, 1919 PA 419, as amended, MCL 460.51 *et seq.*, and 1939 PA 3, as amended, MCL 460.1, *et seq.* as well as other applicable law. Pursuant to these statutory

provisions, the Commission has jurisdiction to regulate Consumers Energy's retail electric and gas rates.

3. On October 6, 2008, the "Clean, Renewable, and Efficient Energy Act" (Act 295) was enacted into law. See MCL 460.1001 *et seq.* Act 295 required Consumers Energy, as well as other electric and natural gas providers, to file proposed EO Plans with the Commission for review and approval. MCL 460.1071; MCL 460.1073. Act 295 states that the overall goal of these plans is to reduce the future costs of providing electric and natural gas service to customers. According to Act 295, EO Plans must (i) propose a set of programs that will meet energy savings targets established by Act 295; (ii) include offerings for each customer class, including low-income residential; (iii) specify necessary funding levels; (iv) propose cost recovery mechanisms that will allow recovery of EO Plan costs; (v) demonstrate that the EO programs, excluding program offerings to low-income residential customers, will be cost effective; and (vi) provide for the practical and effective administration of the proposed programs. Act 295 also provides that the Commission may authorize a financial incentive for exceeding the EO performance standard. MCL 460.1075

4. Consumers Energy filed its Application for approval of its initial EO Plan on February 17, 2009. The Commission approved the Company's initial EO Plan in its Order dated May 26, 2009 in MPSC Case Nos. U-15805 and U-15889. On September 10, 2010 the Company filed an amended EO Plan, which was approved by the Commission in its Order dated December 2, 2010 in Case No. U-16412. On August 1, 2011 the Company filed an amended EO Plan, which was approved by the Commission in its Order dated April 17, 2012 in Case No. U-16670. On November 7, 2012 Consumers Energy filed an Application in Case No. U-17138 requesting authority to amend the Case No. U-16670 EO Plan, which the Commission approved

in Orders dated January 31 and February 28, 2013 in Case No. U-17138. The EO Plan approved in Case No. U-16670, as amended by Case No. U-17138, was in effect for the year 2013.<sup>1</sup>

5. In an Order dated February 20, 2014 in MPSC Case Nos. U-17600, et al., the Commission directed Consumers Energy to file its 2013 EO reconciliation on May 30, 2014.

6. As demonstrated by the attached testimony and exhibits of Company witnesses, which are incorporated herein by reference as though fully set forth herein, Consumers Energy successfully implemented the Company's 2013 electric and gas EO Plan. As demonstrated in the attached testimony of Company witness Benjamin M. Ruhl, the Company met its electric and gas energy savings targets for 2013 as certified by independent third parties also testifying in this proceeding. The Company's EO Plan was cost-effective as measured by industry-accepted standards and the Company believes that its 2013 EO performance has earned an incentive payment for both its electric and gas results as described more fully in the accompanying testimony.

7. Consumers Energy has also included a proposal for collection of the electric incentive and gas incentive as described by the accompanying testimony of Company witness Laura M. Collins.

8. This Application is supported by the testimony and exhibits of Benjamin M. Ruhl (2013 EO Results, Annual Report); Laura M. Collins (EO surcharge revenue and proposed mechanism for collecting incentive payments); Katherine L. Allen (accounting/Generally Accepted Accounting Principles); James P. Schwanitz (accounting support); Richard A. Morgan

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<sup>1</sup> On August 1, 2013 Consumers Energy filed an Application in Case No. U-17351 requesting Commission approval to amend the EO Plan approved in Case Nos. U-16670. The Commission issued an Order on December 19, 2013 in which it approved a Settlement Agreement which resolved all issues in Case No. U-17351, and approved the Company's amended EO Plan. The EO Plan approved in Case No. U-17351 applies to the years 2014-2017. The EO reconciliation which is the subject of this Application concerns the year 2013, which was subject to the terms of the Case No. U-16670 EO Plan, as amended in Case No. U-17138.



(benefits/costs); Theodore A. Ykimoff (residential portfolio); Alfred A. Alatalo (business portfolio); M. Sami Khawaja (residential certification); and Robert D. Bordner (business certification).

WHEREFORE, Consumers Energy respectfully requests the Commission to:

- A. Determine that the Company's 2013 EO Plan reconciliation is reasonable and prudent and meets all relevant requirements under Act 295;
- B. Approve the collection of an incentive payment for both the gas and electric EO Plan;
- C. Grant such other and further relief as may be lawful and appropriate.

Respectfully submitted,

CONSUMERS ENERGY COMPANY

Dated: May 30, 2014

By: \_\_\_\_\_  
Patricia K. Poppe  
Vice President Customer Experience,  
Rates and Regulation

\_\_\_\_\_  
John C. Shea (P36854)  
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Jackson, Michigan 49201  
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(517) 788-2910

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**VERIFICATION**

Patricia K. Poppe, states that she is Vice President of Customer Experience, Rates and Regulation of Consumers Energy Company; that she has executed the foregoing Application for and on behalf of Consumers Energy Company; that she has read the foregoing Application and is familiar with the contents thereof; that the facts contained therein are true, to the best of her knowledge and belief; and that she is duly authorized to execute such Application on behalf of Consumers Energy Company.

Dated: May 30, 2014

\_\_\_\_\_  
Patricia K. Poppe  
Vice President Customer Experience,  
Rates and Regulation,  
Consumers Energy Company

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**DIRECT TESTIMONY**

**OF**

**ALFRED A. ALATALO**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

ALFRED A. ALATALO  
DIRECT TESTIMONY

1 Q. Please state your name and business address.

2 A. My name is Alfred A. Alatalo. My business address is One Energy Plaza, Jackson,  
3 Michigan 49201.

4 Q. Please describe your position and responsibilities.

5 A. As Business Energy Efficiency Operations Director, I am responsible for the  
6 development and implementation of Consumers Energy Company's ("Consumers  
7 Energy" or the "Company") business electric and gas energy optimization ("EO")  
8 programs.

9 Q. Please describe your education and professional experience.

10 A. I hold a Bachelor's degree in Mechanical Engineering from Michigan Technological  
11 University and am licensed as a Professional Engineer in the State of Michigan. I have  
12 been employed at Consumers Energy since 1983, where I began my career as a Graduate  
13 Engineer in the Nuclear Plant Support Department. For the first ten years of my  
14 employment I held increasingly responsible positions in the nuclear generation area. In  
15 1993, I transferred to the Demand Side Management area to manage gas energy  
16 efficiency programs for businesses. In 1997, I was transferred to Marketing, Services and  
17 Trading and provided heating, ventilation, and air conditioning ("HVAC") services to  
18 business customers. In 1999 I transferred to the Business Customer Management  
19 Department and continued to provide HVAC services until 2001. At that time I became a  
20 corporate account manager for the Mid-Michigan area. In this role I served as the main  
21 interface to Consumers Energy with business customers in such facets as billing, rates,  
22 reliability, and energy efficiency. In 2003 I was promoted to Southern Team Lead for the  
23 account management team and given the responsibility of managing all business

ALFRED A. ALATALO  
DIRECT TESTIMONY

1 customers from Kalamazoo to Detroit. In 2008 I moved to the Energy Efficiency area as  
2 Business Team Lead and was given responsibility for developing and implementing the  
3 business portfolio of energy efficiency programs. In 2011 I was promoted to my current  
4 position as Business Energy Efficiency Operations Director.

5 Q. Have you previously testified before the Michigan Public Service Commission ("MPSC"  
6 or the "Commission")?

7 A. Yes, I filed testimony on behalf of the Company in the following case:

- 8 • Case No. U-17351 regarding Consumers Energy's 2014-2017 Amended EO Plan.

9 Q. What is the purpose of your testimony in this proceeding?

10 A. The purpose of my testimony is two-fold:

- 11 1. To provide an overview of the Company's business programs; and
- 12 2. To provide actual energy savings and investment for the business portfolio.

13 Q. Are you sponsoring any exhibits with your direct testimony?

14 A. No.

15 Q. What EO programs were available for businesses during 2013?

16 A. The following programs were available to businesses during 2013:

- 17 1. Comprehensive Business Solutions Program
  - 18 a. Prescriptive
  - 19 b. Custom
  - 20 c. New Construction
  - 21 d. Builder Operator Certification
  - 22 e. Compressed Air
  - 23 f. Smart Buildings (Retro-Commissioning)
- 24 2. Small Business Direct Install Program
- 25 3. Business Multi-Family Program

ALFRED A. ALATALO  
DIRECT TESTIMONY

1 Q. What pilot programs were available for businesses during 2013?

2 A. The following pilots were available for businesses in 2013:

- 3 1. Multiple Measure Bonus
- 4 2. Buy Michigan Bonus
- 5 3. Agriculture
- 6 4. Building Performance with ENERGY STAR<sup>®</sup>
- 7 5. Refrigeration
- 8 6. Industrial Continuous Improvement
- 9 7. Energy Check
- 10 8. HVAC Quality Maintenance

11 Q. For each of the business programs and pilots listed above is their detailed information  
12 available in this filing?

13 A. Yes. Company witness Benjamin M. Ruhl's Exhibit A-11 (BMR-1), Consumers Energy:  
14 2013 Energy Optimization Annual Report, is a 184-page comprehensive Report that  
15 reviews the Company's 2013 EO performance that includes information on the  
16 three-business programs and eight-business pilots.

17 Q. What information is contained in this Report?

18 A. The Consumers Energy: 2013 Energy Optimization Annual Report is a comprehensive  
19 Report that reviews the Company's 2013 EO performance on its portfolio of programs.  
20 The Report provides detailed program sections that include program objective, target  
21 market, program duration, program description, program logic, incentive strategy,  
22 eligible measures, implementation strategy, marketing strategy, key milestones,  
23 evaluation strategy requirements, Consumers Energy administrative requirements,

ALFRED A. ALATALO  
DIRECT TESTIMONY

1 participation, investment, energy saving, and benefit-cost test results. Detailed  
2 information on business programs and business pilot programs can be found beginning on  
3 page 93 of that document.

4 Q. From the business programs and business pilot programs that the Company implemented  
5 associated with this filing, what were the actual total annualized MWh, MW, and Mcf  
6 savings for 2013?

7 A. From the business programs and business pilot programs, the Company delivered  
8 270,948 MWh, 42.5 MW, and 936,745 Mcf of energy savings in 2013, respectively.  
9 Individual business program energy saving results can be found in Exhibit A-11  
10 (BMR-1), Consumers Energy: 2013 Energy Optimization Annual Report on page 14 in  
11 Table 4.5.

12 Q. Has the Company certified the business electric and gas energy savings?

13 A. Yes. As detailed in Company witness Ruhl's direct testimony, the Company engaged a  
14 team led by Energy Market Innovations, Inc. ("EMI"), which certified the business  
15 energy savings. Energy savings for pilots as well as education and awareness are done by  
16 calculation as detailed in Exhibit A-11 (BMR-1), Consumers Energy: 2013 Energy  
17 Optimization Annual Report in Section 4.2 Energy Savings for Pilots and Education and  
18 Awareness on page 14.

19 Q. What are EMI's qualifications for certifying the business energy savings?

20 A. The business evaluation team led by EMI includes several of the most reputable  
21 evaluation, research, and engineering firms in the energy industry. All the firms on the  
22 evaluation team have conducted independent impact, process, and engineering analyses  
23 for utilities and regulatory commissions throughout the United States for well over ten

ALFRED A. ALATALO  
DIRECT TESTIMONY

1 years. Evaluation team members have specific experience in evaluating the unique needs  
2 of the commercial and industrial energy efficiency programs.

3 Q. What were EMI's conclusions regarding the amount of 2013 business electric and gas  
4 savings?

5 A. EMI's conclusions regarding the amount of 2013 non-residential electric and gas savings  
6 are presented in the testimony and exhibits of Company witness Robert D. Bordner.

7 Q. Did the Company achieve its business electric savings within the Commission-approved  
8 spend in Case No. U-16670?

9 A. The Company established its 2013 business electric spend in Case No. U-16670 to be  
10 \$38,871,381. The Company actually spent \$38,744,921 as shown on Exhibit A-16  
11 (JPS-1) EO Electric Investments & Incentive Calculation.

12 Q. Did the Company achieve its business gas savings within the Commission-approved  
13 spend in Case No. U-16670?

14 A. The Company established its 2013 business gas spend in Case No. U-16670 to be  
15 \$12,267,441. The Company actually spent \$12,265,360 as shown on Exhibit A-17  
16 (JPS-2) EO Gas Investments & Incentive Calculation.

17 Q. Why do the actual electric and gas spends vary from the planned spends?

18 A. Due to the large number of programs and timing of program expenses it is not possible to  
19 exactly match planned spending with actual spending. It should be noted that the  
20 variance between planned spending and actual spending is a de minimus amount when  
21 compared to the total spending.

22 Q. Does that conclude your testimony?

23 A. Yes.



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Case No. U-17601

**DIRECT TESTIMONY**

**OF**

**KATHERINE L. ALLEN**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

KATHERINE L. ALLEN  
DIRECT TESTIMONY

1 Q. Please state your name and business address.

2 A. My name is Katherine L. Allen. My business address is One Energy Plaza, Jackson,  
3 Michigan 49201.

4 Q. Please describe your position and responsibilities.

5 A. I am employed by Consumers Energy Company ("Consumers Energy" or the  
6 "Company") as the Director of Accounting in the General Accounting Department. I am  
7 responsible for accounting and analyzing financial results for the Company.

8 Q. Please describe your education and professional experience.

9 A. I received a Bachelor of Science in Business Administration degree in Accounting from  
10 Central Michigan University in 2002. In 2003, I began my career in public accounting  
11 and obtained my Certified Public Accountant ("CPA") license in 2004. In 2004, I began  
12 my career at CMS Energy. Between 2004 and 2007, I was employed by CMS  
13 Enterprises, a subsidiary of CMS Energy, as a General Accounting Analyst. In 2007, I  
14 transferred to the Consolidation Department of Consumers Energy. In 2009, I transferred  
15 to the General Accounting Department of Consumers Energy as the Manager of the  
16 Financial Results team. In 2014, I assumed the role as the Director of General  
17 Accounting.

18 Q. What is the purpose of your testimony?

19 A. The purpose of my testimony is to provide the methodology and calculation of the  
20 Company's accounting process associated with its electric and gas Energy Optimization  
21 ("EO") programs. Also, my testimony will discuss the EO earned performance incentive  
22 and the collection period for that incentive required under Generally Accepted  
23 Accounting Principles ("GAAP").

KATHERINE L. ALLEN  
DIRECT TESTIMONY

1 Q. Are you sponsoring any exhibits with your direct testimony?

2 A. Yes, I am sponsoring four exhibits:

3 • Exhibit A-1 (KLA-1): EO Electric Cumulative Over/Under Recovery

4 • Exhibit A-2 (KLA-2): EO Gas Cumulative Over/Under Recovery

5 • Exhibit A-3 (KLA-3): 2010 EO Performance Incentive Cumulative  
6 Over/Under Recovery

7 • Exhibit A-4 (KLA-4): 2011 EO Performance Incentive Cumulative  
8 Over/Under Recovery

9 Q. Have these exhibits been prepared by you or under your supervision?

10 A. Yes.

11 Q. What information is provided in these exhibits?

12 A. Exhibits A-1 (KLA-1) and A-2 (KLA-2) provide accounting data (by month and  
13 customer class) for the electric and gas EO programs including surcharges billed, costs  
14 incurred, and over/under recovery balances with carrying costs. Exhibit A-3 (KLA-3)  
15 provides the 2010 EO incentive amount accrued, amount collected, and the over/under  
16 recovery balance. Exhibit A-4 (KLA-4) provides the 2011 EO incentive amount accrued,  
17 amount collected, and the over/under recovery balance.

18 Q. What surcharge amounts were billed to customers in 2013?

19 A. In accordance with the tariff sheets on file with the Michigan Public Service Commission  
20 ("MPSC" or the "Commission"), the Company began billing customers in June 2009 for  
21 EO surcharges. In 2013, the Company billed \$66,092,183 in total to electric customers  
22 (Exhibit A-1 (KLA-1), page 1, line 1). These surcharges are split between Residential  
23 and Commercial and Industrial ("C&I") classes in the amounts of \$27,763,991 and  
24 \$38,328,192, respectively. In 2013, the Company billed \$47,959,596 in total to gas

KATHERINE L. ALLEN  
DIRECT TESTIMONY

1 customers (Exhibit A-2 (KLA-2), page 1, line 1). These surcharges are split between  
2 Residential and C&I customer classes in the amounts of \$34,563,229 and \$13,396,367,  
3 respectively.

4 Q. What program costs were booked in 2013?

5 A. In 2013, the Company booked \$69,169,718 of program costs for the electric EO program  
6 (Exhibit A-1 (KLA-1), page 1, line 2). These costs are split between Residential and C&I  
7 customer classes in the amounts of \$30,306,431 and \$38,863,287, respectively. In 2013,  
8 the Company booked \$47,787,238 of program costs for the gas EO program (Exhibit A-2  
9 (KLA-2), page 1, line 2). These costs are split between Residential and C&I customer  
10 classes in the amounts of \$35,550,775 and \$12,236,463, respectively.

11 Q. Why do total booked costs in your testimony differ from the amounts provided by  
12 Company witness James P. Schwanitz in his direct testimony in this proceeding?

13 A. The costs, as stated in Mr. Schwanitz's testimony, reflect actual costs for the year while  
14 the booked costs I reference include estimated accruals. At the end of each year, the  
15 Company accrues costs that have been incurred, but are not yet invoiced, on an estimated  
16 basis.

17 Q. How are over/under recovery amounts calculated?

18 A. The incremental over/under recovery amount is the difference between lines 1 and 2  
19 (Exhibits A-1 (KLA-1) and A-2 (KLA-2), page 1, line 3). This difference is added to the  
20 prior year-end over/under recovery amount calculated in the same manner plus the prior  
21 year interest recorded on the over/under recovery balance. If, since program inception,  
22 the Company has collected more in total surcharges than costs incurred, the Company has  
23 over-recovered. In that case, excess revenues are deferred and a regulatory liability is

KATHERINE L. ALLEN  
DIRECT TESTIMONY

1 recorded. Conversely, if since program inception the Company has incurred more costs  
2 than surcharges collected, the Company has under-recovered its costs. In that case,  
3 excess costs are deferred, and a regulatory asset is recorded.

4 Q. What are the over/under balances in the regulatory asset and/or regulatory liability  
5 accounts associated with the EO program as of December 31, 2013?

6 A. In the electric EO program, for the 2013 reconciliation period, total booked costs  
7 exceeded total surcharges resulting in an under-recovery in all customer classes in the  
8 amount of \$3,077,535 (Exhibit A-1 (KLA-1), page 1, line 3) split between Residential  
9 and C&I in the amounts of \$2,542,440 and \$535,095, respectively. The prior year  
10 over-recovery balance and interest carried forward into 2013 was \$28,364,797 and  
11 \$215,086 (Exhibit A-1 (KLA-1), page 1, lines 4 and 5). As a result, the total  
12 over-recovery balance as of year-end 2013 is \$25,502,348 (Exhibit A-1 (KLA-1), page 1,  
13 line 7) split between Residential and C&I in the amounts of \$7,299,689 and \$18,202,659,  
14 respectively.

15 In the gas EO program, 2013 total surcharges exceeded booked costs resulting in  
16 an over-recovery in the amount of \$172,358 (Exhibit A-2 (KLA-2), page 1, line 3). The  
17 C&I program resulted in an over-recovery in the amount of \$1,159,904, and the  
18 Residential program resulted in an under-recovery in the amount of \$987,546. The prior  
19 year over-recovery balance and interest carried forward into 2013 was \$5,485,928 and  
20 \$89,108 (Exhibit A-2 (KLA-2), page 1, lines 4 and 5). As a result, the total  
21 over-recovery balance as of year-end 2013 is \$5,747,394 (Exhibit A-2 (KLA-2), page 1,  
22 line 7) split between an under-recovery of \$7,217,900 associated with the Residential  
23 program and an over-recovery of \$12,965,294 associated with the C&I program.

KATHERINE L. ALLEN  
DIRECT TESTIMONY

1 Q. Have carrying costs on over/under recovery balances been recorded and at what interest  
2 rate?

3 A. Yes, the Company records carrying costs on over/under recovery balances per the  
4 Commission's Order in Case No. U-15805. The carrying cost rate used for both over-  
5 and under-recovery balances is the Company's short-term borrowing rate. In 2013,  
6 carrying costs were recorded for the electric EO program in the amount of \$96,585  
7 (Exhibit A-1 (KLA-1), page 1, line 8). In 2013, carrying costs were recorded for the gas  
8 EO program in the amount of \$31,059 (Exhibit A-2 (KLA-2), page 1, line 8).

9 Q. Was an EO incentive recorded based on program costs in 2013?

10 A. Yes, a financial incentive was recorded equal to 15% of total spend in 2013. The  
11 calculation uses total program expenses by electric and gas, \$69,169,718 and  
12 \$47,787,238 (Exhibits A-1 (KLA-1) and A-2 (KLA-2), page 1, line 2), respectively, and  
13 multiplies that number by 15%. In the electric and gas EO programs, incentives were  
14 recorded equal to \$10,375,458 and \$7,168,086, respectively.

15 Q. Is the EO incentive revenue classified as normal revenue?

16 A. No, the EO incentive revenue falls under an alternative revenue program according to  
17 ASC 980-605-25 ("ASC 605").

18 Q. What are the normal revenue recognition criteria?

19 A. ASC 605, Revenue Recognition, states that revenue should be recognized when it is  
20 realized or realizable and earned. Generally, the following criteria need to be met:  
21 (i) pervasive evidence of arrangements exists; (ii) delivery has occurred or services  
22 rendered; (iii) the seller's price to the buyer is fixed or determinable; and  
23 (iv) collectability is reasonably assured.

KATHERINE L. ALLEN  
DIRECT TESTIMONY

1 Q. What is an alternative revenue program?

2 A. An alternative revenue program is specific GAAP for regulated utilities with alternative  
3 revenue.

4 Q. What is alternative revenue?

5 A. Alternative revenue is generally segregated into two programs. The first program adjusts  
6 billings for the effects of abnormal weather patterns, energy conservations efforts, or  
7 from broad external factors such as a general recession. Revenue recorded through  
8 decoupling falls under this program. The second program provides for additional billings  
9 if the utility achieves certain objectives, such as reducing costs, reaching specified  
10 milestones, or improving customer service. Revenue recorded through the EO incentive  
11 falls under this latter program.

12 Q. What are the alternative revenue recognition criteria?

13 A. ASC 605 states that revenue recognition is appropriate when all of the following criteria  
14 are met:

- 15 • Criteria A: The program is established by an order from the utility's regulatory  
16 commission that allows for automatic adjustment of future rates. Verification of the  
17 adjustment of future rates by the regulator does not preclude the adjustment from  
18 being considered automatic.
- 19 • Criteria B: The amount of additional revenues for the period is objectively  
20 determinable and recovery is probable.
- 21 • Criteria C: The additional revenues will be collected within the 24 months following  
22 the end of the annual period in which they are recognized.

23 Q. Does the EO incentive in this proceeding meet Criteria A?

24 A. Yes, Criteria A has been met. The Order in Case No. U-15800 issued by the Commission  
25 on December 4, 2008 authorizes Consumers Energy to receive a financial incentive for  
26 meeting the energy reduction goals identified in the Company's approved EO Plan.

KATHERINE L. ALLEN  
DIRECT TESTIMONY

1 Q. Does the EO incentive in this proceeding meet Criteria B?

2 A. Yes, the EO incentive recorded is objectively determinable.

3 Q. Does the EO incentive in this proceeding meet Criteria C?

4 A. Yes, but only if the collection of the EO incentive occurs within 24 months from the  
5 period the incentive was recognized.

6 Q. What is the Company's proposed collection period for the EO incentive revenue of  
7 \$17.5 million?

8 A. The EO incentive revenue was recognized on Consumers Energy's books in December  
9 2013. In order to comply with the 24-month collection requirement, Criteria C, the EO  
10 incentive of \$17.5 million needs to be fully collected by December 31, 2015.

11 Q. Why is it important to record the incentive revenue in the year it is associated with?

12 A. It is important to record the incentive revenue in the same period that the EO expenses  
13 are incurred to present a better picture of the true economics of the program. It also  
14 allows for consistent financial reporting as incentives will not be allocated over various  
15 financial reporting periods.

16 Q. What are the implications if the revenue is not fully collected by December 31, 2015?

17 A. If the EO incentive is not fully collected by December 31, 2015, GAAP would require a  
18 determination that the revenue was recorded out of period and should have been  
19 recognized when actually billed to the customer. The requirements of ASC 605 stipulate  
20 that the revenue must be collected within 24 months and allow no flexibility. This would  
21 then require a reversal of the EO incentive revenue that was already recognized by the  
22 Company in 2013.



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1 Q. Have previous EO incentives been collected within the 24-month required time period,  
2 Criteria C?

3 A. The 2009 EO incentive exceeded the required collection period mandated by ASC 605.  
4 The Company's external auditors concluded in their 2011 audit that we did not account  
5 for the 2009 EO incentive in the proper period as we did not collect the 2009 EO  
6 incentive within the 24-month time frame. The 2010 EO incentive also exceeded the  
7 required collection period mandated by ASC 605. The amount not collected within the  
8 24-month period was adjusted in December 2012. The total adjustment recorded  
9 amounted to \$4.2 million. The 2011 EO incentive was collected within the period  
10 required by ASC 605. The 2012 EO incentive is projected to be collected within the  
11 24-month required collection period, as the Commission authorized collection in Case  
12 No. U-17281 to occur by December 2014.

13 Q. What do you mean by proper period?

14 A. Proper period means that the revenue was reported in Consumers Energy's financial  
15 statements in the incorrect accounting period. Specifically, with respect to the 2009 EO  
16 incentive, the Company should have recognized 7 months of incentive revenue in 2009  
17 and 5 months of incentive revenue in 2012. This demonstrates the issue faced by the  
18 Company, basically a time discrepancy between when the incentive is earned, when it is  
19 collected and when it can be recognized.

20 Q. Did you record any adjustments related to the revenue that was recorded in the incorrect  
21 period related to the 2009 and 2010 incentive?

22 A. Yes, a \$4.2 million adjustment was recorded in 2012 reducing revenue for the portion of  
23 the 2010 EO incentive which was not collected by the end of 2012. For the

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2009 incentive, the potential revenue adjustment totaled \$2 million. An adjustment was not recorded due to the amount being determined immaterial in nature. However, the EO incentives going forward will not be immaterial, thus having a larger impact on the financial statements, which could force the Company to restate the financial statements for those periods if the incentives are not collected within the required 24-month time periods.

Q. What are the financial implications if the revenue is reported out of period?

A. The EO incentive recorded in prior financial periods would need to be removed in the accounting period in which an order is received. In future periods, customers would be billed for the EO incentive and revenue would be recognized, thus shifting revenue between financial years. This occurred with the 2010 EO incentive resulting in \$4.2 million of revenue being reduced in 2012 with corresponding revenue being recognized in 2013 when the customers are billed. This is why it is necessary for the Commission to allow the Company to fully recover the EO incentive in this case by no later than December 31, 2015.

Q. Did you have an over/under collection of any previous incentives that should be reconciled as a part of this case?

A. Yes, as shown in Exhibit A-3 (KLA-3) the 2010 EO incentive recorded totaled \$8,483,795, consisting of \$5,076,731 for electric and \$3,407,064 for gas. The amount collected for the 2010 EO incentive totaled \$8,829,181, consisting of \$5,318,459 for electric and \$3,510,722 for gas. The total over-recovery for the 2010 EO incentive totaled \$345,386, consisting of an over-recovery of \$241,728 for electric and \$103,658 for gas. Also, as shown in Exhibit A-4 (KLA-4) the 2011 EO incentive recorded totaled

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1 \$14,593,977, consisting of \$7,281,670 for electric and \$7,312,307 for gas. The amount  
2 collected for the 2011 EO incentive totaled \$15,202,081, consisting of \$7,556,529 for  
3 electric and \$7,645,552 for gas. The total over-recovery for the 2011 EO incentive  
4 totaled \$608,104, consisting of an over-recovery of \$274,859 for electric and \$333,245  
5 for gas.

6 Q. How do you propose to handle the over-recovered balance for the 2010 and 2011 EO  
7 incentives?

8 A. We propose to offset the over-recovered balance of \$953,490 for the 2010 and 2011 EO  
9 incentives with the collection of the 2013 EO incentive by December 31, 2015, as  
10 discussed by Company witness Laura M. Collins in her testimony.

11 Q. Does this conclude your testimony?

12 A. Yes.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_ )

Case No. U-17601

**EXHIBITS**

**OF**

**KATHERINE L. ALLEN**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

# Consumers Energy

## EO Electric Cumulative Over (Under) Recovery (By Class and Total)

| <u>Line</u>                          | (a)<br><u>Description</u>               | (b)<br><u>Residential</u> | (c)<br><u>C&amp;I</u> | (d)<br><u>Total</u> |
|--------------------------------------|---|---------------------------|-----------------------|---------------------|
| <u>Annual Summary</u>                |   |                           |                       |                     |
| 1                                    | Surcharge Revenue                       | \$ 27,763,991             | \$ 38,328,192         | \$ 66,092,183       |
| 2                                    | Program Expenses                        | \$ 30,306,431             | \$ 38,863,287         | \$ 69,169,718       |
| 3                                    | Change in Over (Under) Recovery         | \$ (2,542,440)            | \$ (535,095)          | \$ (3,077,535)      |
| <u>Program Over/(Under) Recovery</u> |   |                           |                       |                     |
| 4                                    | Over (Under) Recovery Beginning Balance | \$ 9,771,706              | \$ 18,593,091         | \$ 28,364,797       |
| 5                                    | Prior Year Carrying Charges             | 70,423                    | 144,663               | 215,086             |
| 6                                    | Change in Balance                       | (2,542,440)               | (535,095)             | (3,077,535)         |
| 7                                    | Over (Under) Recovery Ending Balance    | \$ 7,299,689              | \$ 18,202,659         | \$ 25,502,348       |
| <u>Carrying Charges</u>              |   |                           |                       |                     |
| 8                                    | Carrying Charges, Cumulative            | \$ 30,649                 | \$ 65,936             | \$ 96,585           |
| 9                                    | Cumulative Over (Under) Recovery        | \$ 7,330,338              | \$ 18,268,595         | \$ 25,598,933       |
| 10                                   | Annual Interest Rate                    | 0.31%                     | 0.31%                 | 0.31%               |

Consumers Energy

EO Electric Cumulative Over (Under) Recovery (Residential by Month)

| Line                    | (a)<br>Description                | (b)<br>Jan    | (c)<br>Feb    | (d)<br>Mar    | (e)<br>Apr    | (f)<br>May    | (g)<br>Jun    | (h)<br>Jul    | (i)<br>Aug    | (j)<br>Sep   | (k)<br>Oct     | (l)<br>Nov     | (m)<br>Dec   | (n)<br>Total   | (o)<br>Source                  |
|-------------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|----------------|----------------|--------------|----------------|--------------------------------|
| <b>Residential</b>      |                                   |               |               |               |               |               |               |               |               |              |                |                |              |                |                                |
| 1                       | Surcharge Revenue                 | \$ 2,744,426  | \$ 2,442,849  | \$ 2,311,776  | \$ 2,262,527  | \$ 1,981,698  | \$ 2,057,296  | \$ 2,676,474  | \$ 2,411,647  | \$ 2,427,003 | \$ 1,918,309   | \$ 2,043,429   | \$ 2,486,557 | \$ 27,763,991  | Per Books                      |
| 2                       | Program Expenses                  | \$ 2,085,122  | \$ 2,092,667  | \$ 2,196,335  | \$ 2,109,844  | \$ 2,866,461  | \$ 2,783,516  | \$ 2,031,202  | \$ 2,739,744  | \$ 2,585,941 | \$ 3,191,520   | \$ 3,143,154   | \$ 2,400,925 | \$ 30,306,431  | Per Books                      |
| 3                       | Change in Over (Under) Recovery   | \$ 659,304    | \$ 350,182    | \$ 115,441    | \$ 152,683    | \$ (984,763)  | \$ (728,220)  | \$ 645,272    | \$ (328,097)  | \$ (138,938) | \$ (1,273,211) | \$ (1,099,725) | \$ 85,632    | \$ (2,542,440) | Line 1 - Line 2                |
| 4                       | Program Over/(Under) Recovery     | \$ 9,771,706  | \$ 10,501,433 | \$ 10,851,615 | \$ 10,967,056 | \$ 11,119,739 | \$ 10,134,976 | \$ 9,408,756  | \$ 10,054,028 | \$ 9,725,931 | \$ 9,586,993   | \$ 8,313,782   | \$ 7,214,057 |                | Line 7 Prior Month/Year        |
| 5                       | Over (Under) Recovery Beg.Bal.    | 70,423        |               | 115,441       | 152,683       | (984,763)     | (728,220)     | 645,272       | (328,097)     | (138,938)    | (1,273,211)    | (1,099,725)    | 85,632       |                | Prior Year Ending              |
| 6                       | Prior Year Carrying Charges       | 659,304       | 350,182       |               |               |               |               |               |               |              |                |                |              |                | Line 3                         |
| 7                       | Change in Balance                 | \$ 10,501,433 | \$ 10,851,615 | \$ 10,967,056 | \$ 11,119,739 | \$ 10,134,976 | \$ 9,408,756  | \$ 10,054,028 | \$ 9,725,931  | \$ 9,586,993 | \$ 8,313,782   | \$ 7,214,057   | \$ 7,298,689 |                | Line 4 + Line 5 + Line 6       |
| 8                       | Over (Under) Recovery Ending Bal. | \$ 10,171,781 | \$ 10,676,524 | \$ 10,909,336 | \$ 11,043,398 | \$ 10,627,358 | \$ 9,771,866  | \$ 9,731,392  | \$ 9,889,980  | \$ 9,656,462 | \$ 8,950,388   | \$ 7,763,920   | \$ 7,256,873 |                | Line 4 + Line 5 + (Line 6 / 2) |
| <b>Carrying Charges</b> |                                   |               |               |               |               |               |               |               |               |              |                |                |              |                |                                |
| 9                       | Carrying Charges, Monthly         | \$ 4,800      | \$ 2,714      | \$ 2,739      | \$ 2,793      | \$ 2,652      | \$ 2,416      | \$ 2,378      | \$ 2,399      | \$ 2,286     | \$ 2,093       | \$ 1,762       | \$ 1,617     |                | Line 8 x Line 13               |
| 10                      | Carrying Charges, Cumulative      | \$ 4,800      | \$ 7,514      | \$ 10,253     | \$ 13,046     | \$ 15,698     | \$ 18,114     | \$ 20,492     | \$ 22,891     | \$ 25,177    | \$ 27,270      | \$ 29,032      | \$ 30,649    | \$ 30,649      | Cumulative Line 9              |
| 11                      | Cumulative Over (Under) Recovery  | \$ 10,506,233 | \$ 10,859,129 | \$ 10,977,309 | \$ 11,132,785 | \$ 10,150,674 | \$ 9,426,870  | \$ 10,074,520 | \$ 9,748,822  | \$ 9,612,170 | \$ 8,341,052   | \$ 7,243,089   | \$ 7,330,338 |                | Line 7 + Line 10               |
| 12                      | Annual Interest Rate              | 0.57%         | 0.31%         | 0.30%         | 0.30%         | 0.30%         | 0.30%         | 0.29%         | 0.29%         | 0.28%        | 0.28%          | 0.27%          | 0.27%        |                | Treasury                       |
| 13                      | Monthly Interest Rate             | 0.0475%       | 0.0258%       | 0.0250%       | 0.0250%       | 0.0250%       | 0.0250%       | 0.0242%       | 0.0242%       | 0.0239%      | 0.0233%        | 0.0225%        | 0.0225%      | 0.31%          | Line 12 / 12                   |

Consumers Energy

EO Electric Cumulative Over (Under) Recovery (C&I by Month)

| Line | Description                       | (a)           | (b)           | (c)           | (d)           | (e)           | (f)           | (g)           | (h)           | (i)           | (j)           | (k)            | (l)            | (m)           | (n)    | (o)                            |
|------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|---------------|--------|--------------------------------|
|      |                                   | Jan           | Feb           | Mar           | Apr           | May           | Jun           | Jul           | Aug           | Sep           | Oct           | Nov            | Dec            | Total         | Source |                                |
| 1    | Surcharge Revenue                 | \$ 3,255,889  | \$ 3,255,229  | \$ 3,222,491  | \$ 3,220,536  | \$ 3,223,241  | \$ 3,195,184  | \$ 3,195,776  | \$ 3,155,476  | \$ 3,142,217  | \$ 3,186,990  | \$ 3,133,689   | \$ 3,141,474   | \$ 38,328,192 |        | Per Books                      |
| 2    | Program Expenses                  | \$ 2,379,111  | \$ 2,520,121  | \$ 2,671,819  | \$ 2,504,867  | \$ 3,226,290  | \$ 2,867,332  | \$ 2,929,246  | \$ 2,776,420  | \$ 3,358,167  | \$ 3,353,323  | \$ 5,031,157   | \$ 5,245,434   | \$ 38,863,287 |        | Per Books                      |
| 3    | Change in Over (Under) Recovery   | \$ 876,778    | \$ 735,108    | \$ 550,672    | \$ 715,669    | \$ (3,049)    | \$ 327,852    | \$ 266,530    | \$ 379,056    | \$ (215,950)  | \$ (166,333)  | \$ (1,897,468) | \$ (2,103,960) | \$ (535,095)  |        | Line 1 - Line 2                |
| 4    | Program Over/(Under) Recovery     | \$ 18,593,091 | \$ 19,614,532 | \$ 20,349,640 | \$ 20,900,312 | \$ 21,615,981 | \$ 21,612,932 | \$ 21,940,784 | \$ 22,207,314 | \$ 22,586,370 | \$ 22,370,420 | \$ 22,204,087  | \$ 20,306,619  |               |        | Line 7 Prior Month/Year        |
| 5    | Over (Under) Recovery Beg Bal.    | 144,663       | -             | -             | -             | -             | -             | -             | -             | -             | -             | -              | -              |               |        | Prior Year Ending Line 3       |
| 6    | Prior Year Carrying Charges       | 876,778       | 735,108       | 550,672       | 715,669       | (3,049)       | 327,852       | 266,530       | 379,056       | (215,950)     | (166,333)     | (1,897,468)    | (2,103,960)    |               |        | Line 3                         |
| 7    | Change in Balance                 | \$ 19,614,532 | \$ 20,349,640 | \$ 20,900,312 | \$ 21,615,981 | \$ 21,612,932 | \$ 21,940,784 | \$ 22,207,314 | \$ 22,586,370 | \$ 22,370,420 | \$ 22,204,087 | \$ 20,306,619  | \$ 18,202,659  |               |        | Line 4 + Line 5 + Line 6       |
| 8    | Over (Under) Recovery Ending Bal. | \$ 19,176,143 | \$ 19,982,086 | \$ 20,624,976 | \$ 21,258,147 | \$ 21,614,457 | \$ 21,776,858 | \$ 22,074,049 | \$ 22,396,842 | \$ 22,478,395 | \$ 22,287,254 | \$ 21,255,353  | \$ 19,254,639  |               |        | Line 4 + Line 5 + (Line 6 / 2) |
| 9    | Carrying Charges                  | \$ 9,049      | \$ 5,079      | \$ 5,179      | \$ 5,377      | \$ 5,395      | \$ 5,384      | \$ 5,393      | \$ 5,433      | \$ 5,322      | \$ 5,211      | \$ 4,825       | \$ 4,289       |               |        | Line 8 x Line 13               |
| 10   | Carrying Charges, Monthly         | \$ 9,049      | \$ 14,128     | \$ 19,307     | \$ 24,684     | \$ 30,079     | \$ 35,463     | \$ 40,856     | \$ 46,289     | \$ 51,611     | \$ 56,822     | \$ 61,647      | \$ 65,936      | \$ 65,936     |        | Cumulative Line 9              |
| 11   | Carrying Charges, Cumulative      | \$ 19,623,581 | \$ 20,363,768 | \$ 20,919,619 | \$ 21,640,665 | \$ 21,643,011 | \$ 21,976,247 | \$ 22,248,170 | \$ 22,632,659 | \$ 22,422,031 | \$ 22,260,909 | \$ 20,368,266  | \$ 18,268,595  |               |        | Line 7 + Line 10               |
| 12   | Annual Interest Rate              | 0.57%         | 0.31%         | 0.30%         | 0.30%         | 0.30%         | 0.30%         | 0.29%         | 0.29%         | 0.28%         | 0.28%         | 0.27%          | 0.27%          |               |        | Treasury                       |
| 13   | Monthly Interest Rate             | 0.0475%       | 0.0258%       | 0.0250%       | 0.0250%       | 0.0250%       | 0.0250%       | 0.0242%       | 0.0242%       | 0.0233%       | 0.0233%       | 0.0225%        | 0.0225%        |               | 0.31%  | Line 12 / 12                   |

# Consumers Energy

## EO Electric Cumulative Over (Under) Recovery (Total by Month)

| Line                                 | (a)<br>Description                 | (b)<br>Jan    | (c)<br>Feb    | (d)<br>Mar    | (e)<br>Apr    | (f)<br>May    | (g)<br>Jun    | (h)<br>Jul    | (i)<br>Aug    | (j)<br>Sep    | (k)<br>Oct     | (l)<br>Nov     | (m)<br>Dec     | (n)<br>Total   |
|--------------------------------------|------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|
| <b>Grand Total</b>                   |                                    |               |               |               |               |               |               |               |               |               |                |                |                |                |
| 1                                    | Surcharge Revenue                  | \$ 6,000,315  | \$ 5,698,078  | \$ 5,534,267  | \$ 5,483,063  | \$ 5,204,939  | \$ 5,252,480  | \$ 5,872,250  | \$ 5,567,123  | \$ 5,569,220  | \$ 5,105,299   | \$ 5,177,118   | \$ 5,628,031   | \$ 66,092,183  |
| 2                                    | Program Expenses                   | \$ 4,464,233  | \$ 4,612,788  | \$ 4,888,154  | \$ 4,614,711  | \$ 6,192,751  | \$ 5,650,848  | \$ 4,960,448  | \$ 5,516,164  | \$ 5,924,108  | \$ 6,544,843   | \$ 8,174,311   | \$ 7,646,359   | \$ 69,169,718  |
| 3                                    | Change in Over (Under) Recovery    | \$ 1,536,082  | \$ 1,085,290  | \$ 666,113    | \$ 868,352    | \$ (987,812)  | \$ (398,368)  | \$ 911,802    | \$ 50,959     | \$ (354,888)  | \$ (1,435,544) | \$ (2,997,193) | \$ (2,018,328) | \$ (3,077,535) |
| <b>Program Over/(Under) Recovery</b> |                                    |               |               |               |               |               |               |               |               |               |                |                |                |                |
| 4                                    | Over (Under) Recovery Beg Bal.     | \$ 28,364,797 | \$ 30,115,965 | \$ 31,201,255 | \$ 31,867,368 | \$ 32,735,720 | \$ 31,747,908 | \$ 31,349,540 | \$ 32,261,342 | \$ 32,312,301 | \$ 31,957,413  | \$ 30,517,869  | \$ 27,520,676  |                |
| 5                                    | Prior Year Carrying Charges        | 215,086       | -             | -             | -             | (987,812)     | (398,368)     | -             | 50,959        | (354,888)     | (1,435,544)    | (2,997,193)    | (2,018,328)    |                |
| 6                                    | Change in Balance                  | \$ 1,536,082  | \$ 1,085,290  | \$ 666,113    | \$ 868,352    | \$ (987,812)  | \$ (398,368)  | \$ 911,802    | \$ 50,959     | \$ (354,888)  | \$ (1,435,544) | \$ (2,997,193) | \$ (2,018,328) |                |
| 7                                    | Over (Under) Recovery Ending Bal.  | \$ 30,115,965 | \$ 31,201,255 | \$ 31,867,368 | \$ 32,735,720 | \$ 31,747,908 | \$ 31,349,540 | \$ 32,261,342 | \$ 32,312,301 | \$ 31,957,413 | \$ 30,517,869  | \$ 27,520,676  | \$ 25,502,348  |                |
| 8                                    | Over (Under) Recovery Average Bal. | \$ 29,347,924 | \$ 30,658,610 | \$ 31,534,312 | \$ 32,301,544 | \$ 32,241,814 | \$ 31,548,724 | \$ 31,805,441 | \$ 32,286,822 | \$ 32,134,857 | \$ 31,237,641  | \$ 29,019,273  | \$ 26,511,512  |                |
| <b>Carrying Charges</b>              |                                    |               |               |               |               |               |               |               |               |               |                |                |                |                |
| 9                                    | Carrying Charges, Monthly          | \$ 13,849     | \$ 7,793      | \$ 7,918      | \$ 8,170      | \$ 8,047      | \$ 7,800      | \$ 7,771      | \$ 7,832      | \$ 7,608      | \$ 7,304       | \$ 6,587       | \$ 5,906       |                |
| 10                                   | Carrying Charges, Cumulative       | \$ 13,849     | \$ 21,642     | \$ 29,560     | \$ 37,730     | \$ 45,777     | \$ 53,577     | \$ 61,348     | \$ 69,180     | \$ 76,788     | \$ 84,092      | \$ 90,679      | \$ 96,585      |                |
| 11                                   | Cumulative Over (Under) Recovery   | \$ 30,129,814 | \$ 31,222,897 | \$ 31,896,928 | \$ 32,773,450 | \$ 31,793,685 | \$ 31,403,117 | \$ 32,322,690 | \$ 32,381,481 | \$ 32,034,201 | \$ 30,601,961  | \$ 27,611,355  | \$ 25,598,933  |                |
| 12                                   | Annual Interest Rate               | 0.57%         | 0.31%         | 0.30%         | 0.30%         | 0.30%         | 0.30%         | 0.29%         | 0.29%         | 0.28%         | 0.28%          | 0.27%          | 0.27%          | 0.31%          |
| 13                                   | Monthly Interest Rate              | 0.0475%       | 0.0258%       | 0.0250%       | 0.0250%       | 0.0250%       | 0.0250%       | 0.0242%       | 0.0242%       | 0.0233%       | 0.0233%        | 0.0225%        | 0.0225%        |                |



# Consumers Energy

## EO Gas Cumulative Over (Under) Recovery (By Class and Total)

| <u>Line</u>                          | (a)<br><u>Description</u>               | (b)<br><u>Residential</u> | (c)<br><u>C&amp;I</u> | (d)<br><u>Total</u> |
|--------------------------------------|---|---------------------------|-----------------------|---------------------|
| <u>Annual Summary</u>                |   |                           |                       |                     |
| 1                                    | Surcharge Revenue                       | \$ 34,563,229             | \$ 13,396,367         | \$ 47,959,596       |
| 2                                    | Program Expenses                        | \$ 35,550,775             | \$ 12,236,463         | \$ 47,787,238       |
| 3                                    | Change in Over (Under) Recovery         | \$ (987,546)              | \$ 1,159,904          | \$ 172,358          |
| <u>Program Over/(Under) Recovery</u> |   |                           |                       |                     |
| 4                                    | Over (Under) Recovery Beginning Balance | \$ (6,232,676)            | \$ 11,718,604         | \$ 5,485,928        |
| 5                                    | Prior Year Carrying Charges             | 2,322                     | 86,786                | 89,108              |
| 6                                    | Change in Balance                       | (987,546)                 | 1,159,904             | 172,358             |
| 7                                    | Over (Under) Recovery Ending Balance    | \$ (7,217,900)            | \$ 12,965,294         | \$ 5,747,394        |
| <u>Carrying Charges</u>              |   |                           |                       |                     |
| 8                                    | Carrying Charges, Cumulative            | \$ (11,113)               | \$ 42,172             | \$ 31,059           |
| 9                                    | Cumulative Over (Under) Recovery        | \$ (7,229,013)            | \$ 13,007,466         | \$ 5,778,453        |
| 10                                   | Annual Interest Rate                    | 0.31%                     | 0.31%                 | 0.31%               |

Consumers Energy

EO Gas Cumulative Over (Under) Recovery (Residential by Month)

| Line                          | Description                        | (a)            | (b)            | (c)            | (d)          | (e)          | (f)            | (g)            | (h)            | (i)            | (j)            | (k)            | (l)            | (m)           | (n)                            | (o) |
|-------------------------------|------------------------------------|----------------|----------------|----------------|--------------|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|--------------------------------|-----|
|                               |                                    | Jan            | Feb            | Mar            | Apr          | May          | Jun            | Jul            | Aug            | Sep            | Oct            | Nov            | Dec            | Total         | Source                         |     |
| Residential                   |                                    |                |                |                |              |              |                |                |                |                |                |                |                |               |                                |     |
| 1                             | Surcharge Revenue                  | \$ 5,572,458   | \$ 5,759,607   | \$ 5,291,227   | \$ 4,322,486 | \$ 2,116,376 | \$ 1,046,915   | \$ 662,184     | \$ 607,109     | \$ 654,021     | \$ 916,767     | \$ 2,571,399   | \$ 5,042,680   | \$ 34,563,229 | Per Books                      |     |
| 2                             | Program Expenses                   | \$ 4,021,290   | \$ 3,022,264   | \$ 3,042,002   | \$ 2,503,215 | \$ 2,504,824 | \$ 2,789,267   | \$ 3,082,111   | \$ 2,891,071   | \$ 2,890,481   | \$ 3,354,898   | \$ 2,876,109   | \$ 2,573,243   | \$ 35,550,775 | Per Books                      |     |
| 3                             | Change in Over (Under) Recovery    | \$ 1,551,168   | \$ 2,737,343   | \$ 2,249,225   | \$ 1,819,271 | \$ (388,448) | \$ (1,742,352) | \$ (2,419,927) | \$ (2,283,962) | \$ (2,236,460) | \$ (2,438,131) | \$ (304,710)   | \$ 2,469,437   | \$ (987,546)  | Line 1 - Line 2                |     |
| Program Over/(Under) Recovery |                                    |                |                |                |              |              |                |                |                |                |                |                |                |               |                                |     |
| 4                             | Over (Under) Recovery Beg Bal.     | \$ (6,232,676) | \$ (4,679,186) | \$ (1,941,843) | \$ 307,382   | \$ 2,126,653 | \$ 1,738,205   | \$ (4,147)     | \$ (2,424,074) | \$ (4,708,036) | \$ (6,944,496) | \$ (9,382,627) | \$ (9,687,337) |               | Line 7 Prior Month/Year        |     |
| 5                             | Prior Year Carrying Charges        | 2,322          |                |                |              |              |                |                |                |                |                |                |                |               | Prior Year Ending              |     |
| 6                             | Change in Balance                  | \$ 1,551,168   | \$ 2,737,343   | \$ 2,249,225   | \$ 1,819,271 | \$ (388,448) | \$ (1,742,352) | \$ (2,419,927) | \$ (2,283,962) | \$ (2,236,460) | \$ (2,438,131) | \$ (304,710)   | \$ 2,469,437   |               | Line 3                         |     |
| 7                             | Over (Under) Recovery Ending Bal.  | \$ (4,679,186) | \$ (1,941,843) | \$ 307,382     | \$ 2,126,653 | \$ 1,738,205 | \$ (4,147)     | \$ (2,424,074) | \$ (4,708,036) | \$ (6,944,496) | \$ (9,382,627) | \$ (9,687,337) | \$ (7,217,900) |               | Line 4 + Line 5 + Line 6       |     |
| 8                             | Over (Under) Recovery Average Bal. | \$ (5,454,770) | \$ (3,310,515) | \$ (817,231)   | \$ 1,217,018 | \$ 1,932,429 | \$ 867,029     | \$ (1,214,111) | \$ (3,566,055) | \$ (5,826,266) | \$ (8,163,562) | \$ (9,534,982) | \$ (8,452,619) |               | Line 4 + Line 5 + (Line 6 / 2) |     |
| Carrying Charges              |                                    |                |                |                |              |              |                |                |                |                |                |                |                |               |                                |     |
| 9                             | Carrying Charges, Monthly          | \$ (2,574)     | \$ (841)       | \$ (205)       | \$ 308       | \$ 482       | \$ 214         | \$ (297)       | \$ (865)       | \$ (1,379)     | \$ (1,909)     | \$ (2,164)     | \$ (1,883)     |               | Line 8 x Line 13               |     |
| 10                            | Carrying Charges, Cumulative       | \$ (2,574)     | \$ (3,415)     | \$ (3,620)     | \$ (3,312)   | \$ (2,830)   | \$ (2,616)     | \$ (2,913)     | \$ (3,778)     | \$ (5,157)     | \$ (7,066)     | \$ (9,230)     | \$ (11,113)    |               | Cumulative Line 9              |     |
| 11                            | Cumulative Over (Under) Recovery   | \$ (4,681,760) | \$ (1,945,258) | \$ 303,762     | \$ 2,123,341 | \$ 1,735,375 | \$ (6,763)     | \$ (2,426,987) | \$ (4,711,814) | \$ (6,949,653) | \$ (9,389,693) | \$ (9,696,567) | \$ (7,229,013) |               | Line 7 + Line 10               |     |
| 12                            | Annual Interest Rate               | 0.57%          | 0.31%          | 0.30%          | 0.30%        | 0.30%        | 0.30%          | 0.29%          | 0.29%          | 0.28%          | 0.28%          | 0.27%          | 0.27%          |               | Treasury                       |     |
| 13                            | Monthly Interest Rate              | 0.0475%        | 0.0258%        | 0.0250%        | 0.0250%      | 0.0250%      | 0.0250%        | 0.0242%        | 0.0242%        | 0.0233%        | 0.0233%        | 0.0225%        | 0.0225%        | 0.31%         | Line 12/12                     |     |

## Consumers Energy

## EO Gas Cumulative Over (Under) Recovery (C&amp;I by Month)

| Line                    | (a)<br>Description                | (b)<br>Jan    | (c)<br>Feb    | (d)<br>Mar    | (e)<br>Apr    | (f)<br>May    | (g)<br>Jun    | (h)<br>Jul    | (i)<br>Aug    | (j)<br>Sep    | (k)<br>Oct    | (l)<br>Nov    | (m)<br>Dec    | (n)<br>Total  | (o)<br>Source                  |
|-------------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------------------------|
| <b>C&amp;I</b>          |                                   |               |               |               |               |               |               |               |               |               |               |               |               |               |                                |
| 1                       | Surcharge Revenue                 | \$ 1,856,131  | \$ 2,120,652  | \$ 1,945,936  | \$ 1,649,456  | \$ 950,319    | \$ 482,696    | \$ 360,846    | \$ 370,031    | \$ 393,844    | \$ 468,401    | \$ 1,007,592  | \$ 1,790,463  | \$ 13,396,367 | Per Books                      |
| 2                       | Program Expenses                  | \$ 2,002,697  | \$ 977,545    | \$ 1,041,659  | \$ 628,424    | \$ 767,478    | \$ 598,587    | \$ 700,974    | \$ 601,595    | \$ 888,563    | \$ 1,223,357  | \$ 1,371,474  | \$ 1,434,110  | \$ 12,236,463 | Per Books                      |
| 3                       | Change in Over (Under) Recovery   | \$ (146,566)  | \$ 1,143,107  | \$ 904,277    | \$ 1,021,032  | \$ 182,841    | \$ (115,891)  | \$ (340,128)  | \$ (231,564)  | \$ (494,719)  | \$ (754,956)  | \$ (363,882)  | \$ 356,353    | \$ 1,159,904  | Line 1 - Line 2                |
| 4                       | Program Over/(Under) Recovery     | \$ 11,718,604 | \$ 11,658,824 | \$ 12,801,931 | \$ 13,706,208 | \$ 14,727,240 | \$ 14,910,081 | \$ 14,794,190 | \$ 14,454,062 | \$ 14,222,488 | \$ 13,727,779 | \$ 12,972,823 | \$ 12,608,941 |               | Line 7 Prior Month/Year        |
| 5                       | Over (Under) Recovery Beg.Bal.    | \$ 96,786     |               |               |               |               |               |               |               |               |               |               |               |               | Prior Year Ending              |
| 6                       | Prior Year Carrying Charges       | (146,566)     | 1,143,107     | 904,277       | 1,021,032     | 182,841       | (115,891)     | (340,128)     | (231,564)     | (494,719)     | (754,956)     | (363,882)     | 356,353       |               | Line 3                         |
| 7                       | Change in Balance                 | \$ 11,658,824 | \$ 12,801,931 | \$ 13,706,208 | \$ 14,727,240 | \$ 14,910,081 | \$ 14,794,190 | \$ 14,454,062 | \$ 14,222,488 | \$ 13,727,779 | \$ 12,972,823 | \$ 12,608,941 | \$ 12,965,294 |               | Line 4 + Line 5 + Line 6       |
| 8                       | Over (Under) Recovery Ending Bal. | \$ 11,732,107 | \$ 12,230,378 | \$ 13,254,070 | \$ 14,216,724 | \$ 14,818,661 | \$ 14,852,136 | \$ 14,624,126 | \$ 14,338,280 | \$ 13,975,139 | \$ 13,350,301 | \$ 12,790,882 | \$ 12,787,118 |               | Line 4 + Line 5 + (Line 6 / 2) |
| <b>Carrying Charges</b> |                                   |               |               |               |               |               |               |               |               |               |               |               |               |               |                                |
| 9                       | Carrying Charges, Monthly         | \$ 5,536      | \$ 3,109      | \$ 3,328      | \$ 3,596      | \$ 3,698      | \$ 3,672      | \$ 3,573      | \$ 3,478      | \$ 3,309      | \$ 3,122      | \$ 2,903      | \$ 2,848      |               | Line 8 x Line 13               |
| 10                      | Carrying Charges, Cumulative      | \$ 5,536      | \$ 8,645      | \$ 11,973     | \$ 15,569     | \$ 19,267     | \$ 22,939     | \$ 26,512     | \$ 29,990     | \$ 33,299     | \$ 36,421     | \$ 39,324     | \$ 42,172     | \$ 42,172     | Cumulative Line 9              |
| 11                      | Cumulative Over (Under) Recovery  | \$ 11,664,360 | \$ 12,810,576 | \$ 13,718,181 | \$ 14,742,809 | \$ 14,929,348 | \$ 14,817,129 | \$ 14,480,574 | \$ 14,252,488 | \$ 13,761,078 | \$ 13,009,244 | \$ 12,648,265 | \$ 13,007,466 |               | Line 7 + Line 10               |
| 12                      | Annual Interest Rate              | 0.57%         | 0.31%         | 0.30%         | 0.30%         | 0.30%         | 0.30%         | 0.29%         | 0.29%         | 0.28%         | 0.28%         | 0.27%         | 0.27%         | 0.31%         | Treasury                       |
| 13                      | Monthly Interest Rate             | 0.0475%       | 0.0258%       | 0.0250%       | 0.0250%       | 0.0250%       | 0.0250%       | 0.0242%       | 0.0242%       | 0.0233%       | 0.0233%       | 0.0225%       | 0.0225%       |               | Line 12 / 12                   |

# Consumers Energy

## EO Gas Cumulative Over (Under) Recovery (Total by Month)

| Line                                 | (a)<br>Description                 | (b)<br>Jan   | (c)<br>Feb    | (d)<br>Mar    | (e)<br>Apr    | (f)<br>May    | (g)<br>Jun     | (h)<br>Jul     | (i)<br>Aug     | (j)<br>Sep     | (k)<br>Oct     | (l)<br>Nov   | (m)<br>Dec   | (n)<br>Total  |
|--------------------------------------|------------------------------------|--------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|--------------|--------------|---------------|
| <b>Grand Total</b>                   |                                    |              |               |               |               |               |                |                |                |                |                |              |              |               |
| 1                                    | Surcharge Revenue                  | \$ 7,428,589 | \$ 7,880,259  | \$ 7,237,163  | \$ 5,971,942  | \$ 3,066,695  | \$ 1,529,611   | \$ 1,023,030   | \$ 977,140     | \$ 1,047,865   | \$ 1,385,168   | \$ 3,578,991 | \$ 6,833,143 | \$ 47,959,596 |
| 2                                    | Program Expenses                   | \$ 6,023,987 | \$ 3,999,809  | \$ 4,083,661  | \$ 3,131,639  | \$ 3,272,302  | \$ 3,387,854   | \$ 3,783,085   | \$ 3,492,666   | \$ 3,779,044   | \$ 4,578,255   | \$ 4,247,583 | \$ 4,007,353 | \$ 47,787,238 |
| 3                                    | Change in Over (Under) Recovery    | \$ 1,404,602 | \$ 3,880,450  | \$ 3,153,502  | \$ 2,840,303  | \$ (205,607)  | \$ (1,858,243) | \$ (2,760,055) | \$ (2,515,526) | \$ (2,731,179) | \$ (3,193,087) | \$ (668,592) | \$ 2,825,790 | \$ 172,358    |
| <b>Program Over/(Under) Recovery</b> |                                    |              |               |               |               |               |                |                |                |                |                |              |              |               |
| 4                                    | Over (Under) Recovery Beg Bal.     | \$ 5,485,928 | \$ 6,979,638  | \$ 10,860,088 | \$ 14,013,590 | \$ 16,853,893 | \$ 16,648,286  | \$ 14,790,043  | \$ 12,029,988  | \$ 9,514,462   | \$ 6,783,283   | \$ 3,590,196 | \$ 2,921,604 |               |
| 5                                    | Prior Year Carrying Charges        | 89,108       | -             | -             | -             | -             | -              | -              | -              | -              | -              | -            | -            |               |
| 6                                    | Change in Balance                  | 1,404,602    | 3,880,450     | 3,153,502     | 2,840,303     | (205,607)     | (1,858,243)    | (2,760,055)    | (2,515,526)    | (2,731,179)    | (3,193,087)    | (668,592)    | 2,825,790    |               |
| 7                                    | Over (Under) Recovery Ending Bal.  | \$ 6,979,638 | \$ 10,860,088 | \$ 14,013,590 | \$ 16,853,893 | \$ 16,648,286 | \$ 14,790,043  | \$ 12,029,988  | \$ 9,514,462   | \$ 6,783,283   | \$ 3,590,196   | \$ 2,921,604 | \$ 5,747,394 |               |
| 8                                    | Over (Under) Recovery Average Bal. | \$ 6,277,337 | \$ 8,919,863  | \$ 12,436,839 | \$ 15,433,742 | \$ 16,751,090 | \$ 15,719,165  | \$ 13,410,016  | \$ 10,772,225  | \$ 8,148,873   | \$ 5,186,740   | \$ 3,255,900 | \$ 4,334,499 |               |
| <b>Carrying Charges</b>              |                                    |              |               |               |               |               |                |                |                |                |                |              |              |               |
| 9                                    | Carrying Charges, Monthly          | \$ 2,962     | \$ 2,268      | \$ 3,123      | \$ 3,904      | \$ 4,180      | \$ 3,886       | \$ 3,276       | \$ 2,613       | \$ 1,930       | \$ 1,213       | \$ 739       | \$ 965       |               |
| 10                                   | Carrying Charges, Cumulative       | \$ 2,962     | \$ 5,230      | \$ 8,353      | \$ 12,257     | \$ 16,437     | \$ 20,323      | \$ 23,599      | \$ 26,212      | \$ 28,142      | \$ 29,355      | \$ 30,094    | \$ 31,059    | \$ 31,059     |
| 11                                   | Cumulative Over (Under) Recovery   | \$ 6,982,600 | \$ 10,865,318 | \$ 14,021,943 | \$ 16,866,150 | \$ 16,664,723 | \$ 14,810,366  | \$ 12,053,587  | \$ 9,540,674   | \$ 6,811,425   | \$ 3,619,551   | \$ 2,951,698 | \$ 5,778,453 |               |
| 12                                   | Annual Interest Rate               | 0.57%        | 0.31%         | 0.30%         | 0.30%         | 0.30%         | 0.30%          | 0.29%          | 0.29%          | 0.28%          | 0.28%          | 0.27%        | 0.27%        | 0.31%         |
| 13                                   | Monthly Interest Rate              | 0.0475%      | 0.0258%       | 0.0250%       | 0.0250%       | 0.0250%       | 0.0250%        | 0.0242%        | 0.0242%        | 0.0233%        | 0.0233%        | 0.0225%      | 0.0225%      |               |

**Consumers Energy**

**2010 EO Incentive Cumulative (Over)/Under Recovery**

| Month                                      | Year | Current Month<br>Collection | Prior Month Cumulative<br>(Over)/Under Collection |
|--|------|-----------------------------|---|
| (a)  | (b)  | (c)                         | (d)   |
| 2010 EO Incentive Regulatory Asset Balance |      |                             | 8,483,795   |
| 1 June                                     | 2012 | (529,629)                   | 7,954,166   |
| 2 July                                     | 2012 | (563,578)                   | 7,390,588   |
| 3 August                                   | 2012 | (539,130)                   | 6,851,458   |
| 4 September                                | 2012 | (525,112)                   | 6,326,346   |
| 5 October                                  | 2012 | (544,569)                   | 5,781,777   |
| 6 November                                 | 2012 | (679,674)                   | 5,102,103   |
| 7 December                                 | 2012 | (859,336)                   | 4,242,767   |
| 8 January                                  | 2013 | (1,034,358)                 | 3,208,409   |
| 9 February                                 | 2013 | (1,059,774)                 | 2,148,635   |
| 10 March                                   | 2013 | (999,740)                   | 1,148,895   |
| 11 April                                   | 2013 | (901,158)                   | 247,737   |
| 12 May                                     | 2013 | (667,953)                   | -420,216  |
| 13 June                                    | 2013 | -                           | -420,216  |
| 14 July                                    | 2013 | -                           | -420,216  |
| 15 August                                  | 2013 | 35,374                      | -384,842  |
| 16 September                               | 2013 | 18,098                      | -366,744  |
| 17 October                                 | 2013 | 6,744                       | -360,000  |
| 18 November                                | 2013 | 6,091                       | -353,909  |
| 19 December                                | 2013 | 2,480                       | -351,429  |
| 20 January                                 | 2014 | 1,144                       | -350,285  |
| 21 February                                | 2014 | 2,186                       | -348,099  |
| 22 March                                   | 2014 | 2,713                       | -345,386  |
|  |      |                             |   |
|  |      |                             | (8,829,181)                                       |

Consumers Energy

2010 EO Electric Incentive Cumulative (Over)/Under Recovery

| Month                                      | Year | Current Month<br>Collection | Prior Month Cumulative<br>(Over)/Under Collection |
|--|------|-----------------------------|---|
| (a)  | (b)  | (c )                        | (d)   |
| 2010 EO Incentive Regulatory Asset Balance |      |                             | 5,076,731   |
| 1 June                                     | 2012 | (428,083)                   | 4,648,648   |
| 2 July                                     | 2012 | (484,738)                   | 4,163,910   |
| 3 August                                   | 2012 | (472,433)                   | 3,691,477   |
| 4 September                                | 2012 | (447,421)                   | 3,244,056   |
| 5 October                                  | 2012 | (417,998)                   | 2,826,058   |
| 6 November                                 | 2012 | (421,130)                   | 2,404,928   |
| 7 December                                 | 2012 | (444,101)                   | 1,960,827   |
| 8 January                                  | 2013 | (472,276)                   | 1,488,551   |
| 9 February                                 | 2013 | (454,143)                   | 1,034,408   |
| 10 March                                   | 2013 | (445,368)                   | 589,040   |
| 11 April                                   | 2013 | (442,509)                   | 146,531   |
| 12 May                                     | 2013 | (429,287)                   | (282,756)   |
| 13 June                                    | 2013 | -                           | (282,756)   |
| 14 July                                    | 2013 | -                           | (282,756)   |
| 15 August                                  | 2013 | 17,312                      | (265,444)   |
| 16 September                               | 2013 | 12,506                      | (252,938)   |
| 17 October                                 | 2013 | 2,961                       | (249,977)   |
| 18 November                                | 2013 | 1,958                       | (248,019)   |
| 19 December                                | 2013 | 1,809                       | (246,210)   |
| 20 January                                 | 2014 | 584                         | (245,626)   |
| 21 February                                | 2014 | 1,521                       | (244,105)   |
| 22 March                                   | 2014 | 2,377                       | (241,728)   |
|  |      | (5,318,459)                 |   |

|  |      | Current Month | Prior Month Cumulative  |
|--|------|---------------|-------------------------|
| Month                                      | Year | Collection    | (Over)/Under Collection |
| (a)  | (b)  | (c)           | (d)                     |
| 2010 EO Incentive Regulatory Asset Balance |      |               | 3,407,064               |
| 1 June                                     | 2012 | (101,546)     | 3,305,518               |
| 2 July                                     | 2012 | (78,840)      | 3,226,678               |
| 3 August                                   | 2012 | (66,697)      | 3,159,981               |
| 4 September                                | 2012 | (77,691)      | 3,082,290               |
| 5 October                                  | 2012 | (126,571)     | 2,955,719               |
| 6 November                                 | 2012 | (258,544)     | 2,697,175               |
| 7 December                                 | 2012 | (415,235)     | 2,281,940               |
| 8 January                                  | 2013 | (562,082)     | 1,719,858               |
| 9 February                                 | 2013 | (605,631)     | 1,114,227               |
| 10 March                                   | 2013 | (554,372)     | 559,855                 |
| 11 April                                   | 2013 | (458,649)     | 101,206                 |
| 12 May                                     | 2013 | (238,666)     | -137,460                |
| 13 June                                    | 2013 | -             | -137,460                |
| 14 July                                    | 2013 | -             | -137,460                |
| 15 August                                  | 2013 | 18,062        | -119,398                |
| 16 September                               | 2013 | 5,592         | -113,806                |
| 17 October                                 | 2013 | 3,783         | -110,023                |
| 18 November                                | 2013 | 4,133         | -105,890                |
| 19 December                                | 2013 | 671           | -105,219                |
| 20 January                                 | 2014 | 560           | -104,659                |
| 21 February                                | 2014 | 665           | -103,994                |
| 22 March                                   | 2014 | 336           | -103,658                |
|  |      | (3,510,722)   |                         |

| Month                                      | Year | Current Month<br>Collection | Prior Month Cumulative<br>(Over)/Under Collection |
|--|------|-----------------------------|---|
| (a)  | (b)  | (c )                        | (d)   |
| 2011 EO Incentive Regulatory Asset Balance |      |                             | 14,593,977  |
| 1 June                                     | 2013 | (1,744,037)                 | 12,849,940  |
| 2 July                                     | 2013 | (1,634,273)                 | 11,215,667  |
| 3 August                                   | 2013 | (1,591,264)                 | 9,624,403   |
| 4 September                                | 2013 | (1,605,232)                 | 8,019,171   |
| 5 October                                  | 2013 | (1,651,761)                 | 6,367,410   |
| 6 November                                 | 2013 | (2,667,382)                 | 3,700,028   |
| 7 December                                 | 2013 | (4,268,013)                 | -567,985  |
| 8 January                                  | 2014 | (34,307)                    | -602,292  |
| 9 February                                 | 2014 | (2,107)                     | -604,399  |
| 10 March                                   | 2014 | (3,705)                     | -608,104  |
| (15,202,081)                               |      |                             |   |



|  |      | Current Month | Prior Month Cumulative  |
|--|------|---------------|-------------------------|
| Month                                      | Year | Collection    | (Over)/Under Collection |
| (a)  | (b)  | (c )          | (d)                     |
| 2011 EO Incentive Regulatory Asset Balance |      |               | 7,281,670               |
| 1 June                                     | 2013 | (1,033,297)   | 6,248,373               |
| 2 July                                     | 2013 | (1,151,388)   | 5,096,985               |
| 3 August                                   | 2013 | (1,110,418)   | 3,986,567               |
| 4 September                                | 2013 | (1,109,734)   | 2,876,833               |
| 5 October                                  | 2013 | (1,005,258)   | 1,871,575               |
| 6 November                                 | 2013 | (1,020,891)   | 850,684                 |
| 7 December                                 | 2013 | (1,106,088)   | (255,404)               |
| 8 January                                  | 2014 | (15,505)      | (270,909)               |
| 9 February                                 | 2014 | (1,389)       | (272,298)               |
| 10 March                                   | 2014 | (2,561)       | (274,859)               |
|  |      | (7,556,529)   |                         |

| Month                                      | Year | Current Month<br>Collection | Prior Month Cumulative<br>(Over)/Under Collection |
|--|------|-----------------------------|---|
| (a)  | (b)  | (c )                        | (d)   |
| 2011 EO Incentive Regulatory Asset Balance |      |                             | 7,312,307   |
| 1 June                                     | 2013 | (710,740)                   | 6,601,567   |
| 2 July                                     | 2013 | (482,885)                   | 6,118,682   |
| 3 August                                   | 2013 | (480,846)                   | 5,637,836   |
| 4 September                                | 2013 | (495,498)                   | 5,142,338   |
| 5 October                                  | 2013 | (646,503)                   | 4,495,835   |
| 6 November                                 | 2013 | (1,646,491)                 | 2,849,344   |
| 7 December                                 | 2013 | (3,161,925)                 | -312,581  |
| 8 January                                  | 2014 | (18,802)                    | -331,383  |
| 9 February                                 | 2014 | (718)                       | -332,101  |
| 10 March                                   | 2014 | (1,144)                     | -333,245  |
| (7,645,552)                                |      |                             |   |

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**DIRECT TESTIMONY**

**OF**

**ROBERT D. BORDNER**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

ROBERT D. BORDNER  
DIRECT TESTIMONY

1 Q. Please state your name and business address.

2 A. My name is Robert D. Bordner. My business address is 83 Columbia Street, Suite 400,  
3 Seattle, Washington 98104.

4 Q. Please describe your position and responsibilities.

5 A. I currently serve as the President and Chief Executive Officer ("CEO") of Energy Market  
6 Innovations, Inc. ("EMI"), a research-based consulting firm with 27 staff specializing in  
7 renewable energy, energy efficiency, and demand response. My responsibilities include  
8 overall corporate management and leadership, as well as technical direction on several of  
9 our key projects. I oversee the team that conducts evaluation research for all of the  
10 commercial and industrial ("C&I") programs in Consumers Energy Company's  
11 ("Consumers Energy" or the "Company") Energy Optimization ("EO") portfolio. This  
12 includes (i) process evaluations to assess customer perceptions of program delivery;  
13 (ii) impact evaluations to assess energy savings, verify installation and operation, and  
14 estimate net-to-gross ratios; and (iii) market assessments to identify baseline  
15 characteristics and assess changes in the marketplace stimulated by the offering of EO  
16 programs.

17 Q. Please describe your education and professional experience.

18 A. I hold a Bachelor's degree in Economics and Public Policy Analysis from Pomona  
19 College and completed graduate coursework in Energy Management & Policy from the  
20 University of Pennsylvania. I have a broad perspective of energy systems that draws  
21 upon the disciplines of economics, engineering, law, and behavioral sciences. I began  
22 my career in the energy industry working for a wind energy development company,  
23 conducting financial analyses and negotiating power purchase agreements for projects in

ROBERT D. BORDNER  
DIRECT TESTIMONY

1 New England. After attending graduate school, I began my consulting career with  
2 Synergic Resources Corporation, a pioneer in least cost planning, demand side  
3 management planning, and program evaluation.

4 I founded EMI in 1995, and I currently serve as the President and CEO. The firm  
5 has since grown to a full-time staff of 25, including staff with Masters and Doctorate  
6 degrees in Mechanical Engineering, Economics, Urban Planning, Energy Policy,  
7 Education, Psychology, and Program Evaluation. We have completed over  
8 180 engagements related to energy efficiency strategy, program design, and program  
9 evaluation. My areas of specialty include program evaluation (process impact and  
10 market), regulatory economics, energy policy, and emerging technology assessment. We  
11 are currently working on program evaluation projects in jurisdictions across the United  
12 States, including Maine, Connecticut, Ohio, Michigan, Utah, Wyoming, Montana,  
13 California, New York, Washington, and Hawaii. I have over 26 years of experience in  
14 the energy industry, during which time I have worked with energy companies and  
15 non-profit organizations throughout the United States, Australia, and New Zealand. I  
16 have regularly presented papers, and moderated panels and presentations at professional  
17 conferences sponsored by the American Council for an Energy Efficient Economy  
18 (“ACEEE”) and the International Energy Program Evaluation Conference (“IEPEC”).

19 Q. What is the purpose of your testimony in this proceeding?

20 A. The purpose of my testimony is to present EMI’s certification of the C&I energy savings  
21 presented by Consumers Energy for the 2013 program year.

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DIRECT TESTIMONY

1 Q. Are you sponsoring any exhibits with your direct testimony?

2 A. Yes, I am sponsoring one exhibit – Exhibit A-5 (RDB-1) – Certification of Reported  
3 Savings: Consumers Energy C&I Energy Optimization Programs, Program Year 2013.  
4 This is an 81-page Report produced by EMI that audits and certifies the 2013 C&I  
5 electric and gas energy savings achieved by the Company's EO Plan.

6 Q. Was this exhibit prepared by you or under your supervision?

7 A. Yes.

8 Q. How has EMI certified energy savings for the Company?

9 A. EMI employed a rigorous process to certify energy savings for the Company's C&I EO  
10 programs that included:

- 11 • Comparison of reported savings results to data maintained by Consumers Energy and  
12 implementation contractor tracking systems to ensure utilization of an accurate  
13 process for calculating total savings values by measure, program, and the total  
14 portfolio;
- 15 • Confirmation that the equipment specified on the incentive applications and logged in  
16 the tracking system met program incentive requirements;
- 17 • Review of a random, statistically significant sample of incentive applications for each  
18 program to determine that data were consistently and accurately represented in the  
19 tracking systems;
- 20 • Verification that correct factors were used to calculate savings, including:  
21 (i) Michigan Energy Measures Database ("MEMD") saving values; (ii) evaluation  
22 derived installation rates and engineering adjustments; (iii) appropriate net-to gross  
23 factors; and (iv) the application of savings bonus for measures with lives greater than  
24 ten years.

25 Q. Has EMI reviewed other performance metrics related to the Company's C&I EO  
26 program?

27 A. Yes. EMI verified gas savings from 2013 New Construction projects and compared those  
28 to the New Construction verified gas savings from the 2012 program year. In addition,

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EMI verified the number of electric and gas Multi-Measure projects and compared those metrics to the numbers verified for the 2012 program year.

Q. What are EMI's qualifications for certifying the nonresidential energy savings and other performance metrics?

A. The C&I evaluation team led by EMI includes our own staff, plus several of the most reputable evaluation, research, and engineering firms in the energy industry. These include Evergreen Economics, Research Into Action, Inc., Michaels Energy, Wirtshafter Associates, and PWP Consulting. All firms on the evaluation team have conducted independent impact, process, and engineering analyses for utilities and regulatory commissions throughout the United States for well over ten years. Evaluation team members have specific experience in evaluating the unique needs of C&I energy efficiency utility programs.

Q. What were EMI's conclusions regarding the amount of electric energy savings for 2013 nonresidential programs?

A. EMI's conclusions are set forth in Exhibit A-5 (RDB-1), which is EMI's certification report. Table 1-1 in that report shows that the Company calculated 240,551,436 kWh (240,551.4 MWh) of net nonresidential electric energy savings without the Long-Life Equipment Savings Multiplier, or 255,533,683 kWh (255,533.7 MWh) of net nonresidential electric energy savings with the Long-Life Equipment Savings Multiplier. Table 1-7 of the report shows that the Company planned for 5,936,000 kWh (5,936 MWh) of electric savings from its customers who implemented self-directed EO Plans.

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1 Q. What were EMI's conclusions regarding the amount of 2013 nonresidential electric  
2 demand savings?

3 A. Exhibit A-5 (RDB 1), Table 1-2 shows that the Company calculated 40,479 kW of net  
4 nonresidential electric energy savings without the Long-Life Equipment Savings  
5 Multiplier, or 42,549 kW of net nonresidential electric energy savings with the Long-Life  
6 Equipment Savings Multiplier.

7 Q. What are EMI's conclusions regarding the amount of 2013 nonresidential gas savings?

8 A. Exhibit A-5 (RDB-1), Table 1-3 shows that the Company calculated 862,155 Mcf of net  
9 nonresidential electric energy savings without the Long-Life Equipment Savings  
10 Multiplier, or 913,711 Mcf of net nonresidential electric energy savings with the  
11 Long-Life Equipment Savings Multiplier.

12 Q. What were EMI's conclusions regarding the number of electric Multi-Measure projects?

13 A. Exhibit A-5 (RDB-1), Table 1-9 shows that EMI verified 82 electric Multi-Measure  
14 projects were completed in 2013. This compares to 47 electric Multi-Measure projects in  
15 2012. Participation in 2013 represents a 74.5% increase over 2012 participation.

16 Q. What were EMI's conclusions regarding the number of gas Multi-Measure projects?

17 A. Exhibit A-5 (RDB-1), Table 1-9 shows that EMI verified 35 gas Multi-Measure projects  
18 were completed in 2013. This compares to 22 gas Multi-Measure projects in 2012.  
19 Participation in 2013 represents a 59.1% increase over 2012 participation.

20 Q. What were EMI's conclusions regarding gas New Construction savings?

21 A. Exhibit A-5 (RDB-1), Table 1-9 shows that EMI verified 29,113 Mcf of New  
22 Construction gas savings in 2013. This compares to 10,372 Mcf of New Construction



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1 gas savings in 2012. Participation in 2013 represents a 280.7% increase over  
2 2012 participation.

3 Q. Does that conclude your testimony?

4 A. Yes.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**EXHIBIT**

**OF**

**ROBERT D. BORDNER**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

May 31, 2014

# Certification of Reported Savings: Consumers Energy C&I Energy Optimization Programs

## Certification of Reported Savings: Program Year 2013



### Presented To:

Joseph Forcillo  
Director  
Energy Efficiency Research & Evaluation  
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This report is a deliverable submitted to Consumers Energy as part of a multi-year, independent evaluation contract to conduct impact, process, and market assessment studies relating to the nonresidential sector programs administered by Consumers Energy.

The independent evaluation team includes the following firms:

Energy Market Innovations, Inc. (EMI), Contract Lead  
Evergreen Economics, Inc.  
Michaels Energy  
Wirtshafter Associates  
PWP, Inc.



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## Certification Letter

May 31, 2014

Consumers Energy Company  
1 Energy Plaza Drive  
Jackson, MI 49201-2357

### RE: PY2013 Verification of Net Savings of the Consumers Energy Commercial & Industrial Energy Optimization Programs

This document reports the verified net electric energy, electric demand, and natural gas savings for the Consumers Energy Commercial and Industrial (C&I) Energy Optimization Programs for Program Year 2013. The verification of net savings was conducted by the independent certification team led by Energy Market Innovations, Inc. (EMI).

The objective of this verification was to review the accuracy of the electric energy (kWh), electric demand (kW), and natural gas (Mcf) savings of the 2013 C&I programs offered by Consumers Energy. As indicated in the attached report, the EMI team hereby verifies the following:

- Verified net electric energy savings of 240,551,436 kWh for all Consumers Energy C&I programs for Program Year 2013, plus an additional 14,982,247 kWh with the Long-Life Equipment Savings Multiplier, **for an overall total of 255,533,683 kWh electric savings.**
- Verified net electric demand savings of 40,479 kW for all Consumers Energy C&I programs for Program Year 2013, plus an additional 2,070 kW with the Long-Life Equipment Savings Multiplier, **for an overall total of 42,549 kW demand savings.**
- Verified net natural gas savings of 862,155 Mcf for all Consumers Energy C&I programs for Program Year 2013, plus an additional 51,556 Mcf with the Long-Life Equipment Savings Multiplier, **for an overall total of 913,711 Mcf of natural gas savings.**
- Between 2012 and 2013, Consumers Energy achieved a 75% increase in **electric Multi-Measure projects**, a 59% increase in **gas Multi-Measure projects**, and a 281% increase in verified net **gas New Construction savings.**

The validation did not include the evaluation of the achieved energy impacts resulting from the 2013 C&I programs. Results of the comprehensive impact evaluation will be documented in subsequent reports submitted under separate cover.

Sincerely,



Robert D. Bordner  
President

# 1. Overview

This report documents the energy savings certification of the Commercial and Industrial (C&I) Energy Optimization (EO) Programs administered by Consumers Energy for Program Year 2013. This certification was conducted in February through May of 2014 by the independent certification team led by Energy Market Innovations, Inc. (EMI) as part of a comprehensive evaluation effort covering all of the Consumers Energy C&I programs.

## 1.1 Objectives and Scope

The purpose of the savings certification was to review the Program Year 2013 reported gross electric energy (kWh), electric demand (kW), and natural gas (Mcf) savings tracked by Consumers Energy and its implementation contractors for the C&I energy efficiency programs and initiatives. For the first time, this certification also assesses the various metrics included in Consumers Energy's new performance incentive mechanism (PIM).

Throughout this report, most certification results are presented at the C&I program level, though some results are presented at the subprogram level where appropriate. The C&I programs and subprograms covered by this certification effort include the following:

1. Business Solutions Program
  - a. Business Solutions Program – Prescriptive
  - b. Business Solutions Program – Custom
  - c. Building Operator Certification (BOC)
  - d. New Construction Program (Whole Building and Major Retrofit)
2. Small Business Solutions Program
  - a. Direct Install Program (Direct Install – Core Program)
  - b. Programmable Thermostat Program
  - c. Hospitality Initiative
  - d. Drop Ship Lighting Initiative
  - e. Buydown Lighting Initiative
  - f. Furnace Tune-up Initiative
3. Multi-Family Program

In conjunction with Consumers Energy and the statewide Energy Efficiency Collaborative, the EMI team identified the following tasks to certify Program Year 2013 savings:

1. Verify that the per-unit savings values for each measure entered by Consumers Energy in the program tracking database, eTracker, match those included in the Michigan Energy Measures Database (MEMD) or other relevant supporting documentation.

2. Review a sample of project applications to check for systematic transcription errors affecting program/initiative savings.
3. Verify the calculation of the claimed savings (reported gross savings) in the Consumers Energy eTracker database.
4. Apply appropriate adjustment factors derived from separate impact evaluations to the verified savings results.
5. Verify the appropriate calculation and application of the Long-Life Equipment Savings Multiplier.

To certify net savings, the certification team first completed Tasks 1 and 3 to estimate “adjusted reported gross savings,” which are equal to Consumers Energy’s reported savings after adjusting for any misapplication of deemed savings values or miscalculation of energy savings. In the first two years of Consumers Energy’s C&I programs, when no impact adjustment factors were applied (Task 4), the certification team also included an adjustment from Task 2 when calculating adjusted reported gross savings values. However, as the review of project applications listed as part of Task 2 happens as part of impact evaluations, the adjustment factors resulting from those evaluations applied in Task 4 preclude the need to include these tasks when calculating adjusted reported savings. Doing so would, in essence, adjust the gross savings twice for any errors found.

To complete Task 4, the certification team applied two adjustment factors to the adjusted reported gross savings, including: (1) verified gross savings adjustment factors, and (2) net-to-gross adjustment factors. The verified gross savings adjustment factors incorporate installation rates and, where applicable, engineering adjustment factors derived from previous program evaluations. The net-to-gross adjustment factor was a constant 0.900 across all programs as mandated by a recent MPSC ruling.<sup>1</sup> These adjustment factors are discussed in more detail in the next chapter.

In addition to Tasks 1-4, beginning this year for Program Year 2013, the certification team also included calculation of the Long-Life Equipment Savings Multiplier (LLESM) as part of the certification process. The LLESM is part of the new performance incentive mechanism (PIM) as outlined by the Michigan Public Service Commission (MPSC).<sup>2</sup> In an effort to bolster the installation of longer-lasting measures, the LLESM is a 10% savings multiplier awarded to measures installed through the C&I programs with a measure life of 10 years or more.

In addition to the tasks involved with certifying program savings, the certification team also certified additional metrics associated with Consumers Energy’s performance incentive mechanism (PIM). This included reviewing program tracking data and hard copy documentation to assess the number of Multi-Measure projects and New Construction gas savings.

---

<sup>1</sup> Michigan Public Service Commission, Case No. U-17138.

<sup>2</sup> Michigan Public Service Commission, Case No. U-17138 updated with Case No. U17531.

## 1.2 Summary of Certified Savings

Table 1-1 summarizes the verified electric energy (kWh) savings for each program. As shown, for the 2013 program year, the certification team derived total verified net electric energy savings of 240,551,436 kWh across all programs resulting in an overall kWh savings realization rate of 0.876. Almost two-thirds of total verified net electric energy savings (64.13% or 154,270,443 kWh) resulted from the Business Solutions Program; about one-third (33.72% or 81,963,790 kWh) resulted from the Small Business Solutions Program; only 1.76% (4,317,203 kWh) arose from the Multi-Family Program. The LLESMS for electric energy savings totaled 14,982,247 kWh for an overall PY2013 kWh savings of 255,533,683.

Table 1-2 summarizes the verified electric demand (kW) savings for each program. As shown, for the 2013 program year, the certification team derived total verified net electric demand savings of 40,479 kW across all programs resulting in an overall kW savings realization rate of 0.818. The Business Solutions Program represented the greatest proportion of total electric demand savings (58.96% or 23,865 kW), followed the Small Business Solutions Program at 40.06% (16,216 kW) and the Multi-Family Program (0.98% or 398 kW). The LLESMS for electric demand savings totaled 2,070 kW for an overall PY2013 kW savings of 42,549.

Table 1-3 summarizes the verified natural gas (Mcf) savings for each program. For the 2013 program year, the certification team derived total verified net gas savings of 862,1550 Mcf across all programs resulting in an overall gas realization rate of 0.844. The Business Solutions Program accounted for the greatest proportion of verified net gas savings (81.48%) with 702,517 Mcf. Next was the Small Business Solutions Program with 15.24% of verified net gas savings (131,420 Mcf); the Multi-Family Program accounted for 3.27% of verified net gas savings (28,218 Mcf). The LLESMS for natural gas savings totaled 51,556 Mcf for an overall PY2013 Mcf savings of 913,711.

Table 1-4, Table 1-5, and Table 1-6 present the reported net savings, verified net savings, and percent of reported net savings verified through the 2013 certification process for electric energy, electric demand, and natural gas, respectively. All of these savings values include the LLESMS. Table 1-4 shows no major deviations for reported-to-verified net electric (kWh) savings, with 99.30% of reported net savings being verified. Table 1-5 presents several reported-to-verified net deviations for demand (kW) savings, where 101.41% of reported net savings were verified. Table 1-6 presents no notable reported-to-verified net deviations for gas (Mcf) savings, with 100.39% of reported net savings being verified.

The remainder of this report provides additional detail on the savings certification methods and results.

Table 1-1. PY2013 Certified Electric Energy (kWh) Savings by Program

| Program   | 2013<br>Reported<br>Gross kWh<br>Savings<br>[A] | 2013<br>Adjusted<br>Reported<br>Gross kWh<br>Savings<br>[B] | 2012<br>Verified<br>Gross kWh<br>Savings<br>Adjustment<br>Factor <sup>a</sup><br>[C] | 2013 Verified<br>Gross kWh<br>Savings<br>[D] = [B x C] | Deemed<br>kWh NTG<br>Adjustment<br>Factor <sup>b</sup><br>[E] | 2013 Verified<br>Net kWh<br>Savings<br>[F] = [D x E] | 2013 kWh<br>Realization<br>Rate<br>[G] = [F / A] | 2013 Verified Net<br>kWh Savings<br>Including Long Life<br>Equipment Savings<br>Multiplier (LLESM)<br>[H] = [F x 1.1] <sup>c</sup> |
|---|---|---|--|--|---|--|--|--|
| Business<br>Solutions<br>Program <sup>d</sup>       | 177,331,024                                     | 176,778,028   | 0.970  | 171,414,710  | 0.900   | 154,270,443  | 0.870  | 166,773,674  |
| Small Business<br>Solutions<br>Program <sup>e</sup> | 92,393,647                                      | 92,393,647  | 0.986  | 91,070,877   | 0.900   | 81,963,790   | 0.887  | 84,184,243   |
| Multi-Family<br>Program                             | 4,821,077                                       | 4,821,077   | 0.995  | 4,796,908  | 0.900   | 4,317,203  | 0.895  | 4,575,765  |
| <b>TOTAL</b>  | <b>274,545,749</b>                              | <b>273,992,753</b>  | <b>0.976</b>   | <b>267,282,495</b>                                     | <b>0.900</b>  | <b>240,551,436</b>                                   | <b>0.876</b>                                     | <b>255,533,683</b>   |

Columns may not sum to total due to rounding.

a) Note that the verified gross adjustment factors were derived from prior-year impact evaluations (see Section 2.4).

b) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.

c) The verified net savings including the Long Life Equipment Savings Multiplier (LLESM) are equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.

d) The Business Solutions Program is comprised of the Business Solutions-Custom, Business Solutions-Prescriptive, Building Operator Certification, and New Construction projects.

e) The Small Business Solutions Program is comprised of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL-Drop Ship, and CFL-Buydown Programs.

Table 1-2. PY2013 Certified Electric Demand (kW) Savings by Program

| Program   | 2013<br>Reported<br>Gross kW<br>Savings<br>[A] | 2013<br>Adjusted<br>Reported<br>Gross kW<br>Savings<br>[B] | 2012<br>Verified<br>Gross kW<br>Savings<br>Adjustment<br>Factor <sup>a</sup><br>[C] | 2013 Verified<br>Gross kW<br>Savings<br>[D] = [B x C] | Deemed<br>kW NTG<br>Adjustment<br>Factor <sup>b</sup><br>[E] | 2013 Verified<br>Net kW<br>Savings<br>[F] = [D x E] | 2013 kW<br>Realization<br>Rate<br>[G] = [F / A] | 2013 Verified Net<br>kW Savings<br>Including Long Life<br>Equipment Savings<br>Multiplier (LLES <sup>c</sup> )<br>[H] = [F x 1.1] <sup>c</sup> |
|---|--|--|---|---|--|---|---|--|
| Business<br>Solutions<br>Program <sup>d</sup>       | 29,264   | 28,959   | 0.916   | 26,517  | 0.900  | 23,865  | 0.816   | 25,592   |
| Small Business<br>Solutions<br>Program <sup>e</sup> | 19,743   | 19,104   | 0.943   | 18,017  | 0.900  | 16,216  | 0.821   | 16,545   |
| Multi-Family<br>Program                             | 463  | 445  | 0.994   | 442   | 0.900  | 398   | 0.859   | 412  |
| <b>TOTAL</b>  | <b>49,470</b>                                  | <b>48,507</b>  | <b>0.927</b>  | <b>44,976</b>   | <b>0.900</b>   | <b>40,479</b>                                       | <b>0.818</b>                                    | <b>42,549</b>  |

Columns may not sum to total due to rounding.

a) Note that the verified gross adjustment factors were derived from prior-year impact evaluations (see Section 2.4).

b) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.

c) The verified net savings including the Long Life Equipment Savings Multiplier (LLES<sup>c</sup>) are equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.

d) The Business Solutions Program is comprised of the Business Solutions-Custom, Business Solutions-Prescriptive, Building Operator Certification, and New Construction projects.

e) The Small Business Solutions Program is comprised of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL-Drop Ship, and CFL-Buydown Programs.

Table 1-3. PY2013 Certified Natural Gas (Mcf) Savings by Program

| Program                                       | 2013 Reported Gross Mcf Savings [A] | 2013 Adjusted Reported Gross Mcf Savings [B] | 2012 Verified Gross Mcf Savings Adjustment Factor <sup>a</sup> [C] | 2013 Verified Gross Mcf Savings [D] = [B x C] | Deemed Mcf NTG Adjustment Factor <sup>b</sup> [E] | 2013 Verified Net Mcf Savings [F] = [D x E] | 2013 Mcf Realization Rate [G] = [F / A] | Long Life Equipment Savings Multiplier (LLES <sup>M</sup> ) [H] = [F x 1.1] <sup>c</sup> |
|---|-------------------------------------|--|--|---|---|---|---|--|
| Business Solutions Program <sup>d</sup>       | 843,237                             | 842,966                                      | 0.926  | 780,574                                       | 0.900   | 702,517                                     | 0.833                                   | 750,276  |
| Small Business Solutions Program <sup>e</sup> | 146,960                             | 146,958                                      | 0.994  | 146,022                                       | 0.900   | 131,420                                     | 0.894                                   | 132,612  |
| Multi-Family Program                          | 31,347                              | 31,339                                       | 1.000  | 31,353  | 0.900   | 28,218                                      | 0.900                                   | 30,823   |
| <b>TOTAL</b>                                  | <b>1,021,544</b>                    | <b>1,021,264</b>                             | <b>0.938</b>   | <b>957,949</b>                                | <b>0.900</b>                                      | <b>862,155</b>                              | <b>0.844</b>                            | <b>913,711</b>   |

Columns may not sum to total due to rounding.

a) Note that the verified gross adjustment factors were derived from prior-year impact evaluations (see Section 2.4).

b) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.

c) The verified net savings including the Long Life Equipment Savings Multiplier (LLES<sup>M</sup>) are equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more..

d) The Business Solutions Program is comprised of the Business Solutions-Custom, Business Solutions-Prescriptive, Building Operator Certification, and New Construction projects.

e) The Small Business Solutions Program is comprised of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL-Drop Ship, and CFL-Buydown Programs.



**Table 1-4. 2013 Percent of Reported Net kWh Savings Verified**

| <b>Program/Initiative</b>                     | <b>2013 Reported Net kWh Savings Including LLES</b> | <b>2013 Verified Net kWh Savings Including LLES</b> | <b>2013 Percent of Reported Net kWh Savings Verified</b> |
|---|---|---|--|
| Business Solutions Program <sup>a</sup>       | 165,101,200   | 166,773,674   | 99.00%   |
| Small Business Solutions Program <sup>b</sup> | 84,044,151  | 84,184,243  | 99.83%   |
| Multi-Family Program                          | 4,606,004   | 4,575,765   | 100.66%  |
| <b>Total</b>                                  | <b>253,751,354</b>                                  | <b>255,533,682</b>                                  | <b>99.30%</b>  |

a) The Business Solutions Program is comprised of the Business Solutions-Custom, Business Solutions-Prescriptive, Building Operator Certification, and New Construction projects.

b) The Small Business Solutions Program is comprised of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL-Drop Ship, and CFL-Buydown Programs.

**Table 1-5. 2013 Percent of Reported Net kW Savings Verified**

| <b>Program/Initiative</b>                     | <b>2013 Reported Net kW Savings Including LLES</b> | <b>2013 Verified Net kW Savings Including LLES</b> | <b>2013 Percent of Reported Net kW Savings Verified</b> |
|---|--|--|---|
| Business Solutions Program <sup>a</sup>       | 25,742   | 25,592   | 100.59%   |
| Small Business Solutions Program <sup>b</sup> | 16,969   | 16,545   | 102.56%   |
| Multi-Family Program                          | 437  | 412  | 106.15%   |
| <b>Total</b>                                  | <b>43,148</b>                                      | <b>42,549</b>                                      | <b>101.41%</b>  |

a) The Business Solutions Program is comprised of the Business Solutions-Custom, Business Solutions-Prescriptive, Building Operator Certification, and New Construction projects.

b) The Small Business Solutions Program is comprised of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL-Drop Ship, and CFL-Buydown Programs.

**Table 1-6. 2013 Percent of Reported Net Mcf Savings Verified**

| <b>Program/Initiative</b>                     | <b>2013 Reported Net Mcf Savings Including LLES</b> | <b>2013 Verified Net Mcf Savings Including LLES</b> | <b>2013 Percent of Reported Net Mcf Savings Verified</b> |
|---|---|---|--|
| Business Solutions Program <sup>a</sup>       | 753,954   | 750,276   | 100.49%  |
| Small Business Solutions Program <sup>b</sup> | 132,614   | 132,612   | 100.00%  |
| Multi-Family Program                          | 30,686  | 30,823  | 99.55%   |
| <b>Total</b>                                  | <b>917,253</b>                                      | <b>913,711</b>                                      | <b>100.39%</b>   |

a) The Business Solutions Program is comprised of the Business Solutions-Custom, Business Solutions-Prescriptive, Building Operator Certification, and New Construction projects.

b) The Small Business Solutions Program is comprised of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL-Drop Ship, and CFL-Buydown Programs.

In addition to these programs funded through the EO surcharge, qualifying customers had the choice to opt out of paying the EO surcharge and implement their own energy efficiency projects. A summary of the reported savings for the “self-direct” projects is provided in Table 1-7. The savings numbers were provided by Consumers Energy and were not reviewed as part of this certification process.

**Table 1-7. 2103 Savings from Self-Direct Projects**

| <b>Program</b>       | <b>2012 Reported Gross MWh Savings</b> |
|----------------------|--|
| Self-Direct Projects | 5,936                                  |

## Measure Life and Lifetime Savings

At the request of the MPSC, the certification team calculated lifetime savings and the weighted average measure life for each program. To do so, the certification team verified that appropriate measure lifetime values from the MEMD were used for each prescriptive measure.<sup>3</sup> Table 1-8 summarizes the lifetime kWh and Mcf savings for each program and provides the weighted average measure life by fuel type, where each project’s measure life is weighted by project net first year savings.

**Table 1-8. Lifetime Savings and Weighted Average Measure Life**

| <b>Program</b>                                | <b>Net Lifetime Savings - kWh</b> | <b>Net Lifetime Savings - Mcf</b> | <b>Average kWh Measure Life (in Years)<sup>a</sup></b> | <b>Average Mcf Measure Life (In Years)<sup>a</sup></b> |
|---|-----------------------------------|-----------------------------------|--|--|
| Business Solutions Program <sup>d</sup>       | 1,932,456,235                     | 8,396,337                         | 12.53  | 11.95  |
| Small Business Solutions Program <sup>e</sup> | 536,499,170                       | 1,194,696                         | 6.55   | 9.09   |
| Multi-Family Program                          | 42,596,284                        | 390,865                           | 9.87   | 13.85  |
| <b>TOTAL</b>                                  | <b>2,511,551,690</b>              | <b>9,981,899</b>                  | <b>10.44</b>   | <b>11.58</b>   |

a. Weighted average measure life values computed by each project’s net first year savings as the weights (without inclusion of the LLESIM).

## Performance Incentive Mechanism Metrics

Table 1-9 summarizes the three new performance incentive mechanism (PIM) metrics that the certification team certified for PY2013. These metrics include growth in Multi-Measure electric projects, which increased by 74.5% between 2012 and 2013; growth in Multi-Measure gas projects, which increased by 59.1% between 2012 and 2013; and growth in New Construction gas savings, which increased by 280.7% between 2012 and 2013.

<sup>3</sup> For non-MEMD measure, we used the measure life values from eTracker. These measure life values have never been reviewed during the annual impact evaluations, but will be assessed during future evaluations.

**Table 1-9. PY2013 Performance Metric Certification**

| <b>Multiple Measures Projects</b> | <b>2012 Metric</b> | <b>2013 Metric</b> | <b>Percent Change in Metric</b> |
|-----------------------------------|--------------------|--------------------|---------------------------------|
| Multi-Measures Electric Projects  | 47 Projects        | 82 Projects        | 74.5%                           |
| Multi-Measures Gas Projects       | 22 Projects        | 35 Projects        | 59.1%                           |
| New Construction Gas Savings      | 10,372 MCF         | 29,113 MCF         | 280.7%                          |

## 2. Methodology

The certification team identified the following tasks to be conducted for this certification:

1. Verify that the per-unit savings values for each measure entered by Consumers Energy match those included in the MEMD or other relevant supporting documentation.<sup>4,5</sup>
2. Review a sample of project applications to check for systematic transcription errors affecting program/initiative savings.
3. Verify the calculation of the claimed savings (reported gross savings) in the Consumers Energy tracking database.
4. Apply appropriate adjustment factors derived from separate impact evaluations to the verified savings results.
5. Apply the 10% Long Life Equipment Savings Multiplier (LLESMS) to all C&I measures with a measure life of 10 years or greater.

Details on each of these tasks are discussed below.

### 2.1 Compare Per-unit Savings Values in Program Tracking Database with MEMD

The first task in the certification process involved comparing the reported per-unit savings value of each measure found in the Consumers Energy program-tracking database (eTracker) with the values contained in the MEMD or other relevant supporting documentation. This was not a sampling effort and instead entailed a line-by-line assessment of the entire Consumers Energy tracking database (eTracker) for each measure for each program. The database included records for all measures installed through the following energy efficiency programs and subprograms:

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<sup>4</sup> For savings certification, the certification team referenced the version of the master MEMD dated 11/20/2012 with the file name "mi\_master\_measure\_database\_2013\_11202012\_final.xls." For weather sensitive measures, the certification team referenced the weather-sensitive MEMD file "mi\_weather\_sensitive\_dbase\_2012\_10\_31\_12.xls." Additionally, Navigant Consulting conducted additional weighting for some weather sensitive measures and provided the certification team with spreadsheets containing the weighted results. For the Business Solutions Program, the spreadsheet "Navigant 2013 Q4\_Bus Sol Master Measures\_2014\_01\_24.xlsx" was used; for the Small Business Solutions Programs, the spreadsheet "Navigant 2013 Q4\_SB DI Master Measures\_2013\_1\_23.xlsx" was used; for the Multi-Family Initiative, the spreadsheet "Navigant 2013 Q4\_CI MF Master Measures\_2013\_1\_28.xlsx" was used. Note that the date suffixes on the latter two files are incorrect and the year component should read "2014."

<sup>5</sup> In addition to the MEMD data files cited in Footnote 4, the certification team's verification of several measure savings values required the use of workpapers because the measures were not yet incorporated into the MEMD. The specific workpapers are highlighted later in the report when presenting measure level results.

1. Business Solutions Program
  - a. Business Solutions Program – Prescriptive
  - b. Business Solutions Program – Custom
  - c. Building Operator Certification (BOC)
  - d. New Construction Program (Whole Building and Major Retrofit)
2. Small Business Solutions Program
  - a. Direct Install Program (Direct Install – Core Program)
  - b. Programmable Thermostat Program
  - c. Hospitality Initiative
  - d. Drop Ship Lighting Initiative
  - e. Buydown Lighting Initiative
  - f. Furnace Tune-up Initiative
3. Multi-Family Program

The certification team verified all savings values for all the measures to the accuracy of four significant digits to the right of the decimal place. However, results in some tables throughout this report are rounded to the nearest whole number to allow tables to fit on the page.

## **2.2 Review of Project Applications for Transcription Errors**

To assess how accurately the information from project applications had been transferred to the Consumers Energy tracking database (eTracker), the certification team compared the tracking data with the information contained on the original applications for a sample of projects. The certification team conducted this application review for the Business Solutions, Small Business Solutions, and Multi-Family Programs; however, results are summarized by subprograms, where applicable, because of differences in the available application materials, the program implementers, and the application processes. The certification team conducted and summarized the application review for the following:

- Business Solutions Program (includes Business Solutions-Prescriptive, Business Solutions-Custom, and Building Operator Certification)
- New Construction Program (includes New Construction-Major Retrofit and New Construction-Whole Building)
- Direct Install-Core Program
- Programmable Thermostat Program
- Hospitality Program
- Furnace Tune-up
- Multi-Family

No paper records were available for the Drop Ship Lighting or Buydown Lighting Initiatives so the application review was not conducted for these initiatives.

The certification team reviewed each application to confirm that customer- and measure-level information was transferred correctly to the tracking database. Fields certified at the customer level included project identifier, account number, customer name, address, city, zip code, phone, and customer type (electric only, gas only, or combination). At the measure level, the certification team checked applications for accuracy to ensure the correct measure type and measure quantities were transferred to the tracking databases and that the correct savings type (kWh and/or Mcf) was claimed for the appropriate customer type (i.e. electric savings for electric only customers; gas savings for gas only customers; electric and gas savings – for applicable measures – for combination customers).

For the document review, sampling was used with the goal of attaining a 90% level of confidence at the 10% level of relative precision at the program/subprogram level. The exception to this is with the Business Solutions Program, where for efficiency, the applications reviewed included all the projects that were part of last year's impact evaluation because the documentation materials were already on-hand. Thus, for the Business Solutions Program the number of applications reviewed was larger than needed to attain 90/10. Table 2-1 shows the total number of application reviewed for each program/subprogram.

**Table 2-1. Application Review Sample Sizes by Program/Subprogram**

| Program/Subprogram       | Sample Size |
|--------------------------|-------------|
| Business Solutions       | 153         |
| New Construction Program | 10          |
| Direct Install-Core      | 76          |
| Programmable Thermostats | 77          |
| Hospitality              | 73          |
| Furnace Tune-up          | 72          |
| Multi-Family             | 56          |

The samples were drawn to develop a reliable estimate of the proportion of applications that contained an error either in the customer contact information or the information on installed measures. To draw the sample, the certification team randomly selected projects from each program's database. The certification team then obtained an electronic copy of each application to conduct the certification review.

The results of the documentation reviews are provided for informational purposes only and adjustments resulting from any variances found during the reviews are not applied to the certified savings. Differences in quantity installed or any issues related to energy savings are derived from the more rigorous impact evaluations. Thus, applying an adjustment factor derived from the application review along with the verified gross savings adjustment factors would effectively "double-count" the adjustment. As such, the results of the

application review are provided herein to be consistent with past year's reports, but the results were not applied to savings in any way.<sup>6</sup>

## 2.3 Calculate Adjusted Reported Gross Savings

The third task in the certification process involved replicating the calculations used to derive reported gross savings for each measure for each program, based on the information from Task 1. These calculations result in the adjusted reported gross savings.

For measures installed through the Programmable Thermostat, Hospitality, Drop Ship Lighting, Buydown Lighting, and Furnace Tune-up Programs, as well as the vast majority of the Multi-Family Program measures, this calculation simply involved multiplying the installed quantity by the verified MEMD or workpaper per-unit savings value from Task 1, because all measures installed under these subprograms used deemed savings. Most measures installed through the Business Solutions – Prescriptive, Building Operator Certification, and New Construction Programs used the same method, however, several measures use performance, efficiency, or quantity adjustments to compute the final energy savings (these measures are discussed in more detail in Chapter 3 of this report).

For any custom measure (e.g. Business Solution-Custom, custom measures installed under the Multi-Family Program, and Direct Install – Core Program measures, which are based on project-specific, individualized energy savings calculations), the certification team assumed the adjusted reported gross savings for each measure were the same as the reported gross savings. This approach has been taken since the PY2012 certification, to avoid the potential threat of double counting errors. That is, an error that would be captured as a difference between this year's reported gross savings and adjusted reported gross savings in the certification process could also be captured in next year's verified gross savings adjustment factor derived through the program evaluations.<sup>7</sup> Thus, to avoid this potential double counting, the certification team no longer recalculates the individualized measure savings using the energy savings equations for Direct Install – Core Program measures, but instead, considers the adjusted reported gross savings to be the same as the reported gross savings for the purposes of certification. This approach is now also more consistent with the treatment of other programs in the certification process (i.e., Business Solutions – Custom), where the information needed to recalculate savings is not contained in the tracking data, and the actual savings estimates are verified through the annual evaluations. In general, the rule is that if the computation can be reproduced based on the information present in the tracking data, it is included as part of the certification process; if not, it is not included because it is captured through the annual evaluations.

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<sup>6</sup> For program years 2009 and 2010, adjustments based on the results of the document review process were applied to program savings because gross savings adjustment factors derived from the rigorous annual program evaluations were not yet applied in the certification process. Beginning in PY2010, gross savings adjustment factors were applied to certification results and adjustments from the document reviews were no longer incorporated to eliminate potential double counting.

<sup>7</sup> The phrase "...could also be captured..." was used instead of "...would also be captured..." because the evaluations are conducted using statistical sampling methods while the entire population of measures is assessed through this certification process. However, this does not detract from the basic argument and double counting is still the concern.

## 2.4 Application of Adjustment Factors

Following Task 3, the certification team applied two adjustment factors to derive verified net saving: (1) the verified gross savings adjustment factor, and (2) the net-to-gross adjustment factor. In accordance with the decision of the MPSC Evaluation Collaborative, the verified gross savings adjustment factors are derived from previous years impact evaluations, while the net-to-gross adjustment factors are a constant 0.900 across all measures (see discussion below).

The first adjustment factor, the *verified gross savings adjustment factor*, incorporates the installation adjustment factors and, where applicable, engineering adjustment factors for each program resulting from previous years program evaluations.

The *installation adjustment factors* account for issues such as, but not limited to:

- Incented measures that were not installed
- Measures that were installed but later removed
- Measures that were improperly installed or no longer operable
- Measures that did not match those identified in the EO provider's tracking system
- Measures that were installed but were not eligible according to program guidelines

The *engineering adjustment factors* take into account factors such as:

- Incorrect assumptions used to estimate project impacts (e.g. coincidence factor, baseline specifications, operating characteristics, operating hours, efficiency performance specifications, capacity, and load)
- Errors in the algorithm used to estimate reported impacts

The derivation of the verified gross adjustment factors differs for custom and prescriptive measures. For measures with custom calculated savings, the verified gross savings adjustment factors incorporate the program level installation adjustment factors and engineering adjustment factors; for prescriptive measures, the measure savings are all deemed and only installation adjustment factors are required (i.e. no engineering adjustments are applied). Thus, for prescriptive measures, the verified gross savings adjustment factors are the same as the installation adjustment factors derived from the impact evaluations; for custom measures, the verified gross savings adjustment factors are equal to the installation adjustment factors times the engineering adjustment factors.

Gross adjustment factors differ by measure and are applied at the measure level before aggregating results to the program level. Table 2-2 shows the average gross kWh, kW, Mcf, and net-to-gross adjustment factors used in this Program Year 2013 certification.



**Table 2-2. PY2013 Average Gross kWh, kW, MCF and Net-to-Gross Adjustment Factors <sup>a</sup>**

| Program                          | Gross kWh Adjustment Factor | Gross kW Adjustment Factor | Gross Mcf Adjustment Factor | Net-to-Gross Adjustment Factor |
|----------------------------------|-----------------------------|----------------------------|-----------------------------|--------------------------------|
| Business Solutions Program       | 0.970                       | 0.916                      | 0.926                       | 0.900                          |
| Small Business Solutions Program | 0.986                       | 0.943                      | 0.994                       | 0.900                          |
| Multi-Family Program             | 0.995                       | 0.994                      | 1.000                       | 0.900                          |

a) The adjustment factors shown in this table are average adjustment factors. Gross adjustment factors vary by measure and measures within the same program often have different gross adjustment factors based on specific impact evaluation findings from prior years.

The impact evaluation sources for the gross adjustment factors are shown in Table 2-3.

**Table 2-3. PY2013 Gross Adjustment Factor Impact Evaluation Sources**

| Subprogram                        | Source   |
|-----------------------------------|--|
| Business Solutions – Prescriptive | 2012 Business Solutions Impact Evaluation and 2011 Business Solutions Impact Evaluation for measures not rebated in 2012 |
| Business Solutions – Custom       | 2012 Business Solutions Impact Evaluation  |
| Direct Install – Core             | 2011 Consumers Energy Direct Install Program Impact Evaluation   |
| Programmable Thermostat           | 2012 Small Business Solutions Impact Evaluation  |
| Hospitality                       | 2012 Small Business Solutions Impact Evaluation  |
| New Construction                  | 2012 Business Solutions Impact Evaluation and 2011 Business Solutions Impact Evaluation for measures not rebated in 2012 |
| Multi-Family                      | The Cadmus Group. Consumers Energy 2011 Evaluation Activity and Summary Report, May 18, 2012.                            |
| Drop Ship Lighting                | No GAF because reported gross savings include installation adjustment from 2009 Drop Ship Lighting Impact Evaluation     |
| Buydown Lighting                  | The Cadmus Group. Consumers Energy 2011 Evaluation Activity and Summary Report, May 18, 2012.                            |
| Furnace Tune-up                   | New program - no impact evaluation results   |

For each measure,  $j$ , in each program,  $i$ , the appropriate verified gross savings adjustment factors were applied to 2013 adjusted reported gross savings to derive 2013 verified gross savings in accordance with the following:

$$= \frac{\text{2013 Verified Gross Savings}_{i,j}}{\text{2013 Adjusted Reported Gross Savings}_{i,j} \times \text{Verified Gross Savings Adjustment Factor}_{i,j}}$$

The second adjustment factor applied to these certification results was the net-to-gross adjustment factor. For this 2013 certification effort, the net-to-gross adjustment factor was a constant 0.900 across all programs, as mandated by a recent MPSC ruling.<sup>8</sup> The deemed net-

<sup>8</sup> Michigan Public Service Commission, Case No. U-17138.

to-gross adjustment factor was applied to verified gross savings to derive verified net savings:

$$\begin{aligned} & 2013 \text{ Verified Net Savings}_{i,j} \\ &= 2013 \text{ Verified Gross Savings}_{i,j} \times \text{Deemed NTG Adjustment Factor}_{i,j} \end{aligned}$$

The final 2013 realization rates are equal to the 2013 verified net savings divided by the 2013 reported gross savings:

$$2013 \text{ Realization Rate}_{i,j} = \frac{2013 \text{ Verified Net Savings}_{i,j}}{2013 \text{ Reported Gross Savings}_{i,j}}$$

All calculations were conducted at the measure level and then aggregated to the program or subprogram level for reporting purposes.

## 2.5 Application of Long Life Equipment Savings Multiplier

Beginning this year for Program Year 2013, the certification team also included the calculation of the Long Life Equipment Savings Multiplier (LLESM) as part of the certification process. The LLESM is part of the new performance incentive mechanism (PIM) as outlined by the MPSC.<sup>9</sup> In an effort to bolster the installation of longer-lasting measures, the LLESM is a 10% savings multiplier awarded to all measures installed through the C&I programs with a measure life of 10 years or more. The certification team relied on the measure lives contained in the MEMD or relevant workpapers for determining eligible long-life measures. As such, a 1.1 multiplier was applied to net savings for each appropriate measure,  $j$ , in each program,  $i$ , as shown in the following:

$$2013 \text{ Verified Net Savings Including LLESM}_{i,j} = 2013 \text{ Verified Gross Savings}_{i,j} \times 1.1$$

In the body of the report results are shown as aggregated to the program level; complete measure level results are shown in Appendix A.

## 2.6 Verification of Performance Incentive Metrics

In January 2013, the MPSC outlined a new performance incentive mechanism (PIM) for Consumers Energy's EO programs in Case No. U-17138, which was then updated in Case No. U-17531.<sup>10</sup> This new PIM includes a series of metrics that contribute towards Consumers Energy's total performance incentive, such as increases in multi-measure projects and new construction savings. Beginning this year for Program Year 2013, the certification team also verified the various metrics that contribute towards Consumers Energy's performance

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<sup>9</sup> Michigan Public Service Commission, Case No. U-17138 updated with Case No. U17531.

<sup>10</sup> <http://efile.mpsc.state.mi.us/efile/docs/17138/0060.pdf> and <https://efile.mpsc.state.mi.us/efile/docs/17351/0028.pdf>

incentive. In addition to the demand (kW) and long-life savings included in this report, Consumers Energy's (PIM) include the following:

- Multi-measure C&I electric projects
- Multi-measure C&I gas projects
- New Construction C&I gas savings

To certify the number of multi-measure projects, the certification team reviewed the invoices for multi-measure bonuses paid by Consumers Energy in PY2012 and PY2013. To certify the level of New Construction gas savings, the certification team verified program tracking data values. Details of this PIM certification are included in Chapter 6 of this report.

## 3. Summary of Savings Variances

This section summarizes the results of the independent certification of adjusted reported gross savings as compared to reported gross savings, focusing on variances found associated with per-unit savings. All calculations were conducted using per-unit and total savings values rounded to four decimal places;<sup>11</sup> adjustment factors are rounded to three decimal places.

### 3.1 Certification of Per-unit Savings

This step of the certification process involved comparing the reported per-unit electric energy (kWh), electric demand (kW), and natural gas (Mcf) savings values for each prescriptive measure contained in the program tracking databases to the appropriate deemed savings values from the master non-weather sensitive MEMD,<sup>12</sup> the weather-sensitive-weighted MEMD results,<sup>13</sup> or other supporting documentation (i.e. measure workpapers). All custom projects installed under the Business Solutions and Multi-Family Programs, and most lighting measures installed under Direct Install-Core Program, are calculated individually based on the operational characteristic of each project installation and are captured under impact evaluation efforts, so an assessment of per-unit savings for these are precluded. The following sections summarize variances found for the measures using MEMD or workpaper savings values for the Business Solutions Program, Small Business Solutions Program, and the Multifamily Program, respectively. Because some measure were installed across multiple subprograms and results may vary between subprograms, where applicable, tabular results also indicate which installations of the measure by subprogram were associated with the variance.

#### Business Solutions Program

The results presented in this section of the report present variances found by the certification team associated with the prescriptive measures installed through the Program Year 2013 Business Solutions Program. Most prescriptive measures installed through the Business Solutions Program fall into two main types: (1) measures that use deemed savings values obtained from the master MEMD, or (2) weather-sensitive-weighted measures that

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<sup>11</sup> Rounding to four decimal places can result in very small variances when comparing the reported gross and adjusted reported gross savings. This is because it appears different data is rounded at different steps when computing the reported savings values in the tracking data. For example, some rounding seems to have occurred as three decimal places and some at four decimal places during intermediate calculation steps; some values were not rounded at all until the final value was computed. Even in aggregate, the net impacts of these rounding issues are quite small and the resulting variances are not discussed in this certification report. Instead, the focus is placed on ensuring that the correct MEMD/weather-sensitive-weighted values were used in the tracking data and that systematic computation errors were not committed.

<sup>12</sup> mi\_master\_measure\_database\_2013\_11202012\_final.xls

<sup>13</sup> For Business Solutions: Navigant 2013 Q4\_Bus Sol Master Measures\_2014\_01\_24.xlsx; for Small Business Solutions: Navigant 2013 Q4\_SB DI Master Measures\_2013\_1\_23.xlsx; for Multi-Family: Navigant 2013 Q4\_CI MF Master Measures\_2013\_1\_28.xlsx.

rely on savings values taken from the weather-sensitive-weighted MEMD.<sup>14</sup> However, in some cases, prescriptive measures were not contained in the MEMD, and instead work paper savings values were used.<sup>15</sup> In addition, some other measures use performance or size adjustments and require additional computations to verify savings – these are discussed later in this section of the report.

Table 3-1 summarizes these variances for electric energy (kWh) savings, Table 3-2 summarizes the variances detected by the certification team for electric demand (kW), and Table 3-3 summarizes the variances detected by the certification team for natural gas (Mcf) savings.

Details of all measures installed under the Business Solutions Program are included in Appendix A.

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<sup>14</sup> Though nearly all measures used deemed savings, several measures also had additional performance savings adjustments. The per-unit savings values for these measures varied and, thus, are not analyzed in this section.

<sup>15</sup> More specifically, for the Business Solutions Program, savings values were sourced from the following workpapers: *CA Outside Air Intake Workpaper\_042812.docx* (CAE0008); *CA-Low pressure drop filter Workpaper-042412.docx* (CAE0004); *CA-NoLossDrain Workpaper-042412.docx* (CAE0005); *CE Work Paper Review- Toilet Exhaust 03082012.docx* (CHC0070); *CHE0012 21 37 38 39 - Chillers.pdf* (CHE0041); *DecorativeLEDWorkpaper\_062613.docx* (CFE0010); *Ductless AC WorkPaper\_043013.docx* (CHE0011 and CHE0064); *Exterior LED-Induction - watts reduced Workpaper.docx* (CFE0008); *High Efficiency Dishwasher\_011813.docx* (CSE0028, CSE0078, CSE0079, CSE0080 and CSE0082); *Hydronic HVAC Pump Control Workpaper\_030811.docx* (CHC0015 and CHE0062); *Indoor CFL WorkPaper\_042712.docx* (CFE0003 and CLE0052); *LED Tube Light Workpaper\_040613.docx* (CFE0013); *Neon to LED Workpaper\_042912.docx* (CFE0006 and CFE0009); *ParkingGarage LED-Induction - watts reduced Workpaper.docx* (CFE0005); *Process Steam Pipe Condensate Insulation\_050312.docx* (CHG0054); *ToiletExhaustOccSensor workpaper\_052011.docx* (CHG0065); *UPS Workpaper\_032713.docx* (CSE0042); *Lighting Power Density Workpaper 032713.docx* (CSE0017 and CSE0049).

Table 3-1. PY2013 Business Solutions Program Per-Unit Electric Energy (kWh) Savings Variances

| Subprogram                        | Measure Category           | Measure Code | Measure Description                             | UOM           | Install Quantity | Per Unit kWh - MEMD | Effect on Reported kWh | Variance Description   |
|-----------------------------------|----------------------------|--------------|---|---------------|------------------|---------------------|------------------------|--|
| Business Solutions - Prescriptive | Compressed Air             | CAE0004      | Low-Pressure Drop Air Filter                    | SCFM          | 800.0            | 24.9600             | 7,984.0000             | eTracker reported per unit kWh = 14.9800; should be 24.9600 kWh      |
| Business Solutions - Prescriptive | Compressed Air             | CAE0005      | Zero Loss Condensate Drain                      | Units         | 20.0             | 1,914.0000          | -10,080.0000           | eTracker reported per unit kWh = 2418.0000; should be 1914.0000 kWh  |
| Business Solutions - Prescriptive | Compressed Air             | CAE0007      | Compressed Air Energy Audit                     | Units         | 5,263.2          | 624.0000            | 1.9472                 | eTracker reported incorrect kWh savings for 7 projects (values vary) |
| Business Solutions - Prescriptive | Compressed Air             | CAE0008      | Air Compressor Outdoor Air Intake               | HP            | 100.0            | 89.8600             | 300.0000               | eTracker reported per unit kWh = 86.8600; should be 89.8600 kWh      |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0005      | Parking Garage LED/Induction Lighting Retrofit  | Watts Removed | 277,007.0        | 8.7600              | 0.0002                 | kWh rounding issue   |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0010      | LED Replacing Incandescent Candelabra and Globe | Units         | 623.0            | 118.0000            | -5,607.0000            | eTracker reported per unit kWh = 127.0000; should be 118.0000 kWh    |
| Business Solutions - Prescriptive | T8 Fluorescent             | CFE0012      | 8-foot T12 to Two (2) 4-ft HP/RW T8             | Units         | 4,160.0          | 39.3000             | 0.0021                 | kWh rounding issue   |
| Business Solutions - Prescriptive | Unitary/Split HVAC         | CHE0001      | AC < 65,000 Btuh (5.4 tons)                     | Tons          | 318.1            | 46.9503             | -0.0001                | kWh rounding issue   |
| Business Solutions - Prescriptive | Room AC / PTAC             | CHE0008      | Package Terminal AC - AC >= 10%                 | Tons          | 88.8             | 68.3707             | -0.0001                | kWh rounding issues  |

|                                      |                       |         |  |                     |             |             |               |  |
|--------------------------------------|-----------------------|---------|--|---------------------|-------------|-------------|---------------|--|
| Business Solutions<br>- Prescriptive | Room AC /<br>PTAC     | CHE0011 | EER higher<br>than IECC<br>2006 standard   | Units               | 390.4       | 123.0000    | -43,255.2300  | eTracker reported per<br>unit kWh = 233.8114;<br>should be 123.0000<br>kWh |
| Business Solutions<br>- Prescriptive | Unitary/Split<br>HVAC | CHE0029 | AC Units ><br>120,000 Btuh<br>(10 tons) and<br><= 240,000<br>Btuh (20 tons)                    | Tons                | 478.5       | 62.5513     | -0.0004       | kWh rounding issues  |
| Business Solutions<br>- Prescriptive | HVAC<br>Controls      | CHE0062 | Hydronic<br>HVAC Pump  | Square<br>Feet      | 1,153,456.0 | 0.5205      | 0.0004        | kWh rounding issue   |
| Business Solutions<br>- Prescriptive | Room AC /<br>PTAC     | CHE0064 | Ductless Air<br>Conditioning   | Units               | 6.5         | 123.0000    | 370.7977      | eTracker reported per<br>unit kWh = 65.9542;<br>should be 123.0000<br>kWh  |
| Business Solutions<br>- Prescriptive | Lamp<br>Removal       | CLE0030 | Lamp<br>Removal:<br>Remove 4-<br>foot T12<br>fluorescent<br>lamp (with T8<br>ballast retrofit) | Lamps<br>Removed    | 12,419.0    | 97.6000     | -449,567.8000 | eTracker reported per<br>unit kWh = 133.8000;<br>should be 97.6000<br>kWh  |
| Business Solutions<br>- Prescriptive | Lamp<br>Removal       | CLE0031 | Lamp<br>Removal:<br>Remove 8-<br>foot T12<br>fluorescent<br>lamp (with T8<br>ballast retrofit) | Lamps<br>Removed    | 1,147.0     | 150.3000    | -30,166.0998  | eTracker reported per<br>unit kWh = 176.6000;<br>should be 150.3000<br>kWh |
| Business Solutions<br>- Prescriptive | Lighting<br>Controls  | CLE0033 | Central<br>Lighting<br>Control   | Square<br>Feet      | 2,199,392.0 | 11,500.0000 | 0.0010        | kWh rounding issue   |
| Business Solutions<br>- Prescriptive | Lighting<br>Controls  | CLE0035 | Daylight<br>Sensor<br>controls   | Square<br>Feet      | 1,524,933.0 | 12,100.0000 | 0.0003        | kWh rounding issue   |
| Business Solutions<br>- Prescriptive | Lighting<br>Controls  | CLE0050 | Exterior Multi-<br>Step Dimming<br>Occ Sensor  | Watts<br>Controlled | 94,524.0    | 1.5330      | 0.0001        | kWh rounding issue   |
| Business Solutions<br>- Prescriptive | Variable<br>Frequency | CME0006 | VFD for<br>Process   | HP                  | 1,161.0     | 1,082.1685  | -0.0001       | kWh rounding issue   |

|  | Drives                    |         | Pumping, <= 50 HP                                    |       |         |            |            |   |  |
|--|---------------------------|---------|--|-------|---------|------------|------------|---|--|
| Business Solutions - Prescriptive        | Variable Frequency Drives | CME0007 | VFD/HVAC Fans and Pumps < 100HP - Electric Customers | HP    | 2,476.8 | 846.2031   | -0.0002    | kWh rounding issue  |  |
| Business Solutions - Prescriptive        | Variable Frequency Drives | CME0025 | VFD on HVAC Fans (< 100 HP)                          | HP    | 1,727.3 | 1,012.1021 | -0.0004    | kWh rounding issues   |  |
| Business Solutions - Prescriptive        | Variable Frequency Drives | CME0027 | VFD on HVAC Pumps (< 100 HP)                         | HP    | 969.8   | 2,499.2531 | -0.0002    | kWh rounding issue  |  |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration | CSE0028 | Electric Dishwasher (High Temp; Under Counter)       | Units | 3.0     | 1,136.0000 | -0.0723    | eTracker reported per unit kWh = 1136.0241; should be 1136.0000     |  |
| Business Solutions - Prescriptive        | Other                     | CSE0042 | UPS - Single Normal Mode - VI (P > 10 kW)            | kW    | 960.0   | 92.2000    | 9,495.9360 | eTracker reported per unit kWh = 82.3084; should be 92.2000 kWh     |  |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration | CSE0078 | Electric Dishwasher (High Temp; Multi Tank)          | Units | 1.0     | 7,778.0000 | 0.3873     | eTracker reported per unit kWh = 7777.6127; should be 7778.0000 kWh |  |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration | CSE0079 | Electric Dishwasher (Low Temp; Single Tank)          | Units | 1.0     | 3,017.0000 | 0.0193     | eTracker reported per unit kWh = 3016.9807; should be 3017.0000 kWh |  |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration | CSE0080 | Electric Dishwasher (High Temp; Single Tank)         | Units | 1.0     | 7,120.0000 | -0.2650    | eTracker reported per unit kWh = 7120.2650; should be 7120.0000 kWh |  |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration | CSE0082 | Electric Dishwasher (Low Temp; Door)                 | Units | 1.0     | 3,567.0000 | 0.1813     | eTracker reported per unit kWh = 3566.8187; should be 3567.0000 kWh |  |
| New Construction - Major Renovation 2013 | Unitary/Split HVAC        | CHE0001 | AC < 65,000 Btuh (5.4 tons)                          | Tons  | 98.1    | 46.9503    | -0.0001    | kWh rounding issues   |  |
| New Construction -                       | Unitary/Split             | CHE0029 | AC Units >   | Tons  | 178.6   | 62.5513    | 0.0001     | kWh rounding issue  |  |



|  |                                 |         |   |                  |           |             |                      |  |  |  |
|--|---------------------------------|---------|---|------------------|-----------|-------------|----------------------|--|--|--|
| Major Renovation<br>2013                       | HVAC                            |         | 120,000 Btuh<br>(10 tons) and<br><= 240,000<br>Btuh (20 tons)       |                  |           |             |                      |  |  |  |
| New Construction -<br>Major Renovation<br>2013 | Lighting<br>Controls            | CLE0035 | Daylight<br>Sensor<br>controls                                      | Square<br>Feet   | 67,772.0  | 12,100.0000 | 0.0001               | kWh rounding issue   |  |  |
| New Construction -<br>Major Renovation<br>2013 | Variable<br>Frequency<br>Drives | CME0007 | VFD/HVAC<br>Fans and<br>Pumps <<br>100HP -<br>Electric<br>Customers | HP               | 587.5     | 846.2031    | -0.0002              | kWh rounding issue   |  |  |
| New Construction -<br>Major Renovation<br>2013 | Other                           | CSE0042 | UPS - Single<br>Normal Mode<br>- VI (P > 10<br>kW)                  | kW               | 34.7      | 92.2000     | 343.6342             | eTracker reported per<br>unit kWh = 82.3084;<br>should be 92.2000<br>kWh     |  |  |
| New Construction -<br>Major Renovation<br>2013 | Other                           | CSE0049 | Lighting<br>Power Density<br>(Exterior)                             | Watts<br>Removed | 213,066.0 | 3.6800      | -32,599.0980         | eTracker reported per<br>unit kWh = 3.8830;<br>should be 3.6800 kWh          |  |  |
| New Construction -<br>Major Renovation<br>2013 | Kitchen and<br>Refrigeration    | CSE0079 | Electric<br>Dishwasher<br>(Low Temp;<br>Single Tank)                | Units            | 1.0       | 3,017.0000  | 0.0193               | eTracker reported per<br>unit kWh = 3016.9807;<br>should be 3017.0000<br>kWh |  |  |
| <b>TOTAL</b>                                   |                                 |         |   |                  |           |             | <b>-552,778.6403</b> |  |  |  |

Table 3-2. PY2013 Business Solutions Program Per-Unit Electric Demand (kW) Savings Variances

| Subprogram                        | Measure Category           | Measure Code | Measure Description   | UOM           | Install Quantity | Per Unit kW - MEMD | Effect on Reported kW | Variance Description   |
|-----------------------------------|----------------------------|--------------|---|---------------|------------------|--------------------|-----------------------|--|
| Business Solutions - Prescriptive | Compressed Air             | CAE0004      | Low-Pressure Drop Air Filter                                      | SCFM          | 800.00           | 0.0035             | 0.3200                | eTracker reported per unit kW = 0.0031; should be 0.0035 kW          |
| Business Solutions - Prescriptive | Compressed Air             | CAE0005      | Zero Loss Condensate Drain  | Units         | 20.00            | 15.9200            | 32.4000               | eTracker reported per unit kW = 14.3000; should be 15.9200 kW        |
| Business Solutions - Prescriptive | Compressed Air             | CAE0007      | Compressed Air Energy Audit                                       | Units         | 5,263.19         | 0.0865             | 2.5934                | eTracker reported incorrect kW savings for 18 projects (values vary) |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0001      | Interior LED/Induction Lighting                                   | Watts Removed | 38,085.00        | 0.0010             | 3.8085                | eTracker reported per unit kW = 0.0009; should be using 0.0010 kW    |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0010      | LED Replacing Incandescent Candelabra and Globe                   | Units         | 623.00           | 0.0289             | -1.3706               | eTracker reported per unit kW = 0.0311; should be 0.0289 kW          |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0011      | LED Replacing Incandescent BR-Series                              | Units         | 3,525.00         | 0.0257             | -9.5175               | eTracker reported per unit kW = 0.0284; should be 0.0257 kW          |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0013      | 4-ft T12 to LED Tube Lights                                       | Units         | 3,442.00         | 0.0106             | -0.3442               | eTracker reported per unit kW = 0.0107; should be 0.0106 kW          |
| Business Solutions - Prescriptive | Room AC / PTAC             | CHE0008      | Package Terminal AC - AC >=10% EER higher than IECC 2006 standard | Tons          | 88.75            | 0.0791             | -0.0001               | kW rounding issues   |

|                                   |                      |         |   |               |           |        |          |   |
|-----------------------------------|----------------------|---------|---|---------------|-----------|--------|----------|---|
| Business Solutions - Prescriptive | Room AC / PTAC       | CHE0011 | Ductless Heat Pump  | Units         | 390.35    | 0.0740 | -4.3719  | eTracker reported per unit kW = 0.0852; should be 0.0740 kW                     |
| Business Solutions - Prescriptive | Chiller              | CHE0012 | Air-cooled Chiller - 1.04 kW/ton IPLV                                       | Tons          | 4,000.40  | 0.0575 | -0.0384  | For 6 of the projects the performance kW calculations in eTracker are incorrect |
| Business Solutions - Prescriptive | Unitary/Split HVAC   | CHE0028 | AC Units > 65,000 Btuh (5.4 tons) and < =120,000 Btuh (10 tons)             | Tons          | 374.50    | 0.0669 | -0.0002  | kW rounding issue   |
| Business Solutions - Prescriptive | Unitary/Split HVAC   | CHE0029 | AC Units > 120,000 Btuh (10 tons) and <= 240,000 Btuh (20 tons)             | Tons          | 478.50    | 0.0757 | -0.0004  | kW rounding issues  |
| Business Solutions - Prescriptive | Room AC / PTAC       | CHE0064 | Ductless Air Conditioning   | Units         | 6.50      | 0.0740 | -0.0383  | eTracker reported per unit kW = 0.0799; should be 0.0740 kW                     |
| Business Solutions - Prescriptive | CFL                  | CLE0001 | CFL Screw in (30 watts or less)   | Units         | 6,140.00  | 0.0382 | -25.7880 | eTracker reported per unit kW = 0.0424; should be 0.0382 kW                     |
| Business Solutions - Prescriptive | HP or RW Fluorescent | CLE0027 | High Performance or Reduced Wattage T8: HP 4-foot lamp and ballast upgrade  | Units         | 96,863.00 | 0.0072 | 19.3726  | eTracker reported per unit kW = 0.0070; should be 0.0072 kW                     |
| Business Solutions - Prescriptive | Lamp Removal         | CLE0030 | Lamp Removal: Remove 4-foot T12 fluorescent lamp (with T8 ballast retrofit) | Lamps Removed | 12,419.00 | 0.0243 | -95.6263 | eTracker reported per unit kW = 0.0320; should be 0.0243 kW                     |

|                                   |                           |         |   |               |            |        |           |   |
|-----------------------------------|---------------------------|---------|---|---------------|------------|--------|-----------|---|
| Business Solutions - Prescriptive | Lamp Removal              | CLE0031 | Lamp Removal: Remove 8-foot T12 fluorescent lamp (with T8 ballast retrofit) | Lamps Removed | 1,147.00   | 0.0369 | -6.9967   | eTracker reported per unit kW = 0.0430; should be 0.0369 kW   |
| Business Solutions - Prescriptive | Variable Frequency Drives | CMC0002 | Constant Volume AHU to VAV with Hydronic Reheat (Combo)                     | Square Feet   | 245,282.00 | 0.0000 | -178.2789 | eTracker reported per unit kW = 0.0019 for 4 projects; there is no MEMD demand savings for this measure |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0007 | VFD/HVAC Fans and Pumps < 100HP - Electric Customers                        | HP            | 2,476.75   | 0.0174 | -0.0001   | eTracker reported per unit kW = 0.0175 for 1 project; should be 0.0174                                  |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0009 | VFD/Chiller Motors - Electric Customers                                     | HP            | 230.00     | 0.0000 | -4.1400   | eTracker reported per unit kW = 0.0180; no MEMD demand savings for this measure                         |
| Business Solutions - Prescriptive | Custom                    | CME0019 | VFDs for Process Fixed Speed Control (Throttled; <= 50 hz)                  | HP            | 90.00      | 0.1516 | -0.0002   | eTracker reported per unit kW = 0.1567 for 1 project; should be 0.1516 kW                               |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0022 | Constant Volume AHU to VAV with Hydronic Reheat (Electric)                  | Square Feet   | 228,097.00 | 0.0000 | -38.9880  | eTracker reported per unit kW = 0.0019 for 1 project; there is no MEMD demand savings for this measure  |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0025 | VFD on HVAC Fans (< 100 HP)   | HP            | 1,727.25   | 0.0301 | -0.0004   | kW rounding issues  |
| Business Solutions - Prescriptive | Other                     | CSC0039 | Roof Insulation - Attic Roof (Combo)  | Square Feet   | 8,504.00   | 0.0000 | -0.8504   | eTracker reported per unit kW = 0.0001; there is no MEMD demand savings for                             |

|  |                    |         |   |      |  |        |        |           | this measure  |
|--|--------------------|---------|---|------|--|--------|--------|-----------|---|
| Business Solutions - Prescriptive        | Other              | CSE0042 | UPS - Single Normal Mode - VI (P > 10 kW) | kW   |  | 960.00 | 0.0240 | 2.4960    | eTracker reported per unit kW = 0.0214 kW; should be 0.0240 kW                |
| New Construction - Major Renovation 2013 | Unitary/Split HVAC | CHE0001 | AC < 65,000 Btuh (5.4 tons)               | Tons |  | 98.12  | 0.0616 | 0.0001    | kW rounding issues  |
| New Construction - Major Renovation 2013 | Chiller            | CHE0012 | Air-cooled Chiller - 1.04 kW/ton IPLV     | Tons |  | 726.50 | 0.0575 | -0.0257   | For 1 of the projects the performance kW calculation in eTracker is incorrect |
| New Construction - Major Renovation 2013 | Other              | CSE0042 | UPS - Single Normal Mode - VI (P > 10 kW) | kW   |  | 34.74  | 0.0240 | 0.0904    | eTracker reported per unit kW = 0.0214 kW; should be 0.0240 kW                |
| TOTAL                                    |                    |         |   |      |  |        |        | -305.2312 |   |

Table 3-3. PY2013 Business Solutions Program Per-Unit Natural Gas (Mcf) Savings Variances

| Subprogram                        | Measure Category            | Measure Code | Measure Description   | UOM         | Install Quantity | Per Unit MCF - MEMD | Effect on Reported Mcf | Variance Description   |
|-----------------------------------|-----------------------------|--------------|---|-------------|------------------|---------------------|------------------------|--|
| BOC                               | Other                       | CSC0042      | BOC (Combo Customer)  | Units       | 11.00            | 152.0203            | -0.0055                | eTracker reported per unit MCF = 15.0208; should be 15.0203 MCF                        |
| BOC                               | Other                       | CSG0027      | BOC (Gas Customer)  | Units       | 8.00             | 152.0203            | -0.0040                | eTracker reported per unit MCF = 15.0208; should be 15.0203 MCF                        |
| Business Solutions - Prescriptive | HVAC Controls               | CHE0065      | Chilled Water Reset Retrofit (10 degrees) - Electric          | Tons        | 438.00           | 0.0639              | -0.4080                | eTracker reported per unit MCF = 0.0699 for 1 project; should be 0.0639 MCF.           |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0025      | Boiler Tune-up Level 3 (>=1200 kbtu/h)                        | Units       | 539.00           | 0.0317              | -0.0001                | MCF rounding issue   |
| Business Solutions - Prescriptive | Steam Traps                 | CHG0102      | Leaking Steam Trap Repair or Replacement -- Special Incentive | Units       | 1,370.00         | 28.9655             | -0.1370                | eTracker reported per unit MCF = 29.9656; should be 29.9655 MCF                        |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0207      | Optimized Boiler Plant Sequencing (Process)                   | MBH         | 61,946.00        | 0.0545              | -235.3948              | eTracker reported per unit MCF = 0.0583; should be 0.0545 MCF                          |
| Business Solutions - Prescriptive | Kitchen and Refrigeration   | CSE0043      | Night Covers (Combo)  | Linear Feet | 204.00           | 0.0000              | -32.4768               | eTracker reported per unit MCF = 0.1592; there is no MEMD gas savings for this measure |
| Business Solutions - Prescriptive | Other                       | CSG0002      | Truck Loading Dock Seals                                      | Units       | 22.00            | 39.0743             | -0.0022                | eTracker reported per unit MCF = 39.0744; should be 39.0743 MCF                        |
| Business Solutions - Prescriptive | Other                       | CSG0003      | Truck Loading Dock Leveler Ramp Seals                         | Units       | 25.00            | 25.4663             | -0.0025                | eTracker reported per unit MCF = 25.4664; should be 25.4663 MCF                        |
| Business Solutions - Prescriptive | Kitchen and Refrigeration   | CSG0009      | Commercial Conveyor Oven (>25" Conveyor)                      | Units       | 1.00             | 85.9245             | -0.0003                | eTracker reported per unit MCF = 85.9248; should be 85.9245 MCF                        |

|  |                           |          | Width)   |       |           |          |           |  |
|--|---------------------------|----------|--|-------|-----------|----------|-----------|--|
| Business Solutions - Prescriptive        | Kitchen and Refrigeration | CSG00020 | EnergyStar Steam Cookers - 6 Pan; Gas              | Units | 1.00      | 202.5641 | -0.0007   | eTracker reported per unit MCF = 202.5648; should be 202.5641 MCF            |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration | CSG00024 | Fixed-Plate Energy Recovery Unit (GO)              | CFM   | 450.00    | 0.1187   | -0.0900   | eTracker reported per unit MCF = 0.1189; should be 0.1187 MCF                |
| Business Solutions - Prescriptive        | C&I Waterheating          | CWG00002 | Gas Water Heater > 80 gal                          | Units | 16.00     | 18.2735  | -0.0016   | eTracker reported per unit MCF = 18.2736; should be 18.2735 MCF              |
| Business Solutions - Prescriptive        | C&I Waterheating          | CWG00004 | Gas tankless water heater                          | Units | 36.00     | 17.2043  | -0.0036   | eTracker reported per unit MCF = 17.2044; should be 17.2043 MCF              |
| Business Solutions - Prescriptive        | C&I Waterheating          | CWG00015 | High Eff Domestic Water Heater (90%)               | MBH   | 11,492.00 | 0.2412   | -1.1492   | eTracker reported per unit MCF = 0.2413; should be 0.2412 MCF                |
| New Construction - Major Renovation 2013 | Furnaces and Heaters      | CHG00061 | High Efficiency Furnace or Unit Heater (>94% AFUE) | MBH   | 400.00    | 0.2542   | -0.4560   | For 1 project, eTracker reported per unit MCF = 0.2559; should be 0.2542 MCF |
| New Construction - Major Renovation 2013 | Other                     | CSG00003 | Truck Loading Dock Leveler Ramp Seals              | Units | 59.00     | 25.4663  | -0.0059   | eTracker reported per unit MCF = 25.4664; should be 25.4663 MCF              |
| New Construction - Major Renovation 2013 | C&I Waterheating          | CWG00002 | Gas Water Heater > 80 gal                          | Units | 3.00      | 18.2735  | -0.0003   | eTracker reported per unit MCF = 18.2736; should be 18.2735 MCF              |
| New Construction - Major Renovation 2013 | C&I Waterheating          | CWG00015 | High Eff Domestic Water Heater (90%)               | MBH   | 3,180.00  | 0.2412   | -0.3180   | eTracker reported per unit MCF = 0.2413; should be 0.2412 MCF                |
| TOTAL                                    |                           |          |  |       |           |          | -270.4565 |  |

While the majority of Business Solutions Program prescriptive measures used master MEMD, weather-sensitive-weighted MEMD, or workpaper savings values, savings calculations for some other measures relied on additional adjustments to account for size or performance of the measure installed. The certification team recalculated savings using the appropriate equations to ensure the correct measure savings were reported; we did not assess the other variables in the equations as they are assessed through the periodic impact evaluations.

Performance adjustments were used for some measures to account for efficiency levels that differ from that of the equipment used to determine the baseline or deemed savings value in the MEMD. The formula used to calculate total savings for measures receiving a performance adjustment of additional kWh or kW per ton reduction is:

$$Sav_t = Q \times Sav_d + Q \times \left[ \left( \frac{Eff - Eff_b}{PI} \right) \times Sav_i \right]$$

where:

$Sav_t$  = Calculated annual kWh/kW savings

$Q$  = Quantity of units installed

$Sav_d$  = Deemed annual kWh/kW savings

$Eff$  = Efficiency of installed measure

$Eff_b$  = Efficiency of baseline measure

$PI$  = Performance Incremental

$Sav_i$  = Incremental annual performance kWh/kW savings

The measures using this methodology are shown in Table 3-4:

**Table 3-4. Business Solutions Program Measures with Additional Performance Savings**

| Measure Code | Measure Description  |
|--------------|--|
| CHE0012      | Air-cooled Chiller - 1.04 kW/ton IPLV                                      |
| CHE0037      | Water Cooled Chillers- Centrifugal   |
| CHE0038      | Water Cooled Chillers- Centrifugal >300 tons and <= 600 tons, IPLV = 0.49  |
| CHE0039      | Water-Cooled Chillers- Centrifugal >600 tons, IPLV =0.49                   |
| CHE0041      | Water-Cooled Chillers- Reciprocating >150 tons and <=300 tons, IPLV = 0.52 |

Table 3-5 shows the variances found by the certification team associated with electric energy (kWh) savings and Table 3-6 shows the variances found associated with electric demand (kW).



**Table 3-5. PY2013 Business Solutions Program Variances for Measures with Additional kWh Performance savings**

| Subprogram                               | Measure Category | Measure Code | Measure Description                   | UOM  | Install Quantity | Effect on Reported kWh | Variance Description  |
|--|------------------|--------------|---------------------------------------|------|------------------|------------------------|---|
| Business Solutions - Prescriptive        | Chiller          | CHE0012      | Air-cooled Chiller - 1.04 kW/ton IPLV | Tons | 4,000.4          | -130.4808              | For 6 projects the performance kWh calculations in eTracker are incorrect |
| New Construction - Major Renovation 2013 | Chiller          | CHE0012      | Air-cooled Chiller - 1.04 kW/ton IPLV | Tons | 726.5            | -87.3852               | For 1 project the performance kWh calculation in eTracker is incorrect    |
| <b>TOTAL</b>                             |                  |              |                                       |      |                  | <b>-217.8660</b>       |   |

**Table 3-6. PY2013 Business Solutions Program Variances for Measures with Additional kW Performance savings**

| Subprogram                               | Measure Category | Measure Code | Measure Description                   | UOM  | Install Quantity | Effect on Reported kW | Variance Description   |
|--|------------------|--------------|---------------------------------------|------|------------------|-----------------------|--|
| Business Solutions - Prescriptive        | Chiller          | CHE0012      | Air-cooled Chiller - 1.04 kW/ton IPLV | Tons | 4,000.4          | -0.0384               | For 6 projects the performance kW calculations in eTracker are incorrect |
| New Construction - Major Renovation 2013 | Chiller          | CHE0012      | Air-cooled Chiller - 1.04 kW/ton IPLV | Tons | 726.5            | -0.0257               | For 1 project the performance kW calculation in eTracker is incorrect    |
| <b>TOTAL</b>                             |                  |              |                                       |      |                  | <b>-0.0641</b>        |  |

The formula used to calculate total savings for measures receiving a performance adjustment associated with kBTUh or MBH is:

$$Sav_t = Q \times (Eff - Eff_b) \times Sav_i$$

where:

Sav<sub>t</sub> = Calculated annual MCF savings

Q = Quantity of units installed

Eff = Efficiency of installed measure

$Eff_b$  = Efficiency of baseline measure

$Sav_i$  = Incremental annual performance MCF savings

The measures using this methodology are shown in Table 3-7:

**Table 3-7. Business Solutions Program Measures with Additional Efficiency Savings**

| Measure Code | Measure Description                              |
|--------------|--|
| CWG0016      | Domestic Water Heater Tune-Up (199 - 499 MBH)    |
| CWG0017      | Domestic Water Heater Tune-Up (500 - 1,199 MBH)  |
| CWG0019      | Domestic Water Heater Tune-Up ( $\geq$ 1200 MBH) |

No variances were found with any of these three measures.

Another adjustment is used to account for differing sizes for certain measures. The formula used to calculate savings for these measures is:

$$Sav_t = Q \times Sav_d \times Size$$

where:

$Sav_t$  = Calculated annual kWh/Mcf savings

$Q$  = Quantity of units installed

$Sav_d$  = Deemed annual kWh/Mcf savings

Size = Size of installed measure

The measures using this methodology are shown in Table 3-8:

**Table 3-8. Business Solutions Program Measures with Additional Size Savings**

| Measure Code | Measure Description                                 |
|--------------|---|
| CHE0043      | Air and Water-Cooled Chiller Tune-up                |
| CHG0019      | Gas Furnace or RTU Tune-up ( $\geq$ 40 and          |
| CHG0021      | Gas Furnace or RTU Tune-up ( $\geq$ 300 MBH)        |
| CHG0023      | Boiler Tune-up Level 1 ( $\geq$ 110 and 500 kbtu/h) |
| CHG0024      | Boiler Tune-up Level 2 ( $\geq$ 500 and             |
| CHG0025      | Boiler Tune-up Level 3 ( $\geq$ 1200 kbtu/h)        |
| CHG0026      | High Efficiency Process Boiler Replacement (Water)  |
| CHG0028      | Process Boilers Tune-up $\geq$ 1200 kbtu/h          |
| CHG0029      | Process Boiler Tune-up Level 5 ( $\geq$ 500 and     |
| CHG0030      | Process Boiler Tune-up Level 4 ( $\geq$ 300 and     |

No variances were found with any of these 10 measures.

## Small Business Solutions

The results presented in this section of the report summarize variances found by the certification team associated with the Program Year 2013 Small Business Solutions Program. Most measures installed through the Small Business Solutions Program fall into two main types: (1) measures that use deemed savings values obtained from the master non-weather sensitive MEMD, or (2) weather-sensitive-weighted measures that rely on savings values taken from the weather-sensitive-weighted MEMD. However, two measures were not contained in either MEMD and per-unit savings were taken from the following workpapers:

- *DecorativeLEDWorkpaper\_062713.docx* (CDE0090)
- *LED\_LinearT12Workpaper\_11082013\_IS.docx* (CFE0014)

In addition, the two measures installed thorough the Furnace Tune-up subprogram – CDG0011 and CDG0012 – use performance adjustments, which are discussed later in this section.

As discussed earlier, lighting measures installed through the Direct Install-Core Program are not assessed here as they rely on project-specific calculations to derive energy savings, which are covered as part of the annual impact evaluations.

Table 3-9 summarizes these variances for electric energy (kWh) savings; Table 3-10 summarizes the variances detected by the certification team for electric demand (kW); Table 3-11 shows the variance found associated with natural gas (Mcf) savings.

Appendix A includes the complete listing of all measures installed through the Small Business Solutions Program in Program Year 2013.

Table 3-9. PY2013 Small Business Solutions Program Per-Unit Electric Energy (kWh) Savings Variances

| Program                  | Measure Category        | Measure Code | Measure Description                | UOM   | Install Quantity | Per Unit kWh - MEMD | Effect on Reported kWh | Variance Description |
|--------------------------|-------------------------|--------------|------------------------------------|-------|------------------|---------------------|------------------------|----------------------|
| Programmable Thermostats | Direct Install Lighting | CFE0014      | Linear Fluorescent to LED Retrofit | Units | 339.00           | 379.3900            | 0.0019                 | kWh rounding issue   |
| <b>TOTAL</b>             |                         |              |                                    |       |                  |                     | <b>0.0019</b>          |                      |

Table 3-10. PY2013 Small Business Solutions Program Per-Unit Electric Demand (kW) Savings Variances

| Program       | Measure Category             | Measure Code | Measure Description  | UOM   | Install Quantity | Per Unit kW - MEMD | Effect on Reported kW | Variance Description  |
|---------------|------------------------------|--------------|--|-------|------------------|--------------------|-----------------------|---|
| CFL - Buydown | Direct Install Non-lighting  | CDE0198      | CFL bulbs regular (buydown)                                | Units | 149,234.00       | 0.0382             | -626.7828             | eTracker reported per unit kW = 0.0424; should be 0.0382 kW                   |
| CFL - Buydown | Direct Install Non-lighting  | CDE0199      | CFL bulbs specialty (buydown)                              | Units | 4,582.00         | 0.0382             | -19.2444              | eTracker reported per unit kW = 0.0424; should be 0.0382 kW                   |
| Core DI       | Direct Install Non-lighting  | CDE0080      | ECM Case Motor   | Units | 44.00            | 0.0846             | -0.4176               | eTracker reported per unit kW = 0.0941; should be 0.0846 kW                   |
| Core DI       | Direct Install Non-lighting  | CDE0081      | ECM Walk-in Cooler and Freezer Motor                       | Units | 302.00           | 0.1404             | -4.7172               | eTracker reported per unit kW = various incorrect values; should be 0.1404 kW |
| Core DI       | Direct Install Lighting      | CDE0084      | Evaporator Fan Motor Controls on PSC motors                | Units | 11.00            | 0.0819             | -0.0991               | eTracker reported per unit kW = 0.0909; should be 0.0819 kW                   |
| Hospitality   | Direct Install - Hospitality | CDE0103      | LED Lighting - 6 W LED Lamps Replacing Incandescent Lights | Units | 1,640.00         | 0.0479             | 12.4640               | eTracker reported per unit kW = 0.0403; should be 0.0479 kW                   |
| <b>TOTAL</b>  |                              |              |  |       |                  |                    | <b>-638.7971</b>      |   |

The only natural gas (Mcf) variances associated with the Small Business Solutions Program were associated with a measure installed through the Furnace Tune-up subprogram. The formula used to calculate total savings for the two measure measures installed through the Furnace Tune-up subprogram (CDG0011 and CDG0012) used a performance adjustment:

$$Sav_t = Q \times Eff \times Sav_i$$

where:

Sav<sub>t</sub> = Calculated annual MCF savings

Q = Quantity of units installed

Eff = Efficiency of installed measure

Sav<sub>i</sub> = Incremental annual performance MCF savings

Table 3-11 shows the variances found by the certification team associated with natural gas (Mcf) savings for the Small Business Solutions Program.

**Table 3-11. PY2013 Small Business Solutions Program Per-Unit Natural Gas (Mcf) Savings Variances**

| Program         | Measure Category            | Measure Code | Measure Description                                 | UOM   | Install Quantity | Per Unit MCF - MEMD | Effect on Reported Mcf | Variance Description   |
|-----------------|-----------------------------|--------------|---|-------|------------------|---------------------|------------------------|--|
| Furnace Tune-up | Direct Install Non-lighting | CDG0011      | DI - Gas Furnace or RTU Tune-up (>=40 and <300 MBH) | Units | 2,402            | 0.0309              | -2.0394                | 1 project has incorrect computed MCF performance savings in eTracker |
| <b>TOTAL</b>    |                             |              |   |       |                  |                     | <b>-2.0394</b>         |  |

## Multi-Family Program

The results presented in this section of the report summarize variances found by the certification team associated with the Program Year 2013 Multi-Family Program. Nearly all measures installed through the Multi-Family Program used deemed savings values obtained from the master MEMD or the weather-sensitive-weighted MEMD. However, a few measures were not contained in either MEMD and per-unit savings for these were taken from the following workpapers:

- *FES-C11a DHW Pipe Insulation Michigan 073013.doc* (CTG0052)
- *LED and CFL Candelabra Style Lamps in Multifamily\_0737.doc* (CTE0139, CTE0143, CTE0144, CTE0145, and CTE0146)
- *Low Flow 1.5gpm Kitchen and 1.0gpm Bath Aerators.doc* (CTE0019, CTE0172, CTG0014, CTG0114, and CTG0141)

The certification team found no variances associated with electric energy (kWh) savings for this program. Table 3-12 shows the variances associated with electric demand (kW) savings; Table 3-13 shows the variances associated with natural gas (Mcf) Savings.

Appendix A includes the complete listing of all measures installed through the Multi-Family Program in Program Year 2013.

**Table 3-12. PY2013 Multi-Family Program Per-Unit Electric Demand (kW) Savings Variances**

| Measure Category | Measure Code | Measure Description                                  | UOM   | Install Quantity | Per Unit kW - MEMD | Effect on Reported kW | Variance Description  |
|------------------|--------------|--|-------|------------------|--------------------|-----------------------|---|
| C&I Multifamily  | CTE0019      | Low Flow Kitchen Faucet Aerators- Electric - DI      | Units | 76.00            | 0.0239             | -0.0076               | eTracker reported per unit kW = 0.0240; should be 0.0239 kW |
| C&I Multifamily  | CTE0172      | Low Flow Bath Faucet Aerators 1.0gpm - Electric - DI | Units | 28.00            | 0.0234             | 0.1260                | eTracker reported per unit kW = 0.0189; should be 0.0234 kW |
| C&I Multifamily  | CTE0174      | DI - LED Candelabra Lamp (3-5W) - In-Unit - DI       | Units | 612.00           | 0.0010             | -16.7076              | eTracker reported per unit kW = 0.0283; should be 0.0010 kW |
| C&I Multifamily  | CTE0175      | DI - CFL Candelabra Lamp (5-13W) - In-Unit - DI      | Units | 67.00            | 0.0053             | -1.9229               | eTracker reported per unit kW = 0.0340; should be 0.0053 kW |
| <b>TOTAL</b>     |              |  |       |                  |                    | <b>-18.5121</b>       |   |

**Table 3-13. PY2013 Multi-Family Program Per-Unit Gas (Mcf) Savings Variances**

| Measure Category | Measure Code | Measure Description               | UOM         | Install Quantity | Per Unit MCF - MEMD | Diff Mcf       | Variance Description  |
|------------------|--------------|-----------------------------------|-------------|------------------|---------------------|----------------|---|
| C&I Multifamily  | CTG0052      | Pipe Wrap - DHW - Common - DI     | Linear Feet | 7,896.00         | 0.2431              | -7.8960        | eTracker reported per unit MCF = 0.2441; should be 0.2431 MCF |
| C&I Multifamily  | CTG0131      | In-Direct Water Heater (e90% Eff) | MBH         | 3,510.00         | 0.2412              | -0.3510        | eTracker reported per unit MCF= 0.2413; should be 0.2412 MCF  |
| <b>TOTAL</b>     |              |                                   |             |                  |                     | <b>-8.2470</b> |   |

## 4. Application Certification

This section of the report provides the results of the application review conducted for the Program Year 2013 Consumer Energy C&I certification process. As noted elsewhere in this report, the results of this review were not used to estimate verified net savings this year. Because the gross adjustment factors derived through the impact evaluations could also capture errors in the tracking database, applying these results in addition to the gross adjustment factors could double count tracking data errors. Instead, these results are presented for consistency with previous years' certification reports and informative purposes.

Also note that in this section of the report, findings are presented by subprogram. The reason for this is that the application process and materials often vary by subprogram within a program, and the certification team sought to ensure consistency across the different results. More specifically, the results in this section are summarized according to the following groupings:

- Business Solutions Program (includes Business Solutions-Prescriptive, Business Solutions-Custom, and Building Operator Certification)
- New Construction Program (includes New Construction-Major Retrofit and New Construction-Whole Building)
- Direct Install-Core Program
- Programmable Thermostat Program
- Hospitality Program
- Furnace Tune-up
- Multi-Family

No paper records were available for the Drop Ship Lighting or Buydown Lighting Initiatives so the application review was not conducted for these initiatives.

In order to conduct this review, the certification team obtained copies of applications for a random selection of participants for each of the programs, and entries in the tracking database were then compared to the same entries in the application. The document review identified variances between the eTracker database and the paper record. Fields missing in either the Consumer Energy tracking database or the paper application were considered variances, since they could not be verified against each other. While the results of this review are provided for informational purposes, it is important to preface these with the fact that the customer-level variances presented herein do not necessarily reflect actual data problems.

When implementation staff, customers, or contractors fill out an application, much of the information they enter is collected directly from a contact person at the facility. Many companies have multiple phone numbers and contact staff, so variances in contact person or phone number may simply be due to the wrong name or number being provided. Similarly, billing address information may have been provided instead of the address of the physical location, so variances in address, city, and/or state are not necessarily reflective of errors either. In terms of customer name variances, the results will show that many were the result of a



person's name being entered on the application when it should have been a company, or no name was provided at all. Another issue is that many customers have multiple account numbers due to factors such as multiple gas and electric accounts, multiple locations, and/or multiple buildings at a location. Discussions with the program staff revealed that often an initial account number was assigned based on a tracking system search, but it is later determined that the account number used was not the appropriate one because it was associated with the wrong account type (e.g. a gas account number was first assigned, but the measure installed was an electric measure). Thus, different account numbers or customer types are not necessarily problems either; in actuality, they may represent corrections. Because of the array of different factors that can come into play, it was not possible for the certification team to determine which cases were associated with actual errors and which were related to issues such as those discussed above, thus the information provided here should be interpreted with care and should not be taken to suggest actual data problems.

## Business Solutions Program

The Business Solutions Program application certification process covered a variety of forms for each project application file selected for the sample, including an application review form, incentive application checklist, incentive application form, final application agreement, measure worksheets, invoices, and measure specifications. The certification team examined a total of 153 applications for accuracy.

Table 4-1 shows that the most common variances at the customer level for Business Solutions applications were in the customer address field, with 33% of the applications containing an error. Most of the errors were due to minor differences in the street number or street spelling between the application and the database.

The next most common errors were in the contact name and customer type fields (24 and 17%, respectively). The most frequent error in the contact name field was a different name being listed; the most frequent error for customer type was the customer being marked as a combination customer in the application but showing up as either an electricity or gas customer in the database. Additionally, the review examined and discovered variances in customer name (8%), city (5%), and phone number (5%).

In total, 10% of all application fields examined in the sampled applications were associated with an error, and 60% of the sampled applications had at least one variance at the customer level. Of those customers that had at least one variance, the average number of variances was 1.548.

**Table 4-1. PY2013 Business Solutions Program, Application Variances at the Customer-Level**

| Tracking Database Field Name                | Number of Variances | Percent of Sampled Applications (n=153) |
|---|---------------------|---|
| Project ID                                  | 0                   | 0%                                      |
| Account Number                              | 0                   | 0%                                      |
| Contact Name                                | 37                  | 24%                                     |
| Customer Name                               | 12                  | 8%                                      |
| Address                                     | 51                  | 33%                                     |
| City  | 8                   | 5%                                      |
| State                                       | 0                   | 0%                                      |
| Phone                                       | 8                   | 5%                                      |
| Customer Type                               | 27                  | 17%                                     |
| <b>Total (Variances/Application Fields)</b> | <b>143</b>          | <b>10%</b>                              |
| <b>Total (Apps With Variances/Apps)</b>     | <b>92</b>           | <b>60%</b>                              |

Columns may not sum to total due to rounding.

Table 4-2 summarizes the measure-level variances found for each of the end use categories in the Business Solution application sample. Two types of variances were screened: (1) measure code variances, and measure quantity variances.<sup>16</sup> *Measure code variances* occur when a measure code appeared in the application, but not in the tracking system, or a measure code appeared in the tracking database, but not in the application. *Measure quantity variances* occur when the quantity installed of a measure differs between the application and tracking database.

As Table 4-2 shows, a total of 15 measure quantity variances were identified from the review of the 153 applications. These variances were present in approximately 3% of all measures reviewed and were most common in the HVAC-electric end use. No measure code variances were found in any category. A detailed list of all Business Solutions Program document review variances is presented in Appendix B.

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<sup>16</sup> Note that as discussed in the methods section of this report, because impact evaluations for this program capture the same type of information as the application review, to avoid the double counting of effects, the reported gross savings are not adjusted for these findings.

**Table 4-2. PY2013 Business Solutions Program Measure-Level Application Variances**

| End Use Category | # of Measures | Count of Measure Quantity Variances | Percent of Total Measures | Count of Measure Code Variances | Percent of Total Measures |
|------------------|---------------|-------------------------------------|---------------------------|---------------------------------|---------------------------|
| Compressed Air   | 18            | 0                                   | 0%                        | 0                               | 0%                        |
| EMS - gas        | 8             | 0                                   | 0%                        | 0                               | 0%                        |
| EMS - elec       | 6             | 0                                   | 0%                        | 0                               | 0%                        |
| EMS - both       | 7             | 0                                   | 0%                        | 0                               | 0%                        |
| HVAC – elec      | 24            | 2                                   | 8%                        | 0                               | 0%                        |
| HVAC – gas       | 68            | 0                                   | 0%                        | 0                               | 0%                        |
| HVAC – both      | 6             | 0                                   | 0%                        | 0                               | 0%                        |
| Lighting         | 219           | 6                                   | 3%                        | 0                               | 0%                        |
| Motors           | 70            | 3                                   | 4%                        | 0                               | 0%                        |
| Miscellaneous    | 78            | 0                                   | 0%                        | 0                               | 0%                        |
| Water Heating    | 20            | 0                                   | 0%                        | 0                               | 0%                        |
| Custom           | 65            | 4                                   | 6%                        | 0                               | 0%                        |
| <b>Total</b>     | <b>589</b>    | <b>15</b>                           | <b>3%</b>                 | <b>0</b>                        | <b>0%</b>                 |

Columns may not sum to total due to rounding.

## New Construction Program

The New Construction Program application certification covered a variety of forms for each project application file selected for the sample, including an application review form, incentive application checklist, incentive application form, final application agreement, measure worksheets, invoices, and measure specifications. The certification team examined a total of 10 applications for accuracy.

Table 4-3 summarizes the application customer level variances detected during this certification process. In all, the certification team reviewed 10 total applications and 8 (80%) were found to have some type of variance. The greatest proportion of variances (40%) was associated with addresses. Other variances included customer name and customer type (20% each), contact name (10%), city (10%), and phone number (10%).

**Table 4-3. PY2013 New Construction Program Variances at Customer Level**

| Tracking Database Field Name                | Number of Variances | Percent of Sampled Applications (n=10) |
|---|---------------------|--|
| Project ID                                  | 0                   | 0%                                     |
| Account Number                              | 0                   | 0%                                     |
| Contact Name                                | 1                   | 10%                                    |
| Customer Name                               | 2                   | 20%                                    |
| Address                                     | 4                   | 40%                                    |
| City  | 1                   | 10%                                    |
| State                                       | 0                   | 0%                                     |
| Phone                                       | 1                   | 10%                                    |
| Customer Type                               | 2                   | 20%                                    |
| <b>Total (Variances/Application Fields)</b> | <b>11</b>           | <b>12%</b>                             |
| <b>Total (Apps With Variances/Apps)</b>     | <b>8</b>            | <b>80%</b>                             |

Columns may not sum to total due to rounding.

The certification team only located one measure-level variance during the application review process for the New Construction Program. This variance involved an inaccurate quantity of watts reduced being recorded for a “Lighting Power Density” measure.

## Direct Install - Core Program

For the Direct Install – Core Program, contractors filled out electronic applications on a computer and posted them directly into the implementer’s tracking database where energy savings calculations occurred. The implementer database was then uploaded to the Consumers Energy tracking database. The certification team reviewed paper copies of the electronic applications and compared them to the Consumers Energy database of record. However, since measure types, quantities, and energy savings computations are uploaded directly into the Consumers Energy database electronically, no variances are possible for these fields. Thus, only customer level results are discussed.

Table 4-4 shows the results of the Direct Install – Core Program application review. In all, the certification team examined documents for 76 projects, and the greatest variances were associated with phone numbers (45%), and customer name (24%). Other fields that contained variances included address (4%), zip code (4%), and city (3%). In all, 46 of the 76 applications had some type of variance, which translates to a 61% variance rate based on the total number of fields compared. A detailed list of all Direct Install – Core document review variances is presented in Appendix C.

**Table 4-4. PY2013 Direct Install – Core Program Application Variances at Customer-Level**

| Tracking Database Field Name            | Number of Variances | Percent of Sampled Applications (n=76)       |
|---|---------------------|--|
| Project ID                              | 1                   | 1%   |
| Account Number                          | 0                   | 0%   |
| Customer Name                           | 18                  | 24%  |
| Address                                 | 8                   | 4%   |
| City                                    | 2                   | 3%   |
| Zip                                     | 3                   | 4%   |
| Phone                                   | 34                  | 45%  |
| Customer Type                           | 0                   | 0%   |
| <b>Total Variances</b>                  | <b>66</b>           | <b>11%</b><br>(Variances/Application Fields) |
| <b>Total (Apps With Variances/Apps)</b> | <b>46</b>           | <b>61%</b>                                   |

Columns may not sum to total due to rounding.

## Programmable Thermostat Program

For the Programmable Thermostat Program, installers filled out a paper application that was hand-entered into the implementer database, which subsequently was uploaded into the Consumers Energy tracking database. The certification team compared copies of the original paper applications to the Consumers Energy database.

Table 4-5 summarizes the application customer level variances detected during this certification process. In all, the certification team reviewed 77 total applications and 28% were found to have some type of variance. The greatest proportion of variances (18%) was associated with the phone numbers. Other variances included city (6%), address (8%), and customer name (4%).

**Table 4-5. PY2013 Programmable Thermostat Variances at Customer Level**

| Tracking Database Field Name            | Number of Variances | Percent of Sampled Applications (n=77)      |
|---|---------------------|---|
| Project ID                              | 0                   | 0%  |
| Account Number                          | 0                   | 0%  |
| Customer Name                           | 3                   | 4%  |
| Address                                 | 6                   | 8%  |
| City                                    | 5                   | 6%  |
| Zip Code                                | 2                   | 2%  |
| Phone                                   | 14                  | 18%   |
| Customer Type                           | 1                   | 1%  |
| <b>Total Variances</b>                  | <b>31</b>           | <b>3%</b><br>(Variances/Application Fields) |
| <b>Total (Apps With Variances/Apps)</b> | <b>22</b>           | <b>28%</b>                                  |

Columns may not sum to total due to rounding.

Table 4-6 presents the measure level variances found by the certification team during the application review process for the Programmable Thermostat Program. There was only one variance found associated with the measure type: one customer's paper record did not have a Consumers Energy electric account number recorded, but the tracking database indicated that this was a combination customer. In all other cases when the tracking database indicated the customer was a combination customer, the paper record contained an account number for both gas and electric accounts. A detailed list of all Programmable Thermostat Program document review variances is presented in Appendix C.

**Table 4-6. PY2013 Programmable Thermostat Measure-Level Application Variances**

| Measure Type                                       | Number of Measures | Count of Measure Type Variances | Percent of Total Measures | Count of Measure Quantity Variances | Percent of Total Measures |
|--|--------------------|---------------------------------|---------------------------|-------------------------------------|---------------------------|
| Programmable Thermostat – Combination Customers    | 14                 | 1                               | 1%                        | 0                                   | 0%                        |
| Programmable Thermostat – Gas Customers            | 29                 | 0                               | 0%                        | 0                                   | 0%                        |
| Programmable Thermostat - DTE Shared - Electric    | 3                  | 0                               | 0%                        | 0                                   | 0%                        |
| Programmable Thermostat - DTE Shared - Gas         | 6                  | 0                               | 0%                        | 0                                   | 0%                        |
| Programmable Thermostats (Electric)                | 25                 | 0                               | 0%                        | 0                                   | 0%                        |
| Programmable Thermostat – Board of Water and Light | ??                 | 0                               | 0%                        | 0                                   | 0%                        |
| Pre Rinse Sprayers - < 1.6 gpm                     | ??                 | 0                               | 0%                        | 0                                   | 0%                        |
| Low-flow Shower Head < 1.75 gpm                    | ??                 | 0                               | 0%                        | 0                                   | 0%                        |
| Low-flow Faucet Aerator <1.5 gpm                   | ??                 | 0                               | 0%                        | 0                                   | 0%                        |
| <b>Total</b>                                       | <b>77</b>          | <b>1</b>                        | <b>1%</b>                 | <b>0</b>                            | <b>0%</b>                 |

Columns may not sum to total due to rounding.

## Hospitality Initiative

Similar in process to the Programmable Thermostat Program, Hospitality Initiative installers filled out a paper application that was manually entered into the implementer database, which subsequently was uploaded into the Consumers Energy tracking database. The certification team compared copies of the original paper applications to the Consumers Energy database.

Table 4-7 summarizes the application customer level variances detected during this certification process. In all, the certification team reviewed 73 total applications and 40% were found to have some type of variance. The greatest proportion of variances (29%) was associated with phone numbers. Other variances included customer name (15%), address (3%), ZIP code (1%), and customer type (1%).

**Table 4-7. PY2013 Hospitality Initiative Application Variances at Customer Level**

| Tracking Database Field Name            | Number of Variances | Percent of Sampled Applications (n=73)      |
|---|---------------------|---|
| Project ID                              | 0                   | 0%  |
| Account Number                          | 0                   | 0%  |
| Customer Name                           | 11                  | 15%   |
| Address                                 | 2                   | 3%  |
| City                                    | 0                   | 0%  |
| ZIP Code                                | 1                   | 1%  |
| Phone                                   | 21                  | 29%   |
| Customer Type                           | 0                   | 0%  |
| <b>Total Variances</b>                  | <b>36</b>           | <b>6%</b><br>(Variances/Application Fields) |
| <b>Total (Apps With Variances/Apps)</b> | <b>29</b>           | <b>40%</b>                                  |

Columns may not sum to total due to rounding.

Several variances were found at the measure level with measure type and measure quantity. Table 4-8 summarizes these variances. A total of 133 electric measures were verified across the 73 projects. There was one variance in measure description, and three variances in measure quantity. A detailed list of all Hospitality Initiative document review variances is presented in Appendix B.



**Table 4-8. PY2013 Hospitality Initiative Application Variances at Measure Level**

| Measure Type   | Number of Measures | Count of Measure Type Variances | Percent of Total Measures | Count of Measure Quantity Variances | Percent of Total Measures |
|--|--------------------|---------------------------------|---------------------------|-------------------------------------|---------------------------|
| LED Lighting - 12 W LED Lamps replacing incandescent lights  | 31                 | 0                               | 0%                        | 0                                   | 0%                        |
| LED Lighting - 11 W LED Flood Lamp                           | 42                 | 1                               | 1%                        | 2                                   | 2%                        |
| LED Lighting - 9.5 W LED Lamps Replacing Incandescent Lights | 17                 | 0                               | 0%                        | 0                                   | 0%                        |
| LED Lighting - 8 W LED Lamps replacing incandescent lights   | 14                 | 0                               | 0%                        | 0                                   | 0%                        |
| LED Lighting - 6 W LED Lamps Replacing Incandescent Lights   | 4                  | 0                               | 0%                        | 0                                   | 0%                        |
| 3.5 W LED Candelabra   | 7                  | 0                               | 0%                        | 0                                   | 0%                        |
| LED Exit Sign  | 18                 | 0                               | 0%                        | 1                                   | 1%                        |
| <b>Total</b>   | <b>133</b>         | <b>1</b>                        | <b>1%</b>                 | <b>3</b>                            | <b>2%</b>                 |

Columns may not sum to total due to rounding.

## Furnace Tune-Up Initiative

The Furnace Tune-up Initiative was implemented by approved independent contractors, who filled out and submitted paper incentive applications to program staff. The certification team compared copies of the original paper applications to the information contained in the Consumers Energy database.

Table 4-9 summarizes the application customer level variances detected for the Furnace Tune-up Initiative. In all, the certification team reviewed 72 total applications and 66% were found to have some type of variance. The greatest proportion of variances (60%) was associated with phone numbers. Other variances included customer name (21%), address (5%), and account number (4%). Two applications had variances by customer type (3%). No measure-level variances for measure type or quantity were found. A detailed list of all Furnace Tune-up Initiative document review variances is presented in Appendix B.

**Table 4-9. PY2013 Furnace Tune-up Initiative Variances at Customer Level**

| Tracking Database Field Name            | Number of Variances | Percent of Sampled Applications (n=72)       |
|---|---------------------|--|
| Project ID                              | 0                   | 0%   |
| Account Number                          | 3                   | 4%   |
| Customer Name                           | 15                  | 21%  |
| Address                                 | 4                   | 5%   |
| City                                    | 0                   | 0%   |
| ZIP Code                                | 1                   | 1%   |
| Phone                                   | 44                  | 60%  |
| Customer Type                           | 2                   | 3%   |
| <b>Total Variances</b>                  | <b>69</b>           | <b>12%</b><br>(Variances/Application Fields) |
| <b>Total (Apps With Variances/Apps)</b> | <b>48</b>           | <b>66%</b>                                   |

Columns may not sum to total due to rounding.

## Multi-Family Program

The Multi-Family Program included two types of paper documentation reflecting two different project pathways. As in the Programmable Thermostat Program and Hospitality Initiative, the Multi-Family Program employed implementers to directly install equipment, but the Multi-Family Program also permitted independent contractors to install lighting equipment, much like the Direct Install – Core Program. The certification team compared the paper records filled out by implementers and the incentive applications submitted by contractors to the Consumers Energy tracking database.

Table 4-10 summarizes the application customer level variances detected during this certification process. In all, the certification team reviewed 56 total applications and 70% were found to have some type of variance. The greatest proportion of variances (67%) were associated with phone numbers. Other variances included customer names (5%), address (9%), and customer type (3%).

**Table 4-10. PY2013 Multi-Family Program Application Variances at Customer Level**

| Tracking Database Field Name            | Number of Variances | Percent of Sampled Applications (n=56)       |
|---|---------------------|--|
| Project ID                              | 0                   | 0%   |
| Account Number                          | 0                   | 0%   |
| Customer Name                           | 3                   | 5%   |
| Address                                 | 5                   | 9%   |
| City                                    | 0                   | 0%   |
| ZIP Code                                | 0                   | 0%   |
| Phone                                   | 38                  | 67%  |
| Customer Type                           | 0                   | 0%   |
| <b>Total Variances</b>                  | <b>46</b>           | <b>10%</b><br>(Variances/Application Fields) |
| <b>Total (Apps With Variances/Apps)</b> | <b>40</b>           | <b>70%</b>                                   |

Columns may not sum to total due to rounding.

Several variances were found at the measure level. Table 4-11 summarizes these variances. A total of 163 electric measures were verified across the 56 projects. There were no variances found in the measure descriptions and 11 variances found in the measure quantity. All measures not listed in the table below had zero variances. A detailed list of all Multifamily Program document review variances is presented in Appendix B.

**Table 4-11. PY2013 Multi-Family Program Application Variances at Measure Level**

| Measure Type                                | Number of Measures | Count of Measure Type Variances | Percent of Total Measures | Count of Measure Quantity Variances | Percent of Total Measures |
|---|--------------------|---------------------------------|---------------------------|-------------------------------------|---------------------------|
| Low Flow Showerhead - 1.5 gpm Handheld - DI | 12                 | 0                               | 0%                        | 1                                   | 1%                        |
| Low Flow Showerhead - 1.5 gpm - DI          | 13                 | 0                               | 0%                        | 2                                   | 1%                        |
| Low Flow Bath Faucet Aerators - Gas - DI    | 9                  | 0                               | 0%                        | 2                                   | 1%                        |
| Low Flow Kitchen Faucet Aerators- Gas - DI  | 14                 | 0                               | 0%                        | 2                                   | 1%                        |
| CFL bulbs - 13W                             | 12                 | 0                               | 0%                        | 1                                   | 1%                        |
| CFL Specialty                               | 1                  | 0                               | 0%                        | 1                                   | 1%                        |
| CFL Candelabra                              | 1                  | 0                               | 0%                        | 1                                   | 1%                        |
| C_I Multifamily Custom - Gas                | 2                  | 0                               | 0%                        | 1                                   | 1%                        |
| <b>Total</b>                                | <b>163</b>         | <b>0</b>                        | <b>0%</b>                 | <b>11</b>                           | <b>7%</b>                 |

Columns may not sum to total due to rounding.

## 5. Certified Savings

This section of the report summarizes the certified savings values at the end use (Business Solutions Program) or measure level (Small Business Solutions and Multi-Family Programs). Results for the Business Solutions Program are presented at the end use level for the sake of brevity and clarity due to the relatively large number of individual measures installed under these programs, though all measure-level results are provided in Appendix B.

In each of the tables in this section, results are presented showing the reported gross savings representing the program database values (Column A), the certification team's calculated savings, or adjusted gross savings, using the appropriate deemed savings values (Column B), application of the appropriate gross savings adjustment factors (Columns C and D), application of the appropriate net-to-gross adjustment factors (Column E) resulting in verified net savings (Column F). Column G presents the realization rate, which is the relationship of verified net savings (Column F) to reported gross savings in the program database (Column A). Finally, Column H shows the verified net savings including any applicable 10% LLESM.

All calculations were conducted using savings values rounded to four decimal places and adjustment factors are rounded to three decimal places. Though rounding was used for all computations, the savings results in this section are rounded to the nearest whole number to conserve space in the tables.

### Business Solutions Program

Table 5-1, Table 5-2, and Table 5-3 present the certified savings for electric energy (kWh), electric demand (kW), and gas savings (Mcf), respectively, for the Program Year 2013 Business Solutions Program by end use category.

Table 5-1. PY2013 Business Solutions Program—Electric Energy (kWh) Certified Savings by Measure End Use Category <sup>a,b</sup>

| End Use Category               | 2013<br>Reported<br>Gross kWh<br>Savings<br>[A] | 2013<br>Adjusted<br>Reported<br>Gross kWh<br>Savings<br>[B] | 2012<br>Verified<br>Gross kWh<br>Adjustment<br>Factor <sup>c</sup><br>[C] | 2013<br>Verified<br>Gross kWh<br>Savings<br>[D] = [B x C] | Deemed<br>Net-to-<br>Gross<br>Adjustment<br>Factor <sup>d</sup><br>[E] | 2013 Verified<br>Net kWh<br>Savings<br>[F] = [D x E] | 2013 kWh<br>Realization<br>Rate<br>[G] = [F / A] | 2013 Verified<br>Net kWh<br>Savings<br>Including<br>LLESM<br>[H] = [F x 1.1] <sup>e</sup> |
|--------------------------------|---|---|---|---|--|--|--|---|
| BLDG Envelope                  | 4,476   | 4,476   | 0.954   | 4,270   | 0.900  | 3,843  | 0.859  | 4,228   |
| C&I Water heating              | 1,873   | 1,873   | 0.957   | 1,791   | 0.900  | 1,612  | 0.861  | 1,774   |
| CFL                            | 1,114,542                                       | 1,114,542   | 0.954   | 1,063,273   | 0.900  | 956,946  | 0.859  | 956,946   |
| Chiller                        | 5,840,802                                       | 5,840,584   | 0.974   | 5,686,327   | 0.900  | 5,117,694  | 0.876  | 5,405,783   |
| Compressed Air                 | 6,544,991                                       | 6,543,197   | 0.954   | 6,244,566   | 0.900  | 5,620,110  | 0.859  | 5,895,130   |
| Custom                         | 21,992,470                                      | 21,992,470  | 1.005   | 22,106,432  | 0.900  | 19,895,789   | 0.905  | 21,408,965  |
| DCV and Economizers            | -33,138   | -33,138   | 0.954   | -31,614   | 0.900  | -28,453  | 0.859  | -31,298   |
| Energy Management Systems      | 3,266,101                                       | 3,266,101   | 0.954   | 3,115,860   | 0.900  | 2,804,274  | 0.859  | 3,084,702   |
| Energy Recovery                | -56,937   | -56,937   | 0.883   | -50,275   | 0.956  | -48,043  | 0.844  | -52,847   |
| Exit Signs                     | 360,795   | 360,795   | 0.954   | 344,198   | 0.900  | 309,779  | 0.859  | 340,756   |
| Furnaces and Heaters           | 456,260   | 456,260   | 0.954   | 435,272   | 0.900  | 391,745  | 0.859  | 426,766   |
| Heat Pump                      | 6,062   | 6,062   | 0.954   | 5,783   | 0.900  | 5,205  | 0.859  | 5,725   |
| HP or RW Fluorescent           | 3,694,717                                       | 3,694,717   | 0.954   | 3,524,760   | 0.900  | 3,172,284  | 0.859  | 3,172,284   |
| HVAC Controls                  | 2,212,309                                       | 2,212,309   | 0.975   | 2,156,757   | 0.900  | 1,941,081  | 0.877  | 2,114,727   |
| Ice Machines                   | 15,363  | 15,363  | 0.954   | 14,656  | 0.900  | 13,191   | 0.859  | 14,510  |
| Kitchen and Refrigeration      | 27,060,607                                      | 27,060,608  | 0.954   | 25,822,906  | 0.900  | 23,240,616   | 0.859  | 25,562,306  |
| Lamp Removal                   | 1,887,977                                       | 1,408,243   | 0.954   | 1,343,464   | 0.900  | 1,209,117  | 0.640  | 1,211,157   |
| LED or Induction Fixtures      | 11,860,785                                      | 11,855,178  | 0.993   | 11,771,146  | 0.900  | 10,594,031   | 0.893  | 10,594,031  |
| Lighting Controls              | 9,099,504                                       | 9,099,504   | 0.954   | 8,681,361   | 0.900  | 7,813,225  | 0.859  | 8,574,454   |
| Lighting Retrofit Fixtures     | 25,044,428                                      | 25,044,428  | 0.987   | 24,720,313  | 0.900  | 22,248,282   | 0.888  | 24,462,387  |
| New Construction               | 773,695   | 773,695   | 0.954   | 738,105   | 0.900  | 664,295  | 0.859  | 664,295   |
| Occupancy Sensors and Controls | 365,168   | 365,168   | 0.954   | 348,370   | 0.900  | 313,533  | 0.859  | 315,044   |

|                           |                    |                    |              |                    |              |                    |              |                    |
|---------------------------|--------------------|--------------------|--------------|--------------------|--------------|--------------------|--------------|--------------------|
| Other                     | 5,873,491          | 5,850,732          | 0.961        | 5,620,220          | 0.900        | 5,058,198          | 0.861        | 5,496,720          |
| Room AC / PTAC            | 102,477            | 59,593             | 0.992        | 59,097             | 0.900        | 53,187             | 0.519        | 58,506             |
| T8 Fluorescent            | 1,465,589          | 1,465,590          | 0.959        | 1,405,693          | 0.900        | 1,265,124          | 0.863        | 1,267,485          |
| T8/T5 Fixture             | 37,454,772         | 37,454,772         | 0.954        | 35,731,853         | 0.900        | 32,158,667         | 0.859        | 35,374,534         |
| Unitary/Split HVAC        | 126,998            | 126,998            | 0.954        | 121,156            | 0.900        | 109,041            | 0.859        | 119,929            |
| Variable Frequency Drives | 10,794,846         | 10,794,846         | 0.966        | 10,428,966         | 0.900        | 9,386,070          | 0.869        | 10,324,677         |
| <b>TOTAL</b>              | <b>177,331,024</b> | <b>176,778,028</b> | <b>0.970</b> | <b>171,414,710</b> | <b>0.900</b> | <b>154,270,443</b> | <b>0.870</b> | <b>166,773,674</b> |

Columns may not sum to total due to rounding.

a) The Business Solutions Program consists of the Business Solutions-Prescriptive, Business Solutions-Custom, Building Operator Certification, New Construction-Major Retrofit and New Construction-Whole Building Programs.

b) This table presents results by end use because of the relatively large number of measures installed under the program. Measure level results are presented in Appendix B.

c) Note that the verified gross adjustment factors were derived from the prior year's impact evaluations (see Section 2.4).

d) The net-to-gross adjustment factor was deemed at 0.900 for all programs by the MPSC.

e) The verified net savings including LLES is equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure life of 10 years or more.

Table 5-2. PY2013 Business Solutions Program—Electric Demand (kW) Certified Savings by Measure End Use Category <sup>a,b</sup>

| End Use Category               | 2013<br>Reported<br>Gross<br>kW<br>Savings<br>[A] | 2013<br>Adjusted<br>Reported<br>Gross<br>kW<br>Savings<br>[B] | 2012<br>Verified<br>Gross kW<br>Adjustment<br>Factor <sup>c</sup><br>[C] | 2013<br>Verified<br>Gross kW<br>Savings<br>[D] = [B x C] | Deemed<br>Net-to-<br>Gross<br>Adjustment<br>Factor <sup>d</sup><br>[E] | 2013<br>Verified Net<br>kW Savings<br>[F] = [D x E] | 2013 kW<br>Realization<br>Rate<br>[G] = [F / A] | 2013 Verified<br>Net kW<br>Savings<br>Including<br>LLESM<br>[H] = [F x 1.1] <sup>e</sup> |
|--------------------------------|---|---|--|--|--|---|---|--|
| BLDG Envelope                  | 5   | 5   | 0.942  | 5  | 0.900  | 5   | 0.848   | 5  |
| C&I Water heating              | 1   | 1   | 0.995  | 1  | 0.900  | 1   | 0.895   | 1  |
| CFL                            | 299   | 273   | 0.942  | 257  | 0.900  | 231   | 0.775   | 231  |
| Chiller                        | 2,210   | 2,210   | 0.973  | 2,151  | 0.900  | 1,936   | 0.876   | 2,024  |
| Compressed Air                 | 1,001   | 1,037   | 0.942  | 977  | 0.900  | 879   | 0.878   | 901  |
| Custom                         | 2,641   | 2,641   | 0.509  | 1,345  | 0.900  | 1,210   | 0.458   | 1,268  |
| DCV and Economizers            | 278   | 278   | 0.942  | 262  | 0.900  | 236   | 0.848   | 260  |
| Energy Management Systems      | 671   | 671   | 0.942  | 632  | 0.900  | 569   | 0.848   | 626  |
| Energy Recovery                | -2  | -2  | 0.331  | -1   | 0.900  | -1  | 0.298   | -1   |
| Exit Signs                     | 41  | 41  | 0.942  | 39   | 0.900  | 35  | 0.848   | 39   |
| Furnaces and Heaters           | 86  | 86  | 0.942  | 81   | 0.900  | 73  | 0.848   | 81   |
| Heat Pump                      | 9   | 9   | 0.942  | 9  | 0.900  | 8   | 0.848   | 8  |
| HP or RW Fluorescent           | 891   | 910   | 0.942  | 857  | 0.900  | 771   | 0.866   | 771  |
| HVAC Controls                  | 93  | 93  | 1.012  | 94   | 0.900  | 85  | 0.910   | 93   |
| Ice Machines                   | 2   | 2   | 0.942  | 2  | 0.900  | 1   | 0.848   | 2  |
| Kitchen and Refrigeration      | 2,070   | 2,070   | 0.947  | 1,961  | 0.900  | 1,765   | 0.853   | 1,942  |
| Lamp Removal                   | 453   | 350   | 0.942  | 330  | 0.900  | 297   | 0.656   | 297  |
| LED or Induction Fixtures      | 2,849   | 2,838   | 1.000  | 2,838  | 0.900  | 2,554   | 0.896   | 2,554  |
| Lighting Controls              | 2,311   | 2,311   | 0.942  | 2,177  | 0.900  | 1,960   | 0.848   | 2,155  |
| Lighting Retrofit Fixtures     | 1,652   | 1,656   | 0.998  | 1,652  | 0.900  | 1,487   | 0.900   | 1,633  |
| Occupancy Sensors and Controls | 28  | 28  | 0.942  | 27   | 0.900  | 24  | 0.848   | 24   |
| Other                          | 1,295   | 1,297   | 0.955  | 1,239  | 0.900  | 1,115   | 0.861   | 1,220  |

|                           |               |               |              |               |              |               |              |               |
|---------------------------|---------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|
| Room AC / PTAC            | 43            | 38            | 0.986        | 38            | 0.900        | 34            | 0.796        | 38            |
| T8 Fluorescent            | 355           | 355           | 0.948        | 337           | 0.900        | 303           | 0.854        | 304           |
| T8/T5 Fixture             | 9,004         | 9,004         | 0.942        | 8,481         | 0.900        | 7,633         | 0.848        | 8,397         |
| Unitary/Split HVAC        | 184           | 184           | 0.942        | 173           | 0.900        | 156           | 0.848        | 171           |
| Variable Frequency Drives | 792           | 571           | 0.968        | 553           | 0.900        | 497           | 0.628        | 547           |
| <b>TOTAL</b>              | <b>29,264</b> | <b>28,959</b> | <b>0.916</b> | <b>26,517</b> | <b>0.900</b> | <b>23,865</b> | <b>0.816</b> | <b>25,592</b> |

Columns may not sum to total due to rounding.

a) The Business Solutions Program consists of the Business Solutions-Prescriptive, Business Solutions-Custom, Building Operator Certification, New Construction-Major Retrofit and New Construction-Whole Building Programs.

b) This table presents results by end use because of the relatively large number of measures installed under the program. Measure level results are presented in Appendix B.

c) Note that the verified gross adjustment factors were derived from the prior year's impact evaluations (see Section 2.4).

d) The net-to-gross adjustment factor was deemed at 0.900 for all programs by the MPSC.

e) The verified net savings including LLES is equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure life of 10 years or more.



Table 5-3. PY2013 Business Solutions Program—Natural Gas (Mcf) Certified Savings by Measure End Use Category<sup>a,b</sup>

| End Use Category            | 2013<br>Reported<br>Gross<br>Mcf<br>Savings<br>[A] | 2013<br>Adjusted<br>Reported<br>Gross Mcf<br>Savings<br>[B] | 2012<br>Verified<br>Gross Mcf<br>Adjustment<br>Factor <sup>c</sup><br>[C] | 2013<br>Verified<br>Gross Mcf<br>Savings<br>[D] = [B x C] | Deemed<br>Net-to-<br>Gross<br>Adjustment<br>Factor <sup>d</sup><br>[E] | 2013<br>Verified Net<br>Mcf<br>Savings<br>[F] = [D x E] | 2013 Mcf<br>Realization<br>Rate<br>[G] = [F / A] | 2013 Verified<br>Net Mcf Savings<br>Including<br>LLES <sup>m</sup><br>[H] = [F x 1.1] <sup>e</sup> |
|-----------------------------|--|---|---|---|--|---|--|--|
| BLDG Envelope               | 77   | 77  | 0.911   | 70  | 0.900  | 63  | 0.820  | 69   |
| Boilers and Boiler Controls | 213,142  | 212,906   | 0.939   | 199,884   | 0.900  | 179,895   | 0.844  | 185,901  |
| C&I Water heating           | 12,530   | 12,529  | 0.882   | 11,049  | 0.900  | 9,944   | 0.794  | 10,603   |
| Compressed Air              | 1,745  | 1,745   | 0.881   | 1,538   | 0.900  | 1,384   | 0.793  | 1,522  |
| Custom                      | 70,297   | 70,297  | 1.104   | 77,588  | 0.900  | 69,829  | 0.993  | 76,675.40  |
| DCV and Economizers         | 73,345   | 73,345  | 0.881   | 64,617  | 0.900  | 58,156  | 0.793  | 63,971   |
| Energy Management Systems   | 154,913  | 154,913   | 0.881   | 136,478   | 0.900  | 122,830   | 0.793  | 135,113  |
| Energy Recovery             | 100,319  | 100,319   | 0.947   | 95,036  | 0.900  | 85,532  | 0.853  | 94,086   |
| Furnaces and Heaters        | 47,686   | 47,685  | 0.896   | 42,743  | 0.900  | 38,469  | 0.807  | 42,316   |
| Heating                     | 57   | 57  | 0.881   | 50  | 0.900  | 45  | 0.793  | 49   |
| HVAC Controls               | 20,526   | 20,526  | 0.924   | 18,974  | 0.900  | 17,077  | 0.832  | 17,784   |
| Kitchen and Refrigeration   | 2,262  | 2,229   | 0.966   | 2,154   | 0.900  | 1,939   | 0.857  | 2,133  |
| New Construction            | 9,857  | 9,857   | 0.881   | 8,684   | 0.900  | 7,815   | 0.793  | 7,815  |
| Other                       | 85,913   | 85,913  | 0.886   | 76,102  | 0.900  | 68,492  | 0.797  | 70,234   |
| Steam Traps                 | 39,683   | 39,683  | 0.881   | 34,960  | 0.900  | 31,464  | 0.793  | 31,464   |
| Swimming Pool               | 1,988  | 1,988   | 0.881   | 1,751   | 0.900  | 1,576   | 0.793  | 1,734  |
| Unitary/Split HVAC          | 19   | 19  | 0.881   | 16  | 0.900  | 15  | 0.793  | 15   |
| Variable Frequency Drives   | 8,879  | 8,879   | 1.000   | 8,879   | 0.900  | 7,991   | 0.900  | 8,790  |
| <b>TOTAL</b>                | <b>843,237</b>                                     | <b>842,966</b>  | <b>0.926</b>  | <b>780,574</b>  | <b>0.900</b>   | <b>702,517</b>  | <b>0.833</b>                                     | <b>750,276</b>   |

Columns may not sum to total due to rounding.

a) The Business Solutions Program consists of the Business Solutions-Prescriptive, Business Solutions-Custom, Building Operator Certification, New Construction-Major Retrofit and New Construction-Whole Building Programs.

b) This table presents results by end use because of the relatively large number of measures installed under the program. Measure level results are presented in Appendix B.

c) Note that the verified gross adjustment factors were derived from the prior year's impact evaluations (see Section 2.4).

d) The net-to-gross adjustment factor was deemed at 0.900 for all programs by the MPSC.

e) The verified net savings including LLES<sup>m</sup> is equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure life of 10 years or more.

## Small Business Solutions Program

Table 5-4, Table 5-5, and Table 5-6 present the certified savings for electric energy (kWh), electric demand (kW), and gas savings (Mcf), respectively, for the Program Year 2013 Small Business Solutions Program by measure.

Table 5-4. PY2013 Small Business Solutions Program Electric Energy (kWh) Certified Savings by Measure <sup>a</sup>

| Measure Code | Measure Description   | 2013 Reported Gross kWh Savings [A] | 2013 Adjusted Reported Gross kWh Savings [B] | 2012 Verified Gross kWh Adjustment Factor <sup>b</sup> [C] | 2013 Verified Gross kWh Savings [D] = [B x C] | Deemed Net-to-Gross Adjustment Factor <sup>c</sup> [E] | 2013 Verified Net kWh Savings [F] = [D x E] | 2013 kWh Realization Rate [G] = [F / A] | 2013 Verified Net kWh Savings Including LLESMS [H] = [F x 1.1] <sup>d</sup> |
|--------------|---|-------------------------------------|--|--|---|--|---|---|---|
| CDC0058      | Programmable Thermostats -- Combination Customers           | 974,665                             | 974,665                                      | 0.993  | 967,842                                       | 0.900  | 871,058                                     | 0.894                                   | 871,058   |
| CDE0044      | LED Lighting - 12 W LED Lamps replacing incandescent lights | 756,560                             | 756,560                                      | 0.980  | 741,429                                       | 0.900  | 667,286                                     | 0.882                                   | 667,286   |
| CDE0045      | LED Lighting - 11 W LED Flood Lamp                          | 1,684,605                           | 1,684,605                                    | 0.924  | 1,556,575                                     | 0.900  | 1,400,918                                   | 0.832                                   | 1,541,009   |
| CDE0046      | LED Lighting - 8 W LED Lamps replacing incandescent lights  | 524,888                             | 524,888                                      | 0.924  | 484,997                                       | 0.900  | 436,497                                     | 0.832                                   | 436,497   |
| CDE0050      | Lighting Controls   | 105,381                             | 105,381                                      | 0.999  | 105,276                                       | 0.900  | 94,748                                      | 0.899                                   | 104,223   |
| CDE0051      | CFL Bulb - Screw-in   | 123,743                             | 123,743                                      | 0.995  | 123,124                                       | 0.900  | 110,812                                     | 0.896                                   | 110,812   |
| CDE0052      | Hardwired CFL   | 38,709                              | 38,709                                       | 0.999  | 38,670  | 0.900  | 34,803                                      | 0.899                                   | 38,283  |
| CDE0053      | Specialty CFL   | 58,530                              | 58,530                                       | 0.999  | 58,471  | 0.900  | 52,624                                      | 0.899                                   | 52,624  |
| CDE0054      | T8s and U-Tube T8 Lamps                                     | 8,997,412                           | 8,997,412                                    | 0.999  | 8,988,415                                     | 0.900  | 8,089,573                                   | 0.899                                   | 8,898,531   |
| CDE0055      | T5 Lamps  | 46,490                              | 46,490                                       | 0.999  | 46,443  | 0.900  | 41,799                                      | 0.899                                   | 45,979  |
| CDE0057      | LEDs, LED Exit Signs, Induction                             | 5,844,960                           | 5,844,960                                    | 0.999  | 5,839,115                                     | 0.900  | 5,255,203                                   | 0.899                                   | 5,780,724   |
| CDE0058      | Programmable Thermostats                                    | 1,581,081                           | 1,581,081                                    | 0.993  | 1,570,013                                     | 0.900  | 1,413,012                                   | 0.894                                   | 1,413,012   |
| CDE0059      | Anti-sweat Heater Control                                   | 6,453,326                           | 6,453,326                                    | 0.999  | 6,446,873                                     | 0.900  | 5,802,185                                   | 0.899                                   | 6,382,404   |
| CDE0064      | Small Business Custom Electric                              | 39,602                              | 39,602                                       | 0.999  | 39,563  | 0.900  | 35,606                                      | 0.899                                   | 35,606  |

|         |  |            |            |       |            |       |            |       |            |
|---------|--|------------|------------|-------|------------|-------|------------|-------|------------|
| CDE0068 | CFL Box - Door Delivery                                      | 22,685,520 | 22,685,520 | 1.000 | 22,685,520 | 0.900 | 20,416,968 | 0.900 | 20,416,968 |
| CDE0069 | CFL Box - Door Delivery (TC)                                 | 2,609,100  | 2,609,100  | 1.000 | 2,609,100  | 0.900 | 2,348,190  | 0.900 | 2,348,190  |
| CDE0072 | Programmable Thermostat - DTE Shared - Electric              | 280,411    | 280,411    | 0.993 | 278,448    | 0.900 | 250,603    | 0.894 | 250,603    |
| CDE0080 | ECM Case Motor   | 36,256     | 36,256     | 0.999 | 36,220     | 0.900 | 32,598     | 0.899 | 35,858     |
| CDE0081 | ECM Walk-in Cooler and Freezer Motor                         | 412,230    | 412,230    | 0.999 | 411,818    | 0.900 | 370,636    | 0.899 | 407,700    |
| CDE0084 | Evaporator Fan Motor Controls on PSC motors                  | 8,756      | 8,756      | 0.999 | 8,747      | 0.900 | 7,873      | 0.899 | 7,873      |
| CDE0087 | Vending Equipment Controller (Halo)                          | 9,600      | 9,600      | 1.000 | 9,600      | 0.900 | 8,640      | 0.900 | 9,504      |
| CDE0090 | 3.5 W LED Candelabra   | 107,525    | 107,525    | 1.000 | 107,525    | 0.900 | 96,773     | 0.900 | 96,773     |
| CDE0100 | 13W BR30 LED Downlight                                       | 585        | 585        | 0.980 | 573        | 0.900 | 516        | 0.882 | 568        |
| CDE0101 | LED Exit Sign  | 216,879    | 216,879    | 0.980 | 212,541    | 0.900 | 191,287    | 0.882 | 210,416    |
| CDE0102 | LED Lighting - 9.5 W LED Lamps Replacing Incandescent Lights | 1,272,040  | 1,272,040  | 1.000 | 1,272,040  | 0.900 | 1,144,836  | 0.900 | 1,144,836  |
| CDE0103 | LED Lighting - 6 W LED Lamps Replacing Incandescent Lights   | 321,440    | 321,440    | 1.000 | 321,440    | 0.900 | 289,296    | 0.900 | 289,296    |
| CDE0104 | 14 W CFL Replacing 60 W Globe Inc (Halo)                     | 13,332     | 13,332     | 1.000 | 13,332     | 0.900 | 11,999     | 0.900 | 11,999     |
| CDE0198 | CFL bulbs regular (buydown)                                  | 23,280,504 | 23,280,504 | 0.955 | 22,232,881 | 0.900 | 20,009,593 | 0.859 | 20,009,593 |
| CDE0199 | CFL bulbs specialty (buydown)                                | 714,792    | 714,792    | 0.955 | 682,626    | 0.900 | 614,364    | 0.860 | 614,364    |
| CDE0200 | Miscellaneous Lighting                                       | 12,214,286 | 12,214,286 | 0.999 | 12,202,071 | 0.900 | 10,981,864 | 0.899 | 10,981,864 |
| CDE0201 | Fixture Removal  | 851,827    | 851,827    | 0.999 | 850,975    | 0.900 | 765,877    | 0.899 | 842,465    |

|              |                                    |                   |                   |              |                   |              |                   |              |                   |
|--------------|------------------------------------|-------------------|-------------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|
| CFE0014      | Linear Fluorescent to LED Retrofit | 128,613           | 128,613           | 1.000        | 128,613           | 0.900        | 115,752           | 0.900        | 127,327           |
| <b>TOTAL</b> |                                    | <b>92,393,647</b> | <b>92,393,647</b> | <b>0.986</b> | <b>91,070,877</b> | <b>0.900</b> | <b>81,963,790</b> | <b>0.887</b> | <b>84,184,243</b> |

Columns may not sum to total due to rounding.

- a) The Small Business Solutions Program consists of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL Drop Ship, and CFL Buydown Programs.  
b) Note that the verified gross adjustment factors were derived from the prior year's impact evaluations (see Section 2.4).  
c) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.  
d) The verified net savings including LLES is equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.

Table 5-5. PY2013 Small Business Solutions Program Electric Demand (kW) Certified Savings by Measure <sup>a</sup>

| Measure Code | Measure Description   | 2013 Reported Gross kW Savings [A] | 2013 Adjusted Reported Gross kW Savings [B] | 2012 Verified Gross kW Adjustment Factor <sup>b</sup> [C] | 2013 Verified Gross kW Savings [D] = [B x C] | Deemed Net-to-Gross Adjustment Factor <sup>c</sup> [E] | 2013 Verified Net kW Savings [F] = [D x E] | 2013 kW Realization Rate [G] = [F / A] | 2013 Verified Net kW Savings Including LLES <sup>m</sup> [H] = [F x 1.1] <sup>d</sup> |
|--------------|---|------------------------------------|---|---|--|--|--|--|---|
| CDC0058      | Programmable Thermostats -- Combination Customers           | -106                               | -106  | 0.993   | -106   | 0.900  | -95  | 0.894                                  | -95   |
| CDE0044      | LED Lighting - 12 W LED Lamps replacing incandescent lights | 185                                | 185   | 1.000   | 185  | 0.900  | 166  | 0.900                                  | 166   |
| CDE0045      | LED Lighting - 11 W LED Flood Lamp                          | 412                                | 412   | 0.924   | 381  | 0.900  | 343  | 0.832                                  | 377   |
| CDE0046      | LED Lighting - 8 W LED Lamps replacing incandescent lights  | 128                                | 128   | 0.924   | 119  | 0.900  | 107  | 0.832                                  | 107   |
| CDE0051      | CFL Bulb - Screw-in   | 37                                 | 37  | 0.925   | 34   | 0.900  | 31   | 0.832                                  | 31  |
| CDE0052      | Hardwired CFL   | 10                                 | 10  | 0.873   | 9  | 0.900  | 8  | 0.786                                  | 8   |
| CDE0053      | Specialty CFL   | 16                                 | 16  | 0.873   | 14   | 0.900  | 12   | 0.786                                  | 12  |
| CDE0054      | T8s and U-Tube T8 Lamps                                     | 2,241                              | 2,241                                       | 0.873   | 1,957  | 0.900  | 1,761                                      | 0.786                                  | 1,937   |
| CDE0055      | T5 Lamps  | 11                                 | 11  | 0.873   | 9  | 0.900  | 8  | 0.786                                  | 9   |
| CDE0057      | LEDs, LED Exit Signs,                                       | 1,167                              | 1,167                                       | 0.873   | 1,018  | 0.900  | 917  | 0.786                                  | 1,008   |

|         | Induction                                       |       |       |       |       |       |       |       |       |  |  |       |
|---------|---|-------|-------|-------|-------|-------|-------|-------|-------|--|--|-------|
| CDE0058 | Programmable Thermostats                        | -207  | -207  | 0.993 | -206  | 0.900 | -185  | 0.894 | -185  |  |  |       |
| CDE0064 | Small Business Custom Electric                  | 5     | 5     | 0.873 | 4     | 0.900 | 4     | 0.786 | 4     |  |  | 4     |
| CDE0068 | CFL Box - Door Delivery                         | 5,549 | 5,549 | 1.000 | 5,549 | 0.900 | 4,994 | 0.900 | 4,994 |  |  | 4,994 |
| CDE0069 | CFL Box - Door Delivery (TC)                    | 638   | 638   | 1.000 | 638   | 0.900 | 574   | 0.900 | 574   |  |  | 574   |
| CDE0072 | Programmable Thermostat - DTE Shared - Electric | -42   | -42   | 0.993 | -41   | 0.900 | -37   | 0.894 | -37   |  |  | -37   |
| CDE0080 | ECM Case Motor                                  | 4     | 4     | 1.000 | 4     | 0.900 | 3     | 0.809 | 3     |  |  | 4     |
| CDE0081 | ECM Walk-in Cooler and Freezer Motor            | 47    | 42    | 0.873 | 37    | 0.900 | 33    | 0.707 | 33    |  |  | 37    |
| CDE0084 | Evaporator Fan Motor Controls on PSC motors     | 1     | 1     | 1.000 | 1     | 0.900 | 1     | 0.811 | 1     |  |  | 1     |
| CDE0087 | Vending Equipment Controller (Halo)             | 1     | 1     | 1.000 | 1     | 0.900 | 0     | 0.900 | 0     |  |  | 0     |
| CDE0090 | 3.5 W LED Candelabra                            | 26    | 26    | 1.000 | 26    | 0.900 | 24    | 0.900 | 24    |  |  | 24    |
| CDE0100 | 13W BR30 LED Downlight                          | 0     | 0     | 1.000 | 0     | 0.900 | 0     | 0.900 | 0     |  |  | 0     |
| CDE0101 | LED Exit Sign                                   | 25    | 25    | 1.000 | 25    | 0.900 | 22    | 0.900 | 22    |  |  | 25    |
| CDE0102 | LED Lighting - 9.5 W LED Lamps Replacing        | 311   | 311   | 1.000 | 311   | 0.900 | 280   | 0.900 | 280   |  |  | 280   |

|         | Incandescent Lights  |        |        |       |        |       |        |       |  |  |  |        |
|---------|--|--------|--------|-------|--------|-------|--------|-------|--|--|--|--------|
| CDE0103 | LED Lighting - 6 W LED Lamps Replacing Incandescent Lights | 66     | 79     | 1,000 | 79     | 0.900 | 71     | 1,070 |  |  |  | 71     |
| CDE0104 | 14 W CFL Replacing 60 W Globe Inc (Halo)                   | 3      | 3      | 1,000 | 3      | 0.900 | 3      | 0.900 |  |  |  | 3      |
| CDE0198 | CFL bulbs regular (buydown)                                | 6,328  | 5,701  | 0.955 | 5,444  | 0.900 | 4,900  | 0.774 |  |  |  | 4,900  |
| CDE0199 | CFL bulbs specialty (buydown)                              | 194    | 175    | 0.955 | 167    | 0.900 | 150    | 0.774 |  |  |  | 150    |
| CDE0200 | Miscellaneous Lighting                                     | 2,442  | 2,442  | 0.873 | 2,132  | 0.900 | 1,919  | 0.786 |  |  |  | 1,919  |
| CDE0201 | Fixture Removal  | 217    | 217    | 0.873 | 189    | 0.900 | 170    | 0.786 |  |  |  | 187    |
| CFE0014 | Linear Fluorescent to LED Retrofit                         | 35     | 35     | 1,000 | 35     | 0.900 | 31     | 0.900 |  |  |  | 35     |
| TOTAL   |  | 19,743 | 19,104 | 0.943 | 18,017 | 0.900 | 16,216 | 0.821 |  |  |  | 16,545 |

Columns may not sum to total due to rounding.

- The Small Business Solutions Program consists of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL Drop Ship, and CFL Buydown Programs.
- Note that the verified gross adjustment factors were derived from the prior year's impact evaluations (see Section 2.4).
- The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.
- The verified net savings including LLESIM is equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.



Table 5-6. PY2013 Small Business Solutions Program Natural Gas (Mcf) Certified Savings by Measure <sup>a</sup>

| Measure Code | Measure Description                                 | 2013 Reported Gross Mcf Savings [A] | 2013 Adjusted Reported Gross Mcf Savings [B] | 2012 Verified Gross Mcf Adjustment Factor <sup>b</sup> [C] | 2013 Verified Gross Mcf Savings [D] = [B x C] | Deemed Net-to-Gross Adjustment Factor <sup>c</sup> [E] | 2013 Verified Net Mcf Savings [F] = [D x E] | 2013 Mcf Realization Rate [G] = [F / A] | 2013 Verified Net Mcf Savings Including LLESM [H] = [F x 1.1] <sup>d</sup> |
|--------------|---|-------------------------------------|--|--|---|--|---|---|--|
| CDC0058      | Programmable Thermostats -- Combination Customers   | 31,653                              | 31,653                                       | 0.993  | 31,431  | 0.900  | 28,288                                      | 0.894                                   | 28,288   |
| CDG0011      | DI - Gas Furnace or RTU Tune-up (>=40 and <300 MBH) | 10,070                              | 10,068                                       | 1.000  | 10,068  | 0.900  | 9,061                                       | 0.900                                   | 9,967  |
| CDG0012      | DI - Gas Furnace or RTU Tune-up (>=300 MBH)         | 3,171                               | 3,171  | 1.000  | 3,171   | 0.900  | 2,854                                       | 0.900                                   | 3,139  |
| CDG0033      | Programmable Thermostat - DTE Shared - Gas          | 10,468                              | 10,468                                       | 0.993  | 10,395  | 0.900  | 9,356                                       | 0.894                                   | 9,356  |
| CDG0058      | Programmable Thermostat - Gas Customers             | 91,599                              | 91,599                                       | 0.993  | 90,958  | 0.900  | 81,862                                      | 0.894                                   | 81,862   |
| <b>TOTAL</b> |   | <b>146,960</b>                      | <b>146,958</b>                               | <b>0.994</b>   | <b>146,022</b>                                | <b>0.900</b>   | <b>131,420</b>                              | <b>0.894</b>                            | <b>132,612</b>   |

Columns may not sum to total due to rounding.

a) The Small Business Solutions Program consists of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL Drop Ship, and CFL Buydown Programs.

b) Note that the verified gross adjustment factors were derived from the prior year's impact evaluations (see Section 2.4).

c) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.

d) The verified net savings including LLESM is equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.

## Multi-Family Program

Table 5-7, Table 5-8, and Table 5-9 present the certified savings for electric energy (kWh), electric demand (kW), and gas savings (Mcf), respectively, for the Program Year 2013 Multi-Family Program by measure.

Table 5-7. PY2013 Multi-Family Program Electric Energy (kWh) Certified Savings by Measure

| Measure Code | Measure Description  | 2013 Reported Gross kWh Savings [A] | 2013 Adjusted Reported Gross kWh Savings [B] | 2012 Verified Gross kWh Adjustment Factor <sup>a</sup> [C] | 2013 Verified Gross kWh Savings [D] = [B x C] | Deemed Net-to-Gross Adjustment Factor <sup>b</sup> [E] | 2013 Verified Net kWh Savings [F] = [D x E] | 2013 kWh Realization Rate [G] = [F / A] | 2013 Verified Net kWh Savings Including LLESMS [H] = [F x 1.1] <sup>c</sup> |
|--------------|--|-------------------------------------|--|--|---|--|---|---|---|
| CCE0001      | C_I Multifamily Custom - Electric                            | 2,006,719                           | 2,006,719                                    | 1.000  | 2,006,719                                     | 0.900  | 1,806,047                                   | 0.900                                   | 1,982,023   |
| CTE0002      | Common Area - Hardwired CFL Fixture                          | 141,757                             | 141,757                                      | 1.000  | 141,757                                       | 0.900  | 127,581                                     | 0.900                                   | 140,339   |
| CTE0003      | Common Area -- LED Exit Signs (Retrofit Only)                | 66,330                              | 66,330                                       | 1.000  | 66,330  | 0.900  | 59,697                                      | 0.900                                   | 65,667  |
| CTE0004      | Low Flow Bath Faucet Aerators - Electric - DI                | 6,972                               | 6,972  | 1.004  | 7,000   | 0.900  | 6,300                                       | 0.904                                   | 6,930   |
| CTE0019      | Low Flow Kitchen Faucet Aerators- Electric - DI              | 16,112                              | 16,112                                       | 1.004  | 16,176  | 0.900  | 14,559                                      | 0.904                                   | 16,015  |
| CTE0020      | T12 4-ft Lamp Removal (combined with T8/T5 ballast retrofit) | 12,524                              | 12,524                                       | 1.000  | 12,524  | 0.900  | 11,272                                      | 0.900                                   | 12,399  |
| CTE0023      | CFL bulbs - 13W  | 349,630                             | 349,630                                      | 0.948  | 331,450                                       | 0.900  | 298,305                                     | 0.853                                   | 298,305   |
| CTE0025      | CFL Bulbs - 23W  | 816                                 | 816  | 0.948  | 774   | 0.900  | 696   | 0.853                                   | 696   |
| CTE0026      | CFL Bulbs Regular (30W or less in                            | 55,800                              | 55,800                                       | 0.948  | 52,898  | 0.900  | 47,609                                      | 0.853                                   | 47,609  |

|         | common area)                             |         |         |       |         |       |         |       |  |         |
|---------|--|---------|---------|-------|---------|-------|---------|-------|--|---------|
| CTE0027 | CFL Screw in - Prescriptive              | 60,325  | 60,325  | 0.948 | 57,188  | 0.900 | 51,469  | 0.853 |  | 51,469  |
| CTE0029 | CFL Fixture - Prescriptive               | 30,264  | 30,264  | 1.000 | 30,264  | 0.900 | 27,238  | 0.900 |  | 29,961  |
| CTE0031 | Occupancy Sensors under 500 W            | 28,584  | 28,584  | 1.000 | 28,584  | 0.900 | 25,726  | 0.900 |  | 28,298  |
| CTE0032 | Occupancy Sensors over 500 W             | 994     | 994     | 1.000 | 994     | 0.900 | 895     | 0.900 |  | 984     |
| CTE0033 | LED Downlight Fixture                    | 27,690  | 27,690  | 1.000 | 27,690  | 0.900 | 24,921  | 0.900 |  | 27,413  |
| CTE0035 | LED/Induction (Night Only) <175W         | 96,212  | 96,212  | 1.000 | 96,212  | 0.900 | 86,591  | 0.900 |  | 95,250  |
| CTE0036 | LED/Induction (Night Only) 175-250W      | 12,270  | 12,270  | 1.000 | 12,270  | 0.900 | 11,043  | 0.900 |  | 12,147  |
| CTE0038 | LED/Induction (Night Only) 250-400W      | 141,200 | 141,200 | 1.000 | 141,200 | 0.900 | 127,080 | 0.900 |  | 139,788 |
| CTE0039 | LED/Induction (24x7) <175W               | 25,662  | 25,662  | 1.000 | 25,662  | 0.900 | 23,096  | 0.900 |  | 25,405  |
| CTE0040 | LED/Induction (24x7) 175-250W            | 42,120  | 42,120  | 1.000 | 42,120  | 0.900 | 37,908  | 0.900 |  | 41,699  |
| CTE0045 | CFL Specialty - Common Area              | 5,580   | 5,580   | 1.000 | 5,580   | 0.900 | 5,022   | 0.900 |  | 5,022   |
| CTE0046 | CFL Specialty - In-Unit - DI             | 142,840 | 142,840 | 1.000 | 142,840 | 0.900 | 128,556 | 0.900 |  | 128,556 |
| CTE0050 | Low Flow Showerhead - 1.5 gpm - Electric | 42,090  | 42,090  | 1.000 | 42,090  | 0.900 | 37,881  | 0.900 |  | 41,669  |
| CTE0051 | Low Flow Showerhead -                    | 13,110  | 13,110  | 1.000 | 13,110  | 0.900 | 11,799  | 0.900 |  | 12,979  |

|         | 1.5 gpm -<br>Electric -<br>Handheld                               |        |        |       |        |       |        |       |        |       |  |  |  |  |  |  |  |  |  |  |
|---------|---|--------|--------|-------|--------|-------|--------|-------|--------|-------|--|--|--|--|--|--|--|--|--|--|
| CTE0052 | 13W CFL -<br>Common Area<br>- Direct Install                      | 30,318 | 30,318 | 1,000 | 30,318 | 0.900 | 27,286 | 0.900 | 27,286 | 0.900 |  |  |  |  |  |  |  |  |  |  |
| CTE0124 | 1L HPT8<br>replacing T12 -<br>Common -<br>24/7                    | 4,738  | 4,738  | 1,000 | 4,738  | 0.900 | 4,264  | 0.900 | 4,264  | 0.900 |  |  |  |  |  |  |  |  |  |  |
| CTE0125 | 1L RW HPT8<br>replacing T12 -<br>Common -<br>24/7                 | 13,356 | 13,356 | 1,000 | 13,356 | 0.900 | 12,020 | 0.900 | 12,020 | 0.900 |  |  |  |  |  |  |  |  |  |  |
| CTE0126 | 2L HPT8<br>replacing T12 -<br>Common -<br>24/7                    | 21,804 | 21,804 | 1,000 | 21,804 | 0.900 | 19,624 | 0.900 | 19,624 | 0.900 |  |  |  |  |  |  |  |  |  |  |
| CTE0127 | 2L RW HPT8<br>replacing T12 -<br>Common -<br>24/7                 | 47,340 | 47,340 | 1,000 | 47,340 | 0.900 | 42,606 | 0.900 | 42,606 | 0.900 |  |  |  |  |  |  |  |  |  |  |
| CTE0130 | 4L HPT8<br>replacing T12 -<br>Common -<br>24/7                    | 8,448  | 8,448  | 1,000 | 8,448  | 0.900 | 7,603  | 0.900 | 7,603  | 0.900 |  |  |  |  |  |  |  |  |  |  |
| CTE0131 | 4L RW HPT8<br>replacing T12 -<br>Common -<br>24/7                 | 12,565 | 12,565 | 1,000 | 12,565 | 0.900 | 11,309 | 0.900 | 11,309 | 0.900 |  |  |  |  |  |  |  |  |  |  |
| CTE0139 | CFL<br>Candelabra<br>Lamp (5-13W)<br>- Common -<br>24/7 operation | 3,576  | 3,576  | 1,000 | 3,576  | 0.900 | 3,218  | 0.900 | 3,218  | 0.900 |  |  |  |  |  |  |  |  |  |  |
| CTE0143 | DI - CFL<br>Candelabra<br>Lamp (5-13W)<br>- 24/7                  | 44,402 | 44,402 | 1,000 | 44,402 | 0.900 | 39,962 | 0.900 | 39,962 | 0.900 |  |  |  |  |  |  |  |  |  |  |

|         | operation - DI  |         |         |       |         |       |         |       |         |         |
|---------|---|---------|---------|-------|---------|-------|---------|-------|---------|---------|
| CTE0144 | DI - CFL<br>Candelabra<br>Lamp (5-13W)<br>- DI                    | 100,426 | 100,426 | 1.000 | 100,426 | 0.900 | 90,383  | 0.900 | 90,383  | 90,383  |
| CTE0145 | DI - LED<br>Candelabra<br>Lamp (3-5W) -<br>24/7 operation<br>- DI | 450,034 | 450,034 | 1.000 | 450,034 | 0.900 | 405,031 | 0.900 | 405,031 | 405,031 |
| CTE0146 | DI - LED<br>Candelabra<br>Lamp (3-5W) -<br>DI                     | 36,332  | 36,332  | 1.000 | 36,332  | 0.900 | 32,699  | 0.900 | 32,699  | 32,699  |
| CTE0147 | Exterior CFL<br>(replacing<br>d175W HID)                          | 98,208  | 98,208  | 1.000 | 98,208  | 0.900 | 88,387  | 0.900 | 88,387  | 97,226  |
| CTE0153 | HPT8<br>replacing T12 -<br>per lamp -<br>Common                   | 57,507  | 57,507  | 1.000 | 57,507  | 0.900 | 51,756  | 0.900 | 51,756  | 56,932  |
| CTE0157 | LED Fixture -<br>In Unit  | 2,288   | 2,288   | 1.000 | 2,288   | 0.900 | 2,059   | 0.900 | 2,059   | 2,265   |
| CTE0158 | LED Lamp -<br>100W<br>Replacement -<br>In Unit                    | 16,368  | 16,368  | 1.000 | 16,368  | 0.900 | 14,731  | 0.900 | 14,731  | 16,204  |
| CTE0160 | LED Lamp -<br>50-80W<br>Replacement -<br>Common                   | 483,140 | 483,140 | 1.000 | 483,140 | 0.900 | 434,826 | 0.900 | 434,826 | 434,826 |
| CTE0161 | LED Lamp -<br>60W<br>Replacement -<br>In Unit                     | 920     | 920     | 1.000 | 920     | 0.900 | 828     | 0.900 | 828     | 911     |
| CTE0163 | LED Lamp -<br>80-100W<br>Replacement -                            | 21,930  | 21,930  | 1.000 | 21,930  | 0.900 | 19,737  | 0.900 | 19,737  | 19,737  |

Columns may not sum to total due to rounding.

a) Note that the verified gross adjustment factors were derived from the prior year's impact evaluations (see Section 2.4).

b) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.

c) The verified net savings including LLESIM is equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.

Table 5-8. PY2013 Multi-Family Program Electric Demand (kW) Certified Savings by Measure

| Measure Code | Measure Description  | 2013 Reported Gross kW Savings [A] | 2013 Adjusted Reported Gross kW Savings [B] | 2012 Verified Gross kW Adjustment Factor <sup>a</sup> [C] | 2013 Verified Gross kW Savings [D] = [B x C] | Deemed Net-to-Gross Adjustment Factor <sup>b</sup> [E] | 2013 Verified Net kW Savings [F] = [D x E] | 2013 kW Realization Rate [G] = [F / A] | 2013 Verified Net kW Savings Including LLES <sup>M</sup> [H] = [F x 1.1] <sup>c</sup> |
|--------------|--|------------------------------------|---|---|--|--|--|--|---|
| CCE0001      | C_I Multifamily Custom - Electric                            | 89                                 | 89  | 1.000   | 89   | 0.900  | 80   | 0.900                                  | 88  |
| CTE0003      | Common Area -- LED Exit Signs (Retrofit Only)                | 8                                  | 8   | 1.000   | 8  | 0.900  | 7  | 0.900                                  | 8   |
| CTE0004      | Low Flow Bath Faucet Aerators - Electric - DI                | 1                                  | 1   | 1.004   | 1  | 0.900  | 1  | 0.904                                  | 1   |
| CTE0019      | Low Flow Kitchen Faucet Aerators- Electric - DI              | 2                                  | 2   | 1.004   | 2  | 0.900  | 2  | 0.900                                  | 2   |
| CTE0020      | T12 4-ft Lamp Removal (combined with T8/T5 ballast retrofit) | 3                                  | 3   | 1.000   | 3  | 0.900  | 3  | 0.900                                  | 3   |
| CTE0023      | CFL bulbs - 13W  | 41                                 | 41  | 0.948   | 39   | 0.900  | 35   | 0.853                                  | 35  |
| CTE0025      | CFL Bulbs - 23W  | 0                                  | 0   | 0.948   | 0  | 0.900  | 0  | 0.853                                  | 0   |
| CTE0027      | CFL Screw in - Prescriptive                                  | 7                                  | 7   | 0.948   | 7  | 0.900  | 6  | 0.853                                  | 6   |
| CTE0029      | CFL Fixture - Prescriptive                                   | 4                                  | 4   | 1.000   | 4  | 0.900  | 3  | 0.900                                  | 4   |
| CTE0031      | Occupancy Sensors under 500 W                                | 7                                  | 7   | 1.000   | 7  | 0.900  | 6  | 0.900                                  | 7   |
| CTE0032      | Occupancy Sensors over 500 W                                 | 0                                  | 0   | 1.000   | 0  | 0.900  | 0  | 0.900                                  | 0   |
| CTE0033      | LED Downlight Fixture  | 7                                  | 7   | 1.000   | 7  | 0.900  | 6  | 0.900                                  | 7   |
| CTE0039      | LED/Induction (24x7) <175W                                   | 3                                  | 3   | 1.000   | 3  | 0.900  | 3  | 0.900                                  | 3   |
| CTE0040      | LED/Induction (24x7) 175-250W                                | 5                                  | 5   | 1.000   | 5  | 0.900  | 4  | 0.900                                  | 5   |
| CTE0046      | CFL Specialty - In-Unit - DI                                 | 17                                 | 17  | 1.000   | 17   | 0.900  | 15   | 0.900                                  | 15  |



|         |  |     |     |       |     |       |     |       |     |
|---------|--|-----|-----|-------|-----|-------|-----|-------|-----|
| CTE0050 | Low Flow Showerhead - 1.5 gpm - Electric               | 5   | 5   | 1.000 | 5   | 0.900 | 4   | 0.900 | 5   |
| CTE0051 | Low Flow Showerhead - 1.5 gpm - Electric - Handheld    | 1   | 1   | 1.000 | 1   | 0.900 | 1   | 0.900 | 1   |
| CTE0124 | 1L HPT8 replacing T12 - Common - 24/7                  | 0   | 0   | 1.000 | 0   | 0.900 | 0   | 0.900 | 0   |
| CTE0125 | 1L RW HPT8 replacing T12 - Common - 24/7               | 1   | 1   | 1.000 | 1   | 0.900 | 1   | 0.900 | 1   |
| CTE0126 | 2L HPT8 replacing T12 - Common - 24/7                  | 2   | 2   | 1.000 | 2   | 0.900 | 2   | 0.900 | 2   |
| CTE0127 | 2L RW HPT8 replacing T12 - Common - 24/7               | 5   | 5   | 1.000 | 5   | 0.900 | 4   | 0.900 | 4   |
| CTE0130 | 4L HPT8 replacing T12 - Common - 24/7                  | 1   | 1   | 1.000 | 1   | 0.900 | 1   | 0.900 | 1   |
| CTE0131 | 4L RW HPT8 replacing T12 - Common - 24/7               | 1   | 1   | 1.000 | 1   | 0.900 | 1   | 0.900 | 1   |
| CTE0139 | CFL Candelabra Lamp (5-13W) - Common - 24/7 operation  | 0   | 0   | 1.000 | 0   | 0.900 | 0   | 0.900 | 0   |
| CTE0143 | DI - CFL Candelabra Lamp (5-13W) - 24/7 operation - DI | 5   | 5   | 1.000 | 5   | 0.900 | 5   | 0.900 | 5   |
| CTE0144 | DI - CFL Candelabra Lamp (5-13W) - DI                  | 23  | 23  | 1.000 | 23  | 0.900 | 21  | 0.900 | 21  |
| CTE0145 | DI - LED Candelabra Lamp (3-5W) - 24/7 operation - DI  | 52  | 52  | 1.000 | 52  | 0.900 | 46  | 0.900 | 46  |
| CTE0146 | DI - LED Candelabra Lamp (3-5W) - DI                   | 8   | 8   | 1.000 | 8   | 0.900 | 7   | 0.900 | 7   |
| CTE0153 | HPT8 replacing T12 - per lamp - Common                 | 14  | 14  | 1.000 | 14  | 0.900 | 13  | 0.900 | 14  |
| CTE0157 | LED Fixture - In Unit                                  | 0   | 0   | 1.000 | 0   | 0.900 | 0   | 0.900 | 0   |
| CTE0158 | LED Lamp - 100W Replacement - In Unit                  | 2   | 2   | 1.000 | 2   | 0.900 | 2   | 0.900 | 2   |
| CTE0160 | LED Lamp - 50-80W Replacement - Common                 | 118 | 118 | 1.000 | 118 | 0.900 | 106 | 0.900 | 106 |

|              |  |            |            |              |            |              |            |              |            |   |
|--------------|--|------------|------------|--------------|------------|--------------|------------|--------------|------------|---|
| CTE0161      | LED Lamp - 60W Replacement - In Unit                 | 0          | 0          | 1.000        | 0          | 0.900        | 0          | 0.900        | 0          | 0 |
| CTE0163      | LED Lamp - 80-100W Replacement - Common              | 5          | 5          | 1.000        | 5          | 0.900        | 5          | 0.900        | 5          | 5 |
| CTE0164      | LED Lamp - Flood/PAR - Common                        | 0          | 0          | 1.000        | 0          | 0.900        | 0          | 0.900        | 0          | 0 |
| CTE0166      | LED Lamp - PAR - In Unit                             | 0          | 0          | 1.000        | 0          | 0.900        | 0          | 0.900        | 0          | 0 |
| CTE0168      | PTHP - In Unit                                       | 3          | 3          | 1.000        | 3          | 0.900        | 3          | 0.900        | 3          | 3 |
| CTE0171      | VFD - Pump   | 1          | 1          | 1.000        | 1          | 0.900        | 1          | 0.900        | 1          | 1 |
| CTE0172      | Low Flow Bath Faucet Aerators 1.0gpm - Electric - DI | 1          | 1          | 1.000        | 1          | 0.900        | 1          | 1.114        | 1          | 1 |
| CTE0174      | DI - LED Candelabra Lamp (3-5W) - In-Unit - DI       | 17         | 1          | 1.000        | 1          | 0.900        | 1          | 0.032        | 1          | 1 |
| CTE0175      | DI - CFL Candelabra Lamp (5-13W) - In-Unit - DI      | 2          | 0          | 1.000        | 0          | 0.900        | 0          | 0.140        | 0          | 0 |
| <b>TOTAL</b> |  | <b>463</b> | <b>445</b> | <b>0.994</b> | <b>442</b> | <b>0.900</b> | <b>398</b> | <b>0.859</b> | <b>412</b> |   |

Columns may not sum to total due to rounding.

a) Note that the verified gross adjustment factors were derived from the prior year's impact evaluations (see Section 2.4).

b) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.

c) The verified net savings including LLES is equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.

Table 5-9. PY2013 Multi-Family Program Gas (Mcf) Certified Savings by Measure

| Measure Code | Measure Description                                    | 2013 Reported Gross Mcf Savings [A] | 2013 Adjusted Reported Gross Mcf Savings [B] | 2012 Verified Gross Mcf Adjustment Factor <sup>a</sup> [C] | 2013 Verified Gross Mcf Savings [D] = [B x C] | Deemed Net-to-Gross Adjustment Factor <sup>b</sup> [E] | 2013 Verified Net Mcf Savings [F] = [D x E] | 2013 Mcf Realization Rate [G] = [F / A] | 2013 Verified Net Mcf Savings Including LLESMS [H] = [F x 1.1] <sup>c</sup> |
|--------------|--|-------------------------------------|--|--|---|--|---|---|---|
| CCG0001      | C_I Multifamily Custom - Gas                           | 2,285                               | 2,285  | 1.000  | 2,285   | 0.900  | 2,057                                       | 0.900                                   | 2,256   |
| CTE0171      | VFD - Pump   | 1                                   | 1  | 1.000  | 1   | 1.000  | 1   | 1.000                                   | 2   |
| CTG0004      | Low Flow Bath Faucet Aerators - Gas - DI               | 982                                 | 982  | 1.004  | 985   | 0.900  | 887   | 0.904                                   | 976   |
| CTG0007      | Pipe Wrap - Gas - DHW - In unit                        | 922                                 | 922  | 1.000  | 922   | 0.900  | 830   | 0.900                                   | 830   |
| CTG0009      | Boiler Controls  | 320                                 | 320  | 1.000  | 320   | 0.900  | 288   | 0.900                                   | 317   |
| CTG0011      | Boiler tune-up   | 311                                 | 311  | 1.000  | 311   | 0.900  | 280   | 0.900                                   | 280   |
| CTG0014      | Low Flow Kitchen Faucet Aerators- Gas - DI             | 2,443                               | 2,443  | 1.004  | 2,452   | 0.900  | 2,207                                       | 0.904                                   | 2,428   |
| CTG0035      | Energy Star Window                                     | 50                                  | 50   | 1.000  | 50  | 0.900  | 45  | 0.900                                   | 50  |
| CTG0040      | Setback thermostat - moderate setback -- Gas - In Unit | 975                                 | 975  | 1.000  | 975   | 0.900  | 878   | 0.900                                   | 878   |
| CTG0044      | Furnace Replacement (<=200MBH) 95% Eff. - Common       | 8                                   | 8  | 1.000  | 8   | 0.900  | 8   | 0.900                                   | 8   |

|         |  |       |       |       |       |       |       |       |       |
|---------|--|-------|-------|-------|-------|-------|-------|-------|-------|
| CTG0047 | High Efficiency<br>Boiler<br>Replacement ><br>92% Eff          | 2,591 | 2,591 | 1,000 | 2,591 | 0.900 | 2,332 | 0.900 | 2,565 |
| CTG0048 | High Efficiency<br>Boiler<br>Replacement ><br>95% Eff          | 105   | 105   | 1,000 | 105   | 0.900 | 94    | 0.900 | 104   |
| CTG0050 | Low Flow<br>Showerhead -<br>1.5 gpm - DI                       | 6,575 | 6,575 | 1,000 | 6,575 | 0.900 | 5,917 | 0.900 | 6,509 |
| CTG0051 | Low Flow<br>Showerhead -<br>1.5 gpm<br>Handheld - DI           | 3,828 | 3,828 | 1,000 | 3,828 | 0.900 | 3,445 | 0.900 | 3,790 |
| CTG0052 | Pipe Wrap -<br>DHW -<br>Common - DI                            | 1,927 | 1,920 | 1,000 | 1,920 | 0.900 | 1,728 | 0.896 | 1,900 |
| CTG0104 | Low Flow Bath<br>Faucet<br>Aerators -<br>Prescriptive<br>Gas   | 25    | 25    | 1,004 | 25    | 0.900 | 22    | 0.904 | 25    |
| CTG0114 | Low Flow<br>Kitchen Faucet<br>Aerators-<br>Prescriptive<br>Gas | 32    | 32    | 1,004 | 33    | 0.900 | 29    | 0.904 | 32    |
| CTG0122 | DHW Boiler<br>Tune-up  | 132   | 132   | 1,000 | 132   | 0.900 | 119   | 0.900 | 119   |
| CTG0131 | In-Direct Water<br>Heater (90%<br>Eff)                         | 847   | 847   | 1,000 | 847   | 0.900 | 762   | 0.900 | 838   |
| CTG0141 | Low Flow Bath<br>Faucet<br>Aerators<br>1.0gpm - Gas -<br>DI    | 2,658 | 2,658 | 1,000 | 2,658 | 0.900 | 2,392 | 0.900 | 2,631 |

|              |                |               |               |              |               |              |               |              |               |
|--------------|----------------|---------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|
| CTG0150      | Boiler Tune-Up | 4,330         | 4,330         | 1,000        | 4,330         | 0.900        | 3,897         | 0.900        | 4,286         |
| <b>TOTAL</b> |                | <b>31,347</b> | <b>31,339</b> | <b>1,000</b> | <b>31,353</b> | <b>0.900</b> | <b>28,218</b> | <b>0.900</b> | <b>30,823</b> |

Columns may not sum to total due to rounding.

- a) Note that the verified gross adjustment factors were derived from the prior year's impact evaluations (see Section 2.4).
- b) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.
- c) The verified net savings including LLES is equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.

## 6. Performance Incentive Mechanism

This section outlines our certification of the various metrics that contribute to Consumers Energy's Performance Incentive Mechanism. Besides the long-life savings and the demand (kW) reductions detailed in this report, the metrics detailed in this chapter include:

- Multi-measure C&I projects: electric and gas
- New Construction C&I gas savings

### 6.1 Multi-measure C&I projects

The Settlement Agreement for Case No. U-17138 outlines PIM metrics related to both gas and electric multiple measures projects. This metric is defined as a percentage increase over 2012 levels in 2013, 2014, and 2015. For both the gas and electric PIMs, there is a metric defined as such:

- “ii. The Company would earn a 0.33% incentive for achieving a 50% increase in multi-measure participants in 2013 (over 2012 levels) and additional 33% increases in each of 2014 and 2015.
- iii. The Company would earn a 1.0% incentive for achieving a 60% increase in 2013 and additional 40% increases in each of 2014 and 2015.”

Since 2012 Consumers Energy has offered a Multiple Measures incentive bonus, through which bonus incentives are paid to customers who complete projects that include more than 1 of 13 measure categories, if the sum of all additional measure categories is at least 25% of the measure category with the highest incentive. The project is considered an electric project if the primary measure category is an electric measure, and a gas project if the primary measure category is a gas measure. For each year, EMI is certifying the number of multiple measure projects as equal to the number of bonuses that Consumers Energy pays through this program.

Based on the text of the Settlement Agreement, the number of 2012 multiple measures projects is a static baseline, which determines 2013, 2014, and 2015 savings targets. In other words, the 2014 metric is based on a 33% (minimum incentive) to 40% (maximum incentive) increase over the 2013 **minimum goal**, not over the actual numbers of multiple measure projects in 2013. Table 6-1 shows our calculations of what those targets will be.

**Table 6-1. Multiple Measures Projects: Targets**

|          | 2012   | 2013  |                 |              | 2014  |                 |              | 2015  |                 |              |
|----------|--------|-------|-----------------|--------------|-------|-----------------|--------------|-------|-----------------|--------------|
| Metric   | Actual | Floor | 0.33% incentive | 1% incentive | Floor | 0.33% incentive | 1% incentive | Floor | 0.33% incentive | 1% incentive |
| Electric | 47     | 47.0  | 70.5            | 75.2         | 70.5  | 93.8            | 98.7         | 93.8  | 124.7           | 131.3        |
| Gas      | 22     | 22.0  | 33.0            | 35.2         | 33.0  | 43.9            | 46.2         | 43.9  | 58.4            | 61.4         |

Table 6-2 summarizes the certified number of multiple measures bonuses paid in 2012 and 2013, for both electric and gas projects. These calculations are based on lists of multiple measures projects and hard copies of bonus incentive payments provided by program implementation staff. Consumers Energy achieved a 74.5% increase in electric multi-measure projects between 2012 and 2013, and a 59.1% increase in gas multi-measure projects between 2012 and 2013.

**Table 6-2. Multiple Measures Projects: Achieved**

| Multiple Measures Projects | 2012 | 2013 | Percent Change in Projects |
|----------------------------|------|------|----------------------------|
| Electric                   | 47   | 82   | 74.5%                      |
| Gas                        | 22   | 35   | 59.1%                      |

## 6.2 New Construction C&I gas savings

The Settlement Agreement for Case No. U-17138 outlines a PIM metric related to MCF savings from C&I New Construction program participants. This metric is defined as a percentage increase over 2012 levels in 2013, 2014, and 2015:

- “iv. The Company would earn, on a sliding scale, an incentive between 0% and 0.33% for achieving an increase (over 2012 levels) between 0% and 50% in gas energy savings for the New Construction C&I program, and additional 0% to 33% increases in savings in each of 2014 and 2015.
- v. The Company would earn, on a sliding scale, an incentive between 0.33% and 1.0% incentive for achieving an increase between 50% and 60% in gas energy savings for the New Construction C&I program, and additional 33% to 40% increases in savings in each of 2014 and 2015.”

For this metric, the certified C&I New Construction savings are equal to the verified net savings included in our annual Certification reports. These savings include whole building design incentives, as well as major retrofit projects included in the larger Business Solutions program.

Based on the text of the Settlement Agreement, the 2012 New Construction savings is a static baseline, which determines 2013, 2014, and 2015 savings targets. In other words, the 2014 metric is based on a 33% (minimum incentive) to 40% (maximum incentive) increase over the 2013 **minimum goal**, not over the 2013 performance of the New Construction program. Table 6-3 shows our calculations of what those targets will be.

**Table 6-3. Gas New Construction Savings: Targets**

|                          | 2012   | 2013   |            |         | 2014   |            |         | 2015   |            |         |
|--------------------------|--------|--------|------------|---------|--------|------------|---------|--------|------------|---------|
| Metric                   | Actual | Floor  | 0.33% inc. | 1% inc. | Floor  | 0.33% inc. | 1% inc. | Floor  | 0.33% inc. | 1% inc. |
| Verified Net MCF Savings | 10,372 | 10,372 | 15,558     | 16,595  | 15,558 | 20,692     | 21,781  | 20,692 | 27,521     | 28,969  |

Table 6-4 summarizes our calculations of New Construction gas savings achieved in 2012 and 2013. Between 2012 and 2013, Consumers Energy achieved a 281% increase in New Construction verified net gas savings.

**Table 6-4. New Construction Gas Savings: Achieved**

| New Construction Savings | 2012 Verified Net MCF Savings | 2013 Verified Net MCF Savings <sup>a</sup> | Percent Change in Projects |
|--------------------------|-------------------------------|--|----------------------------|
| Major Retrofit Projects  | 9,736                         | 21,298                                     | 219%                       |
| Design Incentives        | 636                           | 7815.4225                                  | 1229%                      |
| <b>Total</b>             | <b>10,372</b>                 | <b>29,113</b>                              | <b>281%</b>                |

a. 2013 Verified Net Savings include the 1.1 savings multiplier for measures with measure lives of 10 years or greater.



## 7. Savings Verification Summary

Table 7-1 summarizes the verified electric energy (kWh) savings for each program. As shown, for the 2013 program year, the certification team derived total verified net electric energy savings of 240,551,436 kWh across all programs resulting in an overall kWh savings realization rate of 0.876. Almost two-thirds of total verified net electric energy savings (64.13% or 154,270,443 kWh) resulted from the Business Solutions Program; about one-third (33.72% or 81,963,790 kWh) resulted from the Small Business Solutions Program; only 1.76% (4,317,203 kWh) arose from the Multi-Family Program. The LLESMS for electric energy savings totaled 14,982,246 kWh for an overall PY2013 kWh savings of 255,533,682.

Table 7-2 summarizes the verified electric demand (kW) savings for each program. As shown, for the 2013 program year, the certification team derived total verified net electric demand savings of 40,479 kW across all programs resulting in an overall kW savings realization rate of 0.818. The Business Solutions Program represented the greatest proportion of total electric demand savings (58.96% or 23,865 kW), followed the Small Business Solutions Program at 40.06% (16,216 kW) and the Multi-Family Program (0.98% or 398 kW). The LLESMS for electric demand savings totaled 2,070 kW for an overall PY2013 kW savings of 42,549.

Table 7-3 summarizes the verified natural gas (Mcf) savings for each program. For the 2013 program year, the certification team derived total verified net gas savings of 862,1550 Mcf across all programs resulting in an overall gas realization rate of 0.844. The Business Solutions Program accounted for the greatest proportion of verified net gas savings (81.48%) with 707,517 Mcf. Next was the Small Business Solutions Program with 15.24% of verified net gas savings (131,420 Mcf); the Multi-Family Program accounted for 3.27% of verified net gas savings (28,218 Mcf). The LLESMS for natural gas savings totaled 51,556 Mcf for an overall PY2013 Mcf savings of 913,711.

Table 7-4 summarizes the three new performance incentive mechanism (PIM) metrics that the certification team certified for PY2013. These metrics include growth in Multi-Measure electric projects, which increased by 74.5% between 2012 and 2013; growth in Multi-Measure gas projects, which increased by 59.1% between 2012 and 2013; and growth in New Construction gas savings, which increased by 280.7% between 2012 and 2013.

Table 7-1. PY2013 Certified Electric Energy (kWh) Savings by Program

| Program   | 2013<br>Reported<br>Gross kWh<br>Savings<br>[A] | 2013<br>Adjusted<br>Reported<br>Gross kWh<br>Savings<br>[B] | 2012<br>Verified<br>Gross kWh<br>Savings<br>Adjustment<br>Factor <sup>a</sup><br>[C] | 2013 Verified<br>Gross kWh<br>Savings<br>[D] = [B x C] | Deemed<br>kWh NTG<br>Adjustment<br>Factor <sup>b</sup><br>[E] | 2013 Verified<br>Net kWh<br>Savings<br>[F] = [D x E] | 2013 kWh<br>Realization<br>Rate<br>[G] = [F / A] | 2013 Verified Net<br>kWh Savings<br>Including Long<br>Life Equipment<br>Savings Multiplier<br>(LLESM)<br>[H] = [F x 1.1] <sup>c</sup> |
|---|---|---|--|--|---|--|--|---|
| Business<br>Solutions<br>Program <sup>d</sup>       | 177,331,024                                     | 176,778,028   | 0.970  | 171,414,710  | 0.900   | 154,270,443  | 0.870  | 166,773,674   |
| Small Business<br>Solutions<br>Program <sup>e</sup> | 92,393,647                                      | 92,393,647  | 0.986  | 91,070,877   | 0.900   | 81,963,790   | 0.887  | 84,184,243  |
| Multi-Family<br>Program                             | 4,821,077                                       | 4,821,077   | 0.995  | 4,796,908  | 0.900   | 4,317,203  | 0.895  | 4,575,765   |
| <b>TOTAL</b>  | <b>274,545,749</b>                              | <b>273,992,753</b>  | <b>0.976</b>   | <b>267,282,495</b>                                     | <b>0.900</b>  | <b>240,551,436</b>                                   | <b>0.876</b>                                     | <b>255,533,683</b>  |

Columns may not sum to total due to rounding.

a) Note that the verified gross adjustment factors were derived from prior-year impact evaluations (see Section 2.4).

b) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.

c) The verified net savings including the Long Life Equipment Savings Multiplier (LLESM) are equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.

d) The Business Solutions Program is comprised of the Business Solutions-Custom, Business Solutions-Prescriptive, Building Operator Certification, and New Construction projects.

e) The Small Business Solutions Program is comprised of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL-Drop Ship, and CFL-Buydown Programs.

Table 7-2. PY2013 Certified Electric Demand (kW) Savings by Program

| Program   | 2013<br>Reported<br>Gross kW<br>Savings<br>[A] | 2013<br>Adjusted<br>Reported<br>Gross kW<br>Savings<br>[B] | 2012<br>Verified<br>Gross kW<br>Savings<br>Adjustment<br>Factor <sup>a</sup><br>[C] | 2013 Verified<br>Gross kW<br>Savings<br>[D] = [B x C] | Deemed<br>kW NTG<br>Adjustment<br>Factor <sup>b</sup><br>[E] | 2013 Verified<br>Net kW<br>Savings<br>[F] = [D x E] | 2013 kW<br>Realization<br>Rate<br>[G] = [F / A] | 2013 Verified Net kW<br>Savings Including<br>Long Life Equipment<br>Savings Multiplier<br>(LLESM)<br>[H] = [F x 1.1] <sup>c</sup> |
|---|--|--|---|---|--|---|---|---|
| Business<br>Solutions<br>Program <sup>d</sup>       | 29,264   | 28,959   | 0.916   | 26,517  | 0.900  | 23,865  | 0.816   | 25,592  |
| Small Business<br>Solutions<br>Program <sup>e</sup> | 19,743   | 19,104   | 0.943   | 18,017  | 0.900  | 16,216  | 0.821   | 16,545  |
| Multi-Family<br>Program                             | 463  | 445  | 0.994   | 442   | 0.900  | 398   | 0.859   | 412   |
| <b>TOTAL</b>  | <b>49,470</b>                                  | <b>48,507</b>  | <b>0.927</b>  | <b>44,976</b>   | <b>0.900</b>   | <b>40,479</b>                                       | <b>0.818</b>                                    | <b>42,549</b>   |

Columns may not sum to total due to rounding.

a) Note that the verified gross adjustment factors were derived from prior-year impact evaluations (see Section 2.4).

b) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.

c) The verified net savings including the Long Life Equipment Savings Multiplier (LLESM) are equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.

d) The Business Solutions Program is comprised of the Business Solutions-Custom, Business Solutions-Prescriptive, Building Operator Certification, and New Construction projects.

e) The Small Business Solutions Program is comprised of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL-Drop Ship, and CFL-Buydown Programs.

Table 7-3. PY2013 Certified Natural Gas (Mcf) Savings by Program

| Program                                       | 2013 Reported Gross Mcf Savings [A] | 2013 Adjusted Reported Gross Mcf Savings [B] | 2012 Verified Gross Mcf Savings Adjustment Factor <sup>a</sup> [C] | 2013 Verified Gross Mcf Savings [D] = [B x C] | Deemed Mcf NTG Adjustment Factor <sup>b</sup> [E] | 2013 Verified Net Mcf Savings [F] = [D x E] | 2013 Mcf Realization Rate [G] = [F / A] | 2013 Verified Net Mcf Savings Including Long Life Equipment Savings Multiplier (LLES <sup>SM</sup> ) [H] = [F x 1.1] <sup>c</sup> |
|---|-------------------------------------|--|--|---|---|---|---|---|
| Business Solutions Program <sup>d</sup>       | 843,237                             | 842,966                                      | 0.926  | 780,574                                       | 0.900   | 702,517                                     | 0.833                                   | 750,276   |
| Small Business Solutions Program <sup>e</sup> | 146,960                             | 146,958                                      | 0.994  | 146,022                                       | 0.900   | 131,420                                     | 0.894                                   | 132,612   |
| Multi-Family Program                          | 31,347                              | 31,339                                       | 1.000  | 31,353  | 0.900   | 28,218                                      | 0.900                                   | 30,823  |
| <b>TOTAL</b>                                  | <b>1,021,544</b>                    | <b>1,021,264</b>                             | <b>0.938</b>   | <b>957,949</b>                                | <b>0.900</b>                                      | <b>862,155</b>                              | <b>0.844</b>                            | <b>913,711</b>  |

Columns may not sum to total due to rounding.

a) Note that the verified gross adjustment factors were derived from prior-year impact evaluations (see Section 2.4).

b) The net-to-gross adjustment factor was deemed at 0.900 for all programs/initiatives by the MPSC.

c) The verified net savings including the Long Life Equipment Savings Multiplier (LLES<sup>SM</sup>) are equal to the verified net savings plus a 10% multiplier for all measures installed under each program that have a measure of 10 years or more.

d) The Business Solutions Program is comprised of the Business Solutions-Custom, Business Solutions-Prescriptive, Building Operator Certification, and New Construction projects.

e) The Small Business Solutions Program is comprised of the Direct Install-Core, Programmable Thermostat, Hospitality, Furnace Tune-up, CFL-Drop Ship, and CFL-Buydown Programs.

Table 7-4. PY2013 Performance Metric Certification

| Multiple Measures Projects       | 2012 Metric | 2013 Metric | Percent Change in Metric |
|----------------------------------|-------------|-------------|--------------------------|
| Multi-Measures Electric Projects | 47 Projects | 82 Projects | 74.5%                    |
| Multi-Measures Gas Projects      | 22 Projects | 35 Projects | 59.1%                    |
| New Construction Gas Savings     | 10,372 MCF  | 29,113 MCF  | 280.7%                   |



Energy Market Innovations

May 31, 2013

# Certification of Reported Savings: Consumers Energy C&I Energy Optimization Programs

Appendices: Program Year 2013



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Table A-1. Business Solutions Program Per-Unit Savings for Electric Energy (kWh)

| Program                           | End Use        | Measure Code | Measure Description                         | Units | Install Quantity | MEMD or Workpaper Per-Unit kWh Savings | Deemed Source                                     | Effect on Reported kWh | Variance Description  |
|-----------------------------------|----------------|--------------|---|-------|------------------|--|---|------------------------|---|
| BOC                               | Other          | CSC0042      | BOC (Combo Customer)                        | Units | 11.00            | 23,534.5000                            | Master MEMD; Commercial                           | 0.0000                 | No variances  |
| BOC                               | Other          | CSE0090      | BOC (Electric Customer)                     | Units | 12.00            | 23,534.5000                            | Master MEMD; Commercial                           | 0.0000                 | No variances  |
| Business Solutions - Custom       | Custom         | CBE0001      | Custom Electric Program                     | Units | 44.00            | 0.0000                                 | Custom calculated                                 | 0.0000                 | No variances  |
| Business Solutions - Custom       | Custom         | CBE0300      | Smart Buildings - Electric                  | Units | 3.00             | 0.0000                                 | Custom calculated                                 | 0.0000                 | No variances  |
| Business Solutions - Custom       | Custom         | CJE0001      | Lumens per Watt Improvement per Year        | kWh   | 54.00            | 0.0000                                 | Custom calculated                                 | 0.0000                 | No variances  |
| Business Solutions - Custom       | Custom         | CJE0002      | Energy Conservation Improvement per Year    | kWh   | 14.00            | 0.0000                                 | Custom calculated                                 | 0.0000                 | No variances  |
| Business Solutions - Prescriptive | Compressed Air | CAE0001      | VSD Air Compressor                          | HP    | 2,050.00         | 1,390.0000                             | Master MEMD; Commercial                           | 0.0000                 | No variances  |
| Business Solutions - Prescriptive | Compressed Air | CAE0002      | Refrigerated Cycling Thermal Mass Air Dryer | SCFM  | 10,800.00        | 5.2420                                 | Master MEMD; Commercial                           | 0.0000                 | No variances  |
| Business Solutions - Prescriptive | Compressed Air | CAE0004      | Low-Pressure Drop Air Filter                | SCFM  | 800.00           | 24.9600                                | CA-Low pressure drop filter Workpaper-042412.docx | 7,984.0000             | eTracker reported per unit kWh = 14.9800; should be 24.9600 kWh     |
| Business Solutions - Prescriptive | Compressed Air | CAE0005      | Zero Loss Condensate Drain                  | Units | 20.00            | 1,914.0000                             | CA-NoLossDrain Workpaper-042412.docx              | -10,080.0000           | eTracker reported per unit kWh = 2418.0000; should be 1914.0000 kWh |
| Business Solutions - Prescriptive | Compressed Air | CAE0007      | Compressed Air Energy Audit                 | Units | 5,263.19         | 624.0000                               | Master MEMD; Commercial                           | 1.9472                 | eTracker reported incorrect kWh savings for 7 projects (values      |

|                                   |                            |         |   |               |            |            |  |          |                    |   |
|-----------------------------------|----------------------------|---------|---|---------------|------------|------------|--|----------|--------------------|---|
| Business Solutions - Prescriptive | Compressed Air             | CAE0008 | Air Compressor Outdoor Air Intake                         | HP            | 100.00     | 89.8600    | CA Outside Air Intake<br>Workpaper_042812.docx                 | 300.0000 | vary)              | eTracker reported per unit kWh = 86.8600; should be 89.8600 kWh |
| Business Solutions - Prescriptive | Compressed Air             | CAE0009 | Compressed Air Pressure Flow Controller                   | HP            | 275.00     | 73.9400    | Master MEMD; Commercial  | 0.0000   | No variances       | No variances  |
| Business Solutions - Prescriptive | Compressed Air             | CAE0011 | Refrigerated Cycling - Digital Scroll                     | SCFM          | 1,000.00   | 16.1620    | Master MEMD; Commercial  | 0.0000   | No variances       | No variances  |
| Business Solutions - Prescriptive | BLDG Envelope              | CBC0001 | Window Reduction  | Square Feet   | 1,421.00   | 315.0000   | WS MEMD  | 0.0000   | No variances       | No variances  |
| Business Solutions - Prescriptive | Energy Management Systems  | CEB0001 | EMS - Combination Customers                               | Square Feet   | 1,911.80   | 981.3116   | WS MEMD  | 0.0000   | No variances       | No variances  |
| Business Solutions - Prescriptive | Energy Management Systems  | CEE0001 | EMS (Electric Cooling)- Electric Customers                | Square Feet   | 1,444.00   | 962.6345   | WS MEMD  | 0.0000   | No variances       | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0001 | Interior LED/Induction Lighting                           | Watts Removed | 38,085.00  | 4.1600     | Master MEMD; Commercial  | 0.0000   | No variances       | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0003 | CFL Replacing MH  | Watts Removed | 33,939.00  | 3.6800     | Indoor CFL<br>WorkPaper_042712.docx                            | 0.0000   | No variances       | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0004 | Exterior Linear Fluorescent Lighting Retrofit             | Watts Removed | 466.594.00 | 3,833.0000 | Master MEMD; Commercial  | 0.0000   | No variances       | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0005 | Parking Garage LED/Induction Lighting Retrofit            | Watts Removed | 277.007.00 | 8.7600     | Parking Garage LED-Induction - watts reduced<br>Workpaper.docx | 0.0002   | kWh rounding issue |   |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0006 | Neon to LED Sign Lighting Retrofit (Continuous Operation) | Watts Removed | 1,178.40   | 8.7600     | Neon to LED<br>Workpaper_042912.docx                           | 0.0000   | No variances       | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit          | CFE0007 | Interior LED Lighting                                     | Watts Removed | 1,298.4    | 4,160.0000 | Master MEMD;   | 0.0000   | No variances       | No variances  |

| Prescriptive                      | Fixtures                   | Retrofit | ed   | 52.00         |                  | Commercial |  |   |
|-----------------------------------|----------------------------|----------|--|---------------|------------------|------------|--|---|
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0008  | Exterior LED/Induction Lighting Retrofit                   | Watts Removed | 3,936.7<br>98.10 | 3.8330     | Exterior LED-Induction - watts reduced<br>Workpaper.docx | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0009  | Neon to LED Sign Lighting Retrofit (Commercial Hours)      | Watts Removed | 12,074.00        | 3.6800     | Neon to LED<br>Workpaper_042912.docx                     | No variances  |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0010  | LED Replacing Incandescent Candelabra and Globe            | Units         | 623.00           | 118.0000   | DecorativeLEDWork<br>paper_062613.docx                   | eTracker reported per unit kWh = 127.0000; should be 118.0000 kWh |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0011  | LED Replacing Incandescent BR-Series                       | Units         | 3,525.00         | 116.0000   | Master MEMD; Commercial                                  | No variances  |
| Business Solutions - Prescriptive | T8 Fluorescent             | CFE0012  | 8-foot T12 to Two (2) 4-ft HP/RW T8                        | Units         | 4,160.00         | 39.3000    | Master MEMD; Commercial                                  | kWh rounding issue  |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0013  | 4-ft T12 to LED Tube Lights                                | Units         | 3,442.00         | 43.2000    | LED Tube Light<br>Workpaper_040613.docx                  | No variances  |
| Business Solutions - Prescriptive | Furnaces and Heaters       | CHC0010  | Infrared Heaters - Combination Customers                   | kBtu/h        | 10,802.00        | 26.3369    | WS MEMD  | No variances  |
| Business Solutions - Prescriptive | HVAC Controls              | CHC0011  | Programmable Thermostat - Combination Customers            | Square Feet   | 182,775.00       | 886.0820   | WS MEMD  | No variances  |
| Business Solutions - Prescriptive | HVAC Controls              | CHC0012  | Guestroom Energy Management Control - Combination Customer | Units         | 286.00           | 237.0000   | Master MEMD; Commercial                                  | No variances  |
| Business Solutions - Prescriptive | HVAC Controls              | CHC0014  | Critical Zone Supply Air Reset Control (Combo)             | Tons          | 70.00            | 253.6519   | WS MEMD  | No variances  |
| Business Solutions - Prescriptive | HVAC Controls              | CHC0015  | Hydronic HVAC Pump   | Square Feet   | 602,772.00       | 0.5205     | Hydronic HVAC Pump Control                               | No variances  |

| Prescriptive                      |                     |         | (Combo)  |             |                |          |  | Workpaper_030811.docx |   |  |
|-----------------------------------|---------------------|---------|--|-------------|----------------|----------|--|-----------------------|---|--|
| Business Solutions - Prescriptive | HVAC Controls       | CHC0017 | Optimal Start/Stop on Air Handling Units (Combo)                       | Square Feet | 890.53<br>0.00 | 840.3862 | WS MEMD  | 0.0000                | No variances                                      |  |
| Business Solutions - Prescriptive | HVAC Controls       | CHC0018 | Occupancy Sensor Controls on HVAC Units (Combo)                        | Square Feet | 123.95<br>0.00 | 381.3629 | WS MEMD  | 0.0000                | No variances                                      |  |
| Business Solutions - Prescriptive | DCV and Economizers | CHC0027 | Demand Control Ventilation - Combination Customers                     | Square Feet | 884.21<br>8.00 | 77.7194  | WS MEMD  | 0.0000                | No variances                                      |  |
| Business Solutions - Prescriptive | Unitary/Split HVAC  | CHC0070 | Occ Sensor For Toilet Rm Exhaust                                       | Units       | 2.00           | 94.0000  | CE Work Paper Review- Toilet Exhaust 03082012.docx | 0.0000                | No variances                                      |  |
| Business Solutions - Prescriptive | Unitary/Split HVAC  | CHE0001 | AC < 65,000 Btuh (5.4 tons)  | Tons        | 318.08         | 46.9503  | WS MEMD  | -0.0001               | kWh rounding issue                                |  |
| Business Solutions - Prescriptive | Unitary/Split HVAC  | CHE0003 | AC > 240,000 Btuh (20 tons) & ≤ 760,000 Btuh (63.3 tons)               | Tons        | 920.65         | 44.0911  | WS MEMD  | 0.0000                | No variances                                      |  |
| Business Solutions - Prescriptive | Room AC / PTAC      | CHE0008 | Package Terminal AC - AC ≥ 10% EER higher than IECC 2006 standard      | Tons        | 88.75          | 68.3707  | WS MEMD  | -0.0001               | kWh rounding issues                               |  |
| Business Solutions - Prescriptive | Room AC / PTAC      | CHE0009 | Package Terminal AC-Heat Pump ≥ 10% EER higher than IECC 2006 standard | Tons        | 20.80          | 226.5647 | WS MEMD  | 0.0000                | No variances                                      |  |
| Business Solutions - Prescriptive | Room AC / PTAC      | CHE0011 | Ductless Heat Pump   | Units       | 390.35         | 123.0000 | Ductless AC WorkPaper_043013.docx                  | -43,255.2300          | eTracker reported per unit kWh = 233.8114 and kWh |  |

|                                   |                     |         |   |             |              |          |                  |           |  |  |
|-----------------------------------|---------------------|---------|---|-------------|--------------|----------|------------------|-----------|--|--|
| Business Solutions - Prescriptive | Chiller             | CHE0012 | Air-cooled Chiller - 1.04 kW/ton IPLV                                     | Tons        | 4,000.40     | 139.6560 | WS MEMD          | -130.4808 | For 6 of the 21 projects the performance kWh and kW calculations in eTracker are incorrect | = 0.0852; should be kWh = 123.0000 and kW = 0.0740 |
| Business Solutions - Prescriptive | DCV and Economizers | CHE0027 | Demand Control Ventilation - Electric Customers                           | Square Feet | 1,851,887.00 | -55.1625 | WS MEMD          | 0.0000    | No variances   | No variances                                       |
| Business Solutions - Prescriptive | Unitary/Split HVAC  | CHE0028 | AC Units > 65,000 Btuh (5.4 tons) and <= 120,000 Btuh (10 tons)           | Tons        | 374.50       | 54.4702  | WS MEMD          | 0.0000    | No variances   | No variances                                       |
| Business Solutions - Prescriptive | Unitary/Split HVAC  | CHE0029 | AC Units > 120,000 Btuh (10 tons) and <= 240,000 Btuh (20 tons)           | Tons        | 478.50       | 62.5513  | WS MEMD          | -0.0004   | kWh rounding issues  | No variances                                       |
| Business Solutions - Prescriptive | Heat Pump           | CHE0030 | Heat Pumps <= 65,000 Btuh (5.4 tons)                                      | Tons        | 6.00         | 126.2635 | WS MEMD          | 0.0000    | No variances   | No variances                                       |
| Business Solutions - Prescriptive | Chiller             | CHE0037 | Water Cooled Chillers- Centrifugal  | Tons        | 960.00       | 129.1580 | WS MEMD          | 0.0000    | No variances   | No variances                                       |
| Business Solutions - Prescriptive | Chiller             | CHE0038 | Water Cooled Chillers- Centrifugal >300 tons and <= 600 tons, IPLV = 0.49 | Tons        | 2,075.00     | 109.5922 | WS MEMD          | 0.0000    | No variances   | No variances                                       |
| Business Solutions - Prescriptive | Chiller             | CHE0039 | Water-Cooled Chillers- Centrifugal >600 tons, IPLV =0.49                  | Tons        | 2,100.00     | 107.0499 | WS MEMD          | 0.0000    | No variances   | No variances                                       |
| Business                          | Chiller             | CHE0041 | Water-Cooled  | Tons        | 220.00       | 127.3920 | CHE0012 21 37 38 | 0.0000    | No variances   | No variances                                       |

| Solutions - Prescriptive          |                      | Chillers- Reciprocating >150 tons and <=300 tons, IPLV = 0.52 |  |             |              | 39 - Chillers.pdf |  |  |
|-----------------------------------|----------------------|---|--|-------------|--------------|-------------------|--|--|
| Business Solutions - Prescriptive | Chiller              | CHE0043   | Air and Water-Cooled Chiller Tune-up                 | Units       | 85.00        | 133.7573          | WS MEMD  | No variances   |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0061   | Air Side Economizer                                  | Tons        | 433.00       | 204.7916          | WS MEMD  | No variances   |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0062   | Hydronic HVAC Pump                                   | Square Feet | 1,153,456.00 | 0.5205            | Hydronic HVAC Pump Control Workpaper_030811.docx | kWh rounding issue   |
| Business Solutions - Prescriptive | Room AC / PTAC       | CHE0064   | Ductless Air Conditioning                            | Units       | 6.50         | 123.0000          | Ductless AC WorkPaper_043013.docx                | eTracker reported per unit kWh = 65.9542 and kW = 0.0799; should be kWh = 123.0000 and kW = 0.0740 |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0065   | Chilled Water Reset Retrofit (10 degrees) - Electric | Tons        | 438.00       | 18.2350           | WS MEMD  | No variances   |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0067   | Optimal Start/Stop on Air Handling Units (EO)        | Square Feet | 48,923.00    | 753.8879          | WS MEMD  | No variances   |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0069   | Critical Zone Supply Air Reset Control (EO)          | Tons        | 490.00       | 247.9121          | WS MEMD  | No variances   |
| Business Solutions - Prescriptive | Furnaces and Heaters | CHE0090   | Programmable Thermostat - Electric Customer          | Square Feet | 65,690.00    | 736.4690          | WS MEMD  | No variances   |
| Business Solutions - Prescriptive | CFL                  | CLE0001   | CFL Screw in (30 watts or less)                      | Units       | 6,140.00     | 156.0000          | Master MEMD; Commercial                          | No variances   |
| Business Solutions - Prescriptive | CFL                  | CLE0002   | CFL Specialty (down-light, 3-way,                    | Units       | 77.00        | 202.0000          | Master MEMD; Commercial                          | No variances   |

|                                   |                      |         | dimmbable)   |                  |              |            |                         |        |              |  |  |  |  |
|-----------------------------------|----------------------|---------|--|------------------|--------------|------------|-------------------------|--------|--------------|--|--|--|--|
| Business Solutions - Prescriptive | HP or RW Fluorescent | CLE0009 | 4-foot Standard T8 to Reduced Wattage T8 (lamp only)                       | Units            | 59,046.00    | 15.0000    | Master MEMD; Commercial | 0.0000 | No variances |  |  |  |  |
| Business Solutions - Prescriptive | Exit Signs           | CLE0014 | LED, T-1, or Electroluminescent Exit Signs                                 | Units            | 1,795.00     | 201.0000   | Master MEMD; Commercial | 0.0000 | No variances |  |  |  |  |
| Business Solutions - Prescriptive | Lighting Controls    | CLE0017 | Lighting Occupancy Sensors   | Watts Controlled | 2,902,463.00 | 1,104.0000 | Master MEMD; Commercial | 0.0000 | No variances |  |  |  |  |
| Business Solutions - Prescriptive | T8/T5 Fixture        | CLE0018 | New T8/T5 Fixture (Includes HID to Fluorescent conversions)                | Watts Removed    | 9,003,551.00 | 4,160.0000 | Master MEMD; Commercial | 0.0000 | No variances |  |  |  |  |
| Business Solutions - Prescriptive | CFL                  | CLE0020 | Compact Fluorescents: Screw-in, 31-115 W                                   | Units            | 284.00       | 497.0000   | Master MEMD; Commercial | 0.0000 | No variances |  |  |  |  |
| Business Solutions - Prescriptive | T8 Fluorescent       | CLE0023 | T12 to Standard T8: 2-foot lamp and ballast upgrade                        | Units            | 1,019.00     | 28.0000    | Master MEMD; Commercial | 0.0000 | No variances |  |  |  |  |
| Business Solutions - Prescriptive | T8 Fluorescent       | CLE0024 | T12 to Standard T8: 3-foot lamp and ballast upgrade                        | Units            | 679.00       | 40.5000    | Master MEMD; Commercial | 0.0000 | No variances |  |  |  |  |
| Business Solutions - Prescriptive | HP or RW Fluorescent | CLE0027 | High Performance or Reduced Wattage T8: HP 4-foot lamp and ballast upgrade | Units            | 96,863.00    | 29.0000    | Master MEMD; Commercial | 0.0000 | No variances |  |  |  |  |
| Business Solutions - Prescriptive | Lamp Removal         | CLE0028 | Lamp Removal: Remove 2-foot T12 fluorescent lamp (with T8                  | Lamps Removed    | 236.00       | 92.0000    | Master MEMD; Commercial | 0.0000 | No variances |  |  |  |  |



|                                   |                   |         |   |                  |              |             |                         |               |   |
|-----------------------------------|-------------------|---------|---|------------------|--------------|-------------|-------------------------|---------------|---|
| Business Solutions - Prescriptive | Lamp Removal      | CLE0029 | Lamp Removal: Remove 3-foot T12 fluorescent lamp (with T8 ballast retrofit) | Lamps Removed    | 24.00        | 85.1000     | Master MEMD; Commercial | 0.0000        | No variances  |
| Business Solutions - Prescriptive | Lamp Removal      | CLE0030 | Lamp Removal: Remove 4-foot T12 fluorescent lamp (with T8 ballast retrofit) | Lamps Removed    | 12,419.00    | 97.6000     | Master MEMD; Commercial | -449,567.8000 | eTracker reported per unit kWh = 133.8000; should be 97.6000 kWh  |
| Business Solutions - Prescriptive | Lamp Removal      | CLE0031 | Lamp Removal: Remove 8-foot T12 fluorescent lamp (with T8 ballast retrofit) | Lamps Removed    | 1,147.00     | 150.3000    | Master MEMD; Commercial | -30,166.0998  | eTracker reported per unit kWh = 176.6000; should be 150.3000 kWh |
| Business Solutions - Prescriptive | Lighting Controls | CLE0033 | Central Lighting Control  | Square Feet      | 2,199,392.00 | 11,500.0000 | Master MEMD; Commercial | 0.0010        | kWh rounding issue  |
| Business Solutions - Prescriptive | Lighting Controls | CLE0034 | Switching Controls for Multilevel Lighting                                  | Square Feet      | 349,432.00   | 8,000.0000  | Master MEMD; Commercial | 0.0000        | No variances  |
| Business Solutions - Prescriptive | Lighting Controls | CLE0035 | Daylight Sensor controls  | Square Feet      | 1,524,933.00 | 12,100.0000 | Master MEMD; Commercial | 0.0003        | kWh rounding issue  |
| Business Solutions - Prescriptive | T8 Fluorescent    | CLE0046 | 8-FT T12HO to 2 4-FT T8HP   | Units            | 10,172.00    | 122.5000    | Master MEMD; Commercial | 0.0000        | No variances  |
| Business Solutions - Prescriptive | Lighting Controls | CLE0050 | Exterior Multi-Step Dimming Occ Sensor                                      | Watts Controlled | 94,524.00    | 1.5330      | Master MEMD; Commercial | 0.0001        | kWh rounding issue  |
| Business Solutions - Prescriptive | Lighting Controls | CLE0051 | Parking Garage Multi-Step Dimming Occ Sensor                                | Watts Controlled | 67,481.00    | 1.3140      | Master MEMD; Commercial | 0.0000        | No variances  |
| Business                          | Lighting          | CLE0052 | Probe Start to  | Watts            | 251,51       | 3.6800      | Indoor CFL              | 0.0000        | No variances  |

| Solutions - Prescriptive          | Controls                  | Pulse Start Lighting (Lamp and Ballast Retrofit)        | Removed     | 9.00       | WorkPaper_042712.docx   |         |                     |
|-----------------------------------|---------------------------|---|-------------|------------|-------------------------|---------|---------------------|
| Business Solutions - Prescriptive | LED or Induction Fixtures | LED Replacing A19                                       | Units       | 45,338.00  | Master MEMD; Commercial | 0.0000  | No variances        |
| Business Solutions - Prescriptive | LED or Induction Fixtures | LED MR16 Replacing Halogen MR16                         | Units       | 2,960.00   | Master MEMD; Commercial | 0.0000  | No variances        |
| Business Solutions - Prescriptive | LED or Induction Fixtures | LED Par Replacing Halogen Par                           | Units       | 16,847.00  | Master MEMD; Commercial | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Variable Frequency Drives | Constant Volume AHU to VAV with Hydronic Reheat (Combo) | Square Feet | 245,282.00 | WS MEMD                 | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Variable Frequency Drives | VFD for Process Pumping, <= 50 HP                       | HP          | 1,161.00   | Master MEMD; Commercial | -0.0001 | kWh rounding issue  |
| Business Solutions - Prescriptive | Variable Frequency Drives | VFD/HVAC Fans and Pumps < 100HP - Electric Customers    | HP          | 2,476.75   | WS MEMD                 | -0.0002 | kWh rounding issues |
| Business Solutions - Prescriptive | Variable Frequency Drives | VFD/Chiller Motors - Electric Customers                 | HP          | 230.00     | WS MEMD                 | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Custom                    | VFD on Process Pumps (50-250 HP)                        | HP          | 8.00       | Custom calculated       | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Variable Frequency Drives | EC Motors   | HP          | 93.00      | Master MEMD; Commercial | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Variable Frequency Drives | VFD on Process Fans (< 50 HP)                           | HP          | 223.00     | Master MEMD; Commercial | 0.0000  | No variances        |

|                                   |                           |         |  |             |                |            |                         |         |                     |
|-----------------------------------|---------------------------|---------|--|-------------|----------------|------------|-------------------------|---------|---------------------|
| Business Solutions - Prescriptive | Custom                    | CME0019 | VFDs for Process Fixed Speed Control (Throttled; <= 50 hz)       | HP          | 90.00          | 625.0000   | Master MEMD; Commercial | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0022 | Constant Volume AHU to VAV with Hydronic Reheat (Electric)       | Square Feet | 228.09<br>7.00 | 3,974.6476 | WS MEMD                 | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0025 | VFD on HVAC Fans (< 100 HP)                                      | HP          | 1,727.2<br>5   | 1,012.1021 | WS MEMD                 | -0.0004 | kWh rounding issues |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0026 | VFD on HVAC Fans (100HP - 250HP)                                 | HP          | 100.00         | 674.0385   | WS MEMD                 | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0027 | VFD on HVAC Pumps (< 100 HP)                                     | HP          | 969.80         | 2,499.2531 | WS MEMD                 | -0.0002 | kWh rounding issues |
| Business Solutions - Prescriptive | Energy Recovery           | CRC0001 | Enthalpy Wheels ERUs   | CFM         | 1,600.0<br>0   | -18.3126   | WS MEMD                 | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Energy Recovery           | CRC0002 | Fixed-Plate Air to Air ERUs                                      | CFM         | 22,475.0<br>00 | -5.1404    | WS MEMD                 | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Energy Recovery           | CRE0001 | Laboratory Fume-Hood Ventilation Reduction (EO)                  | CFM         | 9,345.0<br>0   | 9.4054     | WS MEMD                 | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSC0030 | Reach-In Refrigerated Case Door; Low Temp - Combination Customer | Linear Feet | 148.00         | 1,454.0000 | Master MEMD; Commercial | 0.0000  | No variances        |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSC0031 | Temperature and Optical Sensor on Exhaust - Combo                | CFM         | 19,750.0<br>00 | 1.0067     | WS MEMD                 | 0.0000  | No variances        |
| Business                          | Other                     | CSC0039 | Roof Insulation  | Square      | 8,504.0        | 0.2001     | WS MEMD                 | 0.0000  | No variances        |

| Solutions - Prescriptive          |                                |         | - Attic Roof (Combo)                                | Feet        | 0          |            |                         |        |              |  |
|-----------------------------------|--------------------------------|---------|---|-------------|------------|------------|-------------------------|--------|--------------|--|
| Business Solutions - Prescriptive | Other                          | CSC0040 | Roof Insulation - Flat Roof (Combo)                 | Square Feet | 212,780.00 | 78.3786    | WS MEMD                 | 0.0000 | No variances |  |
| Business Solutions - Prescriptive | Other                          | CSC0106 | Wall Insulation - Combination Customer              | Square Feet | 11,994.00  | 680.8227   | WS MEMD                 | 0.0000 | No variances |  |
| Business Solutions - Prescriptive | Occupancy Sensors and Controls | CSE0001 | Beverage Vending Machine Controller                 | Units       | 22.00      | 800.0000   | Master MEMD; Commercial | 0.0000 | No variances |  |
| Business Solutions - Prescriptive | Occupancy Sensors and Controls | CSE0002 | Guestroom Energy Management Control (electric heat) | Units       | 312.00     | 1,114.0000 | Master MEMD; Commercial | 0.0000 | No variances |  |
| Business Solutions - Prescriptive | Ice Machines                   | CSE0003 | Energy Efficient Ice Machines less than 500 lbs     | Units       | 3.00       | 599.0000   | Master MEMD; Commercial | 0.0000 | No variances |  |
| Business Solutions - Prescriptive | Ice Machines                   | CSE0004 | Energy Efficient Ice Machines 500-1000 lbs          | Units       | 8.00       | 892.0000   | Master MEMD; Commercial | 0.0000 | No variances |  |
| Business Solutions - Prescriptive | Ice Machines                   | CSE0005 | Energy Efficient Ice Machines 1000-1500 lbs         | Units       | 2.00       | 1,286.0000 | Master MEMD; Commercial | 0.0000 | No variances |  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSE0007 | Night Covers  | Linear Feet | 786.00     | 16.9514    | WS MEMD                 | 0.0000 | No variances |  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSE0011 | Anti-Sweat Heater Controls                          | Units       | 2,406.00   | 1,489.0000 | Master MEMD; Commercial | 0.0000 | No variances |  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSE0013 | LED Lighting for Refrigeration Cases                | Units       | 42,782.00  | 460.0000   | Master MEMD; Commercial | 0.0000 | No variances |  |
| Business Solutions - Prescriptive | Other                          | CSE0016 | Network Power                                       | PCs Control | 1,603.00   | 135.0000   | Master MEMD; Commercial | 0.0000 | No variances |  |

| Prescriptive                      |                           | Management Software | led   |               |          |           |  |            |   |
|-----------------------------------|---------------------------|---------------------|---|---------------|----------|-----------|--|------------|---|
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0020             | Case EC Motor   | Units         | 1,706.00 | 824,000   | Master MEMD; Commercial                | 0.0000     | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0021             | LED Lighting Occupancy Sensor for Refrigeration Cases             | Units         | 1,020.00 | 195,000   | Master MEMD; Commercial                | 0.0000     | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0022             | A/C Reduction From Lighting Reduction (-20F to 0F)                | Watts Removed | 9,422.00 | 1,7900    | Master MEMD; Commercial                | 0.0000     | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0023             | A/C Reduction From Lighting Reduction (0F to 20F)                 | Watts Removed | 6,600.00 | 1,1600    | Master MEMD; Commercial                | 0.0000     | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0024             | A/C Reduction From Lighting Reduction (20F to 40F)                | Watts Removed | 9,536.00 | 0,7600    | Master MEMD; Commercial                | 0.0000     | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0026             | Evaporator Fan Control (EC motor)                                 | Units         | 33.00    | 330,000   | Master MEMD; Commercial                | 0.0000     | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0027             | Reach-In Refrigerated Case Door; Medium Temp - Electric Customers | Linear Feet   | 79.00    | 574,000   | Master MEMD; Commercial                | 0.0000     | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0028             | Electric Dishwasher (High Temp; Under Counter)                    | Units         | 3.00     | 1,136,000 | High Efficiency Dishwasher_011813.docx | -0.0723    | eTracker reported per unit kWh = 1136.0241; should be 1136.0000 |
| Business Solutions - Prescriptive | Other                     | CSE0042             | UPS - Single Normal Mode - VI (P > 10 kW)                         | kW            | 960.00   | 92,200    | UPS Workpaper_032713.docx              | 9,495.9360 | eTracker reported per unit kWh = 82.3084; should be 92.2000 kWh |
| Business                          | Kitchen                   | CSE0043             | Night Covers  | Linear        | 204.00   | 16,6171   | WS MEMD                                | 0.0000     | No variances  |

| Solutions - Prescriptive            | and Refrigeration         | (Combo) | Feet  |             |          |            |  |  |
|-------------------------------------|---------------------------|---------|---|-------------|----------|------------|--|--|
| Business Solutions - Prescriptive   | Other                     | CSE0045 | Battery Charger - Continuous                              | Units       | 42.00    | 3,638.0000 | Master MEMD; Commercial                | 0.0000<br>No variances   |
| Business Solutions - Prescriptive   | Other                     | CSE0046 | Battery Charger - 1 Shift/Day                             | Units       | 1.00     | 1,460.0000 | Master MEMD; Commercial                | 0.0000<br>No variances   |
| Business Solutions - Prescriptive   | Kitchen and Refrigeration | CSE0078 | Electric Dishwasher (High Temp; Multi Tank)               | Units       | 1.00     | 7,778.0000 | High Efficiency Dishwasher_011813.docx | 0.3873<br>eTracker reported per unit kWh = 7777.6127; should be 7778.0000 kWh  |
| Business Solutions - Prescriptive   | Kitchen and Refrigeration | CSE0079 | Electric Dishwasher (Low Temp; Single Tank)               | Units       | 1.00     | 3,017.0000 | High Efficiency Dishwasher_011813.docx | 0.0193<br>eTracker reported per unit kWh = 3016.9807; should be 3017.0000 kWh  |
| Business Solutions - Prescriptive   | Kitchen and Refrigeration | CSE0080 | Electric Dishwasher (High Temp; Single Tank)              | Units       | 1.00     | 7,120.0000 | High Efficiency Dishwasher_011813.docx | -0.2650<br>eTracker reported per unit kWh = 7120.2650; should be 7120.0000 kWh |
| Business Solutions - Prescriptive   | Kitchen and Refrigeration | CSE0082 | Electric Dishwasher (Low Temp; Door)                      | Units       | 1.00     | 3,567.0000 | High Efficiency Dishwasher_011813.docx | 0.1813<br>eTracker reported per unit kWh = 3566.8187; should be 3567.0000 kWh  |
| Business Solutions - Prescriptive   | Kitchen and Refrigeration | CSE0089 | Walk-in EC Motor replacing non-EC Motor                   | Units       | 1,028.00 | 1,365.0000 | Master MEMD; Commercial                | 0.0000<br>No variances   |
| Business Solutions - Prescriptive   | C&I Waterheating          | CWE0010 | Pipe Wrap - Domestic Hot Water - conditioned space (120F) | Linear Feet | 594.00   | 2.8550     | Master MEMD; Commercial                | 0.0000<br>No variances   |
| Business Solutions - Prescriptive   | C&I Waterheating          | CWG0012 | Pipe Wrap - Domestic Hot Water - conditioned space (140F) | Linear Feet | 42.00    | 4.2060     | Master MEMD; Commercial                | 0.0000<br>No variances   |
| New Construction - Major Renovation | Compressed Air            | CAE0001 | VSD Air Compressor  | HP          | 170.00   | 1,390.0000 | Master MEMD; Commercial                | 0.0000<br>No variances   |

[illegible]

[illegible]



[illegible]

Table A-2. Business Solutions Program Per-Unit Savings for Electric Demand (kW)

| Program                           | End Use        | Measure Code | Measure Description                         | Units | Install Quantity | MEMD or Workpap-er Per-Unit kW Savings | Deemed Source                                     | Effect on Reported kW | Variance Description   |
|-----------------------------------|----------------|--------------|---|-------|------------------|--|---|-----------------------|--|
| BOC                               | Other          | CSC0042      | BOC (Combo Customer)                        | Units | 11.00            | 2.6866                                 | Master MEMD; Commercial                           | 0.0000                | No variances   |
| BOC                               | Other          | CSE0090      | BOC (Electric Customer)                     | Units | 12.00            | 2.6866                                 | Master MEMD; Commercial                           | 0.0000                | No variances   |
| Business Solutions - Custom       | Custom         | CBE0001      | Custom Electric Program                     | Units | 44.00            | 0.0000                                 | Custom calculated                                 | 0.0000                | No variances   |
| Business Solutions - Custom       | Custom         | CJE0001      | Lumens per Watt Improvement per Year        | kWh   | 54.00            | 0.0000                                 | Custom calculated                                 | 0.0000                | No variances   |
| Business Solutions - Custom       | Custom         | CJE0002      | Energy Conservation Improvement per Year    | kWh   | 14.00            | 0.0000                                 | Custom calculated                                 | 0.0000                | No variances   |
| Business Solutions - Prescriptive | Compressed Air | CAE0001      | VSD Air Compressor                          | HP    | 2,050.00         | 0.1100                                 | Master MEMD; Commercial                           | 0.0000                | No variances   |
| Business Solutions - Prescriptive | Compressed Air | CAE0002      | Refrigerated Cycling Thermal Mass Air Dryer | SCFM  | 10,800.00        | 0.0008                                 | Master MEMD; Commercial                           | 0.0000                | No variances   |
| Business Solutions - Prescriptive | Compressed Air | CAE0004      | Low-Pressure Drop Air Filter                | SCFM  | 800.00           | 0.0035                                 | CA-Low pressure drop filter Workpaper-042412.docx | 0.3200                | eTracker reported per unit kW = 0.0031; should be 0.0035 kW          |
| Business Solutions - Prescriptive | Compressed Air | CAE0005      | Zero Loss Condensate Drain                  | Units | 20.00            | 15.9200                                | CA-NoLossDrain Workpaper-042412.docx              | 32.4000               | eTracker reported per unit kW = 14.3000; should be 15.9200 kW        |
| Business Solutions - Prescriptive | Compressed Air | CAE0007      | Compressed Air Energy Audit                 | Units | 5,263.19         | 0.0865                                 | Master MEMD; Commercial                           | 2.5934                | eTracker reported incorrect kW savings for 18 projects (values vary) |
| Business Solutions - Prescriptive | Compressed Air | CAE0008      | Air Compressor Outdoor Air Intake           | HP    | 100.00           | 0.0005                                 | CA Outside Air Intake Workpaper_042812.docx       | 0.0000                | No variances   |

|                                   |                            |         |   |               |              |        |  |         |   |
|-----------------------------------|----------------------------|---------|---|---------------|--------------|--------|--|---------|---|
| Business Solutions - Prescriptive | Compressed Air             | CAE0009 | Compressed Air Pressure Flow Controller                   | HP            | 275.00       | 0.0103 | Master MEMD; Commercial                                    | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Compressed Air             | CAE0011 | Refrigerated Cycling - Digital Scroll                     | SCFM          | 1,000.00     | 0.0026 | Master MEMD; Commercial                                    | 0.0000  | No variances  |
| Business Solutions - Prescriptive | BLDG Envelope              | CBC0001 | Window Reduction  | Square Feet   | 1,421.00     | 0.3840 | WS MEMD  | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Energy Management Systems  | CEB0001 | EMS - Combination Customers                               | Square Feet   | 1,911,812.00 | 0.1911 | WS MEMD  | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Energy Management Systems  | CEE0001 | EMS (Electric Cooling) - Electric Customers               | Square Feet   | 1,444,047.00 | 0.1545 | WS MEMD  | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0001 | Interior LED/Induction Lighting                           | Watts Removed | 38,085.00    | 0.0010 | Master MEMD; Commercial                                    | 3.8085  | eTracker reported per unit kW = 0.0009; should be using 0.0010 kW |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0003 | CFL Replacing MH  | Watts Removed | 33,939.00    | 0.0009 | Indoor CFL WorkPaper_042712.docx                           | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0005 | Parking Garage LED/Induction Lighting Retrofit            | Watts Removed | 277,007.00   | 0.0010 | ParkingGarage LED-Induction - watts reduced Workpaper.docx | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0006 | Neon to LED Sign Lighting Retrofit (Continuous Operation) | Watts Removed | 1,178.40     | 0.0010 | Neon to LED Workpaper_042912.docx                          | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0007 | Interior LED Lighting Retrofit                            | Watts Removed | 1,298,452.00 | 0.9500 | Master MEMD; Commercial                                    | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0009 | Neon to LED Sign Lighting Retrofit (Commercial Hours)     | Watts Removed | 12,074.00    | 0.0009 | Neon to LED Workpaper_042912.docx                          | 0.0000  | No variances  |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0010 | LED Replacing Incandescent Candelabra and Globe           | Units         | 623.00       | 0.0289 | DecorativeLEDWorkpaper_062613.docx                         | -1.3706 | eTracker reported per unit kW = 0.0289; should be 0.0289 kW       |
| Business                          | LED or                     | CFE0011 | LED Replacing   | Units         | 3,525.00     | 0.0257 | Master MEMD;   | -9.5175 | eTracker reported   |

| Solutions - Prescriptive          | Induction Fixtures        | Incandescent BR-Series  |             |            | Commercial |   | per unit kW = 0.0284; should be 0.0257 kW                   |
|-----------------------------------|---------------------------|---|-------------|------------|------------|---|---|
| Business Solutions - Prescriptive | T8 Fluorescent            | 8-foot T12 to Two (2) 4-ft HP/RW T8                               | Units       | 4,160.00   | 0.0095     | Master MEMD; Commercial                 | No variances  |
| Business Solutions - Prescriptive | LED or Induction Fixtures | 4-ft T12 to LED Tube Lights                                       | Units       | 3,442.00   | 0.0106     | LED Tube Light<br>Worksheet_040613.docx | eTracker reported per unit kW = 0.0107; should be 0.0106 kW |
| Business Solutions - Prescriptive | Furnaces and Heaters      | Infrared Heaters - Combination Customers                          | kBtu/h      | 10,802.00  | 0.0060     | WS MEMD                                 | No variances  |
| Business Solutions - Prescriptive | HVAC Controls             | Programmable Thermostat - Combination Customers                   | Square Feet | 182,775.00 | -0.0558    | WS MEMD                                 | No variances  |
| Business Solutions - Prescriptive | HVAC Controls             | Guestroom Energy Management Control - Combination Customer        | Units       | 286.00     | 0.0930     | Master MEMD; Commercial                 | No variances  |
| Business Solutions - Prescriptive | HVAC Controls             | Critical Zone Supply Air Reset Control (Combo)                    | Tons        | 70.00      | -0.0012    | WS MEMD                                 | No variances  |
| Business Solutions - Prescriptive | HVAC Controls             | Optimal Start/Stop on Air Handling Units (Combo)                  | Square Feet | 890,530.00 | 0.0564     | WS MEMD                                 | No variances  |
| Business Solutions - Prescriptive | DCV and Economizers       | Demand Control Ventilation - Combination Customers                | Square Feet | 884,218.00 | 0.1354     | WS MEMD                                 | No variances  |
| Business Solutions - Prescriptive | Unitary/Split HVAC        | AC < 65,000 Btuh (5.4 tons)                                       | Tons        | 318.08     | 0.0616     | WS MEMD                                 | No variances  |
| Business Solutions - Prescriptive | Unitary/Split HVAC        | AC > 240,000 Btuh (20 tons) & <= 760,000 Btuh (63.3 tons)         | Tons        | 920.65     | 0.0835     | WS MEMD                                 | No variances  |
| Business Solutions - Prescriptive | Room AC / PTAC            | Package Terminal AC - AC >=10% EER higher than IECC 2006 standard | Tons        | 88.75      | 0.0791     | WS MEMD                                 | kW rounding issues  |
| Business Solutions - Prescriptive | Room AC / PTAC            | Package Terminal AC-Heat Pump >=10% EER higher than IECC          | Tons        | 20.80      | 0.1002     | WS MEMD                                 | No variances  |

## Appendix A: Savings Values of Validated Measures



| Prescriptive                      |                     |         | 2006 standard   |             |              |         |                                    |         |  |  |
|-----------------------------------|---------------------|---------|---|-------------|--------------|---------|------------------------------------|---------|--|--|
| Business Solutions - Prescriptive | Room AC / PTAC      | CHE0011 | Ductless Heat Pump  | Units       | 390.35       | 0.0740  | Ductless AC WorkPaper_04301 3.docx | -4.3719 | eTracker reported per unit kW = 0.0852; should be kW = 0.0740                      |  |
| Business Solutions - Prescriptive | Chiller             | CHE0012 | Air-cooled Chiller - 1.04 kW/ton IPLV                                     | Tons        | 4,000.40     | 0.0575  | WS MEMD                            | -0.0384 | For 6 of the 21 projects the performance kW calculations in eTracker are incorrect |  |
| Business Solutions - Prescriptive | DCV and Economizers | CHE0027 | Demand Control Ventilation - Electric Customers                           | Square Feet | 1,851,887.00 | 0.0533  | WS MEMD                            | 0.0000  | No variances   |  |
| Business Solutions - Prescriptive | Unitary/Split HVAC  | CHE0028 | AC Units > 65,000 Btuh (5.4 tons) and <= 120,000 Btuh (10 tons)           | Tons        | 374.50       | 0.0669  | WS MEMD                            | -0.0002 | kW rounding issue  |  |
| Business Solutions - Prescriptive | Unitary/Split HVAC  | CHE0029 | AC Units > 120,000 Btuh (10 tons) and <= 240,000 Btuh (20 tons)           | Tons        | 478.50       | 0.0757  | WS MEMD                            | -0.0004 | kW rounding issues   |  |
| Business Solutions - Prescriptive | Heat Pump           | CHE0030 | Heat Pumps <= 65,000 Btuh (5.4 tons)                                      | Tons        | 6.00         | 0.0863  | WS MEMD                            | 0.0000  | No variances   |  |
| Business Solutions - Prescriptive | Chiller             | CHE0037 | Water Cooled Chillers-Centrifugal   | Tons        | 960.00       | 0.0433  | WS MEMD                            | 0.0000  | No variances   |  |
| Business Solutions - Prescriptive | Chiller             | CHE0038 | Water Cooled Chillers-Centrifugal >300 tons and <= 600 tons, IPLV = 0.49  | Tons        | 2,075.00     | 0.0540  | WS MEMD                            | 0.0000  | No variances   |  |
| Business Solutions - Prescriptive | Chiller             | CHE0039 | Water-Cooled Chillers-Centrifugal >600 tons, IPLV = 0.49                  | Tons        | 2,100.00     | 0.0471  | WS MEMD                            | 0.0000  | No variances   |  |
| Business Solutions - Prescriptive | Chiller             | CHE0041 | Water-Cooled Chillers-Reciprocating >150 tons and <=300 tons, IPLV = 0.52 | Tons        | 220.00       | 0.0666  | CHE0012 21 37 38 39 - Chillers.pdf | 0.0000  | No variances   |  |
| Business Solutions - Prescriptive | Chiller             | CHE0043 | Air and Water-Cooled Chiller Tune-up                                      | Units       | 85.00        | 0.0629  | WS MEMD                            | 0.0000  | No variances   |  |
| Business Solutions - Prescriptive | HVAC                | CHE0061 | Air Side Economizer   | Tons        | 433.00       | -0.0008 | WS MEMD                            | 0.0000  | No variances   |  |

| Prescriptive                      | Controls             |         |   |                  |              |         |                                    |          |   |  |  |
|-----------------------------------|----------------------|---------|---|------------------|--------------|---------|------------------------------------|----------|---|--|--|
| Business Solutions - Prescriptive | Room AC / PTAC       | CHE0064 | Ductless Air Conditioning                                   | Units            | 6.50         | 0.0740  | Ductless AC WorkPaper_04301 3.docx | -0.0383  | eTracker reported per unit kW = 0.0799; should be kW = 0.0740 |  |  |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0065 | Chilled Water Reset Retrofit (10 degrees) - Electric        | Tons             | 438.00       | -0.0179 | WS MEMD                            | 0.0000   | No variances  |  |  |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0067 | Optimal Start/Stop on Air Handling Units (EO)               | Square Feet      | 48,923.00    | 0.0515  | WS MEMD                            | 0.0000   | No variances  |  |  |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0069 | Critical Zone Supply Air Reset Control (EO)                 | Tons             | 490.00       | -0.0020 | WS MEMD                            | 0.0000   | No variances  |  |  |
| Business Solutions - Prescriptive | Furnaces and Heaters | CHE0090 | Programmable Thermostat - Electric Customer                 | Square Feet      | 65,690.00    | -0.1147 | WS MEMD                            | 0.0000   | No variances  |  |  |
| Business Solutions - Prescriptive | CFL                  | CLE0001 | CFL Screw in (30 watts or less)                             | Units            | 6,140.00     | 0.0382  | Master MEMD; Commercial            | -25.7880 | eTracker reported 0.0424 kW; should be 0.0382 kW              |  |  |
| Business Solutions - Prescriptive | CFL                  | CLE0002 | CFL Specialty (down-light, 3-way, dimmable)                 | Units            | 77.00        | 0.0494  | Master MEMD; Commercial            | 0.0000   | No variances  |  |  |
| Business Solutions - Prescriptive | HP or RW Fluorescent | CLE0009 | 4-foot Standard T8 to Reduced Wattage T8 (lamp only)        | Units            | 59,046.00    | 0.0036  | Master MEMD; Commercial            | 0.0000   | No variances  |  |  |
| Business Solutions - Prescriptive | Exit Signs           | CLE0014 | LED, T-1, or Electroluminescent Exit Signs                  | Units            | 1,795.00     | 0.0230  | Master MEMD; Commercial            | 0.0000   | No variances  |  |  |
| Business Solutions - Prescriptive | Lighting Controls    | CLE0017 | Lighting Occupancy Sensors                                  | Watts Controlled | 2,902,463.00 | 0.2700  | Master MEMD; Commercial            | 0.0000   | No variances  |  |  |
| Business Solutions - Prescriptive | T8/T5 Fixture        | CLE0018 | New T8/T5 Fixture (Includes HID to Fluorescent conversions) | Watts Removed    | 9,003,551.00 | 0.9500  | Master MEMD; Commercial            | 0.0000   | No variances  |  |  |
| Business Solutions - Prescriptive | CFL                  | CLE0020 | Compact Fluorescents: Screw-in, 31-115 W                    | Units            | 284.00       | 0.1215  | Master MEMD; Commercial            | 0.0000   | No variances  |  |  |
| Business Solutions - Prescriptive | T8 Fluorescent       | CLE0023 | T12 to Standard T8: 2-foot lamp and ballast upgrade         | Units            | 1,019.00     | 0.0068  | Master MEMD; Commercial            | 0.0000   | No variances  |  |  |

## Appendix A: Savings Values of Validated Measures



|                                   |                      |         |   |                  |              |        |                                   |          |   |
|-----------------------------------|----------------------|---------|---|------------------|--------------|--------|-----------------------------------|----------|---|
| Business Solutions - Prescriptive | T8 Fluorescent       | CLE0024 | T12 to Standard T8; 3-foot lamp and ballast upgrade                         | Units            | 679.00       | 0.0099 | Master MEMD; Commercial           | 0.0000   | No variances  |
| Business Solutions - Prescriptive | HP or RW Fluorescent | CLE0027 | High Performance or Reduced Wattage T8; HP 4-foot lamp and ballast upgrade  | Units            | 96,863.00    | 0.0072 | Master MEMD; Commercial           | 19.3726  | eTracker reported per unit kW = 0.0070; should be 0.0072 kW |
| Business Solutions - Prescriptive | Lamp Removal         | CLE0028 | Lamp Removal: Remove 2-foot T12 fluorescent lamp (with T8 ballast retrofit) | Lamps Removed    | 236.00       | 0.0230 | Master MEMD; Commercial           | 0.0000   | No variances  |
| Business Solutions - Prescriptive | Lamp Removal         | CLE0029 | Lamp Removal: Remove 3-foot T12 fluorescent lamp (with T8 ballast retrofit) | Lamps Removed    | 24.00        | 0.0210 | Master MEMD; Commercial           | 0.0000   | No variances  |
| Business Solutions - Prescriptive | Lamp Removal         | CLE0030 | Lamp Removal: Remove 4-foot T12 fluorescent lamp (with T8 ballast retrofit) | Lamps Removed    | 12,419.00    | 0.0243 | Master MEMD; Commercial           | -95.6263 | eTracker reported per unit kW = 0.0320; should be 0.0243 kW |
| Business Solutions - Prescriptive | Lamp Removal         | CLE0031 | Lamp Removal: Remove 8-foot T12 fluorescent lamp (with T8 ballast retrofit) | Lamps Removed    | 1,147.00     | 0.0369 | Master MEMD; Commercial           | -6.9967  | eTracker reported per unit kW = 0.0430; should be 0.0369 kW |
| Business Solutions - Prescriptive | Lighting Controls    | CLE0033 | Central Lighting Control  | Square Feet      | 2,199,392.00 | 2.8080 | Master MEMD; Commercial           | 0.0000   | No variances  |
| Business Solutions - Prescriptive | Lighting Controls    | CLE0034 | Switching Controls for Multilevel Lighting                                  | Square Feet      | 349,432.00   | 2.1960 | Master MEMD; Commercial           | 0.0000   | No variances  |
| Business Solutions - Prescriptive | Lighting Controls    | CLE0035 | Daylight Sensor controls  | Square Feet      | 1,524,933.00 | 3.3250 | Master MEMD; Commercial           | 0.0000   | No variances  |
| Business Solutions - Prescriptive | T8 Fluorescent       | CLE0046 | 8-FT T12HO to 2 4-FT T8HP   | Units            | 10,172.00    | 0.0297 | Master MEMD; Commercial           | 0.0000   | No variances  |
| Business Solutions - Prescriptive | Lighting Controls    | CLE0051 | Parking Garage Multi-Step Dimming Occupancy Sensor                          | Watts Controlled | 67,481.00    | 0.0001 | Master MEMD; Commercial           | 0.0000   | No variances  |
| Business Solutions - Prescriptive | Lighting Controls    | CLE0052 | Probe Start to Pulse Start Lighting(Lamp and Ballast Retrofit)              | Watts Removed    | 251,519.00   | 0.0009 | Indoor CFL WorkPaper_04271 2.docx | 0.0000   | No variances  |
| Business                          | LED or               | CLE0053 | LED Replacing A19   | Units            | 45,338.00    | 0.0491 | Master MEMD; Commercial           | 0.0000   | No variances  |

| Solutions - Prescriptive          | Induction Fixtures        |         |  |             |            | Commercial |                         |   |
|-----------------------------------|---------------------------|---------|--|-------------|------------|------------|-------------------------|---|
| Business Solutions - Prescriptive | LED or Induction Fixtures | CLE0054 | LED MR16 Replacing Halogen MR16                            | Units       | 2,960.00   | 0.0115     | Master MEMD; Commercial | No variances  |
| Business Solutions - Prescriptive | LED or Induction Fixtures | CLE0055 | LED Par Replacing Halogen Par                              | Units       | 16,847.00  | 0.0257     | Master MEMD; Commercial | No variances  |
| Business Solutions - Prescriptive | Variable Frequency Drives | CMC0002 | Constant Volume AHU to VAV with Hydronic Reheat (Combo)    | Square Feet | 245,282.00 | 0.0000     | WS MEMD                 | eTracker reported per unit kW = 0.0019 for 4 projects; there is no MEMD demand savings for this measure |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0006 | VFD for Process Pumping, <= 50 HP                          | HP          | 1,161.00   | 0.2286     | Master MEMD; Commercial | No variances  |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0007 | VFD/HVAC Fans and Pumps < 100HP - Electric Customers       | HP          | 2,476.75   | 0.0174     | WS MEMD                 | eTracker reported per unit kW = 0.0175 for 1 project; should be 0.0174                                  |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0009 | VFD/Chiller Motors - Electric Customers                    | HP          | 230.00     | 0.0000     | WS MEMD                 | eTracker reported per unit kW = 0.0180; no MEMD demand savings for this measure                         |
| Business Solutions - Prescriptive | Custom                    | CME0013 | VFD on Process Pumps (50-250 HP)                           | HP          | 8.00       | 0.0000     | Custom calculated       | No variances  |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0014 | EC Motors  | HP          | 93.00      | 0.0650     | Master MEMD; Commercial | No variances  |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0015 | VFD on Process Fans (< 50 HP)                              | HP          | 223.00     | 0.1100     | Master MEMD; Commercial | No variances  |
| Business Solutions - Prescriptive | Custom                    | CME0019 | VFDs for Process Fixed Speed Control (Throttled; <= 50 hz) | HP          | 90.00      | 0.1516     | Master MEMD; Commercial | eTracker reported per unit kW = 0.1567 for 1 project; should be 0.1516 kW                               |
| Business Solutions - Prescriptive | Variable Frequency        | CME0022 | Constant Volume AHU to VAV with Hydronic                   | Square      | 228,097.00 | 0.0000     | WS MEMD                 | eTracker reported per unit kW =   |



## Appendix A: Savings Values of Validated Measures



| Prescriptive                      | y Drives                  | Reheat (Electric)  | Feet        |            |         |  |         | 0.0019 for 1 project;<br>there is no MEMD<br>demand savings for<br>this measure                         |
|-----------------------------------|---------------------------|--|-------------|------------|---------|--|---------|---|
| Business Solutions - Prescriptive | Variable Frequency Drives | VFD on HVAC Fans (< 100 HP)                                      | HP          | 1,727.25   | 0.0301  | WS MEMD                                      | -0.0004 | kW rounding issues  |
| Business Solutions - Prescriptive | Variable Frequency Drives | VFD on HVAC Fans (100HP - 250HP)                                 | HP          | 100.00     | 0.0079  | WS MEMD                                      | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Variable Frequency Drives | VFD on HVAC Pumps (< 100 HP)                                     | HP          | 969.80     | 0.1742  | WS MEMD                                      | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Energy Recovery           | Enthalpy Wheels ERUs   | CFM         | 1,600.00   | -0.0082 | WS MEMD                                      | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Energy Recovery           | Fixed-Plate Air to Air ERUs                                      | CFM         | 22,475.00  | -0.0006 | WS MEMD                                      | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Energy Recovery           | Laboratory Fume-Hood Ventilation Reduction (EO)                  | CFM         | 9,345.00   | 0.0026  | WS MEMD                                      | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | Reach-In Refrigerated Case Door; Low Temp - Combination Customer | Linear Feet | 148.00     | 0.2500  | Master MEMD; Commercial                      | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | Temperature and Optical Sensor on Exhaust - Combo                | CFM         | 19,750.00  | 0.0001  | mi_weather_sensitive_dbase_2012_10_31_12.xls | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Other                     | Roof Insulation - Attic Roof (Combo)                             | Square Feet | 8,504.00   | 0.0000  | WS MEMD                                      | -0.8504 | eTracker reported per unit kW = 0.0001 for 2 projects; there is no MEMD demand savings for this measure |
| Business Solutions - Prescriptive | Other                     | Roof Insulation - Flat Roof (Combo)                              | Square Feet | 212,780.00 | 0.1004  | WS MEMD                                      | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Other                     | Wall Insulation - Combination Customer                           | Square Feet | 11,994.00  | 0.1039  | WS MEMD                                      | 0.0000  | No variances  |

|                                   |                                |         |   |                |           |        |                         |        |              |
|-----------------------------------|--------------------------------|---------|---|----------------|-----------|--------|-------------------------|--------|--------------|
| Business Solutions - Prescriptive | Occupancy Sensors and Controls | CSE0001 | Beverage Vending Machine Controller                   | Units          | 22.00     | 0.0420 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Occupancy Sensors and Controls | CSE0002 | Guestroom Energy Management Control (electric heat)   | Units          | 312.00    | 0.0880 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Ice Machines                   | CSE0003 | Energy Efficient Ice Machines less than 500 lbs       | Units          | 3.00      | 0.0679 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Ice Machines                   | CSE0004 | Energy Efficient Ice Machines 500-1000 lbs            | Units          | 8.00      | 0.1024 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Ice Machines                   | CSE0005 | Energy Efficient Ice Machines 1000-1500 lbs           | Units          | 2.00      | 0.1464 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSE0013 | LED Lighting for Refrigeration Cases                  | Units          | 42,782.00 | 0.0390 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Other                          | CSE0016 | Network Power Management Software                     | PCs Controlled | 1,603.00  | 0.0060 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSE0020 | Case EC Motor   | Units          | 1,706.00  | 0.0846 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSE0021 | LED Lighting Occupancy Sensor for Refrigeration Cases | Units          | 1,020.00  | 0.0160 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSE0022 | A/C Reduction From Lighting Reduction (-20F to 0F)    | Watts Removed  | 9,422.00  | 0.0005 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSE0023 | A/C Reduction From Lighting Reduction (0F to 20F)     | Watts Removed  | 6,600.00  | 0.0003 | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSE0024 | A/C Reduction From Lighting Reduction (20F to 40F)    | Watts Removed  | 9,536.00  | 0.0002 | Master MEMD; Commercial | 0.0000 | No variances |

|                                   | ion                        |         |   |             |          |        |   |        |  |  |  |  |  |
|-----------------------------------|----------------------------|---------|---|-------------|----------|--------|---|--------|--|--|--|--|--|
| Business Solutions - Prescriptive | Kitchen and Refrigerat ion | CSE0026 | Evaporator Fan Control (EC motor)                                 | Units       | 33.00    | 0.0342 | Master MEMD; Commercial                 | 0.0000 | No variances   |  |  |  |  |
| Business Solutions - Prescriptive | Kitchen and Refrigerat ion | CSE0027 | Reach-In Refrigerated Case Door; Medium Temp - Electric Customers | Linear Feet | 79.00    | 0.1200 | Master MEMD; Commercial                 | 0.0000 | No variances   |  |  |  |  |
| Business Solutions - Prescriptive | Kitchen and Refrigerat ion | CSE0028 | Electric Dishwasher (High Temp; Under Counter)                    | Units       | 3.00     | 0.2630 | High Efficiency Dishwasher_0118 13.docx | 0.0000 | No variances   |  |  |  |  |
| Business Solutions - Prescriptive | Other                      | CSE0042 | UPS - Single Normal Mode - VI (P > 10 kW)                         | kW          | 960.00   | 0.0240 | UPS Workpaper_03271 3.docx              | 2.4960 | eTracker reported per unit kW = 0.0214 kW; should be 0.0240 kW |  |  |  |  |
| Business Solutions - Prescriptive | Kitchen and Refrigerat ion | CSE0078 | Electric Dishwasher (High Temp; Multi Tank)                       | Units       | 1.00     | 1.8004 | High Efficiency Dishwasher_0118 13.docx | 0.0000 | No variances   |  |  |  |  |
| Business Solutions - Prescriptive | Kitchen and Refrigerat ion | CSE0079 | Electric Dishwasher (Low Temp; Single Tank)                       | Units       | 1.00     | 0.6984 | High Efficiency Dishwasher_0118 13.docx | 0.0000 | No variances   |  |  |  |  |
| Business Solutions - Prescriptive | Kitchen and Refrigerat ion | CSE0080 | Electric Dishwasher (High Temp; Single Tank)                      | Units       | 1.00     | 1.6482 | High Efficiency Dishwasher_0118 13.docx | 0.0000 | No variances   |  |  |  |  |
| Business Solutions - Prescriptive | Kitchen and Refrigerat ion | CSE0082 | Electric Dishwasher (Low Temp; Door)                              | Units       | 1.00     | 0.8257 | High Efficiency Dishwasher_0118 13.docx | 0.0000 | No variances   |  |  |  |  |
| Business Solutions - Prescriptive | Kitchen and Refrigerat ion | CSE0089 | Walk-in EC Motor replacing non-EC Motor                           | Units       | 1,028.00 | 0.1404 | Master MEMD; Commercial                 | 0.0000 | No variances   |  |  |  |  |
| Business Solutions - Prescriptive | C&I Waterhea ting          | CWE0010 | Pipe Wrap - Domestic Hot Water - conditioned space (120F)         | Linear Feet | 594.00   | 0.0020 | Master MEMD; Commercial                 | 0.0000 | No variances   |  |  |  |  |
| Business Solutions - Prescriptive | C&I Waterhea ting          | CWG0012 | Pipe Wrap - Domestic Hot Water - conditioned space (140F)         | Linear Feet | 42.00    | 0.0029 | Master MEMD; Commercial                 | 0.0000 | No variances   |  |  |  |  |

|  |                      |         |   |             |           |        |                         |         |   |
|--|----------------------|---------|---|-------------|-----------|--------|-------------------------|---------|---|
| New Construction - Major Renovation 2013 | Compressed Air       | CAE0001 | VSD Air Compressor  | HP          | 170.00    | 0.1100 | Master MEMD; Commercial | 0.0000  | No variances  |
| New Construction - Major Renovation 2013 | Compressed Air       | CAE0002 | Refrigerated Cycling Thermal Mass Air Dryer               | SCFM        | 1,600.00  | 0.0008 | Master MEMD; Commercial | 0.0000  | No variances  |
| New Construction - Major Renovation 2013 | Compressed Air       | CAE0009 | Compressed Air Pressure Flow Controller                   | HP          | 60.00     | 0.0103 | Master MEMD; Commercial | 0.0000  | No variances  |
| New Construction - Major Renovation 2013 | Furnaces and Heaters | CHC0010 | Infrared Heaters - Combination Customers                  | kBtu/h      | 4,685.00  | 0.0060 | WS MEMD                 | 0.0000  | No variances  |
| New Construction - Major Renovation 2013 | DCV and Economizers  | CHC0027 | Demand Control Ventilation - Combination Customers        | Square Feet | 22,798.00 | 0.1354 | WS MEMD                 | 0.0000  | No variances  |
| New Construction - Major Renovation 2013 | Unitary/Split HVAC   | CHE0001 | AC < 65,000 Btuh (5.4 tons)                               | Tons        | 98.12     | 0.0616 | WS MEMD                 | 0.0001  | kW rounding issues  |
| New Construction - Major Renovation 2013 | Chiller              | CHE0012 | Air-cooled Chiller - 1.04 kW/ton IPLV                     | Tons        | 726.50    | 0.0575 | WS MEMD                 | -0.0257 | For 1 of the 5 projects the performance kW calculations in eTracker are incorrect |
| New Construction - Major Renovation 2013 | DCV and Economizers  | CHE0027 | Demand Control Ventilation - Electric Customers           | Square Feet | 25,170.00 | 0.0533 | WS MEMD                 | 0.0000  | No variances  |
| New Construction - Major                 | Unitary/Split HVAC   | CHE0028 | AC Units > 65,000 Btuh (5.4 tons) and < =120,000 Btuh (10 | Tons        | 95.04     | 0.0669 | WS MEMD                 | 0.0000  | No variances  |

| Renovation<br>2013                                   |                                     |         | tons)  |                    |                  |        |                            |        |              |  |  |  |
|--|-------------------------------------|---------|--|--------------------|------------------|--------|----------------------------|--------|--------------|--|--|--|
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Unitary/S<br>plit HVAC              | CHE0029 | AC Units > 120,000<br>Btuh (10 tons) and <= 240,000 Btuh (20 tons)                 | Tons               | 178.58           | 0.0757 | WS MEMD                    | 0.0000 | No variances |  |  |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Heat<br>Pump                        | CHE0031 | Heat Pumps > 65,000<br>Btuh (5.4 tons) and <= 120,000 Btuh (10 tons)               | Tons               | 60.00            | 0.0555 | WS MEMD                    | 0.0000 | No variances |  |  |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Heat<br>Pump                        | CHE0032 | Heat Pumps > 120,000<br>Btuh (10 tons) and <= 240,000 Btuh (20 tons)               | Tons               | 60.00            | 0.0873 | WS MEMD                    | 0.0000 | No variances |  |  |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Chiller                             | CHE0038 | Water Cooled Chillers-<br>Centrifugal >300 tons<br>and <= 600 tons, IPLV<br>= 0.49 | Tons               | 750.00           | 0.0540 | WS MEMD                    | 0.0000 | No variances |  |  |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Lighting<br>Controls                | CLE0035 | Daylight Sensor<br>controls  | Squar<br>e<br>Feet | 67,772.00        | 3.3250 | Master MEMD;<br>Commercial | 0.0000 | No variances |  |  |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Variable<br>Frequenc<br>y Drives    | CME0007 | VFD/HVAC Fans and<br>Pumps < 100HP -<br>Electric Customers                         | HP                 | 587.50           | 0.0174 | WS MEMD                    | 0.0000 | No variances |  |  |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Ice<br>Machines                     | CSE0005 | Energy Efficient Ice<br>Machines 1000-1500<br>lbs                                  | Units              | 3.00             | 0.1464 | Master MEMD;<br>Commercial | 0.0000 | No variances |  |  |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Kitchen<br>and<br>Refrigerat<br>ion | CSE0013 | LED Lighting for<br>Refrigeration Cases  | Units              | 822.00           | 0.0390 | Master MEMD;<br>Commercial | 0.0000 | No variances |  |  |  |
| New<br>Construction                                  | Other                               | CSE0017 | Lighting Power Density   | Watts<br>Remo      | 1,096,856.<br>00 | 0.0009 | Lighting Power<br>Density  | 0.0000 | No variances |  |  |  |

| - Major Renovation 2013                  |                           |         | ved   |               |            | Workpaper 032713.docx |  |  |
|--|---------------------------|---------|---|---------------|------------|-----------------------|--|--|
| New Construction - Major Renovation 2013 | Other                     | CSE0042 | UPS - Single Normal Mode - VI (P > 10 kW)   | kW            | 34.74      | 0.0240                | UPS Workpaper_032713.docx                    | 0.0904   |
|  |                           |         |   |               |            |                       |  | eTracker reported per unit kW = 0.0214 kW; should be 0.0240 kW |
| New Construction - Major Renovation 2013 | Other                     | CSE0049 | Lighting Power Density (Exterior)           | Watts Removed | 213,066.00 | 0.0009                | Lighting Power Density Workpaper 032713.docx | 0.0000   |
|  |                           |         |   |               |            |                       |  | No variances   |
| New Construction - Major Renovation 2013 | Kitchen and Refrigeration | CSE0079 | Electric Dishwasher (Low Temp; Single Tank) | Units         | 1.00       | 0.6984                | High Efficiency Dishwasher_0118 13.docx      | 0.0000   |
|  |                           |         |   |               |            |                       |  | No variances   |
| <b>TOTAL</b>                             |                           |         |   |               |            |                       |  | <b>-305.2953</b>   |

Table A-3. Business Solutions Program Per-Unit Savings for Natural Gas (Mcf)

| Program                           | End Use                   | Measure Code | Measure Description                      | Units       | Install Quantity | MEMD or Workpaper Per-Unit Mcf Savings | Deemed Source           | Effect on Reported Mcf | Variance Description  |
|-----------------------------------|---------------------------|--------------|--|-------------|------------------|--|-------------------------|------------------------|---|
| BOC                               | Other                     | CSC0042      | BOC (Combo Customer)                     | Units       | 11.00            | 152.0203                               | Master MEMD; Commercial | -0.0055                | eTracker reported per unit MCF = 15.0208; should be 15.0203 MCF |
| BOC                               | Other                     | CSG0027      | BOC (Gas Customer)                       | Units       | 8.00             | 152.0203                               | Master MEMD; Commercial | -0.0040                | eTracker reported per unit MCF = 15.0208; should be 15.0203 MCF |
| Business Solutions - Custom       | Custom                    | CBG0001      | Custom Gas Program                       | Units       | 19.00            | 0.0000                                 | Custom calculated       | 0.0000                 | No variances  |
| Business Solutions - Custom       | Custom                    | CBG0300      | Smart Buildings - Gas                    | Units       | 1.00             | 0.0000                                 | Custom calculated       | 0.0000                 | No variances  |
| Business Solutions - Prescriptive | Compressed Air            | CAG0006      | Air Compressor Waste Heat Recovery       | HP          | 435.00           | 4.0124                                 | Master MEMD; Commercial | 0.0000                 | No variances  |
| Business Solutions - Prescriptive | BLDG Envelope             | CBC0001      | Window Reduction                         | Square Feet | 1,421.00         | 1.4677                                 | WS MEMD                 | 0.0000                 | No variances  |
| Business Solutions - Prescriptive | BLDG Envelope             | CBC0002      | Window Reduction (Gas)                   | Square Feet | 4,024.00         | 1.3912                                 | WS MEMD                 | 0.0000                 | No variances  |
| Business Solutions - Prescriptive | Energy Management Systems | CEB0001      | EMS - Combination Customers              | Square Feet | 1,911.81<br>2.00 | 29.6349                                | WS MEMD                 | 0.0000                 | No variances  |
| Business Solutions - Prescriptive | Energy Management Systems | CEG0001      | EMS (Gas Heating)- Gas Customers         | Square Feet | 2,917.60<br>1.00 | 33.6641                                | WS MEMD                 | 0.0000                 | No variances  |
| Business Solutions - Prescriptive | Furnaces and Heaters      | CHC0010      | Infrared Heaters - Combination Customers | kBtu/h      | 10,802.0<br>0    | 0.4982                                 | WS MEMD                 | 0.0000                 | No variances  |
| Business Solutions - Prescriptive | HVAC Controls             | CHC0011      | Programmable Thermostat                  | Square Feet | 182,775.00       | 21.5527                                | WS MEMD                 | 0.0000                 | No variances  |

| Prescriptive                      |                             |         | Combination Customers                                      |             |            |         |  |         |   |  |  |  |
|-----------------------------------|-----------------------------|---------|--|-------------|------------|---------|--|---------|---|--|--|--|
| Business Solutions - Prescriptive | HVAC Controls               | CHC0012 | Guestroom Energy Management Control - Combination Customer | Units       | 286.00     | 5.9292  | Master MEMD; Commercial                            | 0.0000  | No variances  |  |  |  |
| Business Solutions - Prescriptive | HVAC Controls               | CHC0014 | Critical Zone Supply Air Reset Control (Combo)             | Tons        | 70.00      | 5.4017  | WS MEMD  | 0.0000  | No variances  |  |  |  |
| Business Solutions - Prescriptive | HVAC Controls               | CHC0015 | Hydronic HVAC Pump (Combo)                                 | Square Feet | 602,772.00 | 0.0028  | Hydronic HVAC Pump Control Workpaper_0308 11.docx  | 0.0000  | No variances  |  |  |  |
| Business Solutions - Prescriptive | HVAC Controls               | CHC0017 | Optimal Start/Stop on Air Handling Units (Combo)           | Square Feet | 890,530.00 | 3.4385  | WS MEMD  | 0.0000  | No variances  |  |  |  |
| Business Solutions - Prescriptive | HVAC Controls               | CHC0018 | Occupancy Sensor Controls on HVAC Units (Combo)            | Square Feet | 123,950.00 | 4.2742  | WS MEMD  | 0.0000  | No variances  |  |  |  |
| Business Solutions - Prescriptive | DCV and Economizers         | CHC0027 | Demand Control Ventilation - Combination Customers         | Square Feet | 884,218.00 | 27.8509 | WS MEMD  | 0.0000  | No variances  |  |  |  |
| Business Solutions - Prescriptive | Unitary/Split HVAC          | CHC0070 | Occ Sensor For Toilet Rm Exhaust                           | Units       | 2.00       | 9.3000  | CE Work Paper Review- Toilet Exhaust 03082012.docx | 0.0000  | No variances  |  |  |  |
| Business Solutions - Prescriptive | HVAC Controls               | CHE0065 | Chilled Water Reset Retrofit (10 degrees) - Electric       | Tons        | 438.00     | 0.0639  | WS MEMD  | -0.4080 | eTracker reported per unit kMCF = 0.0699 for 1 project; should be 0.0639 MCF. |  |  |  |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0005 | Boiler Modulating Burner Control 10 to 1 or 5 to 1         | Units       | 61,474.00  | 0.0943  | WS MEMD  | 0.0000  | No variances  |  |  |  |



|                                   | Furnaces and Heaters        | CHG0010 | Infrared Heaters - Gas Customer Only                | kBtu/h      | 38,237.00    | 0.5029  | WS MEMD                 | 0.0000 | No variances |
|-----------------------------------|-----------------------------|---------|---|-------------|--------------|---------|-------------------------|--------|--------------|
| Business Solutions - Prescriptive | HVAC Controls               | CHG0011 | Programmable Thermostat -- Gas Customers            | Square Feet | 362,322.00   | 15.3346 | WS MEMD                 | 0.0000 | No variances |
| Business Solutions - Prescriptive | HVAC Controls               | CHG0012 | Guestroom Energy Management Control - Gas Customer  | Units       | 224.00       | 5.9292  | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive | DCV and Economizers         | CHG0013 | Demand Control Ventilation                          | Square Feet | 1,840.600.00 | 26.0576 | WS MEMD                 | 0.0000 | No variances |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0014 | High Efficiency Boiler with AFUE >= 86% and < 90%   | kBtu/h      | 29,334.00    | 0.0971  | WS MEMD                 | 0.0000 | No variances |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0016 | High Efficiency Boiler with AFUE >= 90%             | kBtu/h      | 186,523.00   | 0.0934  | WS MEMD                 | 0.0000 | No variances |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0017 | Boiler Oxygen Trim Control                          | kBtu/h      | 57,957.00    | 0.0225  | WS MEMD                 | 0.0000 | No variances |
| Business Solutions - Prescriptive | Furnaces and Heaters        | CHG0019 | Gas Furnace or RTU Tune-up (>=40 and up to 100 MBH) | Units       | 232.00       | 0.0336  | WS MEMD                 | 0.0000 | No variances |
| Business Solutions - Prescriptive | Furnaces and Heaters        | CHG0021 | Gas Furnace or RTU Tune-up (>=300 MBH)              | Units       | 30.00        | 0.0292  | WS MEMD                 | 0.0000 | No variances |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0023 | Boiler Tune-up Level 1 (>=110 and up to 150 MBH)    | Units       | 97.00        | 0.0323  | WS MEMD                 | 0.0000 | No variances |

|                                   |                             |         |  |             |            |        |  |         |                    |
|-----------------------------------|-----------------------------|---------|--|-------------|------------|--------|--|---------|--------------------|
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0024 | 500 kbtu/h)  | Units       | 92.00      | 0.0318 | WS MEMD  | 0.0000  | No variances       |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0025 | Boiler Tune-up Level 3 (>=1200 kbtu/h)                 | Units       | 539.00     | 0.0317 | WS MEMD  | -0.0001 | MCF rounding issue |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0026 | High Efficiency Process Boiler Replacement (Water)     | kBtu/h      | 17,680.00  | 0.1468 | Master MEMD; Commercial                              | 0.0000  | No variances       |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0028 | Process Boilers Tune-up >= 1200 kbtu/h                 | Units       | 11.00      | 0.0739 | Master MEMD; Commercial                              | 0.0000  | No variances       |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0029 | Process Boiler Tune-up Level 5 (>=500 and              | Units       | 8.00       | 0.0739 | Master MEMD; Commercial                              | 0.0000  | No variances       |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0030 | Process Boiler Tune-up Level 4 (>=300 and              | Units       | 1.00       | 0.0739 | Master MEMD; Commercial                              | 0.0000  | No variances       |
| Business Solutions - Prescriptive | Heating                     | CHG0050 | Destratification Fans                                  | Square Feet | 6,500.00   | 8.6907 | WS MEMD  | 0.0000  | No variances       |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0053 | Optimized Boiler Plant Sequencing                      | MBH         | 109,915.00 | 0.0545 | WS MEMD  | 0.0000  | No variances       |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0054 | Process Steam Pipe Condensate Insulation - Conditioned | Linear Feet | 168.00     | 0.1457 | Process Steam Pipe Condensate Insulation_050312.docx | 0.0000  | No variances       |
| Business Solutions - Prescriptive | HVAC Controls               | CHG0055 | Optimal Start/Stop on Air Handling Units (Gas)         | Square Feet | 607,999.00 | 3.5781 | WS MEMD  | 0.0000  | No variances       |
| Business Solutions - Prescriptive | Furnaces and Heaters        | CHG0058 | High Efficiency  | MBH         | 65,032.00  | 0.2084 | WS MEMD  | 0.0000  | No variances       |

| Prescriptive                      |                             | Furnace or Unit Heater (92-94% AFUE) |   |             |            |         |  |            |  |  |  |  |
|-----------------------------------|-----------------------------|--------------------------------------|---|-------------|------------|---------|--|------------|--|--|--|--|
| Business Solutions - Prescriptive | HVAC Controls               | CHG00059                             | Occupancy Sensor Controls on HVAC Units (Gas)                 | Square Feet | 39,990.00  | 4.2526  | WS MEMD  | 0.0000     | No variances   |  |  |  |
| Business Solutions - Prescriptive | Furnaces and Heaters        | CHG00061                             | High Efficiency Furnace or Unit Heater (>94% AFUE)            | MBH         | 15,766.00  | 0.2542  | WS MEMD  | 0.0000     | No variances   |  |  |  |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG00063                             | Linkageless Boiler Controls                                   | MBH         | 10,275.00  | 0.0569  | WS MEMD  | 0.0000     | No variances   |  |  |  |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG00064                             | Modulating Burner Control (GO)                                | MBH         | 110,682.00 | 0.0546  | WS MEMD  | 0.0000     | No variances   |  |  |  |
| Business Solutions - Prescriptive | HVAC Controls               | CHG00065                             | Occupancy Sensor for Toilet Room Exhaust Retrofit (GO)        | Units       | 2.00       | 9.3000  | ToiletExhaustOcc Sensor workpaper_0520 11.docx | 0.0000     | No variances   |  |  |  |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG00067                             | Water Reset Control Retrofit (GO)                             | MBH         | 99,972.00  | 0.0564  | WS MEMD  | 0.0000     | No variances   |  |  |  |
| Business Solutions - Prescriptive | Steam Traps                 | CHG0102                              | Leaking Steam Trap Repair or Replacement -- Special Incentive | Units       | 1,370.00   | 28.9655 | Master MEMD; Commercial                        | -0.1370    | eTracker reported per unit MCF = 29.9656; should be 29.9655 MCF. |  |  |  |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0116                              | Boiler Reset Control  | kBtu/h      | 79,990.00  | 0.0572  | WS MEMD  | 0.0000     | No variances   |  |  |  |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0207                              | Optimized Boiler Plant Sequencing (Process)                   | MBH         | 61,946.00  | 0.0545  | WS MEMD  | - 235.3948 | eTracker reported per unit MCF = 0.0583; should be 0.0545 MCF    |  |  |  |
| Business                          | Boilers and                 | CHG0208                              | Modulating  | MBH         | 106,616    | 0.1025  | Master MEMD                                    | 0.0000     | No variances   |  |  |  |

| Solutions - Prescriptive          | Boiler Controls             | Boiler Control (Process) |   | 00          | Commercial |         |                         |
|-----------------------------------|-----------------------------|--------------------------|---|-------------|------------|---------|-------------------------|
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0209                  | Boiler Oxygen Trim Control (Process)                    | MBH         | 543,017.00 | 0.0683  | Master MEMD; Commercial |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0210                  | Linkageless Boiler Control (Process)                    | MBH         | 494,831.00 | 0.0683  | Master MEMD; Commercial |
| Business Solutions - Prescriptive | Variable Frequency Drives   | CMC0002                  | Constant Volume AHU to VAV with Hydronic Reheat (Combo) | Square Feet | 245,282.00 | 30.7947 | WS MEMD                 |
| Business Solutions - Prescriptive | Variable Frequency Drives   | CMG0002                  | Constant Volume AHU to VAV with Hydronic Reheat (Gas)   | Square Feet | 97,382.00  | 13.5559 | WS MEMD                 |
| Business Solutions - Prescriptive | Energy Recovery             | CRC0001                  | Enthalpy Wheels ERUs                                    | CFM         | 1,600.00   | 0.1256  | WS MEMD                 |
| Business Solutions - Prescriptive | Energy Recovery             | CRC0002                  | Fixed-Plate Air to Air ERUs                             | CFM         | 22,475.00  | 0.0614  | WS MEMD                 |
| Business Solutions - Prescriptive | Energy Recovery             | CRC0006                  | Process Heating Ventilation Reduction                   | CFM         | 335,230.00 | 0.1940  | WS MEMD                 |
| Business Solutions - Prescriptive | Energy Recovery             | CRC0010                  | Boiler Stack Economizer (80F) - Process                 | MBH         | 91,297.00  | 0.0230  | WS MEMD                 |
| Business Solutions - Prescriptive | Energy Recovery             | CRG0004                  | Boiler Stack Economizer (120F)                          | BHP         | 8,375.00   | 0.0345  | WS MEMD                 |
| Business Solutions - Prescriptive | Energy Recovery             | CRG0008                  | Process Heating Ventilation Reduction (GO)              | CFM         | 75,219.00  | 0.1647  | WS MEMD                 |

|                                   |                           |         |  |             |            |          |  |          |  |
|-----------------------------------|---------------------------|---------|--|-------------|------------|----------|--|----------|--|
| Business Solutions - Prescriptive | Energy Recovery           | CRG0009 | Laboratory Fume-Hood Ventilation Reduction (GO)                  | CFM         | 27,186.00  | 0.1318   | WS MEMD                                      | 0.0000   | No variances   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSC0030 | Reach-In Refrigerated Case Door; Low Temp - Combination Customer | Linear Feet | 148.00     | 5.8952   | Master MEMD; Commercial                      | 0.0000   | No variances   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSC0031 | Temperature and Optical Sensor on Exhaust - Combo                | CFM         | 19,750.00  | 0.0410   | mi_weather_sensitive_dbase_2012_10_31_12.xls | 0.0000   | No variances   |
| Business Solutions - Prescriptive | Other                     | CSC0039 | Roof Insulation - Attic Roof (Combo)                             | Square Feet | 8,504.00   | 0.0328   | WS MEMD                                      | 0.0000   | No variances   |
| Business Solutions - Prescriptive | Other                     | CSC0040 | Roof Insulation - Flat Roof (Combo)                              | Square Feet | 212,780.00 | 6.6423   | WS MEMD                                      | 0.0000   | No variances   |
| Business Solutions - Prescriptive | Other                     | CSC0106 | Wall Insulation - Combination Customer                           | Square Feet | 11,994.00  | 142.2272 | WS MEMD                                      | 0.0000   | No variances   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0043 | Night Covers (Combo)   | Linear Feet | 204.00     | 0.0000   | WS MEMD                                      | -32.4768 | eTracker reported per unit MCF = 0.1592; there is no MEMD gas savings for this measure |
| Business Solutions - Prescriptive | Other                     | CSG0001 | Ozone Generation System  | Pounds      | 2,273.00   | 4.0911   | Master MEMD; Commercial                      | 0.0000   | No variances   |
| Business Solutions - Prescriptive | Other                     | CSG0002 | Truck Loading Dock Seals   | Units       | 22.00      | 39.0743  | Master MEMD; Commercial                      | -0.0022  | eTracker reported per unit MCF = 39.0744; should be 39.0743 MCF                        |
| Business Solutions - Prescriptive | Other                     | CSG0003 | Truck Loading Dock Leveler Ramp Seals                            | Units       | 25.00      | 25.4663  | Master MEMD; Commercial                      | -0.0025  | eTracker reported per unit MCF = 25.4664; should be 25.4663 MCF                        |
| Business                          | Other                     | CSG0004 | Greenhouse   | Square      | 220,268.   | 0.0308   | Master MEMD;                                 | 0.0000   | No variances   |

| Solutions - Prescriptive          |                           | Heat Curtains   | Feet        | 00               | Commercial |  |   |
|-----------------------------------|---------------------------|---|-------------|------------------|------------|--|---|
| Business Solutions - Prescriptive | Other                     | Greenhouse Infrared Film                                  | Square Feet | 1,656.85<br>9.00 | 0.0328     | Master MEMD;<br>Commercial                   | No variances  |
| Business Solutions - Prescriptive | Other                     | Wall Insulation - Gas Customer                            | Square Feet | 18,473.0<br>0    | 101.2413   | WS MEMD                                      | No variances  |
| Business Solutions - Prescriptive | Other                     | Roof Insulation - Flat Roof                               | Square Feet | 547,185.<br>00   | 7.7302     | WS MEMD                                      | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | Commercial Conveyor Oven (>25" Conveyor Width)            | Units       | 1.00             | 85.9245    | Master MEMD;<br>Commercial                   | eTracker reported per unit MCF = 85.9248; should be 85.9245 MCF   |
| Business Solutions - Prescriptive | Other                     | Roof Insulation - Attic Roof                              | Square Feet | 13,497.0<br>0    | 9.3010     | WS MEMD                                      | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | Temperature and Optical Sensor on Exhaust - Gas           | CFM         | 5,000.00         | 0.0410     | mi_weather_sensitive_dbase_2012_10_31_12.xls | No variances  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | EnergyStar Steam Cookers - 6 Pan; Gas                     | Units       | 1.00             | 202.5641   | Master MEMD;<br>Commercial                   | eTracker reported per unit MCF = 202.5648; should be 202.5641 MCF |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | Fixed-Plate Energy Recovery Unit (GO)                     | CFM         | 450.00           | 0.1187     | WS MEMD                                      | eTracker reported per unit MCF = 0.1189; should be 0.1187 MCF     |
| Business Solutions - Prescriptive | Energy Recovery           | Enthalpy Wheel Energy Recovery Unit (GO)                  | CFM         | 126,076.<br>00   | 0.1217     | WS MEMD                                      | No variances  |
| Business Solutions - Prescriptive | C&I Waterheating          | Pipe Wrap - Domestic Hot Water - conditioned space (120F) | Linear Feet | 594.00           | 0.1012     | Master MEMD;<br>Commercial                   | No variances  |

Appendix A: Savings Values of Validated Measures



|                                   |                  |         |   |             |           |         |                         |         |   |
|-----------------------------------|------------------|---------|---|-------------|-----------|---------|-------------------------|---------|---|
| Business Solutions - Prescriptive | C&I Waterheating | CWG0001 | Pipe Wrap - Hydronic Space Heating                        | Linear Feet | 1,596.00  | 0.3888  | Master MEMD; Commercial | 0.0000  | No variances  |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0002 | Gas Water Heater > 80 gal                                 | Units       | 16.00     | 18.2735 | Master MEMD; Commercial | -0.0016 | eTracker reported per unit MCF = 18.2736; should be 18.2735 MCF |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0003 | Gas Water Heater <= 80 gal                                | Units       | 3.00      | 3.0132  | Master MEMD; Commercial | 0.0000  | No variances  |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0004 | Gas tankless water heater                                 | Units       | 36.00     | 17.2043 | Master MEMD; Commercial | -0.0036 | eTracker reported per unit MCF = 17.2044; should be 17.2043 MCF |
| Business Solutions - Prescriptive | Swimming Pool    | CWG0007 | High Efficiency Pool Heater .84+ EF                       | mBtu        | 5,249.00  | 0.2372  | Master MEMD; Commercial | 0.0000  | No variances  |
| Business Solutions - Prescriptive | Swimming Pool    | CWG0008 | Pool Covers   | Square Feet | 8,684.00  | 0.0855  | Master MEMD; Commercial | 0.0000  | No variances  |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0009 | Pre Rinse Sprayers - < 1.6 gpm Gas HW                     | Units       | 1.00      | 5.8320  | Master MEMD; Commercial | 0.0000  | No variances  |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0012 | Pipe Wrap - Domestic Hot Water - conditioned space (140F) | Linear Feet | 42.00     | 0.1490  | Master MEMD; Commercial | 0.0000  | No variances  |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0013 | Pipe Wrap - Steam Space Heating                           | Linear Feet | 1,602.00  | 1.4580  | Master MEMD; Commercial | 0.0000  | No variances  |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0014 | High Eff Domestic Water Heater (84% to 89%)               | MBH         | 6,747.00  | 0.1034  | Master MEMD; Commercial | 0.0000  | No variances  |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0015 | High Eff Domestic Water Heater (90%)                      | MBH         | 11,492.00 | 0.2412  | Master MEMD; Commercial | -1.1492 | eTracker reported per unit MCF = 0.2413; should be 0.2412 MCF   |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0016 | Domestic Water Heater Tune-Up (199                        | Units       | 32.00     | 0.0557  | Master MEMD; Commercial | 0.0000  | No variances  |

|  |                             |         |  |             |           |         |                         |        |              |
|--|-----------------------------|---------|--|-------------|-----------|---------|-------------------------|--------|--------------|
| Business Solutions - Prescriptive        | C&I Waterheating            | CWG0017 | - 499 MBH)   | Units       | 28.00     | 0.0557  | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive        | C&I Waterheating            | CWG0019 | Domestic Water Heater Tune-Up (500 - 1,199 MBH)                | Units       | 14.00     | 0.0557  | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive        | C&I Waterheating            | CWG0023 | Domestic Water Heater Tune-Up (>= 1200 MBH)                    | Linear Feet | 91.00     | 0.2302  | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive        | C&I Waterheating            | CWG0024 | Pipe Wrap - Domestic Hot Water - unconditioned space (120F)    | Units       | 2.00      | 7.2900  | Master MEMD; Commercial | 0.0000 | No variances |
| Business Solutions - Prescriptive        | C&I Waterheating            | CWG0025 | Gas Water Heater <= 80 gal                                     | Linear Feet | 219.00    | 0.1012  | Master MEMD; Commercial | 0.0000 | No variances |
| New Construction - Major Renovation 2013 | Furnaces and Heaters        | CHC0010 | Natural Gas Domestic Hot Water - Conditioned Space (120F) (GO) | kBtu/h      | 4,685.00  | 0.4982  | WS MEMD                 | 0.0000 | No variances |
| New Construction - Major Renovation 2013 | DCV and Economizers         | CHC0027 | Infrared Heaters - Combination Customers                       | Square Feet | 22,798.00 | 27.8509 | WS MEMD                 | 0.0000 | No variances |
| New Construction - Major Renovation 2013 | Furnaces and Heaters        | CHG0010 | Demand Control Ventilation - Combination Customers             | kBtu/h      | 3,005.00  | 0.5029  | WS MEMD                 | 0.0000 | No variances |
| New Construction - Major Renovation 2013 | Boilers and Boiler Controls | CHG0016 | Infrared Heaters - Gas Customer Only                           | kBtu/h      | 31,078.00 | 0.0934  | WS MEMD                 | 0.0000 | No variances |
|  |                             |         | High Efficiency Boiler with AFUE >= 90%                        |             |           |         |                         |        |              |



Appendix A: Savings Values of Validated Measures



|  |                             |         |  |        |           |         |                         |                  |   |
|--|-----------------------------|---------|--|--------|-----------|---------|-------------------------|------------------|---|
| New Construction - Major Renovation 2013 | Boilers and Boiler Controls | CHG0026 | High Efficiency Process Boiler Replacement (Water)   | kBtu/h | 97,968.00 | 0.1468  | Master MEMD; Commercial | 0.0000           | No variances  |
| New Construction - Major Renovation 2013 | Furnaces and Heaters        | CHG0058 | High Efficiency Furnace or Unit Heater (92-94% AFUE) | MBH    | 1,006.00  | 0.2084  | WS MEMD                 | 0.0000           | No variances  |
| New Construction - Major Renovation 2013 | Furnaces and Heaters        | CHG0061 | High Efficiency Furnace or Unit Heater (>94% AFUE)   | MBH    | 400.00    | 0.2542  | WS MEMD                 | -0.4560          | eTracker reported per unit MCF = 0.2559 for 1 project; should be 0.2542 MCF |
| New Construction - Major Renovation 2013 | Other                       | CSG0003 | Truck Loading Dock Leveler Ramp Seals                | Units  | 59.00     | 25.4663 | Master MEMD; Commercial | -0.0059          | eTracker reported per unit MCF = 25.4664; should be 25.4663 MCF             |
| New Construction - Major Renovation 2013 | C&I Waterheating            | CWG0002 | Gas Water Heater > 80 gal                            | Units  | 3.00      | 18.2735 | Master MEMD; Commercial | -0.0003          | eTracker reported per unit MCF = 18.2736; should be 18.2735 MCF             |
| New Construction - Major Renovation 2013 | C&I Waterheating            | CWG0003 | Gas Water Heater <= 80 gal                           | Units  | 1.00      | 3.0132  | Master MEMD; Commercial | 0.0000           | No variances  |
| New Construction - Major Renovation 2013 | C&I Waterheating            | CWG0015 | High Eff Domestic Water Heater (90%)                 | MBH    | 3,180.00  | 0.2412  | Master MEMD; Commercial | -0.3180          | eTracker reported per unit MCF = 0.2413; should be 0.2412 MCF               |
| New Construction - Whole Building        | NEW CONSTRUCTION            | CNE0001 | Design Incentive - Building Owner                    | Units  | 5.00      | 0.0000  | Custom calculated       | 0.0000           | No variances  |
| <b>TOTAL</b>                             |                             |         |  |        |           |         |                         | <b>-270.4565</b> |   |

Table A-4. Small Business Solutions Program Per-Unit Savings for Electric Energy (kWh)

| Program         | End Use                     | Measure Code | Measure Description                  | Units            | Install Quantity | MEMD or Workpaper Per-Unit kWh Savings | Deemed Source           | Effect on Reported kWh | Variance Description |
|-----------------|-----------------------------|--------------|--------------------------------------|------------------|------------------|--|-------------------------|------------------------|----------------------|
| CFL - Buydown   | Direct Install Non-lighting | CDE0198      | CFL bulbs regular (buydown)          | Units            | 149,234.00       | 156.0000                               | Master MEMD; Commercial | 0.0000                 | No variances         |
| CFL - Buydown   | Direct Install Non-lighting | CDE0199      | CFL bulbs specialty (buydown)        | Units            | 4,582.00         | 156.0000                               | Master MEMD; Commercial | 0.0000                 | No variances         |
| CFL - Drop Ship | Direct Install Non-lighting | CDE0068      | CFL Box - Door Delivery              | Units            | 29,084.00        | 780.0000                               | Master MEMD; Commercial | 0.0000                 | No variances         |
| CFL - Drop Ship | Direct Install Non-lighting | CDE0069      | CFL Box - Door Delivery (TC)         | Units            | 3,345.00         | 780.0000                               | Master MEMD; Commercial | 0.0000                 | No variances         |
| Core DI         | Direct Install Lighting     | CDE0050      | Lighting Controls                    | Watts Controlled | 75,561.90        | 0.0000                                 | DI Lighting             | 0.0000                 | No variances         |
| Core DI         | Direct Install Lighting     | CDE0051      | CFL Bulb - Screw-in                  | Units            | 753.00           | 0.0000                                 | DI Lighting             | 0.0000                 | No variances         |
| Core DI         | Direct Install Lighting     | CDE0052      | Hardwired CFL                        | Units            | 82.00            | 0.0000                                 | DI Lighting             | 0.0000                 | No variances         |
| Core DI         | Direct Install Lighting     | CDE0053      | Specialty CFL                        | Units            | 270.00           | 0.0000                                 | DI Lighting             | 0.0000                 | No variances         |
| Core DI         | Direct Install Lighting     | CDE0054      | T8s and U-Tube T8 Lamps              | Units            | 27,271.00        | 0.0000                                 | DI Lighting             | 0.0000                 | No variances         |
| Core DI         | Direct Install Lighting     | CDE0055      | T5 Lamps                             | Units            | 85.00            | 0.0000                                 | DI Lighting             | 0.0000                 | No variances         |
| Core DI         | Direct Install Lighting     | CDE0057      | LEDs, LED Exit Signs, Induction      | Units            | 8,451.00         | 0.0000                                 | DI Lighting             | 0.0000                 | No variances         |
| Core DI         | Direct Install Non-lighting | CDE0059      | Anti-sweat Heater Control            | Units            | 4,334.00         | 1,489.0000<br>0                        | Master MEMD; Commercial | 0.0000                 | No variances         |
| Core DI         | Direct Install Non-lighting | CDE0064      | Small Business Custom Electric       | Units            | 90.00            | 0.0000                                 | DI Lighting             | 0.0000                 | No variances         |
| Core DI         | Direct Install Non-lighting | CDE0080      | ECM Case Motor                       | Units            | 44.00            | 824.0000                               | Master MEMD; Commercial | 0.0000                 | No variances         |
| Core DI         | Direct Install Non-lighting | CDE0081      | ECM Walk-in Cooler and Freezer Motor | Units            | 302.00           | 1,365.0000<br>0                        | Master MEMD; Commercial | 0.0000                 | No variances         |



Appendix A: Savings Values of Validated Measures

|             |                               |         |  |       |           |          |  |        |              |
|-------------|-------------------------------|---------|--|-------|-----------|----------|--|--------|--------------|
| Core DI     | Direct Install Lighting       | CDE0084 | Evaporator Fan Motor Controls on PSC motors                  | Units | 11.00     | 796.0000 | Master MEMD; Commercial                    | 0.0000 | No variances |
| Core DI     | Direct Install Lighting       | CDE0200 | Miscellaneous Lighting                                       | Units | 24,027.00 | 0.0000   | DI Lighting                                | 0.0000 | No variances |
| Core DI     | Direct Install Lighting       | CDE0201 | Fixture Removal  | Units | 966.00    | 0.0000   | DI Lighting                                | 0.0000 | No variances |
| Hospitality | Direct Install -- Hospitality | CDE0044 | LED Lighting - 12 W LED Lamps replacing incandescent lights  | Units | 3,860.00  | 196.0000 | Master MEMD; Commercial                    | 0.0000 | No variances |
| Hospitality | Direct Install -- Hospitality | CDE0045 | LED Lighting - 11 W LED Flood Lamp                           | Units | 8,639.00  | 195.0000 | Master MEMD; Commercial                    | 0.0000 | No variances |
| Hospitality | Direct Install -- Hospitality | CDE0046 | LED Lighting - 8 W LED Lamps replacing incandescent lights   | Units | 2,678.00  | 196.0000 | Master MEMD; Commercial                    | 0.0000 | No variances |
| Hospitality | Direct Install Lighting       | CDE0087 | Vending Equipment Controller (Halo)                          | Units | 12.00     | 800.0000 | Master MEMD; Commercial                    | 0.0000 | No variances |
| Hospitality | Direct Install -- Hospitality | CDE0090 | 3.5 W LED Candelabra   | Units | 935.00    | 115.0000 | DecorativeLED<br>Workpaper_06<br>2713.docx | 0.0000 | No variances |
| Hospitality | Direct Install -- Hospitality | CDE0100 | 13W BR30 LED Downlight                                       | Units | 3.00      | 195.0000 | Master MEMD; Commercial                    | 0.0000 | No variances |
| Hospitality | Direct Install -- Hospitality | CDE0101 | LED Exit Sign  | Units | 1,079.00  | 201.0000 | Master MEMD; Commercial                    | 0.0000 | No variances |
| Hospitality | Direct Install -- Hospitality | CDE0102 | LED Lighting - 9.5 W LED Lamps Replacing Incandescent Lights | Units | 6,490.00  | 196.0000 | Master MEMD; Commercial                    | 0.0000 | No variances |
| Hospitality | Direct Install -- Hospitality | CDE0103 | LED Lighting - 6 W LED Lamps Replacing Incandescent Lights   | Units | 1,640.00  | 196.0000 | Master MEMD; Commercial                    | 0.0000 | No variances |

|                          |                               |         |   |       |        |              |  |               |                    |
|--------------------------|-------------------------------|---------|---|-------|--------|--------------|--|---------------|--------------------|
| Hospitality              | Direct Install -- Hospitality | CDE0104 | 14 W CFL Replacing 60 W Globe Inc (Halo)          | Units | 66.00  | 202.0000     | Master MEMD; Commercial                  | 0.0000        | No variances       |
| Programmable Thermostats | Direct Install Non-lighting   | CDC0058 | Programmable Thermostats -- Combination Customers | Units | 602.00 | 1,619,045.00 | WS MEMD                                  | 0.0000        | No variances       |
| Programmable Thermostats | Direct Install Non-lighting   | CDE0058 | Programmable Thermostats                          | Units | 917.00 | 1,724,188.22 | WS MEMD                                  | 0.0000        | No variances       |
| Programmable Thermostats | Direct Install Non-lighting   | CDE0072 | Programmable Thermostat - DTE Shared - Electric   | Units | 184.00 | 1,523,970.33 | WS MEMD                                  | 0.0000        | No variances       |
| Programmable Thermostats | Direct Install Lighting       | CFE0014 | Linear Fluorescent to LED Retrofit                | Units | 339.00 | 379,390.00   | LED_LinearT12Workpaper_11082013_IS.d ocx | 0.0019        | kWh rounding issue |
| <b>TOTAL</b>             |                               |         |   |       |        |              |  | <b>0.0019</b> |                    |

Table A-5. Small Business Solutions Program Per-Unit Savings for Electric Demand (kW)

| Program         | End Use                     | Measure Code | Measure Description                  | Units | Install Quantity | MEMD or Workpaper Per-Unit kW Savings | Deemed Source           | Effect on Reported kW | Variance Description  |
|-----------------|-----------------------------|--------------|--------------------------------------|-------|------------------|---------------------------------------|-------------------------|-----------------------|---|
| CFL - Buydown   | Direct Install Non-lighting | CDE0198      | CFL bulbs regular (buydown)          | Units | 149,234.00       | 0.0382                                | Master MEMD; Commercial | -626.7828             | eTracker reported per unit kW = 0.0424; should be 0.0382 kW                   |
| CFL - Buydown   | Direct Install Non-lighting | CDE0199      | CFL bulbs specialty (buydown)        | Units | 4,582.00         | 0.0382                                | Master MEMD; Commercial | -19.2444              | eTracker reported per unit kW = 0.0424; should be 0.0382 kW                   |
| CFL - Drop Ship | Direct Install Non-lighting | CDE0068      | CFL Box - Door Delivery              | Units | 29,084.00        | 0.1908                                | Master MEMD; Commercial | 0.0000                | No variances  |
| CFL - Drop Ship | Direct Install Non-lighting | CDE0069      | CFL Box - Door Delivery (TC)         | Units | 3,345.00         | 0.1908                                | Master MEMD; Commercial | 0.0000                | No variances  |
| Core DI         | Direct Install Lighting     | CDE0051      | CFL Bulb - Screw-in                  | Units | 753.00           | 0.0000                                | DI Lighting             | 0.0000                | No variances  |
| Core DI         | Direct Install Lighting     | CDE0052      | Hardwired CFL                        | Units | 82.00            | 0.0000                                | DI Lighting             | 0.0000                | No variances  |
| Core DI         | Direct Install Lighting     | CDE0053      | Specialty CFL                        | Units | 270.00           | 0.0000                                | DI Lighting             | 0.0000                | No variances  |
| Core DI         | Direct Install Lighting     | CDE0054      | T8s and U-Tube T8 Lamps              | Units | 27,271.00        | 0.0000                                | DI Lighting             | 0.0000                | No variances  |
| Core DI         | Direct Install Lighting     | CDE0055      | T5 Lamps                             | Units | 85.00            | 0.0000                                | DI Lighting             | 0.0000                | No variances  |
| Core DI         | Direct Install Lighting     | CDE0057      | LEDs, LED Exit Signs, Induction      | Units | 8,451.00         | 0.0000                                | DI Lighting             | 0.0000                | No variances  |
| Core DI         | Direct Install Non-lighting | CDE0064      | Small Business Custom Electric       | Units | 90.00            | 0.0000                                | DI Lighting             | 0.0000                | No variances  |
| Core DI         | Direct Install Non-lighting | CDE0080      | ECM Case Motor                       | Units | 44.00            | 0.0846                                | Master MEMD; Commercial | -0.4176               | eTracker reported per unit kW = 0.0941; should be 0.0846 kW                   |
| Core DI         | Direct Install Non-lighting | CDE0081      | ECM Walk-in Cooler and Freezer Motor | Units | 302.00           | 0.1404                                | Master MEMD; Commercial | -4.7172               | eTracker reported per unit kW = various incorrect values; should be 0.1404 kW |

|             |                              |         |  |       |           |        |                                      |         |   |
|-------------|------------------------------|---------|--|-------|-----------|--------|--------------------------------------|---------|---|
| Core DI     | Direct Install Lighting      | CDE0084 | Evaporator Fan Motor Controls on PSC motors                  | Units | 11.00     | 0.0819 | Master MEMD; Commercial              | -0.0991 | eTracker reported per unit kW = 0.0909; should be 0.0819 kW |
| Core DI     | Direct Install Lighting      | CDE0200 | Miscellaneous Lighting                                       | Units | 24,027.00 | 0.0000 | DI Lighting                          | 0.0000  | No variances  |
| Core DI     | Direct Install Lighting      | CDE0201 | Fixture Removal  | Units | 966.00    | 0.0000 | DI Lighting                          | 0.0000  | No variances  |
| Hospitality | Direct Install - Hospitality | CDE0044 | LED Lighting - 12 W LED Lamps replacing incandescent lights  | Units | 3,860.00  | 0.0479 | Master MEMD; Commercial              | 0.0000  | No variances  |
| Hospitality | Direct Install - Hospitality | CDE0045 | LED Lighting - 11 W LED Flood Lamp                           | Units | 8,639.00  | 0.0477 | Master MEMD; Commercial              | 0.0000  | No variances  |
| Hospitality | Direct Install - Hospitality | CDE0046 | LED Lighting - 8 W LED Lamps replacing incandescent lights   | Units | 2,678.00  | 0.0479 | Master MEMD; Commercial              | 0.0000  | No variances  |
| Hospitality | Direct Install Lighting      | CDE0087 | Vending Equipment Controller (Halo)                          | Units | 12.00     | 0.0420 | Master MEMD; Commercial              | 0.0000  | No variances  |
| Hospitality | Direct Install - Hospitality | CDE0090 | 3.5 W LED Candelabra   | Units | 935.00    | 0.0281 | DecorativeLED Workpaper_06 2713.docx | 0.0000  | No variances  |
| Hospitality | Direct Install - Hospitality | CDE0100 | 13W BR30 LED Downlight                                       | Units | 3.00      | 0.0477 | Master MEMD; Commercial              | 0.0000  | No variances  |
| Hospitality | Direct Install - Hospitality | CDE0101 | LED Exit Sign  | Units | 1,079.00  | 0.0230 | Master MEMD; Commercial              | 0.0000  | No variances  |
| Hospitality | Direct Install - Hospitality | CDE0102 | LED Lighting - 9.5 W LED Lamps Replacing Incandescent Lights | Units | 6,490.00  | 0.0479 | Master MEMD; Commercial              | 0.0000  | No variances  |
| Hospitality | Direct Install - Hospitality | CDE0103 | LED Lighting - 6 W LED Lamps Replacing Incandescent Lights   | Units | 1,640.00  | 0.0479 | Master MEMD; Commercial              | 12.4640 | eTracker reported per unit kW = 0.0403; should be 0.0479 kW |

|                          |                              |         |   |       |        |         |   |                  |              |
|--------------------------|------------------------------|---------|---|-------|--------|---------|---|------------------|--------------|
| Hospitality              | Direct Install - Hospitality | CDE0104 | 14 W CFL Replacing 60 W Globe Inc (Halo)          | Units | 66.00  | 0.0494  | Master MEMD; Commercial                             | 0.0000           | No variances |
| Programmable Thermostats | Direct Install Non-lighting  | CDC0058 | Programmable Thermostats -- Combination Customers | Units | 602.00 | -0.1769 | WS MEMD   | 0.0000           | No variances |
| Programmable Thermostats | Direct Install Non-lighting  | CDE0058 | Programmable Thermostats                          | Units | 917.00 | -0.2260 | WS MEMD   | 0.0000           | No variances |
| Programmable Thermostats | Direct Install Non-lighting  | CDE0072 | Programmable Thermostat - DTE Shared - Electric   | Units | 184.00 | -0.2265 | WS MEMD   | 0.0000           | No variances |
| Programmable Thermostats | Direct Install Lighting      | CFE0014 | Linear Fluorescent to LED Retrofit                | Units | 339.00 | 0.1030  | LED LinearT1<br>2Worksheet_1<br>1082013_IS.d<br>ocx | 0.0000           | No variances |
| <b>TOTAL</b>             |                              |         |   |       |        |         |   | <b>-638.7971</b> |              |

Table A-6. Small Business Solutions Program Per-Unit Savings for Natural Gas (Mcf)

| Program                  | End Use                     | Measure Code | Measure Description                                 | Units | Install Quantity | MEMD or Worksheet Per-Unit Mcf Savings | Deemed Source   | Effect on Reported Mcf | Variance Description   |
|--------------------------|-----------------------------|--------------|---|-------|------------------|--|---|------------------------|--|
| Furnace Tune-up          | Direct Install Non-lighting | CDG0011      | DI - Gas Furnace or RTU Tune-up (>=40 and <300 MBH) | Units | 2,402.00         | 0.0309                                 | Navigant 2013 Q4_SB DI Master Measures_2013_1_23.xlsx | -2.0394                | 1 project has incorrect computed MCF performance savings in eTracker; reported MCF = 16.7478 should be 14.7084 |
| Furnace Tune-up          | Direct Install Non-lighting | CDG0012      | DI - Gas Furnace or RTU Tune-up (>=300 MBH)         | Units | 193.00           | 0.0392                                 | Navigant 2013 Q4_SB DI Master Measures_2013_1_23.xlsx | 0.0000                 | No variances   |
| Programmable Thermostats | Direct Install Non-lighting | CDC0058      | Programmable Thermostats Combination Customers      | Units | 602.00           | 52.5793                                | WS MEMD   | 0.0000                 | No variances   |
| Programmable Thermostats | Direct Install Non-lighting | CDG0033      | Programmable Thermostat - DTE Shared - Gas          | Units | 184.00           | 56.8936                                | WS MEMD   | 0.0000                 | No variances   |
| Programmable Thermostats | Direct Install Non-lighting | CDG0058      | Programmable Thermostat - Gas Customers             | Units | 1,610.00         | 56.8936                                | WS MEMD   | 0.0000                 | No variances   |
| <b>TOTAL</b>             |                             |              |   |       |                  |  |   | <b>-2.0394</b>         |  |



Table A-7. Multi-Family Program Per-Unit Savings for Electric Energy (kWh)

| Program      | End Use         | Measure Code | Measure Description  | Units         | Install Quantity | MEMD or Workpaper Per-Unit kWh Savings | Deemed Source  | Effect on Reported kWh | Variance Description |
|--------------|-----------------|--------------|--|---------------|------------------|--|--|------------------------|----------------------|
| Multi-Family | C&I Multifamily | CCE0001      | C_I Multifamily Custom - Electric                            | Units         | 18.00            | 0.0000                                 | Custom calculated                                    | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0002      | Common Area - Hardwired CFL Fixture                          | Units         | 263.00           | 539.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0003      | Common Area -- LED Exit Signs (Retrofit Only)                | Units         | 330.00           | 201.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0004      | Low Flow Bath Faucet Aerators - Electric - DI                | Units         | 42.00            | 166.0000                               | Master MEMD; Residential                             | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0019      | Low Flow Kitchen Faucet Aerators- Electric - DI              | Units         | 76.00            | 212.0000                               | Low Flow 1.5gpm Kitchen and 1.0gpm Bath Aerators.doc | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0020      | T12 4-ft Lamp Removal (combined with T8/T5 ballast retrofit) | Lamps Removed | 126.00           | 99.4000                                | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0023      | CFL bulbs - 13W  | Units         | 9,424.00         | 37.1000                                | Master MEMD; Residential                             | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0025      | CFL Bulbs - 23W  | Units         | 22.00            | 37.1000                                | Master MEMD; Residential                             | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0026      | CFL Bulbs Regular (30W or less in common area)               | Units         | 300.00           | 186.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0027      | CFL Screw in - Prescriptive                                  | Units         | 1,626.00         | 37.1000                                | Master MEMD; Residential                             | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0029      | CFL Fixture - Prescriptive                                   | Units         | 388.00           | 78.0000                                | Master MEMD; Residential                             | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0031      | Occupancy Sensors under 500 W                                | Units         | 72.00            | 397.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0032      | Occupancy Sensors over 500 W                                 | Units         | 1.00             | 994.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0033      | LED Downlight Fixture  | Units         | 142.00           | 195.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0035      | LED/Induction (Night Only) <175W                             | Units         | 359.00           | 268.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0036      | LED/Induction (Night Only)                                   | Units         | 30.00            | 409.0000                               | Master MEMD;   | 0.0000                 | No variances         |

| Family       |                 | 175-250W |  |       |          |          | Commercial   |        | No variances |
|--------------|-----------------|----------|--|-------|----------|----------|--|--------|--------------|
| Multi-Family | C&I Multifamily | CTE0038  | LED/Induction (Night Only) 250-400W                    | Units | 200.00   | 706.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0039  | LED/Induction (24x7) <175W                             | Units | 42.00    | 611.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0040  | LED/Induction (24x7) 175-250W                          | Units | 45.00    | 936.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0045  | CFL Speciality - Common Area                           | Units | 30.00    | 186.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0046  | CFL Speciality - In-Unit - DI                          | Units | 3,239.00 | 44.1000  | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0050  | Low Flow Showerhead - 1.5 gpm - Electric               | Units | 61.00    | 690.0000 | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0051  | Low Flow Showerhead - 1.5 gpm - Electric - Handheld    | Units | 19.00    | 690.0000 | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0052  | 13W CFL - Common Area - Direct Install                 | Units | 163.00   | 186.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0124  | 1L HPT8 replacing T12 - Common - 24/7                  | Units | 46.00    | 103.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0125  | 1L RW HPT8 replacing T12 - Common - 24/7               | Units | 106.00   | 126.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0126  | 2L HPT8 replacing T12 - Common - 24/7                  | Units | 158.00   | 138.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0127  | 2L RW HPT8 replacing T12 - Common - 24/7               | Units | 263.00   | 180.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0130  | 4L HPT8 replacing T12 - Common - 24/7                  | Units | 32.00    | 264.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0131  | 4L RW HPT8 replacing T12 - Common - 24/7               | Units | 35.00    | 359.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0139  | CFL Candelabra Lamp (5-13W) - Common - 24/7 operation  | Units | 12.00    | 298.0000 | LED and CFL Candelabra Style Lamps in Multifamily_0737.doc | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0143  | DI - CFL Candelabra Lamp (5-13W) - 24/7 operation - DI | Units | 149.00   | 298.0000 | LED and CFL Candelabra Style Lamps in Multifamily_0737.doc | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0144  | DI - CFL Candelabra Lamp (5-13W) - DI                  | Units | 674.00   | 149.0000 | LED and CFL Candelabra Style Lamps in Multifamily_0737.doc | 0.0000 | No variances |

Appendix A: Savings Values of Validated Measures



|              |                 |         |   |               |          |            |  |              |
|--------------|-----------------|---------|---|---------------|----------|------------|--|--------------|
| Multi-Family | C&I Multifamily | CTE0145 | DI - LED Candelabra Lamp (3-5W) - 24/7 operation - DI | Units         | 1,822.00 | 247.0000   | Multifamily_0737.doc                                       | No variances |
| Multi-Family | C&I Multifamily | CTE0146 | DI - LED Candelabra Lamp (3-5W) - DI                  | Units         | 293.00   | 124.0000   | LED and CFL Candelabra Style Lamps in Multifamily_0737.doc | No variances |
| Multi-Family | C&I Multifamily | CTE0147 | Exterior CFL (replacing d175W HID)                    | Units         | 198.00   | 496.0000   | LED and CFL Candelabra Style Lamps in Multifamily_0737.doc | No variances |
| Multi-Family | C&I Multifamily | CTE0153 | HPT8 replacing T12 - per lamp - Common                | Lamps Removed | 1,983.00 | 29.0000    | Master MEMD; Commercial                                    | No variances |
| Multi-Family | C&I Multifamily | CTE0157 | LED Fixture - In Unit                                 | Units         | 52.00    | 44.0000    | Master MEMD; Residential                                   | No variances |
| Multi-Family | C&I Multifamily | CTE0158 | LED Lamp - 100W Replacement - In Unit                 | Units         | 372.00   | 44.0000    | Master MEMD; Residential                                   | No variances |
| Multi-Family | C&I Multifamily | CTE0160 | LED Lamp - 50-80W Replacement - Common                | Units         | 2,465.00 | 196.0000   | Master MEMD; Commercial                                    | No variances |
| Multi-Family | C&I Multifamily | CTE0161 | LED Lamp - 60W Replacement - In Unit                  | Units         | 23.00    | 40.0000    | Master MEMD; Residential                                   | No variances |
| Multi-Family | C&I Multifamily | CTE0163 | LED Lamp - 80-100W Replacement - Common               | Units         | 85.00    | 258.0000   | Master MEMD; Commercial                                    | No variances |
| Multi-Family | C&I Multifamily | CTE0164 | LED Lamp - Flood/PAR - Common                         | Units         | 4.00     | 116.0000   | Master MEMD; Commercial                                    | No variances |
| Multi-Family | C&I Multifamily | CTE0166 | LED Lamp - PAR - In Unit                              | Units         | 37.00    | 54.0000    | Master MEMD; Residential                                   | No variances |
| Multi-Family | C&I Multifamily | CTE0168 | PTHP - In Unit  | Units         | 26.00    | 319.5693   | WS MEMD  | No variances |
| Multi-Family | C&I Multifamily | CTE0171 | VFD - Pump  | HP            | 1.75     | 4,054.7306 | WS MEMD  | No variances |
| Multi-Family | C&I Multifamily | CTE0172 | Low Flow Bath Faucet Aerators 1.0gpm - Electric - DI  | Units         | 28.00    | 207.0412   | Low Flow 1.5gpm Kitchen and 1.0gpm Bath Aerators.doc       | No variances |
| Multi-Family | C&I Multifamily | CTE0174 | DI - LED Candelabra Lamp (3-5W) - In-Unit - DI        | Units         | 612.00   | 25.0000    | Master MEMD; Residential                                   | No variances |
| Multi-Family | C&I Multifamily | CTE0175 | DI - CFL Candelabra Lamp (5-13W) - In-Unit - DI       | Units         | 67.00    | 44.1000    | Master MEMD; Residential                                   | No variances |
| Multi-Family | C&I Multifamily | CTG0009 | Boiler Controls                                       | mBtu          | 5,099.00 | -0.4765    | WS MEMD  | No variances |

[illegible]

Table A-8. Multi-Family Program Per-Unit Savings for Electric Demand (kW)

| Program      | End Use         | Measure Code | Measure Description  | Units         | Install Quantity | MEMD or Workpaper Per-Unit kW Savings | Deemed Source  | Effect on Reported kW | Variance Description  |
|--------------|-----------------|--------------|--|---------------|------------------|---------------------------------------|--|-----------------------|---|
| Multi-Family | C&I Multifamily | CCE0001      | C, I Multifamily Custom - Electric                           | Units         | 18.00            | 0.0000                                | Custom calculated                                    | 0.0000                | No variances  |
| Multi-Family | C&I Multifamily | CTE0002      | Common Area - Hardwired CFL Fixture                          | Units         | 263.00           | 539.0000                              | Master MEMD; Commercial                              | 0.0000                | No variances  |
| Multi-Family | C&I Multifamily | CTE0003      | Common Area -- LED Exit Signs (Retrofit Only)                | Units         | 330.00           | 201.0000                              | Master MEMD; Commercial                              | 0.0000                | No variances  |
| Multi-Family | C&I Multifamily | CTE0004      | Low Flow Bath Faucet Aerators - Electric - DI                | Units         | 42.00            | 166.0000                              | Master MEMD; Residential                             | 0.0000                | No variances  |
| Multi-Family | C&I Multifamily | CTE0019      | Low Flow Kitchen Faucet Aerators- Electric - DI              | Units         | 76.00            | 212.0000                              | Low Flow 1.5gpm Kitchen and 1.0gpm Bath Aerators.doc | -0.0076               | eTracker reported per unit kW = 0.0240; should be 0.0239 kW |
| Multi-Family | C&I Multifamily | CTE0020      | T12 4-ft Lamp Removal (combined with T8/T5 ballast retrofit) | Lamps Removed | 126.00           | 99.4000                               | Master MEMD; Commercial                              | 0.0000                | No variances  |
| Multi-Family | C&I Multifamily | CTE0023      | CFL bulbs - 13W  | Units         | 9,424.00         | 37.1000                               | Master MEMD; Residential                             | 0.0000                | No variances  |
| Multi-Family | C&I Multifamily | CTE0025      | CFL Bulbs - 23W  | Units         | 22.00            | 37.1000                               | Master MEMD; Residential                             | 0.0000                | No variances  |
| Multi-Family | C&I Multifamily | CTE0026      | CFL Bulbs Regular (30W or less in common area)               | Units         | 300.00           | 186.0000                              | Master MEMD; Commercial                              | 0.0000                | No variances  |
| Multi-Family | C&I Multifamily | CTE0027      | CFL Screw in - Prescriptive                                  | Units         | 1,626.00         | 37.1000                               | Master MEMD; Residential                             | 0.0000                | No variances  |
| Multi-Family | C&I Multifamily | CTE0029      | CFL Fixture - Prescriptive                                   | Units         | 388.00           | 78.0000                               | Master MEMD; Residential                             | 0.0000                | No variances  |

|              |                 |         |   |       |          |          |                          |        |              |
|--------------|-----------------|---------|---|-------|----------|----------|--------------------------|--------|--------------|
| Multi-Family | C&I Multifamily | CTE0031 | Occupancy Sensors under 500 W                       | Units | 72.00    | 397.0000 | Master MEMD; Commercial  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0032 | Occupancy Sensors over 500 W                        | Units | 1.00     | 994.0000 | Master MEMD; Commercial  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0033 | LED Downlight Fixture                               | Units | 142.00   | 195.0000 | Master MEMD; Commercial  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0035 | LED/Induction (Night Only) <175W                    | Units | 359.00   | 268.0000 | Master MEMD; Commercial  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0036 | LED/Induction (Night Only) 175-250W                 | Units | 30.00    | 409.0000 | Master MEMD; Commercial  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0038 | LED/Induction (Night Only) 250-400W                 | Units | 200.00   | 706.0000 | Master MEMD; Commercial  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0039 | LED/Induction (24x7) <175W                          | Units | 42.00    | 611.0000 | Master MEMD; Commercial  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0040 | LED/Induction (24x7) 175-250W                       | Units | 45.00    | 936.0000 | Master MEMD; Commercial  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0045 | CFL Specialty - Common Area                         | Units | 30.00    | 186.0000 | Master MEMD; Commercial  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0046 | CFL Specialty - In-Unit - DI                        | Units | 3,239.00 | 44.1000  | Master MEMD; Residential | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0050 | Low Flow Showerhead - 1.5 gpm - Electric            | Units | 61.00    | 690.0000 | Master MEMD; Residential | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0051 | Low Flow Showerhead - 1.5 gpm - Electric - Handheld | Units | 19.00    | 690.0000 | Master MEMD; Residential | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0052 | 13W CFL - Common Area - Direct Install              | Units | 163.00   | 186.0000 | Master MEMD; Commercial  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0124 | 1L HPT8 replacing T12 - Common - 24/7               | Units | 46.00    | 103.0000 | Master MEMD; Commercial  | 0.0000 | No variances |

|              |                 |         |  |       |          |          |   |        |              |
|--------------|-----------------|---------|--|-------|----------|----------|---|--------|--------------|
| Multi-Family | C&I Multifamily | CTE0125 | 1L RW HPT8 replacing T12 - Common - 24/7               | Units | 106.00   | 126.0000 | Master MEMD; Commercial                                     | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0126 | 2L HPT8 replacing T12 - Common - 24/7                  | Units | 158.00   | 138.0000 | Master MEMD; Commercial                                     | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0127 | 2L RW HPT8 replacing T12 - Common - 24/7               | Units | 263.00   | 180.0000 | Master MEMD; Commercial                                     | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0130 | 4L HPT8 replacing T12 - Common - 24/7                  | Units | 32.00    | 264.0000 | Master MEMD; Commercial                                     | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0131 | 4L RW HPT8 replacing T12 - Common - 24/7               | Units | 35.00    | 359.0000 | Master MEMD; Commercial                                     | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0139 | CFL Candelabra Lamp (5-13W) - Common - 24/7 operation  | Units | 12.00    | 298.0000 | LED and CFL Candelabra Style Lamps in Multifamily_0 737.doc | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0143 | DI - CFL Candelabra Lamp (5-13W) - 24/7 operation - DI | Units | 149.00   | 298.0000 | LED and CFL Candelabra Style Lamps in Multifamily_0 737.doc | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0144 | DI - CFL Candelabra Lamp (5-13W) - DI                  | Units | 674.00   | 149.0000 | LED and CFL Candelabra Style Lamps in Multifamily_0 737.doc | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0145 | DI - LED Candelabra Lamp (3-5W) - 24/7 operation - DI  | Units | 1,822.00 | 247.0000 | LED and CFL Candelabra Style Lamps in Multifamily_0 737.doc | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0146 | DI - LED Candelabra Lamp (3-5W) - DI                   | Units | 293.00   | 124.0000 | LED and CFL Candelabra Style Lamps in Multifamily_0         | 0.0000 | No variances |

|              |                 |         |  |               |          |            |  |          |   |
|--------------|-----------------|---------|--|---------------|----------|------------|--|----------|---|
| Multi-Family | C&I Multifamily | CTE0147 | Exterior CFL (replacing d175W HID)                   | Units         | 198.00   | 496.0000   | Master MEMD; Commercial                              | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0153 | HPT8 replacing T12 - per lamp - Common               | Lamps Removed | 1,983.00 | 29.0000    | Master MEMD; Commercial                              | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0157 | LED Fixture - In Unit                                | Units         | 52.00    | 44.0000    | Master MEMD; Residential                             | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0158 | LED Lamp - 100W Replacement - In Unit                | Units         | 372.00   | 44.0000    | Master MEMD; Residential                             | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0160 | LED Lamp - 50-80W Replacement - Common               | Units         | 2,465.00 | 196.0000   | Master MEMD; Commercial                              | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0161 | LED Lamp - 60W Replacement - In Unit                 | Units         | 23.00    | 40.0000    | Master MEMD; Residential                             | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0163 | LED Lamp - 80-100W Replacement - Common              | Units         | 85.00    | 258.0000   | Master MEMD; Commercial                              | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0164 | LED Lamp - Flood/PAR - Common                        | Units         | 4.00     | 116.0000   | Master MEMD; Commercial                              | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0166 | LED Lamp - PAR - In Unit                             | Units         | 37.00    | 54.0000    | Master MEMD; Residential                             | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0168 | PTHP - In Unit                                       | Units         | 26.00    | 319.5693   | WS MEMD  | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0171 | VFD - Pump   | HP            | 1.75     | 4,054.7306 | WS MEMD  | 0.0000   | No variances  |
| Multi-Family | C&I Multifamily | CTE0172 | Low Flow Bath Faucet Aerators 1.0gpm - Electric - DI | Units         | 28.00    | 207.0412   | Low Flow 1.5gpm Kitchen and 1.0gpm Bath Aerators.doc | 0.1260   | eTracker reported per unit kW = 0.0189; should be 0.0234 kW |
| Multi-Family | C&I Multifamily | CTE0174 | DI - LED Candelabra Lamp (3-5W) - In-Unit - DI       | Units         | 612.00   | 25.0000    | Master MEMD; Residential                             | -16.7076 | eTracker reported per unit kW = 0.0283;                     |



|              |                    |         |  |       |          |         |                                |          |  |  |                        |
|--------------|--------------------|---------|--|-------|----------|---------|--------------------------------|----------|--|--|------------------------|
|              |                    |         |  |       |          |         |                                |          |  |  | should be<br>0.0010 kW |
| Multi-Family | C&I<br>Multifamily | CTE0175 | DI - CFL Candelabra<br>Lamp (5-13W) - In-<br>Unit - DI | Units | 67.00    | 44.1000 | Master<br>MEMD;<br>Residential | -1.9229  | eTracker<br>reported per<br>unit kW =<br>0.0340;<br>should be<br>0.0053 kW |  |                        |
| Multi-Family | C&I<br>Multifamily | CTG0009 | Boiler Controls  | mBtu  | 5,099.00 | -0.4765 | WS MEMD                        | 0.0000   | No<br>variances  |  |                        |
| TOTAL        |                    |         |  |       |          |         |                                | -18.5121 |  |  |                        |

Table A-9. Multi-Family Program Per-Unit Savings for Natural Gas (Mcf)

| Program      | End Use         | Measure Code | Measure Description   | Units         | Install Quantity | MEMD or Workpaper Per-Unit Mcf Savings | Deemed Source  | Effect on Reported Mcf | Variance Description |
|--------------|-----------------|--------------|---|---------------|------------------|--|--|------------------------|----------------------|
| Multi-Family | C&I Multifamily | CCG0001      | C_I Multifamily Custom - Gas                                  | Units         | 5.00             | 0.0000                                 | Custom calculated                                    | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0002      | Common Area - Hardwired CFL Fixture                           | Units         | 263.00           | 539.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0003      | Common Area -- LED Exit Signs (Retrofit Only)                 | Units         | 330.00           | 201.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0004      | Low Flow Bath Faucet Aerators - Electric - DI                 | Units         | 42.00            | 166.0000                               | Master MEMD; Residential                             | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0019      | Low Flow Kitchen Faucet Aerators-Electric - DI                | Units         | 76.00            | 212.0000                               | Low Flow 1.5gpm Kitchen and 1.0gpm Bath Aerators.doc | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0020      | T 12 4-ft Lamp Removal (combined with T8/T5 ballast retrofit) | Lamps Removed | 126.00           | 99.4000                                | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0023      | CFL bulbs - 13W   | Units         | 9,424.00         | 37.1000                                | Master MEMD; Residential                             | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0025      | CFL Bulbs - 23W   | Units         | 22.00            | 37.1000                                | Master MEMD; Residential                             | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0026      | CFL Bulbs Regular (30W or less in common area)                | Units         | 300.00           | 186.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0027      | CFL Screw in - Prescriptive                                   | Units         | 1,626.00         | 37.1000                                | Master MEMD; Residential                             | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0029      | CFL Fixture - Prescriptive                                    | Units         | 388.00           | 78.0000                                | Master MEMD; Residential                             | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0031      | Occupancy Sensors under 500 W                                 | Units         | 72.00            | 397.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0032      | Occupancy Sensors over 500 W                                  | Units         | 1.00             | 994.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0033      | LED Downlight Fixture   | Units         | 142.00           | 195.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |
| Multi-Family | C&I Multifamily | CTE0035      | LED/Induction (Night Only) <175W                              | Units         | 359.00           | 268.0000                               | Master MEMD; Commercial                              | 0.0000                 | No variances         |



Appendix A: Savings Values of Validated Measures

|              |                 |          |  |       |          |          |  |        |              |
|--------------|-----------------|----------|--|-------|----------|----------|--|--------|--------------|
| Multi-Family | C&I Multifamily | CTE00036 | LED/Induction (Night Only) 175-250W                    | Units | 30.00    | 409.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE00038 | LED/Induction (Night Only) 250-400W                    | Units | 200.00   | 706.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE00039 | LED/Induction (24x7) <175W                             | Units | 42.00    | 611.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE00040 | LED/Induction (24x7) 175-250W                          | Units | 45.00    | 936.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE00045 | CFL Speciality - Common Area                           | Units | 30.00    | 186.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE00046 | CFL Speciality - In-Unit - DI                          | Units | 3,239.00 | 44.1000  | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE00050 | Low Flow Showerhead - 1.5 gpm - Electric               | Units | 61.00    | 690.0000 | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE00051 | Low Flow Showerhead - 1.5 gpm - Electric - Handheld    | Units | 19.00    | 690.0000 | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE00052 | 13W CFL - Common Area - Direct Install                 | Units | 163.00   | 186.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0124  | 1L HPT8 replacing T12 - Common - 24/7                  | Units | 46.00    | 103.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0125  | 1L RW HPT8 replacing T12 - Common - 24/7               | Units | 106.00   | 126.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0126  | 2L HPT8 replacing T12 - Common - 24/7                  | Units | 158.00   | 138.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0127  | 2L RW HPT8 replacing T12 - Common - 24/7               | Units | 263.00   | 180.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0130  | 4L HPT8 replacing T12 - Common - 24/7                  | Units | 32.00    | 264.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0131  | 4L RW HPT8 replacing T12 - Common - 24/7               | Units | 35.00    | 359.0000 | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0139  | CFL Candelabra Lamp (5-13W) - Common - 24/7 operation  | Units | 12.00    | 298.0000 | LED and CFL Candelabra Style Lamps in Multifamily_0737.doc | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0143  | DI - CFL Candelabra Lamp (5-13W) - 24/7 operation - DI | Units | 149.00   | 298.0000 | LED and CFL Candelabra Style Lamps in Multifamily_0737.doc | 0.0000 | No variances |

|              |                 |         |   |               |          |            |  |        |              |
|--------------|-----------------|---------|---|---------------|----------|------------|--|--------|--------------|
| Multi-Family | C&I Multifamily | CTE0144 | DI - CFL Candelabra Lamp (5-13W) - DI                 | Units         | 674.00   | 149.0000   | LED and CFL Candelabra Style Lamps in Multifamily_0737.doc | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0145 | DI - LED Candelabra Lamp (3-5W) - 24/7 operation - DI | Units         | 1,822.00 | 247.0000   | LED and CFL Candelabra Style Lamps in Multifamily_0737.doc | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0146 | DI - LED Candelabra Lamp (3-5W) - DI                  | Units         | 293.00   | 124.0000   | LED and CFL Candelabra Style Lamps in Multifamily_0737.doc | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0147 | Exterior CFL (replacing d175W HID)                    | Units         | 198.00   | 496.0000   | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0153 | HPT8 replacing T12 - per lamp - Common                | Lamps Removed | 1,983.00 | 29.0000    | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0157 | LED Fixture - In Unit                                 | Units         | 52.00    | 44.0000    | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0158 | LED Lamp - 100W Replacement - In Unit                 | Units         | 372.00   | 44.0000    | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0160 | LED Lamp - 50-80W Replacement - Common                | Units         | 2,485.00 | 196.0000   | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0161 | LED Lamp - 60W Replacement - In Unit                  | Units         | 23.00    | 40.0000    | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0163 | LED Lamp - 80-100W Replacement - Common               | Units         | 85.00    | 258.0000   | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0164 | LED Lamp - Flood/PAR - Common                         | Units         | 4.00     | 116.0000   | Master MEMD; Commercial                                    | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0166 | LED Lamp - PAR - In Unit                              | Units         | 37.00    | 54.0000    | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0168 | PTHP - In Unit  | Units         | 26.00    | 319.5693   | WS MEMD  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0171 | VFD - Pump  | HP            | 1.75     | 4,054.7306 | WS MEMD  | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0172 | Low Flow Bath Faucet Aerators 1.0gpm - Electric - DI  | Units         | 28.00    | 207.0412   | Low Flow 1.5gpm Kitchen and 1.0gpm Bath Aerators.doc       | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0174 | DI - LED Candelabra Lamp (3-5W) - In-Unit - DI        | Units         | 612.00   | 25.0000    | Master MEMD; Residential                                   | 0.0000 | No variances |
| Multi-Family | C&I Multifamily | CTE0175 | DI - CFL Candelabra                                   | Units         | 67.00    | 44.1000    | Master MEMD;   | 0.0000 | No variances |

| Family       | Multifamily     | Lamp (5-13W) - In-Unit - DI | Units                                    |             |          | Residential |  |                |
|--------------|-----------------|-----------------------------|--|-------------|----------|-------------|--|----------------|
| Multi-Family | C&I Multifamily | CTG0004                     | Low Flow Bath Faucet Aerators - Gas - DI | Units       | 1,188.00 | 0.0000      | Master MEMD; Residential                         | 0.0000         |
| Multi-Family | C&I Multifamily | CTG0009                     | Boiler Controls                          | mBtu        | 5,099.00 | -0.4765     | WS MEMD  | 0.0000         |
| Multi-Family | C&I Multifamily | CTG0052                     | Pipe Wrap - DHW - Common - DI            | Linear Feet | 7,896.00 | 0.0000      | FES-C11a DHW Pipe Insulation Michigan 073013.doc | -7.8960        |
| Multi-Family | C&I Multifamily | CTG0131                     | In-Direct Water Heater (e90% Eff)        | MBH         | 3,510.00 | 0.0000      | Master MEMD; Commercial                          | -0.3510        |
| <b>TOTAL</b> |                 |                             |  |             |          |             |  | <b>-8.2470</b> |

## Appendix B: Validated Savings

- Table B-1: Business Solutions Program - Prescriptive Validated Electric (kWh) Savings by Measure
- Table B-2: Business Solutions Program - Prescriptive Validated Demand (Kw) Savings by Measure
- Table B-3: Business Solutions Program - Prescriptive Validated Gas (Mcf) Savings by Measure
- Table B-4: Business Solutions Program - Custom Validated Electric (kWh) Savings
- Table B-5: Business Solutions Program - Custom Validated Demand (Kw) Savings
- Table B-6: Business Solutions Program - Custom Validated Gas (MCF) Savings by Measure
- Table B-7: New Construction Pilot Program Validated Electric (kWh) Savings by Measure
- Table B-8: New Construction Pilot Program Validated Demand (Kw) Savings by Measure
- Table B-9: New Construction Pilot Program Validated Gas (Mcf) Savings by Measure
- Table B-10: Multi-Family Program Validated Electric (kWh) Savings by Measure
- Table B-11: Multi-Family Program Validated Demand (Kw) Savings by Measure
- Table B-12: Multi-Family Program Validated Gas (Mcf) Savings by Measure

Table B-1: Business Solutions Program - Validated Electric Energy (kWh) Savings by Measure

| Program                           | Measure Category | Measure Code | Measure Description                         | Measure Life | Reported kWh Savings | Adjusted Reported Gross kWh Savings | Verified Gross Savings Adjustment Factor | Verified Gross kWh Savings | kWh NTG Adjustment Factor | Verified Net kWh Savings | kWh Realization Rate | Verified Net kWh Savings Inclusion Bonus |
|-----------------------------------|------------------|--------------|---|--------------|----------------------|-------------------------------------|--|----------------------------|---------------------------|--------------------------|----------------------|--|
| BOC                               | Other            | CSC0042      | BOC (Combo Customer)                        | 5.00         | 258,879.50           | 258,879.50                          | 1.000                                    | 258,879.50                 | 0.90                      | 232,991.55               | 0.900                | 232,991.55                               |
| BOC                               | Other            | CSE0090      | BOC (Electric Customer)                     | 5.00         | 282,414.00           | 282,414.00                          | 1.000                                    | 282,414.00                 | 0.90                      | 254,172.60               | 0.900                | 254,172.60                               |
| Business Solutions - Custom       | Custom           | CBE0001      | Custom Electric Program                     | Varies       | 15,259,525.73        | 15,259,525.73                       | 1.025                                    | 15,641,013.88              | 0.90                      | 14,076,912.49            | 0.923                | 15,474,904.75                            |
| Business Solutions - Custom       | Custom           | CBE0300      | Smart Buildings - Electric                  | Varies       | 552,500.00           | 552,500.00                          | 1.000                                    | 552,500.00                 | 0.90                      | 497,250.00               | 0.900                | 497,250.00                               |
| Business Solutions - Custom       | Custom           | CJE0001      | Lumens per Watt Improvement per Year        | Varies       | 5,221,176.19         | 5,221,176.19                        | 0.954                                    | 4,981,002.08               | 0.90                      | 4,482,901.87             | 0.859                | 4,557,781.15                             |
| Business Solutions - Custom       | Custom           | CJE0002      | Energy Conservation Improvement per Year    | Varies       | 594,618.00           | 594,618.00                          | 0.954                                    | 567,265.57                 | 0.90                      | 510,539.01               | 0.859                | 518,025.23                               |
| Business Solutions - Prescriptive | Compressed Air   | CAE0001      | VSD Air Compressor                          | 15.00        | 2,849,500.00         | 2,849,500.00                        | 0.954                                    | 2,718,423.00               | 0.90                      | 2,446,580.70             | 0.859                | 2,691,238.77                             |
| Business Solutions - Prescriptive | Compressed Air   | CAE0002      | Refrigerated Cycling Thermal Mass Air Dryer | 10.00        | 56,613.60            | 56,613.60                           | 0.954                                    | 54,009.37                  | 0.90                      | 48,608.44                | 0.859                | 53,469.28                                |
| Business Solutions - Prescriptive | Compressed Air   | CAE0004      | Low-Pressure Drop Air Filter                | 5.00         | 11,984.00            | 19,968.00                           | 0.957                                    | 19,109.38                  | 0.90                      | 17,198.44                | 1.435                | 17,198.44                                |
| Business Solutions - Prescriptive | Compressed Air   | CAE0005      | Zero Loss Condensate Drain                  | 5.00         | 48,360.00            | 38,280.00                           | 0.954                                    | 36,519.12                  | 0.90                      | 32,867.21                | 0.680                | 32,867.21                                |
| Business Solutions - Prescriptive | Compressed Air   | CAE0007      | Compressed Air Energy Audit                 | 1.00         | 3,284,286.1          | 3,284,230.56                        | 0.954                                    | 3,133,155.95               | 0.90                      | 2,819,840.36             | 0.859                | 2,819,840.36                             |

|                                   |                            |         |   |       |           |           |       |           |      |           |       |              |
|-----------------------------------|----------------------------|---------|---|-------|-----------|-----------|-------|-----------|------|-----------|-------|--------------|
| Business Solutions - Prescriptive | Compressed Air             | CAE0008 | Air Compressor Outdoor Air Intake                         | 20.00 | 8,686.00  | 8,986.00  | 1,000 | 8,986.00  | 0.90 | 8,087.40  | 0.931 | 8,896.14     |
| Business Solutions - Prescriptive | Compressed Air             | CAE0009 | Compressed Air Pressure Flow Controller                   | 10.00 | 20,333.50 | 20,333.50 | 1,000 | 20,333.50 | 0.90 | 18,300.15 | 0.900 | 20,130.17    |
| Business Solutions - Prescriptive | Compressed Air             | CAE0011 | Refrigerated Cycling - Digital Scroll                     | 10.00 | 16,162.00 | 16,162.00 | 1,000 | 16,162.00 | 0.90 | 14,545.80 | 0.900 | 16,000.38    |
| Business Solutions - Prescriptive | BLDG Envelope              | CBC0001 | Window Reduction  | 20.00 | 4,476.15  | 4,476.15  | 0.954 | 4,270.25  | 0.90 | 3,843.22  | 0.859 | 4,227.54     |
| Business Solutions - Prescriptive | Energy Management Systems  | CEB0001 | EMS - Combination Customers                               | 15.00 | 1,876.06  | 1,876.06  | 0.954 | 1,789.76  | 0.90 | 1,610.78  | 0.859 | 1,771,864.68 |
| Business Solutions - Prescriptive | Energy Management Systems  | CEE0001 | EMS (Electric Cooling)-Electric Customers                 | 15.00 | 1,390.03  | 1,390.03  | 0.954 | 1,326.09  | 0.90 | 1,193.48  | 0.859 | 1,312,836.84 |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0001 | Interior LED/Induction Lighting                           | 16.00 | 158.43    | 158.43    | 0.954 | 151.14    | 0.90 | 136.03    | 0.859 | 149,634.20   |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0003 | CFL Replacing MH  | 2.70  | 124.89    | 124.89    | 0.954 | 119.15    | 0.90 | 107.23    | 0.859 | 107,235.29   |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0004 | Exterior Linear Fluorescent Lighting Retrofit             | 12.00 | 1,788.45  | 1,788.45  | 0.957 | 1,711.51  | 0.90 | 1,540.39  | 0.861 | 1,694,435.73 |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0005 | Parking Garage LED/Induction Lighting Retrofit            | 13.00 | 2,426.58  | 2,426.58  | 1,000 | 2,426.58  | 0.90 | 2,183.92  | 0.900 | 2,402,315.51 |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0006 | Neon to LED Sign Lighting Retrofit (Continuous Operation) | 16.00 | 10,322.78 | 10,322.78 | 1,000 | 10,322.78 | 0.90 | 9,290.51  | 0.900 | 10,219.56    |



|                                   |                            |         |  |       |               |               |       |               |       |               |       |               |
|-----------------------------------|----------------------------|---------|--|-------|---------------|---------------|-------|---------------|-------|---------------|-------|---------------|
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0007 | Interior LED Lighting Retrofit                             | 16.00 | 5,401,560.32  | 5,401,560.32  | 0.957 | 5,169,293.23  | 0.900 | 4,652,363.90  | 0.861 | 5,117,600.29  |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0008 | Exterior LED/Induction Lighting Retrofit                   | 13.00 | 15,089,747.12 | 15,089,747.12 | 1.000 | 15,089,747.12 | 0.900 | 13,580,772.41 | 0.900 | 14,938,849.65 |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0009 | Neon to LED Sign Lighting Retrofit (Commercial Hours)      | 14.00 | 44,432.32     | 44,432.32     | 0.957 | 42,521.73     | 0.900 | 38,269.56     | 0.861 | 42,096.51     |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0010 | LED Replacing Incandescent Candelabra and Globe            | 8.00  | 79,121.00     | 73,514.00     | 1.000 | 73,514.00     | 0.900 | 66,162.60     | 0.836 | 66,162.60     |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0011 | LED Replacing Incandescent BR-Series                       | 8.00  | 408.900.00    | 408,900.00    | 1.000 | 408.900.00    | 0.900 | 368,010.00    | 0.900 | 368,010.00    |
| Business Solutions - Prescriptive | T8 Fluorescent             | CFE0012 | 8-foot T12 to Two (2) 4-ft HP/RW T8                        | 8.00  | 163,488.00    | 163,488.00    | 1.000 | 163,488.00    | 0.900 | 147,139.20    | 0.900 | 147,139.20    |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0013 | 4-ft T12 to LED Tube Lights                                | 8.00  | 148,694.40    | 148,694.40    | 1.000 | 148,694.40    | 0.900 | 133,824.96    | 0.900 | 133,824.96    |
| Business Solutions - Prescriptive | Furnaces and Heaters       | CHC0010 | Infrared Heaters - Combination Customers                   | 15.00 | 284,491.19    | 284,491.19    | 0.954 | 271,404.60    | 0.900 | 244,264.14    | 0.859 | 268,690.55    |
| Business Solutions - Prescriptive | HVAC Controls              | CHC0011 | Programmable Thermostat - Combination Customers            | 9.00  | 161,956.93    | 161,956.93    | 0.954 | 154,506.91    | 0.900 | 139,056.22    | 0.859 | 139,056.22    |
| Business Solutions - Prescriptive | HVAC Controls              | CHC0012 | Guestroom Energy Management Control - Combination Customer | 8.00  | 67,782.00     | 67,782.00     | 0.957 | 64,867.37     | 0.900 | 58,380.64     | 0.861 | 58,380.64     |

|                                   |                     |         |   |       |            |            |       |            |       |            |       |            |
|-----------------------------------|---------------------|---------|---|-------|------------|------------|-------|------------|-------|------------|-------|------------|
| Business Solutions - Prescriptive | HVAC Controls       | CHC0014 | Critical Zone Supply Air Reset Control (Combo)                    | 15.00 | 17,755.63  | 17,755.63  | 1,000 | 17,755.63  | 0.900 | 15,980.07  | 0.900 | 17,578.08  |
| Business Solutions - Prescriptive | HVAC Controls       | CHC0015 | Hydronic HVAC Pump (Combo)  | 15.00 | 313,742.83 | 313,742.83 | 0.957 | 300,251.88 | 0.900 | 270,226.70 | 0.861 | 297,249.37 |
| Business Solutions - Prescriptive | HVAC Controls       | CHC0017 | Optimal Start/Stop on Air Handling Units (Combo)                  | 20.00 | 748,401.41 | 748,401.41 | 1,000 | 748,401.41 | 0.900 | 673,561.27 | 0.900 | 740,917.40 |
| Business Solutions - Prescriptive | HVAC Controls       | CHC0018 | Occupancy Sensor Controls on HVAC Units (Combo)                   | 15.00 | 47,274.53  | 47,274.53  | 1,000 | 47,274.53  | 0.900 | 42,547.08  | 0.900 | 46,801.78  |
| Business Solutions - Prescriptive | DCV and Economizers | CHC0027 | Demand Control Ventilation - Combination Customers                | 15.00 | 68,703.74  | 68,703.74  | 0.954 | 65,543.37  | 0.900 | 58,989.03  | 0.859 | 64,887.93  |
| Business Solutions - Prescriptive | Unitary/ Split HVAC | CHC0070 | Occ Sensor For Toilet Rm Exhaust                                  | 8.00  | 188.00     | 188.00     | 0.954 | 179.35     | 0.900 | 161.42     | 0.859 | 161.42     |
| Business Solutions - Prescriptive | Unitary/ Split HVAC | CHE0001 | AC < 65,000 Btuh (5.4 tons)                                       | 15.00 | 14,933.95  | 14,933.95  | 0.954 | 14,246.99  | 0.900 | 12,822.29  | 0.859 | 14,104.52  |
| Business Solutions - Prescriptive | Unitary/ Split HVAC | CHE0003 | AC > 240,000 Btuh (20 tons) & <= 760,000 Btuh (63.3 tons)         | 15.00 | 40,592.47  | 40,592.47  | 0.954 | 38,725.22  | 0.900 | 34,852.70  | 0.859 | 38,337.97  |
| Business Solutions - Prescriptive | Room AC / PTAC      | CHE0008 | Package Terminal AC - AC >=10% EER higher than IECC 2006 standard | 15.00 | 6,067.90   | 6,067.90   | 0.954 | 5,788.78   | 0.900 | 5,209.90   | 0.859 | 5,730.89   |
| Business Solutions - Prescriptive | Room AC / PTAC      | CHE0009 | Package Terminal AC- Heat Pump >=10% EER                          | 15.00 | 4,712.55   | 4,712.55   | 0.954 | 4,495.77   | 0.900 | 4,046.19   | 0.859 | 4,450.81   |

|   |                               |         | higher than<br>IECC 2006<br>standard |       |                  |                  |       |                  |           |                  |       |                  |  |  |  |  |  |  |  |  |
|---|-------------------------------|---------|--------------------------------------|-------|------------------|------------------|-------|------------------|-----------|------------------|-------|------------------|--|--|--|--|--|--|--|--|
| Business<br>Solutions -<br>Prescriptive | Room<br>AC /<br>PTAC          | CHE0011 |                                      | 15.00 | 91,268.<br>28    | 48,013.0<br>5    | 1,000 | 48,013.<br>05    | 0.90<br>0 | 43,211.<br>75    | 0.473 | 47,532.92        |  |  |  |  |  |  |  |  |
| Business<br>Solutions -<br>Prescriptive | Chiller                       | CHE0012 |                                      | 20.00 | 1,681.3<br>39.86 | 1,681.20<br>9.38 | 0.954 | 1,603.8<br>73.74 | 0.90<br>0 | 1,443.4<br>86.37 | 0.859 | 1,587,835.<br>01 |  |  |  |  |  |  |  |  |
| Business<br>Solutions -<br>Prescriptive | DCV<br>and<br>Economi<br>zers | CHE0027 |                                      | 15.00 | 102.22<br>4.16   | 102,224.<br>16   | 0.954 | 97,521.<br>85    | 0.90<br>0 | 87,769.<br>67    | 0.859 | -96,546.63       |  |  |  |  |  |  |  |  |
| Business<br>Solutions -<br>Prescriptive | Unitary/<br>Split<br>HVAC     | CHE0028 |                                      | 15.00 | 20,399.<br>09    | 20,399.0<br>9    | 0.954 | 19,460.<br>73    | 0.90<br>0 | 17,514.<br>66    | 0.859 | 19,266.12        |  |  |  |  |  |  |  |  |
| Business<br>Solutions -<br>Prescriptive | Unitary/<br>Split<br>HVAC     | CHE0029 |                                      | 15.00 | 29,930.<br>80    | 29,930.8<br>0    | 0.954 | 28,553.<br>98    | 0.90<br>0 | 25,698.<br>58    | 0.859 | 28,268.44        |  |  |  |  |  |  |  |  |
| Business<br>Solutions -<br>Prescriptive | Heat<br>Pump                  | CHE0030 |                                      | 15.00 | 757.58           | 757.58           | 0.954 | 722.73           | 0.90<br>0 | 650.46           | 0.859 | 715.51           |  |  |  |  |  |  |  |  |
| Business<br>Solutions -<br>Prescriptive | Chiller                       | CHE0037 |                                      | 20.00 | 187.73<br>6.03   | 187,736.<br>03   | 0.954 | 179.10<br>0.17   | 0.90<br>0 | 161.19<br>0.15   | 0.859 | 177,309.17       |  |  |  |  |  |  |  |  |
| Business<br>Solutions -<br>Prescriptive | Chiller                       | CHE0038 |                                      | 20.00 | 474.23<br>8.67   | 474,238.<br>67   | 0.954 | 452.42<br>3.70   | 0.90<br>0 | 407.18<br>1.33   | 0.859 | 447,899.46       |  |  |  |  |  |  |  |  |
| Business<br>Solutions -<br>Prescriptive | Chiller                       | CHE0039 |                                      | 20.00 | 506.13<br>7.37   | 506,137.<br>37   | 0.954 | 482.85<br>5.05   | 0.90<br>0 | 434.56<br>9.55   | 0.859 | 478,026.50       |  |  |  |  |  |  |  |  |

|                                   |                      |         |  |       |              |              |              |       |              |       |              |       |              |
|-----------------------------------|----------------------|---------|--|-------|--------------|--------------|--------------|-------|--------------|-------|--------------|-------|--------------|
| Business Solutions - Prescriptive | Chiller              | CHE0041 | Water-Cooled Chillers- Reciprocating >150 tons and <=300 tons, IPLV = 0.52 | 20.00 | 28,026.24    | 28,026.24    | 28,026.24    | 0.957 | 26,821.11    | 0.900 | 24,139.00    | 0.861 | 26,552.90    |
| Business Solutions - Prescriptive | Chiller              | CHE0043 | Air and Water-Cooled Chiller Tune-up                                       | 0.00  | 2,485.344.39 | 2,485.344.39 | 2,485.344.39 | 1.000 | 2,485.344.39 | 0.900 | 2,236.809.95 | 0.900 | 2,236,809.95 |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0061 | Air Side Economizer  | 15.00 | 88,674.76    | 88,674.76    | 88,674.76    | 0.954 | 84,595.72    | 0.900 | 76,136.15    | 0.859 | 83,749.77    |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0062 | Hydronic HVAC Pump   | 15.00 | 600.373.85   | 600.373.85   | 600,373.85   | 0.954 | 572.756.65   | 0.900 | 515.480.99   | 0.859 | 567,029.08   |
| Business Solutions - Prescriptive | Room AC / PTAC       | CHE0064 | Ductless Air Conditioning  | 15.00 | 428.70       | 799.50       | 799.50       | 1.000 | 799.50       | 0.900 | 719.55       | 1.678 | 791.51       |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0065 | Chilled Water Reset Retrofit (10 degrees) - Electric                       | 5.00  | 7,986.93     | 7,986.93     | 7,986.93     | 1.000 | 7,986.93     | 0.900 | 7,188.24     | 0.900 | 7,188.24     |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0067 | Optimal Start/Stop on Air Handling Units (EO)                              | 20.00 | 36,883.05    | 36,883.05    | 36,883.05    | 1.000 | 36,883.05    | 0.900 | 33,194.74    | 0.900 | 36,514.22    |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0069 | Critical Zone Supply Air Reset Control (EO)                                | 15.00 | 121,476.93   | 121,476.93   | 121,476.93   | 1.000 | 121,476.93   | 0.900 | 109,329.24   | 0.900 | 120,262.16   |
| Business Solutions - Prescriptive | Furnaces and Heaters | CHE0090 | Programmable Thermostat - Electric Customer                                | 9.00  | 48,380.69    | 48,380.69    | 48,380.69    | 0.954 | 46,155.17    | 0.900 | 41,539.66    | 0.859 | 41,539.66    |
| Business Solutions - Prescriptive | CFL                  | CLE0001 | CFL Screw in (30 watts or less)  | 2.00  | 957.840.00   | 957.840.00   | 957,840.00   | 0.954 | 913.779.36   | 0.900 | 822,401.42   | 0.859 | 822,401.42   |
| Business Solutions - Prescriptive | CFL                  | CLE0002 | CFL Specialty (down-light,   | 2.00  | 15,554.00    | 15,554.00    | 15,554.00    | 0.954 | 14,838.52    | 0.900 | 13,354.66    | 0.859 | 13,354.66    |

[illegible]

| Prescriptive                      |                   |         | Remove 2-foot T12 fluorescent lamp (with T8 ballast retrofit)               |       |              |       |              |       |              |       |  |  |  |  |  |  |  |              |
|-----------------------------------|-------------------|---------|---|-------|--------------|-------|--------------|-------|--------------|-------|--|--|--|--|--|--|--|--------------|
| Business Solutions - Prescriptive | Lamp Removal      | CLE0029 | Lamp Removal: Remove 3-foot T12 fluorescent lamp (with T8 ballast retrofit) | 12.00 | 2,042.40     | 0.954 | 1,948.45     | 0.900 | 1,753.60     | 0.859 |  |  |  |  |  |  |  | 1,928.97     |
| Business Solutions - Prescriptive | Lamp Removal      | CLE0030 | Lamp Removal: Remove 4-foot T12 fluorescent lamp (with T8 ballast retrofit) | 8.00  | 1,212.094.40 | 0.954 | 1,156.38.06  | 0.900 | 1,040.704.25 | 0.626 |  |  |  |  |  |  |  | 1,040,704.25 |
| Business Solutions - Prescriptive | Lamp Removal      | CLE0031 | Lamp Removal: Remove 8-foot T12 fluorescent lamp (with T8 ballast retrofit) | 8.00  | 172,394.10   | 0.954 | 164,463.97   | 0.900 | 148,017.57   | 0.731 |  |  |  |  |  |  |  | 148,017.57   |
| Business Solutions - Prescriptive | Lighting Controls | CLE0033 | Central Lighting Control  | 12.00 | 2,529.300.80 | 0.954 | 2,412.952.96 | 0.900 | 2,171.657.67 | 0.859 |  |  |  |  |  |  |  | 2,388,823.43 |
| Business Solutions - Prescriptive | Lighting Controls | CLE0034 | Switching Controls for Multilevel Lighting                                  | 12.00 | 279,545.60   | 0.954 | 266.686.50   | 0.900 | 240,017.85   | 0.859 |  |  |  |  |  |  |  | 264,019.64   |
| Business Solutions - Prescriptive | Lighting Controls | CLE0035 | Daylight Sensor controls  | 12.00 | 1,845.168.93 | 0.954 | 1,760.291.16 | 0.900 | 1,584.262.04 | 0.859 |  |  |  |  |  |  |  | 1,742,688.25 |
| Business Solutions - Prescriptive | T8 Fluorescent    | CLE0046 | 8-FT T12HO to 2 4-FT T8HP   | 8.00  | 1,246.070.00 | 0.954 | 1,188.750.78 | 0.900 | 1,069.875.70 | 0.859 |  |  |  |  |  |  |  | 1,069,875.70 |
| Business                          | Lighting          | CLE0050 | Exterior Multi-   | 8.00  | 144,905.     | 0.957 | 138.67       | 0.900 | 124,80       | 0.861 |  |  |  |  |  |  |  | 124,806.93   |

| Solutions - Prescriptive          | Controls                  | Step Dimming Occ Sensor | 5.29  | 29           | 4.36         | 0    | 6.93         |              |
|-----------------------------------|---------------------------|-------------------------|-------|--------------|--------------|------|--------------|--------------|
| Business Solutions - Prescriptive | Lighting Controls         | CLE0051                 | 8.00  | 88,670.03    | 84,591.21    | 0.90 | 76,132.09    | 76,132.09    |
| Business Solutions - Prescriptive | Lighting Controls         | CLE0052                 | 13.00 | 925,589.92   | 883,012.78   | 0.90 | 794,711.51   | 874,182.66   |
| Business Solutions - Prescriptive | LED or Induction Fixtures | CLE0053                 | 8.00  | 9,112,938.00 | 9,112,938.00 | 0.90 | 8,201,644.20 | 8,201,644.20 |
| Business Solutions - Prescriptive | LED or Induction Fixtures | CLE0054                 | 8.00  | 156,880.00   | 156,880.00   | 0.90 | 141,192.00   | 141,192.00   |
| Business Solutions - Prescriptive | LED or Induction Fixtures | CLE0055                 | 8.00  | 1,954,252.00 | 1,870,219.16 | 0.90 | 1,683,197.25 | 1,683,197.25 |
| Business Solutions - Prescriptive | Variable Frequency Drives | CMC0002                 | 20.00 | 1,472,280.68 | 1,472,280.68 | 0.90 | 1,325,052.61 | 1,457,557.87 |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0006                 | 15.00 | 1,256,397.63 | 1,198,603.34 | 0.90 | 1,078,743.00 | 1,186,617.30 |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0007                 | 10.00 | 2,095,833.53 | 1,999,425.19 | 0.90 | 1,799,482.67 | 1,979,430.93 |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0009                 | 15.00 | 141,666.34   | 135,149.69   | 0.90 | 121,634.72   | 133,798.19   |



|                                   | Drives                    | Customers |  |       |              |              |       |              |      |              |       |              |
|-----------------------------------|---------------------------|-----------|--|-------|--------------|--------------|-------|--------------|------|--------------|-------|--------------|
| Business Solutions - Prescriptive | Custom                    | CME0013   | VFD on Process Pumps (50-250 HP)                           | 15.00 | 308,400.52   | 308,400.52   | 1,000 | 308,400.52   | 0.90 | 277,560.47   | 0.900 | 305,316.51   |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0014   | EC Motors  | 20.00 | 66,960.00    | 66,960.00    | 1,000 | 66,960.00    | 0.90 | 60,264.00    | 0.900 | 66,290.40    |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0015   | VFD on Process Fans (< 50 HP)                              | 15.00 | 118,636.00   | 118,636.00   | 1,000 | 118,636.00   | 0.90 | 106,772.40   | 0.900 | 117,449.64   |
| Business Solutions - Prescriptive | Custom                    | CME0019   | VFDs for Process Fixed Speed Control (Throttled; <= 50 hz) | 15.00 | 56,250.00    | 56,250.00    | 1,000 | 56,250.00    | 0.90 | 50,625.00    | 0.900 | 55,687.50    |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0022   | Constant Volume AHU to VAV with Hydronic Reheat (Electric) | 20.00 | 906,594.34   | 906,594.34   | 1,000 | 906,594.34   | 0.90 | 815,934.90   | 0.900 | 897,528.39   |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0025   | VFD on HVAC Fans (< 100 HP)                                | 10.00 | 1,748,153.35 | 1,748,153.35 | 0.957 | 1,672,982.76 | 0.90 | 1,505,684.48 | 0.861 | 1,656,252.93 |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0026   | VFD on HVAC Fans (100HP - 250HP)                           | 10.00 | 67,403.85    | 67,403.85    | 0.957 | 64,505.48    | 0.90 | 58,054.94    | 0.861 | 63,860.43    |
| Business Solutions - Prescriptive | Variable Frequency Drives | CME0027   | VFD on HVAC Pumps (< 100 HP)                               | 10.00 | 2,423.775.66 | 2,423.775.66 | 0.957 | 2,319.553.30 | 0.90 | 2,087.597.97 | 0.861 | 2,296,357.77 |
| Business Solutions - Prescriptive | Energy Recovery           | CRC0001   | Enthalpy Wheels ERUs                                       | 15.00 | 29,300.16    | 29,300.16    | 0.954 | 27,952.35    | 1.00 | 27,952.35    | 0.954 | -30,747.59   |
| Business Solutions - Prescriptive | Energy Recovery           | CRC0002   | Fixed-Plate Air to Air FRUs                                | 15.00 | 115,530.49   | 115,530.49   | 0.954 | 110,216.09   | 0.90 | 99,194.48    | 0.859 | 109,113.93   |



|                                   |                                |         |  |       |            |            |       |            |       |            |       |            |
|-----------------------------------|--------------------------------|---------|--|-------|------------|------------|-------|------------|-------|------------|-------|------------|
| Business Solutions - Prescriptive | Energy Recovery                | CRE0001 | Laboratory Fume-Hood Ventilation Reduction (EO)                  | 15.00 | 87,893.46  | 87,893.46  | 1,000 | 87,893.46  | 0.900 | 79,104.12  | 0.900 | 87,014.53  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSC0030 | Reach-In Refrigerated Case Door; Low Temp - Combination Customer | 12.00 | 215,192.00 | 205,938.74 | 0.957 | 215,192.00 | 0.900 | 185,344.87 | 0.861 | 203,879.36 |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSC0031 | Temperature and Optical Sensor on Exhaust - Combo                | 20.00 | 19,882.33  | 19,882.33  | 1,000 | 19,882.33  | 0.900 | 17,894.09  | 0.900 | 19,683.50  |
| Business Solutions - Prescriptive | Other                          | CSC0039 | Roof Insulation - Attic Roof (Combo)                             | 20.00 | 1,701.65   | 1,628.48   | 0.957 | 1,701.65   | 0.900 | 1,465.63   | 0.861 | 1,612.19   |
| Business Solutions - Prescriptive | Other                          | CSC0040 | Roof Insulation - Flat Roof (Combo)                              | 20.00 | 16,681.95  | 15,964.63  | 0.957 | 16,681.95  | 0.900 | 14,368.17  | 0.861 | 15,804.98  |
| Business Solutions - Prescriptive | Other                          | CSC0106 | Wall Insulation - Combination Customer                           | 20.00 | 8,165.52   | 7,789.90   | 0.954 | 8,165.52   | 0.900 | 7,010.91   | 0.859 | 7,712.00   |
| Business Solutions - Prescriptive | Occupancy Sensors and Controls | CSE0001 | Beverage Vending Machine Controller                              | 10.00 | 17,600.00  | 16,790.40  | 0.954 | 17,600.00  | 0.900 | 15,111.36  | 0.859 | 16,622.50  |
| Business Solutions - Prescriptive | Occupancy Sensors and Controls | CSE0002 | Guestroom Energy Management Control (electric heat)              | 8.00  | 347,568.00 | 331,579.87 | 0.954 | 347,568.00 | 0.900 | 298,421.88 | 0.859 | 298,421.88 |
| Business Solutions - Prescriptive | Ice Machines                   | CSE0003 | Energy Efficient Ice Machines less than 500 lbs                  | 12.00 | 1,797.00   | 1,714.34   | 0.954 | 1,797.00   | 0.900 | 1,542.90   | 0.859 | 1,697.19   |
| Business                          | Ice                            | CSE0004 | Energy   | 12.00 | 7,136.00   | 6,807.70   | 0.954 | 7,136.00   | 0.900 | 6,126.90   | 0.859 | 6,739.67   |

| Solutions - Prescriptive          | Machines                  | Efficient Ice Machines 500-1000 lbs                   | 0     | 0             | 4     | 0             | 7             |       |               |
|-----------------------------------|---------------------------|---|-------|---------------|-------|---------------|---------------|-------|---------------|
| Business Solutions - Prescriptive | Ice Machine               | Energy Efficient Ice Machines 1000-1500 lbs           | 12.00 | 2,572.00      | 0.954 | 2,453.69      | 2,208.32      | 0.859 | 2,429.15      |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | Night Covers  | 5.00  | 13,323.80     | 0.954 | 12,710.91     | 11,439.82     | 0.859 | 11,439.82     |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | AntiSweat Heater Controls                             | 15.00 | 3,582.534.00  | 0.954 | 3,417.737.44  | 3,075.963.69  | 0.859 | 3,383,560.06  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | LED Lighting for Refrigeration Cases                  | 16.00 | 19,679,720.00 | 0.954 | 18,774,452.88 | 16,897,007.59 | 0.859 | 18,586,708.35 |
| Business Solutions - Prescriptive | Other                     | Network Power Management Software                     | 4.00  | 216.405.00    | 0.954 | 206.450.37    | 185.805.33    | 0.859 | 185,805.33    |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | Case EC Motor   | 15.00 | 1,405,744.00  | 0.954 | 1,341,079.78  | 1,206,971.80  | 0.859 | 1,327,668.98  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | LED Lighting Occupancy Sensor for Refrigeration Cases | 16.00 | 198.900.00    | 0.954 | 189,750.60    | 170.775.54    | 0.859 | 187,853.09    |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | A/C Reduction From Lighting Reduction (-20F to 0F)    | 12.00 | 16,865.38     | 0.954 | 16,089.57     | 14,480.62     | 0.859 | 15,928.68     |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | A/C Reduction From Lighting Reduction (0F to 20F)     | 12.00 | 7,656.00      | 0.957 | 7,326.79      | 6,594.11      | 0.861 | 7,253.52      |

|                                   |                           |         |   |       |            |       |            |       |            |       |            |
|-----------------------------------|---------------------------|---------|---|-------|------------|-------|------------|-------|------------|-------|------------|
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0024 | A/C Reduction From Lighting Reduction (20F to 40F)                | 12.00 | 7,247.36   | 0.954 | 6,913.98   | 0.900 | 6,222.58   | 0.859 | 6,844.84   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0026 | Evaporator Fan Control (EC motor)                                 | 5.00  | 10,890.00  | 0.954 | 10,389.06  | 0.900 | 9,350.15   | 0.859 | 9,350.15   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0027 | Reach-In Refrigerated Case Door; Medium Temp - Electric Customers | 12.00 | 45,346.00  | 0.954 | 43,260.08  | 0.900 | 38,934.08  | 0.859 | 42,827.48  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0028 | Electric Dishwasher (High Temp; Under Counter)                    | 12.00 | 3,408.07   | 1.000 | 3,408.00   | 0.900 | 3,067.20   | 0.900 | 3,373.92   |
| Business Solutions - Prescriptive | Other                     | CSE0042 | UPS - Single Normal Mode - VI (P > 10 kW)                         | 10.00 | 79,016.06  | 1.000 | 88,512.00  | 0.900 | 79,660.80  | 1.008 | 87,626.88  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0043 | Night Covers (Combo)  | 5.00  | 3,389.89   | 0.957 | 3,244.12   | 0.900 | 2,919.71   | 0.861 | 2,919.71   |
| Business Solutions - Prescriptive | Other                     | CSE0045 | Battery Charger - Continuous                                      | 20.00 | 152,796.00 | 1.000 | 152,796.00 | 0.900 | 137,516.40 | 0.900 | 151,268.04 |
| Business Solutions - Prescriptive | Other                     | CSE0046 | Battery Charger - 1 Shift/Day                                     | 20.00 | 1,460.00   | 1.000 | 1,460.00   | 0.900 | 1,314.00   | 0.900 | 1,445.40   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0078 | Electric Dishwasher (High Temp; Multi Tank)                       | 12.00 | 7,777.61   | 1.000 | 7,778.00   | 0.900 | 7,000.20   | 0.900 | 7,700.22   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0079 | Electric Dishwasher (Low Temp; Single Tank)                       | 12.00 | 3,016.98   | 1.000 | 3,017.00   | 0.900 | 2,715.30   | 0.900 | 2,986.83   |

|  |                           |         |   |       |            |              |       |              |       |              |       |              |
|--|---------------------------|---------|---|-------|------------|--------------|-------|--------------|-------|--------------|-------|--------------|
| Business Solutions - Prescriptive        | Kitchen and Refrigeration | CSE0080 | Electric Dishwasher (High Temp; Single Tank)              | 12.00 | 7,120.27   | 7,120.00     | 1,000 | 7,120.00     | 0.900 | 6,408.00     | 0.900 | 7,048.80     |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration | CSE0082 | Electric Dishwasher (Low Temp; Door)                      | 12.00 | 3,566.82   | 3,567.00     | 1,000 | 3,567.00     | 0.900 | 3,210.30     | 0.900 | 3,531.33     |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration | CSE0089 | Walk-in EC Motor replacing non-EC Motor                   | 15.00 | 1,403.20   | 1,403.220.00 | 0.957 | 1,342,881.54 | 0.900 | 1,208,593.39 | 0.861 | 1,329,452.72 |
| Business Solutions - Prescriptive        | C&I Waterheating          | CWE0010 | Pipe Wrap - Domestic Hot Water - conditioned space (120F) | 20.00 | 1,695.87   | 1,622.95     | 0.957 | 1,622.95     | 0.900 | 1,460.65     | 0.861 | 1,606.72     |
| Business Solutions - Prescriptive        | C&I Waterheating          | CWG0012 | Pipe Wrap - Domestic Hot Water - conditioned space (140F) | 20.00 | 176.65     | 176.65       | 0.954 | 168.53       | 0.900 | 151.67       | 0.859 | 166.84       |
| New Construction - Major Renovation 2013 | Compressed Air            | CAE0001 | VSD Air Compressor  | 15.00 | 236.300.00 | 236,300.00   | 0.954 | 225,430.20   | 0.900 | 202,887.18   | 0.859 | 223,175.90   |
| New Construction - Major Renovation 2013 | Compressed Air            | CAE0002 | Refrigerated Cycling Thermal Mass Air Dryer               | 10.00 | 8,387.20   | 8,387.20     | 0.954 | 8,001.39     | 0.900 | 7,201.25     | 0.859 | 7,921.37     |
| New Construction - Major Renovation 2013 | Compressed Air            | CAE0009 | Compressed Air Pressure Flow Controller                   | 10.00 | 4,436.40   | 4,436.40     | 1,000 | 4,436.40     | 0.900 | 3,992.76     | 0.900 | 4,392.04     |
| New Construction - Major Renovation 2013 | Furnaces and Heaters      | CHC0010 | Infrared Heaters - Combination Customers                  | 15.00 | 123.388.38 | 123,388.38   | 0.954 | 117,712.51   | 0.900 | 105,941.26   | 0.859 | 116,535.39   |
| New                                      | DCV                       | CHC0027 | Demand  | 15.00 | 1,771.4    | 1,771.40     | 0.954 | 1,689.9      | 0.900 | 1,520.9      | 0.859 | 1,673.02     |

| Construction - Major Renovation 2013     | and Economic Renovation 2013     | Control Ventilation - Combination Customers | 0     | 0          | 2     | 0          | 3     |            |
|--|----------------------------------|---|-------|------------|-------|------------|-------|------------|
| New Construction - Major Renovation 2013 | Unitary/ Split HVAC              | CHE0001                                     | 15.00 | 4,606.76   | 0.954 | 4,394.85   | 0.900 | 3,955.37   |
| New Construction - Major Renovation 2013 | Chiller                          | CHE0012                                     | 20.00 | 294,834.52 | 0.954 | 281,188.77 | 0.900 | 253,069.89 |
| New Construction - Major Renovation 2013 | DCV and Economic Renovation 2013 | CHE0027                                     | 15.00 | 1,389.38   | 0.954 | 1,325.47   | 0.900 | 1,192.93   |
| New Construction - Major Renovation 2013 | Unitary/ Split HVAC              | CHE0028                                     | 15.00 | 5,176.85   | 0.954 | 4,938.71   | 0.900 | 4,444.84   |
| New Construction - Major Renovation 2013 | Unitary/ Split HVAC              | CHE0029                                     | 15.00 | 11,170.41  | 0.954 | 10,656.57  | 0.900 | 9,590.92   |
| New Construction - Major Renovation 2013 | Heat Pump                        | CHE0031                                     | 15.00 | 1,702.73   | 0.954 | 1,624.40   | 0.900 | 1,461.96   |
| New Construction - Major Renovation 2013 | Heat Pump                        | CHE0032                                     | 15.00 | 3,601.85   | 0.954 | 3,436.16   | 0.900 | 3,092.55   |
| New                                      | Chiller                          | CHE0038                                     | 20.00 | 183,144.   | 0.954 | 174,72     | 0.900 | 157,24     |
|  |                                  |   |       |            |       |            |       | 172,972.99 |

|  |                           |  |       |              |              |              |      |              |       |
|--|---------------------------|--|-------|--------------|--------------|--------------|------|--------------|-------|
| Construction - Major Renovation 2013     |                           | Chillers- Centrifugal >300 tons and <= 600 tons, IPLV = 0.49 |       | 4.86         | 86           | 0.19         | 0    | 8.17         |       |
| New Construction - Major Renovation 2013 | Lighting Controls         | CLE0035  | 12.00 | 82,004.12    | 82,004.12    | 78,231.93    | 0.90 | 70,408.74    | 0.859 |
| New Construction - Major Renovation 2013 | Variable Frequency Drives | CME0007  | 10.00 | 497,144.32   | 497,144.32   | 474,275.68   | 0.90 | 426,848.11   | 0.859 |
| New Construction - Major Renovation 2013 | Ice Machines              | CSE0005  | 12.00 | 3,858.00     | 3,858.00     | 3,680.53     | 0.90 | 3,312.48     | 0.859 |
| New Construction - Major Renovation 2013 | Kitchen and Refrigeration | CSE0011  | 15.00 | 44,670.00    | 44,670.00    | 42,615.18    | 0.90 | 38,353.66    | 0.859 |
| New Construction - Major Renovation 2013 | Kitchen and Refrigeration | CSE0013  | 16.00 | 378,120.00   | 378,120.00   | 360,726.48   | 0.90 | 324,653.83   | 0.859 |
| New Construction - Major Renovation 2013 | Other                     | CSE0017  | 12.00 | 4,036.430.08 | 4,036.430.08 | 3,850.754.30 | 0.90 | 3,465,678.87 | 0.859 |
| New Construction - Major Renovation 2013 | Other                     | CSE0042  | 10.00 | 2,859.39     | 3,203.03     | 3,203.03     | 0.90 | 2,882.73     | 1.008 |
| New Construction - Major Renovation 2013 | Other                     | CSE0049  | 12.00 | 816.681.98   | 784,082.88   | 750,367.32   | 0.90 | 675,330.58   | 0.827 |
|  |                           |  |       |              |              |              |      |              |       |

| Major Renovation 2013                    |                           | Density (Exterior) |   |       |                |                |       |                |       |                |       |                |
|--|---------------------------|--------------------|---|-------|----------------|----------------|-------|----------------|-------|----------------|-------|----------------|
| New Construction - Major Renovation 2013 | Kitchen and Refrigeration | CSE0079            | Electric Dishwasher (Low Temp; Single Tank) | 12.00 | 3,016.98       | 3,017.00       | 1,000 | 3,017.00       | 0.900 | 2,715.30       | 0.900 | 2,986.83       |
| New Construction - Whole Building        | NEW CONSTRUCTION          | CNE0001            | Design Incentive - Building Owner           | 0.00  | 773,695.00     | 773,695.00     | 0.954 | 738,105.03     | 0.900 | 664,294.53     | 0.859 | 664,294.53     |
| TOTAL                                    |                           |                    |   |       | 177,331,024.34 | 176,778,027.84 |       | 171,414,709.55 |       | 154,270,443.36 |       | 166,773,674.41 |

Table B-2: Business Solutions Program - Validated Electric Demand (Kw) Savings by Measure

| Program                           | Measure Category | Measure Code | Measure Description                         | Measure Life | Reported kW Savings | Adjusted Reported Gross kW Savings | Verified Gross kW Savings Adjustment Factor | Verified Gross kW Savings | kW NTG Adjustment Factor | Verified Net kW Savings | kW Realization Rate | Verified Net kW Savings Incl Bonus |
|-----------------------------------|------------------|--------------|---|--------------|---------------------|------------------------------------|---|---------------------------|--------------------------|-------------------------|---------------------|------------------------------------|
| BOC                               | Other            | CSC0042      | BOC (Combo Customer)                        | 5.00         | 29.55               | 29.55                              | 1.000                                       | 29.55                     | 0.900                    | 26.60                   | 0.900               | 26.60                              |
| BOC                               | Other            | CSE0090      | BOC (Electric Customer)                     | 5.00         | 32.24               | 32.24                              | 1.000                                       | 32.24                     | 0.900                    | 29.02                   | 0.900               | 29.02                              |
| Business Solutions - Custom       | Custom           | CBE0001      | Custom Electric Program                     | Varies       | 1,613.88            | 1,613.88                           | 0.2290                                      | 369.58                    | 0.9000                   | 332.62                  | 0.2060              | 365.59                             |
| Business Solutions - Custom       | Custom           | CJE0001      | Lumens per Watt Improvement per Year        | Varies       | 836.35              | 836.35                             | 0.942                                       | 787.84                    | 0.900                    | 709.05                  | 0.848               | 720.53                             |
| Business Solutions - Custom       | Custom           | CJE0002      | Energy Conservation Improvement per Year    | Varies       | 55.20               | 55.20                              | 0.942                                       | 52.00                     | 0.900                    | 46.80                   | 0.848               | 48.20                              |
| Business Solutions - Prescriptive | Compressed Air   | CAE0001      | VSD Air Compressor                          | 15.00        | 225.50              | 225.50                             | 0.942                                       | 212.42                    | 0.900                    | 191.18                  | 0.848               | 210.30                             |
| Business Solutions - Prescriptive | Compressed Air   | CAE0002      | Refrigerated Cycling Thermal Mass Air Dryer | 10.00        | 8.64                | 8.64                               | 0.942                                       | 8.14                      | 0.900                    | 7.33                    | 0.848               | 8.06                               |
| Business Solutions - Prescriptive | Compressed Air   | CAE0004      | Low-Pressure Drop Air Filter                | 5.00         | 2.48                | 2.80                               | 1.000                                       | 2.80                      | 0.900                    | 2.52                    | 1.016               | 2.52                               |
| Business Solutions - Prescriptive | Compressed Air   | CAE0005      | Zero Loss Condensate Drain                  | 5.00         | 286.00              | 318.40                             | 0.942                                       | 299.93                    | 0.900                    | 269.94                  | 0.944               | 269.94                             |
| Business Solutions - Prescriptive | Compressed Air   | CAE0007      | Compressed Air Energy Audit                 | 1.00         | 452.67              | 455.27                             | 0.942                                       | 428.86                    | 0.900                    | 385.97                  | 0.853               | 385.97                             |
| Business Solutions - Prescriptive | Compressed Air   | CAE0008      | Air Compressor Outdoor Air Intake           | 20.00        | 0.05                | 0.05                               | 1.000                                       | 0.05                      | 0.900                    | 0.05                    | 0.900               | 0.05                               |



|                                   |                            |         |   |       |          |          |       |          |       |          |       |          |
|-----------------------------------|----------------------------|---------|---|-------|----------|----------|-------|----------|-------|----------|-------|----------|
| Business Solutions - Prescriptive | Compressed Air             | CAE0009 | Compressed Air Pressure Flow Controller                   | 10.00 | 2.83     | 2.83     | 1.000 | 2.83     | 0.900 | 2.55     | 0.900 | 2.80     |
| Business Solutions - Prescriptive | Compressed Air             | CAE0011 | Refrigerated Cycling - Digital Scroll                     | 10.00 | 2.60     | 2.60     | 1.000 | 2.60     | 0.900 | 2.34     | 0.900 | 2.57     |
| Business Solutions - Prescriptive | BLDG Envelope              | CBC0001 | Window Reduction  | 20.00 | 5.40     | 5.40     | 0.942 | 5.09     | 0.900 | 4.58     | 0.848 | 5.04     |
| Business Solutions - Prescriptive | Energy Management Systems  | CEB0001 | EMS - Combination Customers                               | 15.00 | 382.36   | 382.36   | 0.942 | 360.19   | 0.900 | 324.17   | 0.848 | 356.58   |
| Business Solutions - Prescriptive | Energy Management Systems  | CEE0001 | EMS (Electric Cooling)-Electric Customers                 | 15.00 | 288.81   | 288.81   | 0.942 | 272.06   | 0.900 | 244.85   | 0.848 | 269.34   |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0001 | Interior LED/Induction Lighting                           | 16.00 | 34.28    | 38.09    | 0.942 | 35.88    | 0.900 | 32.29    | 0.942 | 35.52    |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0003 | CFL Replacing MH  | 2.70  | 30.55    | 30.55    | 0.942 | 28.77    | 0.900 | 25.90    | 0.848 | 25.90    |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0005 | Parking Garage LED/Induction Lighting Retrofit            | 13.00 | 277.01   | 277.01   | 1.000 | 277.01   | 0.900 | 249.31   | 0.900 | 274.24   |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0006 | Neon to LED Sign Lighting Retrofit (Continuous Operation) | 16.00 | 1.18     | 1.18     | 1.000 | 1.18     | 0.900 | 1.06     | 0.900 | 1.17     |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0007 | Interior LED Lighting Retrofit                            | 16.00 | 1,298.45 | 1,298.45 | 1.000 | 1,298.45 | 0.900 | 1,168.61 | 0.900 | 1,285.47 |
| Business Solutions - Prescriptive | Lighting Retrofit Fixtures | CFE0009 | Neon to LED Sign Lighting Retrofit (Commercial Hours)     | 14.00 | 10.87    | 10.87    | 1.000 | 10.87    | 0.900 | 9.78     | 0.900 | 10.76    |
| Business Solutions - Prescriptive | LED or Induction Fixtures  | CFE0010 | LED Replacing Incandescent Candelabra and Globe           | 8.00  | 19.38    | 18.00    | 1.000 | 18.00    | 0.900 | 16.20    | 0.836 | 16.20    |

|                                   |                           |         |  |       |        |        |       |        |       |        |       |        |
|-----------------------------------|---------------------------|---------|--|-------|--------|--------|-------|--------|-------|--------|-------|--------|
| Business Solutions - Prescriptive | LED or Induction Fixtures | CFE0011 | LED Replacing Incandescent BR-Series                       | 8.00  | 100.11 | 90.59  | 1,000 | 90.59  | 0.900 | 81.53  | 0.814 | 81.53  |
| Business Solutions - Prescriptive | T8 Fluorescent            | CFE0012 | 8-foot T12 to Two (2) 4-ft HP/RW T8                        | 8.00  | 39.52  | 39.52  | 1,000 | 39.52  | 0.900 | 35.57  | 0.900 | 35.57  |
| Business Solutions - Prescriptive | LED or Induction Fixtures | CFE0013 | 4-ft T12 to LED Tube Lights                                | 8.00  | 36.83  | 36.49  | 1,000 | 36.49  | 0.900 | 32.84  | 0.892 | 32.84  |
| Business Solutions - Prescriptive | Furnaces and Heaters      | CHC0010 | Infrared Heaters - Combination Customers                   | 15.00 | 64.81  | 64.81  | 0.942 | 61.05  | 0.900 | 54.95  | 0.848 | 60.44  |
| Business Solutions - Prescriptive | HVAC Controls             | CHC0011 | Programmable Thermostat - Combination Customers            | 9.00  | -18.28 | -18.28 | 0.942 | -17.22 | 0.900 | -15.50 | 0.848 | -15.50 |
| Business Solutions - Prescriptive | HVAC Controls             | CHC0012 | Guestroom Energy Management Control - Combination Customer | 8.00  | 26.60  | 26.60  | 1,000 | 26.60  | 0.900 | 23.94  | 0.900 | 23.94  |
| Business Solutions - Prescriptive | HVAC Controls             | CHC0014 | Critical Zone Supply Air Reset Control (Combo)             | 15.00 | -0.08  | -0.08  | 1,000 | -0.08  | 0.900 | -0.08  | 0.900 | -0.08  |
| Business Solutions - Prescriptive | HVAC Controls             | CHC0017 | Optimal Start/Stop on Air Handling Units (Combo)           | 20.00 | 89.05  | 89.05  | 1,000 | 89.05  | 0.900 | 80.15  | 0.900 | 88.16  |
| Business Solutions - Prescriptive | DCV and Economizers       | CHC0027 | Demand Control Ventilation - Combination Customers         | 15.00 | 88.42  | 88.42  | 0.942 | 83.29  | 0.900 | 74.96  | 0.848 | 82.46  |
| Business Solutions - Prescriptive | Unitary/Split HVAC        | CHE0001 | AC < 65,000 Btuh (5.4 tons)                                | 15.00 | 19.59  | 19.59  | 0.942 | 18.46  | 0.900 | 16.61  | 0.848 | 18.27  |
| Business Solutions - Prescriptive | Unitary/Split HVAC        | CHE0003 | AC > 240,000 Btuh (20 tons) & ≤ 760,000 Btuh (63.3 tons)   | 15.00 | 76.87  | 76.87  | 0.942 | 72.42  | 0.900 | 65.17  | 0.848 | 71.69  |

|                                   |                     |         |  |       |        |        |       |        |       |        |                   |        |
|-----------------------------------|---------------------|---------|--|-------|--------|--------|-------|--------|-------|--------|-------------------|--------|
| Business Solutions - Prescriptive | Room AC / PTAC      | CHE0008 | Package Terminal AC - AC >=10% EER higher than IECC 2006 standard      | 15.00 | 7.02   | 7.02   | 0.942 | 6.61   | 0.900 | 5.95   | 0.84 <sub>8</sub> | 6.55   |
| Business Solutions - Prescriptive | Room AC / PTAC      | CHE0009 | Package Terminal AC-Heat Pump >=10% EER higher than IECC 2006 standard | 15.00 | 2.08   | 2.08   | 0.942 | 1.96   | 0.900 | 1.77   | 0.84 <sub>8</sub> | 1.94   |
| Business Solutions - Prescriptive | Room AC / PTAC      | CHE0011 | Ductless Heat Pump   | 15.00 | 33.26  | 28.89  | 1.000 | 28.89  | 0.900 | 26.00  | 0.78 <sub>2</sub> | 28.60  |
| Business Solutions - Prescriptive | Chiller             | CHE0012 | Air-cooled Chiller - 1.04 kW/ton IPLV                                  | 20.00 | 560.08 | 560.04 | 0.942 | 527.56 | 0.900 | 474.81 | 0.84 <sub>8</sub> | 522.29 |
| Business Solutions - Prescriptive | DCV and Economizers | CHE0027 | Demand Control Ventilation - Electric Customers                        | 15.00 | 185.19 | 185.19 | 0.942 | 174.45 | 0.900 | 157.00 | 0.84 <sub>8</sub> | 172.70 |
| Business Solutions - Prescriptive | Unitary/ Split HVAC | CHE0028 | AC Units > 65,000 Btuh (5.4 tons) and < =120,000 Btuh (10 tons)        | 15.00 | 25.05  | 25.05  | 0.942 | 23.60  | 0.900 | 21.24  | 0.84 <sub>8</sub> | 23.36  |
| Business Solutions - Prescriptive | Unitary/ Split HVAC | CHE0029 | AC Units > 120,000 Btuh (10 tons) and < = 240,000 Btuh (20 tons)       | 15.00 | 36.22  | 36.22  | 0.942 | 34.12  | 0.900 | 30.71  | 0.84 <sub>8</sub> | 33.78  |
| Business Solutions - Prescriptive | Heat Pump           | CHE0030 | Heat Pumps <= 65,000 Btuh (5.4 tons)                                   | 15.00 | 0.52   | 0.52   | 0.942 | 0.49   | 0.900 | 0.44   | 0.84 <sub>8</sub> | 0.48   |
| Business Solutions - Prescriptive | Chiller             | CHE0037 | Water Cooled Chillers- Centrifugal                                     | 20.00 | 48.47  | 48.47  | 0.942 | 45.66  | 0.900 | 41.10  | 0.84 <sub>8</sub> | 45.20  |
| Business Solutions - Prescriptive | Chiller             | CHE0038 | Water Cooled Chillers- Centrifugal >300 tons and <= 600 tons,          | 20.00 | 138.79 | 138.79 | 0.942 | 130.74 | 0.900 | 117.66 | 0.84 <sub>8</sub> | 129.43 |

|                                   |                      |         |   |       |          |          |          |       |          |       |          |       |          |
|-----------------------------------|----------------------|---------|---|-------|----------|----------|----------|-------|----------|-------|----------|-------|----------|
| Business Solutions - Prescriptive | Chiller              | CHE0039 | IPLV = 0.49   | 20.00 | 129.38   | 129.38   | 129.38   | 0.942 | 121.88   | 0.900 | 109.69   | 0.848 | 120.66   |
|                                   |                      |         | Water-Cooled Chillers-Centrifugal >600 tons, IPLV = 0.49                  |       |          |          |          |       |          |       |          |       |          |
| Business Solutions - Prescriptive | Chiller              | CHE0041 | Water-Cooled Chillers-Reciprocating >150 tons and <=300 tons, IPLV = 0.52 | 20.00 | 14.65    | 14.65    | 14.65    | 1.000 | 14.65    | 0.900 | 13.19    | 0.900 | 14.51    |
| Business Solutions - Prescriptive | Chiller              | CHE0043 | Air and Water-Cooled Chiller Tune-up                                      | 0.00  | 1,168.74 | 1,168.74 | 1,168.74 | 1.000 | 1,168.74 | 0.900 | 1,051.87 | 0.900 | 1,051.87 |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0061 | Air Side Economizer   | 15.00 | -0.35    | -0.35    | -0.35    | 0.942 | -0.33    | 0.900 | -0.29    | 0.848 | -0.32    |
| Business Solutions - Prescriptive | Room AC / PTAC       | CHE0064 | Ductless Air Conditioning   | 15.00 | 0.52     | 0.48     | 0.48     | 1.000 | 0.48     | 0.900 | 0.43     | 0.834 | 0.48     |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0065 | Chilled Water Reset Retrofit (10 degrees) - Electric                      | 5.00  | -7.84    | -7.84    | -7.84    | 1.000 | -7.84    | 0.900 | -7.06    | 0.900 | -7.06    |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0067 | Optimal Start/Stop on Air Handling Units (EO)                             | 20.00 | 4.89     | 4.89     | 4.89     | 1.000 | 4.89     | 0.900 | 4.40     | 0.900 | 4.84     |
| Business Solutions - Prescriptive | HVAC Controls        | CHE0069 | Critical Zone Supply Air Reset Control (EO)                               | 15.00 | -0.98    | -0.98    | -0.98    | 1.000 | -0.98    | 0.900 | -0.88    | 0.900 | -0.97    |
| Business Solutions - Prescriptive | Furnaces and Heaters | CHE0090 | Programmable Thermostat - Electric Customer                               | 9.00  | -6.57    | -6.57    | -6.57    | 0.942 | -6.19    | 0.900 | -5.57    | 0.848 | -5.57    |
| Business Solutions - Prescriptive | CFL                  | CLE0001 | CFL Screw in (30 watts or less)   | 2.00  | 260.34   | 234.55   | 220.94   | 0.942 | 220.94   | 0.900 | 198.85   | 0.764 | 198.85   |
| Business Solutions - Prescriptive | CFL                  | CLE0002 | CFL Specialty (down-light, 3-way, dimmable)                               | 2.00  | 3.80     | 3.80     | 3.80     | 0.942 | 3.58     | 0.900 | 3.22     | 0.848 | 3.22     |

|                                   |                      |         |   |       |          |          |       |          |       |          |       |          |
|-----------------------------------|----------------------|---------|---|-------|----------|----------|-------|----------|-------|----------|-------|----------|
| Business Solutions - Prescriptive | HP or RW Fluorescent | CLE0009 | 4-foot Standard T8 to Reduced Wattage T8 (lamp only)                        | 5.00  | 212.57   | 212.57   | 0.942 | 200.24   | 0.900 | 180.21   | 0.848 | 180.21   |
| Business Solutions - Prescriptive | Exit Signs           | CLE0014 | LED, T-1, or Electroluminescent Exit Signs                                  | 15.00 | 41.29    | 41.29    | 0.942 | 38.89    | 0.900 | 35.00    | 0.848 | 38.50    |
| Business Solutions - Prescriptive | Lighting Controls    | CLE0017 | Lighting Occupancy Sensors  | 10.00 | 870.74   | 870.74   | 0.942 | 820.24   | 0.900 | 738.21   | 0.848 | 812.03   |
| Business Solutions - Prescriptive | T8/T5 Fixture        | CLE0018 | New T8/T5 Fixture (Includes HID to Fluorescent conversions)                 | 12.00 | 9,003.55 | 9,003.55 | 0.942 | 8,481.35 | 0.900 | 7,633.21 | 0.848 | 8,396.53 |
| Business Solutions - Prescriptive | CFL                  | CLE0020 | Compact Fluorescents: Screw-in, 31-115 W                                    | 2.00  | 34.51    | 34.51    | 0.942 | 32.50    | 0.900 | 29.25    | 0.848 | 29.25    |
| Business Solutions - Prescriptive | T8 Fluorescent       | CLE0023 | T12 to Standard T8: 2-foot lamp and ballast upgrade                         | 8.00  | 6.93     | 6.93     | 0.942 | 6.53     | 0.900 | 5.87     | 0.848 | 5.87     |
| Business Solutions - Prescriptive | T8 Fluorescent       | CLE0024 | T12 to Standard T8: 3-foot lamp and ballast upgrade                         | 12.00 | 6.72     | 6.72     | 0.942 | 6.33     | 0.900 | 5.70     | 0.848 | 6.27     |
| Business Solutions - Prescriptive | HP or RW Fluorescent | CLE0027 | High Performance or Reduced Wattage T8: HP 4-foot lamp and ballast upgrade  | 8.00  | 678.04   | 697.41   | 0.942 | 656.96   | 0.900 | 591.27   | 0.872 | 591.27   |
| Business Solutions - Prescriptive | Lamp Removal         | CLE0028 | Lamp Removal: Remove 2-foot T12 fluorescent lamp (with T8 ballast retrofit) | 12.00 | 5.43     | 5.43     | 0.942 | 5.11     | 0.900 | 4.60     | 0.848 | 5.06     |
| Business Solutions - Prescriptive | Lamp Removal         | CLE0029 | Lamp Removal: Remove 3-foot T12 fluorescent lamp (with T8 ballast retrofit) | 12.00 | 0.50     | 0.50     | 0.942 | 0.47     | 0.900 | 0.43     | 0.848 | 0.47     |

|                                   |                           |         |   |       |          |          |       |          |       |          |       |          |
|-----------------------------------|---------------------------|---------|---|-------|----------|----------|-------|----------|-------|----------|-------|----------|
| Business Solutions - Prescriptive | Lamp Removal              | CLE0030 | Lamp Removal: Remove 4-foot T12 fluorescent lamp (with T8 ballast retrofit) | 8.00  | 397.41   | 301.78   | 0.942 | 284.28   | 0.900 | 255.85   | 0.644 | 255.85   |
| Business Solutions - Prescriptive | Lamp Removal              | CLE0031 | Lamp Removal: Remove 8-foot T12 fluorescent lamp (with T8 ballast retrofit) | 8.00  | 49.32    | 42.32    | 0.942 | 39.87    | 0.900 | 35.88    | 0.728 | 35.88    |
| Business Solutions - Prescriptive | Lighting Controls         | CLE0033 | Central Lighting Control  | 12.00 | 659.82   | 659.82   | 0.942 | 621.55   | 0.900 | 559.39   | 0.848 | 615.33   |
| Business Solutions - Prescriptive | Lighting Controls         | CLE0034 | Switching Controls for Multilevel Lighting                                  | 12.00 | 69.89    | 69.89    | 0.942 | 65.83    | 0.900 | 59.25    | 0.848 | 65.17    |
| Business Solutions - Prescriptive | Lighting Controls         | CLE0035 | Daylight Sensor controls  | 12.00 | 457.48   | 457.48   | 0.942 | 430.95   | 0.900 | 387.85   | 0.848 | 426.64   |
| Business Solutions - Prescriptive | T8 Fluorescent            | CLE0046 | 8-FT T12HO to 2 4-FT T8HP   | 8.00  | 302.11   | 302.11   | 0.942 | 284.59   | 0.900 | 256.13   | 0.848 | 256.13   |
| Business Solutions - Prescriptive | Lighting Controls         | CLE0051 | Parking Garage Multi-Step Dimming Occ Sensor                                | 8.00  | 6.75     | 6.75     | 0.942 | 6.36     | 0.900 | 5.72     | 0.848 | 5.72     |
| Business Solutions - Prescriptive | Lighting Controls         | CLE0052 | Probe Start to Pulse Start Lighting(Lamp and Ballast Retrofit)              | 13.00 | 226.37   | 226.37   | 0.942 | 213.24   | 0.900 | 191.91   | 0.848 | 211.11   |
| Business Solutions - Prescriptive | LED or Induction Fixtures | CLE0053 | LED Replacing A19   | 8.00  | 2,226.10 | 2,226.10 | 1.000 | 2,226.10 | 0.900 | 2,003.49 | 0.900 | 2,003.49 |
| Business Solutions - Prescriptive | LED or Induction Fixtures | CLE0054 | LED MR16 Replacing Halogen MR16   | 8.00  | 34.04    | 34.04    | 1.000 | 34.04    | 0.900 | 30.64    | 0.900 | 30.64    |
| Business Solutions - Prescriptive | LED or Induction          | CLE0055 | LED Par Replacing Halogen Par   | 8.00  | 432.97   | 432.97   | 1.000 | 432.97   | 0.900 | 389.67   | 0.900 | 389.67   |

[illegible]

| Prescriptive                      | y                              |         |  |       |         |          |       |         |       |         |       |          |  |  |  |  |  |  |
|-----------------------------------|--------------------------------|---------|--|-------|---------|----------|-------|---------|-------|---------|-------|----------|--|--|--|--|--|--|
| Business Solutions - Prescriptive | Energy Recover y               | CRE0001 | Laboratory Fume-Hood Ventilation Reduction (EO)                  | 15.00 | 24.30   | 24.30    | 1.000 | 24.30   | 0.900 | 21.87   | 0.900 | 24.05    |  |  |  |  |  |  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSC0030 | Reach-In Refrigerated Case Door; Low Temp - Combination Customer | 12.00 | 37.00   | 37.00    | 1.000 | 37.00   | 0.900 | 33.30   | 0.900 | 36.63    |  |  |  |  |  |  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration      | CSC0031 | Temperature and Optical Sensor on Exhaust - Combo                | 20.00 | 1.98    | 1.98     | 1.000 | 1.98    | 0.900 | 1.78    | 0.900 | 1.96     |  |  |  |  |  |  |
| Business Solutions - Prescriptive | Other                          | CSC0040 | Roof Insulation - Flat Roof (Combo)                              | 20.00 | 21.28   | 21.28    | 1.000 | 21.28   | 0.900 | 19.15   | 0.900 | 21.07    |  |  |  |  |  |  |
| Business Solutions - Prescriptive | Other                          | CSC0106 | Wall Insulation - Combination Customer                           | 20.00 | 1.20    | 1.20     | 0.942 | 1.13    | 0.900 | 1.02    | 0.848 | 1.12     |  |  |  |  |  |  |
| Business Solutions - Prescriptive | Occupancy Sensors and Controls | CSE0001 | Beverage Vending Machine Controller                              | 10.00 | 0.92    | 0.92     | 0.942 | 0.87    | 0.900 | 0.78    | 0.848 | 0.86     |  |  |  |  |  |  |
| Business Solutions - Prescriptive | Occupancy Sensors and Controls | CSE0002 | Guestroom Energy Management Control (electric heat)              | 8.00  | 27.46   | 27.46    | 0.942 | 25.86   | 0.900 | 23.28   | 0.848 | 23.28    |  |  |  |  |  |  |
| Business Solutions - Prescriptive | Ice Machines                   | CSE0003 | Energy Efficient Ice Machines less than 500 lbs                  | 12.00 | 0.20    | 0.20     | 0.942 | 0.19    | 0.900 | 0.17    | 0.848 | 0.19     |  |  |  |  |  |  |
| Business Solutions - Prescriptive | Ice Machines                   | CSE0004 | Energy Efficient Ice Machines 500-1000 lbs                       | 12.00 | 0.82    | 0.82     | 0.942 | 0.77    | 0.900 | 0.69    | 0.848 | 0.76     |  |  |  |  |  |  |
| Business Solutions - Prescriptive | Ice Machines                   | CSE0005 | Energy Efficient Ice Machines 1000-1500 lbs                      | 12.00 | 0.29    | 0.29     | 0.942 | 0.28    | 0.900 | 0.25    | 0.848 | 0.27     |  |  |  |  |  |  |
| Business                          | Kitchen                        | CSE0013 | LED Lighting for   | 16.00 | 1,668.5 | 1,668.50 | 0.942 | 1,571.7 | 0.900 | 1,414.5 | 0.84  | 1,556.01 |  |  |  |  |  |  |



| Solutions - Prescriptive          | and Refrigeration         | Refrigeration Cases |   | 0     |        | 3      |       | 5      | 8     |        |
|-----------------------------------|---------------------------|---------------------|---|-------|--------|--------|-------|--------|-------|--------|
| Business Solutions - Prescriptive | Other                     | CSE0016             | Network Power Management Software                                 | 4.00  | 9.62   | 9.62   | 0.942 | 8.15   | 0.848 | 8.15   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0020             | Case EC Motor   | 15.00 | 144.33 | 144.33 | 0.942 | 122.36 | 0.848 | 134.60 |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0021             | LED Lighting Occupancy Sensor for Refrigeration Cases             | 16.00 | 16.32  | 16.32  | 0.942 | 13.84  | 0.848 | 15.22  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0022             | A/C Reduction From Lighting Reduction (-20F to 0F)                | 12.00 | 4.71   | 4.71   | 0.942 | 3.99   | 0.848 | 4.39   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0023             | A/C Reduction From Lighting Reduction (0F to 20F)                 | 12.00 | 1.98   | 1.98   | 1.000 | 1.78   | 0.900 | 1.96   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0024             | A/C Reduction From Lighting Reduction (20F to 40F)                | 12.00 | 1.91   | 1.91   | 0.942 | 1.62   | 0.848 | 1.78   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0026             | Evaporator Fan Control (EC motor)                                 | 5.00  | 1.13   | 1.13   | 0.942 | 0.96   | 0.848 | 0.96   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0027             | Reach-In Refrigerated Case Door; Medium Temp - Electric Customers | 12.00 | 9.48   | 9.48   | 0.942 | 8.04   | 0.848 | 8.84   |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSE0028             | Electric Dishwasher (High Temp; Under Counter)                    | 12.00 | 0.79   | 0.79   | 1.000 | 0.71   | 0.900 | 0.78   |
| Business Solutions -              | Other                     | CSE0042             | UPS - Single Normal Mode -  | 10.00 | 20.54  | 23.04  | 1.000 | 20.74  | 1.009 | 22.81  |

| Prescriptive                             | Kitchen and Refrigeration                   | CSE0078 | VI (P > 10 kW)  | 12.00 | 1.80   | 1.80   | 1.80   | 1.000 | 1.80   | 0.900 | 1.62   | 0.900 | 1.78   |
|--|---|---------|---|-------|--------|--------|--------|-------|--------|-------|--------|-------|--------|
| Business Solutions - Prescriptive        | Electric Dishwasher (High Temp; Multi Tank) |         |   |       |        |        |        |       |        |       |        |       |        |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration                   | CSE0079 | Electric Dishwasher (Low Temp; Single Tank)               | 12.00 | 0.70   | 0.70   | 0.70   | 1.000 | 0.70   | 0.900 | 0.63   | 0.900 | 0.69   |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration                   | CSE0080 | Electric Dishwasher (High Temp; Single Tank)              | 12.00 | 1.65   | 1.65   | 1.65   | 1.000 | 1.65   | 0.900 | 1.48   | 0.900 | 1.63   |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration                   | CSE0082 | Electric Dishwasher (Low Temp; Door)                      | 12.00 | 0.83   | 0.83   | 0.83   | 1.000 | 0.83   | 0.900 | 0.74   | 0.900 | 0.82   |
| Business Solutions - Prescriptive        | Kitchen and Refrigeration                   | CSE0089 | Walk-in EC Motor replacing non-EC Motor                   | 15.00 | 144.33 | 144.33 | 144.33 | 1.000 | 144.33 | 0.900 | 129.90 | 0.900 | 142.89 |
| Business Solutions - Prescriptive        | C&I Waterheating                            | CWE0010 | Pipe Wrap - Domestic Hot Water - conditioned space (120F) | 20.00 | 1.19   | 1.19   | 1.19   | 1.000 | 1.19   | 0.900 | 1.07   | 0.900 | 1.18   |
| Business Solutions - Prescriptive        | C&I Waterheating                            | CWG0012 | Pipe Wrap - Domestic Hot Water - conditioned space (140F) | 20.00 | 0.12   | 0.12   | 0.12   | 0.942 | 0.12   | 0.900 | 0.10   | 0.848 | 0.11   |
| New Construction - Major Renovation 2013 | Compressed Air                              | CAE0001 | VSD Air Compressor  | 15.00 | 18.70  | 18.70  | 18.70  | 0.942 | 17.62  | 0.900 | 15.85  | 0.848 | 17.44  |
| New Construction - Major Renovation 2013 | Compressed Air                              | CAE0002 | Refrigerated Cycling Thermal Mass Air Dryer               | 10.00 | 1.28   | 1.28   | 1.28   | 0.942 | 1.21   | 0.900 | 1.09   | 0.848 | 1.19   |
| New Construction                         | Compressed Air                              | CAE0009 | Compressed Air Pressure Flow                              | 10.00 | 0.62   | 0.62   | 0.62   | 1.000 | 0.62   | 0.900 | 0.56   | 0.900 | 0.61   |

| - Major Renovation 2013                  |                      | Controller |  |       |       |       |       |       |       |       |       |       |  |  |  |  |  |  |  |  |
|--|----------------------|------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|--|--|--|--|--|--|--|
| New Construction - Major Renovation 2013 | Furnaces and Heaters | CHC0010    | Infrared Heaters - Combination Customers                           | 15.00 | 28.11 | 28.11 | 0.942 | 26.48 | 0.900 | 23.83 | 0.848 | 26.21 |  |  |  |  |  |  |  |  |
| New Construction - Major Renovation 2013 | DCV and Economizers  | CHC0027    | Demand Control Ventilation - Combination Customers                 | 15.00 | 2.28  | 2.28  | 0.942 | 2.15  | 0.900 | 1.93  | 0.848 | 2.13  |  |  |  |  |  |  |  |  |
| New Construction - Major Renovation 2013 | Unitary/ Split HVAC  | CHE0001    | AC < 65,000 Btuh (5.4 tons)  | 15.00 | 6.04  | 6.04  | 0.942 | 5.69  | 0.900 | 5.12  | 0.848 | 5.64  |  |  |  |  |  |  |  |  |
| New Construction - Major Renovation 2013 | Chiller              | CHE0012    | Air-cooled Chiller - 1.04 kW/ton IPLV                              | 20.00 | 98.63 | 98.60 | 0.942 | 92.88 | 0.900 | 83.59 | 0.848 | 91.95 |  |  |  |  |  |  |  |  |
| New Construction - Major Renovation 2013 | DCV and Economizers  | CHE0027    | Demand Control Ventilation - Electric Customers                    | 15.00 | 2.52  | 2.52  | 0.942 | 2.37  | 0.900 | 2.13  | 0.848 | 2.35  |  |  |  |  |  |  |  |  |
| New Construction - Major Renovation 2013 | Unitary/ Split HVAC  | CHE0028    | AC Units > 65,000 Btuh (5.4 tons) and < =120,000 Btuh (10 tons)    | 15.00 | 6.36  | 6.36  | 0.942 | 5.99  | 0.900 | 5.39  | 0.848 | 5.93  |  |  |  |  |  |  |  |  |
| New Construction - Major Renovation 2013 | Unitary/ Split HVAC  | CHE0029    | AC Units > 120,000 Btuh (10 tons) and < = 240,000 Btuh (20 tons)   | 15.00 | 13.52 | 13.52 | 0.942 | 12.73 | 0.900 | 11.46 | 0.848 | 12.61 |  |  |  |  |  |  |  |  |
| New Construction - Major Renovation 2013 | Heat Pump            | CHE0031    | Heat Pumps > 65,000 Btuh (5.4 tons) and < = 120,000 Btuh (10 tons) | 15.00 | 3.33  | 3.33  | 0.942 | 3.14  | 0.900 | 2.82  | 0.848 | 3.11  |  |  |  |  |  |  |  |  |
| New                                      | Heat                 | CHE0032    | Heat Pumps >   | 15.00 | 5.24  | 5.24  | 0.942 | 4.93  | 0.900 | 4.44  | 0.84  | 4.88  |  |  |  |  |  |  |  |  |

|  |                           |  |       |        |        |        |       |        |       |        |       |        |
|--|---------------------------|--|-------|--------|--------|--------|-------|--------|-------|--------|-------|--------|
| Construction - Major Renovation 2013     | Pump                      | 120,000 Btuh (10 tons) and <= 240,000 Btuh (20 tons)                     |       |        |        |        |       |        |       |        | 8     |        |
| New Construction - Major Renovation 2013 | Chiller                   | Water Cooled Chillers-Centrifugal >300 tons and <= 600 tons, IPLV = 0.49 | 20.00 | 51.44  | 51.44  | 51.44  | 0.942 | 48.45  | 0.900 | 43.61  | 0.848 | 47.97  |
| New Construction - Major Renovation 2013 | Lighting Controls         | Daylight Sensor controls   | 12.00 | 20.33  | 20.33  | 20.33  | 0.942 | 19.15  | 0.900 | 17.24  | 0.848 | 18.96  |
| New Construction - Major Renovation 2013 | Variable Frequency Drives | VFD/HVAC Fans and Pumps < 100HP - Electric Customers                     | 10.00 | 10.22  | 10.22  | 10.22  | 0.942 | 9.63   | 0.900 | 8.67   | 0.848 | 9.53   |
| New Construction - Major Renovation 2013 | Ice Machines              | Energy Efficient Ice Machines 1000-1500 lbs                              | 12.00 | 0.44   | 0.44   | 0.44   | 0.942 | 0.41   | 0.900 | 0.37   | 0.848 | 0.41   |
| New Construction - Major Renovation 2013 | Kitchen and Refrigeration | LED Lighting for Refrigeration Cases                                     | 16.00 | 32.06  | 32.06  | 32.06  | 0.942 | 30.20  | 0.900 | 27.18  | 0.848 | 29.90  |
| New Construction - Major Renovation 2013 | Other                     | Lighting Power Density   | 12.00 | 987.17 | 987.17 | 987.17 | 0.942 | 929.91 | 0.900 | 836.92 | 0.848 | 920.62 |
| New Construction - Major Renovation 2013 | Other                     | UPS - Single Normal Mode - VI (P > 10 kW)                                | 10.00 | 0.74   | 0.74   | 0.83   | 1.000 | 0.83   | 0.900 | 0.75   | 1.009 | 0.83   |
| New Construction - Major Renovation      | Other                     | Lighting Power Density (Exterior)  | 12.00 | 191.76 | 191.76 | 191.76 | 1.000 | 191.76 | 0.900 | 172.58 | 0.900 | 189.84 |

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Table B-3: Business Solutions Program - Validated Natural Gas (Mcf) Savings by Measure

| Program                           | Measure Category          | Measure Code | Measure Description                      | Measure Life | Reported MCF Savings | Adjusted Reported Gross MCF Savings | Verified Gross MCF Savings Adjustment Factor | Verified Gross MCF Savings | Verified MCF Savings | MCF NTG Adjustment Factor | Verified Net MCF Savings | MCF Realization Rate | Verified Net MCF Savings Incl Bonus |
|-----------------------------------|---------------------------|--------------|--|--------------|----------------------|-------------------------------------|--|----------------------------|----------------------|---------------------------|--------------------------|----------------------|-------------------------------------|
| BOC                               | Other                     | CSC0042      | BOC (Combo Customer)                     | 5.00         | 1,672.23             | 1,672.22                            | 1.000  | 1,672.22                   | 1,672.22             | 0.90                      | 1,505.00                 | 0.900                | 1,505.00                            |
| BOC                               | Other                     | CSG0027      | BOC (Gas Customer)                       | 5.00         | 1,216.17             | 1,216.16                            | 1.000  | 1,216.16                   | 1,216.16             | 0.90                      | 1,094.55                 | 0.900                | 1,094.55                            |
| Business Solutions - Custom       | Custom                    | CBG0001      | Custom Gas Program                       | Varies       | 68,781.24            | 68,781.24                           | 1.106  | 76,072.05                  | 76,072.05            | 0.90                      | 68,464.84                | 0.995                | 75,311.33                           |
| Business Solutions - Custom       | Custom                    | CBG0300      | Smart Buildings - Gas                    | Varies       | 1,516.00             | 1,516.00                            | 1.000  | 1,516.00                   | 1,516.00             | 0.90                      | 1,364.40                 | 0.900                | 1,364.40                            |
| Business Solutions - Prescriptive | Compressed Air            | CAG0006      | Air Compressor Waste Heat Recovery       | 15.00        | 1,745.39             | 1,745.39                            | 0.881  | 1,537.69                   | 1,537.69             | 0.90                      | 1,383.92                 | 0.793                | 1,522.32                            |
| Business Solutions - Prescriptive | BLDG Envelope             | CBC0001      | Window Reduction                         | 20.00        | 20.89                | 20.89                               | 0.881  | 18.40                      | 18.40                | 0.90                      | 16.56                    | 0.793                | 18.22                               |
| Business Solutions - Prescriptive | BLDG Envelope             | CBC0002      | Window Reduction (Gas)                   | 20.00        | 55.93                | 55.93                               | 0.922  | 51.57                      | 51.57                | 0.90                      | 46.41                    | 0.830                | 51.06                               |
| Business Solutions - Prescriptive | Energy Management Systems | CEB0001      | EMS - Combination Customers              | 15.00        | 56,589.64            | 56,589.64                           | 0.881  | 49,855.47                  | 49,855.47            | 0.90                      | 44,869.92                | 0.793                | 49,356.91                           |
| Business Solutions - Prescriptive | Energy Management Systems | CEG0001      | EMS (Gas Heating)- Gas Customers         | 15.00        | 98,323.15            | 98,323.15                           | 0.881  | 86,622.70                  | 86,622.70            | 0.90                      | 77,960.43                | 0.793                | 85,756.47                           |
| Business Solutions - Prescriptive | Furnaces and Heaters      | CHC0010      | Infrared Heaters - Combination Customers | 15.00        | 5,381.56             | 5,381.56                            | 0.881  | 4,741.15                   | 4,741.15             | 0.90                      | 4,267.04                 | 0.793                | 4,693.74                            |
| Business Solutions -              | HVAC Controls             | CHC0011      | Programmable                             | 9.00         | 3,947.94             | 3,947.94                            | 0.881  | 3,478.14                   | 3,478.14             | 0.90                      | 3,130.32                 | 0.793                | 3,130.32                            |

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| Solutions - Prescriptive          | Boiler Controls             | Modulating Burner Control 10 to 1 or 5 to 1 turn-down (retrofit) | 15.00  | 19,229.39 | 0         | 0.881 | 16,941.09 | 0    | 4         |       |
|-----------------------------------|-----------------------------|--|--|-----------|-----------|-------|-----------|------|-----------|-------|
| Business Solutions - Prescriptive | Furnaces and Heaters        | CHG0010  | Infrared Heaters - Gas Customer Only               | 19,229.39 | 19,229.39 | 0.881 | 16,941.09 | 0.90 | 15,246.98 | 0.793 |
| Business Solutions - Prescriptive | HVAC Controls               | CHG0011  | Programmable Thermostat -- Gas Customers           | 5,543.53  | 5,543.53  | 0.881 | 4,883.85  | 0.90 | 4,395.46  | 0.793 |
| Business Solutions - Prescriptive | HVAC Controls               | CHG0012  | Guestroom Energy Management Control - Gas Customer | 1,328.14  | 1,328.14  | 0.881 | 1,170.09  | 0.90 | 1,053.08  | 0.793 |
| Business Solutions - Prescriptive | DCV and Economizers         | CHG0013  | Demand Control Ventilation                         | 48,039.66 | 48,039.66 | 0.881 | 42,322.94 | 0.90 | 38,090.65 | 0.793 |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0014  | High Efficiency Boiler with AFUE >= 86% and < 90%  | 2,848.33  | 2,848.33  | 0.881 | 2,509.38  | 0.90 | 2,258.44  | 0.793 |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0016  | High Efficiency Boiler with AFUE >= 90%            | 17,421.25 | 17,421.25 | 0.881 | 15,348.12 | 0.90 | 13,813.31 | 0.793 |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0017  | Boiler Oxygen Trim Control                         | 1,304.03  | 1,304.03  | 0.881 | 1,148.85  | 0.90 | 1,033.97  | 0.793 |
| Business Solutions - Prescriptive | Furnaces and Heaters        | CHG0019  | Gas Furnace or RTU Tune-up (>=40 and               | 1,023.42  | 1,023.42  | 0.881 | 901.64    | 0.90 | 811.47    | 0.793 |
|                                   |                             |  |  |           |           |       |           |      |           |       |



|                                   |                             |         |   |       |           |           |       |           |       |           |       |           |
|-----------------------------------|-----------------------------|---------|---|-------|-----------|-----------|-------|-----------|-------|-----------|-------|-----------|
| Business Solutions - Prescriptive | Furnaces and Heaters        | CHG0021 | Gas Furnace or RTU Tune-up (>=300 MBH)                | 10.00 | 333.76    | 333.76    | 0.881 | 294.04    | 0.900 | 264.64    | 0.793 | 291.10    |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0023 | Boiler Tune-up Level 1 (>=110 and 500 kbtu/h)         | 2.00  | 911.44    | 911.44    | 0.881 | 802.98    | 0.900 | 722.68    | 0.793 | 722.68    |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0024 | Boiler Tune-up Level 2 (>=500 and 500 kbtu/h)         | 2.00  | 2,314.94  | 2,314.94  | 0.881 | 2,039.47  | 0.900 | 1,835.52  | 0.793 | 1,835.52  |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0025 | Boiler Tune-up Level 3 (>=1200 kbtu/h)                | 2.00  | 49,862.45 | 49,862.45 | 0.881 | 43,928.82 | 0.900 | 39,535.94 | 0.793 | 39,535.94 |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0026 | High Efficiency Process Boiler Replacement (Water)    | 20.00 | 2,595.42  | 2,595.42  | 0.881 | 2,286.57  | 0.900 | 2,057.91  | 0.793 | 2,263.70  |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0028 | Process Boilers Tune-up >= 1200 kbtu/h                | 2.00  | 4,056.59  | 4,056.59  | 0.881 | 3,573.86  | 0.900 | 3,216.47  | 0.793 | 3,216.47  |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0029 | Process Boiler Tune-up Level 5 (>=500 and 500 kbtu/h) | 2.00  | 433.87    | 433.87    | 0.881 | 382.24    | 0.900 | 344.01    | 0.793 | 344.01    |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0030 | Process Boiler Tune-up Level 4 (>=300 and 500 kbtu/h) | 2.00  | 30.89     | 30.89     | 0.881 | 27.21     | 0.900 | 24.49     | 0.793 | 24.49     |
| Business Solutions - Prescriptive | Heating                     | CHG0050 | Destratification Fans                                 | 15.00 | 56.55     | 56.55     | 0.881 | 49.82     | 0.900 | 44.84     | 0.793 | 49.32     |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0053 | Optimized Boiler Plant Sequencing                     | 15.00 | 5,990.37  | 5,990.37  | 1.000 | 5,990.37  | 0.900 | 5,391.33  | 0.900 | 5,930.46  |
| Business Solutions - Prescriptive | Boilers and Boiler Controls | CHG0054 | Process Steam Pipe Condensate                         | 20.00 | 24.48     | 24.48     | 1.000 | 24.48     | 0.900 | 22.03     | 0.900 | 24.23     |

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| Solutions - Prescriptive          | Recovery                  |         | Heating Ventilation Reduction                                    | 2     | 62        | 92        | 0    | 73        |       |           |
|-----------------------------------|---------------------------|---------|--|-------|-----------|-----------|------|-----------|-------|-----------|
| Business Solutions - Prescriptive | Energy Recovery           | CRC0010 | Boiler Stack Economizer (80F) - Process                          | 15.00 | 2,099.83  | 2,099.83  | 0.90 | 1,889.85  | 0.900 | 2,078.83  |
| Business Solutions - Prescriptive | Energy Recovery           | CRG0004 | Boiler Stack Economizer (120F)                                   | 15.00 | 288.94    | 288.94    | 0.90 | 239.76    | 0.830 | 263.74    |
| Business Solutions - Prescriptive | Energy Recovery           | CRG0008 | Process Heating Ventilation Reduction (GO)                       | 15.00 | 12,388.57 | 12,388.57 | 0.90 | 11,149.71 | 0.900 | 12,264.68 |
| Business Solutions - Prescriptive | Energy Recovery           | CRG0009 | Laboratory Fume-Hood Ventilation Reduction (GO)                  | 15.00 | 3,583.11  | 3,583.11  | 0.90 | 3,224.80  | 0.900 | 3,547.28  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSC0030 | Reach-In Refrigerated Case Door; Low Temp - Combination Customer | 12.00 | 872.49    | 872.49    | 0.90 | 723.99    | 0.830 | 796.39    |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSC0031 | Temperature and Optical Sensor on Exhaust - Combo                | 20.00 | 809.75    | 809.75    | 0.90 | 728.78    | 0.900 | 801.65    |
| Business Solutions - Prescriptive | Other                     | CSC0039 | Roof Insulation - Attic Roof (Combo)                             | 20.00 | 278.93    | 278.93    | 0.90 | 231.46    | 0.830 | 254.60    |
| Business Solutions - Prescriptive | Other                     | CSC0040 | Roof Insulation - Flat Roof (Combo)                              | 20.00 | 1,404.35  | 1,404.35  | 0.90 | 1,165.33  | 0.830 | 1,281.86  |
| Business Solutions - Prescriptive | Other                     | CSC0106 | Wall Insulation - Combination Customer                           | 20.00 | 1,705.55  | 1,705.55  | 0.90 | 1,352.33  | 0.793 | 1,487.56  |

|                                   |                           |         |   |       |           |           |           |       |           |       |           |       |           |
|-----------------------------------|---------------------------|---------|---|-------|-----------|-----------|-----------|-------|-----------|-------|-----------|-------|-----------|
| Business Solutions - Prescriptive | Other                     | CSG0001 | Ozone Generation System                         | 10.00 | 9,299.07  | 9,299.07  | 9,299.07  | 0.881 | 8,192.48  | 0.900 | 7,373.23  | 0.793 | 8,110.56  |
| Business Solutions - Prescriptive | Other                     | CSG0002 | Truck Loading Dock Seals                        | 10.00 | 859.64    | 859.63    | 859.63    | 0.881 | 757.34    | 0.900 | 681.60    | 0.793 | 749.76    |
| Business Solutions - Prescriptive | Other                     | CSG0003 | Truck Loading Dock Leveler Ramp Seals           | 10.00 | 636.66    | 636.66    | 636.66    | 0.881 | 560.90    | 0.900 | 504.81    | 0.793 | 555.29    |
| Business Solutions - Prescriptive | Other                     | CSG0004 | Greenhouse Heat Curtains                        | 5.00  | 6,784.25  | 6,784.25  | 6,784.25  | 0.881 | 5,976.93  | 0.900 | 5,379.24  | 0.793 | 5,379.24  |
| Business Solutions - Prescriptive | Other                     | CSG0005 | Greenhouse Infrared Film                        | 5.00  | 54,344.98 | 54,344.98 | 54,344.98 | 0.881 | 47,877.92 | 0.900 | 43,090.13 | 0.793 | 43,090.13 |
| Business Solutions - Prescriptive | Other                     | CSG0006 | Wall Insulation - Gas Customer                  | 20.00 | 1,869.47  | 1,869.47  | 1,869.47  | 0.881 | 1,647.00  | 0.900 | 1,482.30  | 0.793 | 1,630.53  |
| Business Solutions - Prescriptive | Other                     | CSG0007 | Roof Insulation - Flat Roof                     | 20.00 | 4,213.32  | 4,213.32  | 4,213.32  | 0.881 | 3,711.94  | 0.900 | 3,340.75  | 0.793 | 3,674.82  |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSG0009 | Commercial Conveyor Oven (>25" Width)           | 12.00 | 85.92     | 85.92     | 85.92     | 0.922 | 79.22     | 0.900 | 71.30     | 0.830 | 78.43     |
| Business Solutions - Prescriptive | Other                     | CSG0012 | Roof Insulation - Attic Roof                    | 20.00 | 125.52    | 125.52    | 125.52    | 0.881 | 110.59    | 0.900 | 99.53     | 0.793 | 109.48    |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSG0013 | Temperature and Optical Sensor on Exhaust - Gas | 20.00 | 205.00    | 205.00    | 205.00    | 1.000 | 205.00    | 0.900 | 184.50    | 0.900 | 202.95    |
| Business Solutions - Prescriptive | Kitchen and Refrigeration | CSG0020 | EnergyStar Steam Cookers - 6 Pan; Gas           | 12.00 | 202.56    | 202.56    | 202.56    | 1.000 | 202.56    | 0.900 | 182.31    | 0.900 | 200.54    |
| Business                          | Kitchen and               | CSG0024 | Fixed-Plate                                     | 15.00 | 53.51     | 53.42     | 53.42     | 1.000 | 53.42     | 0.90  | 48.07     | 0.898 | 52.88     |

| Solutions - Prescriptive          | Refrigeration    | Energy Recovery Unit (GO) | 15.00   | 15,343.45 | 15,343.45 | 1.000 | 15,343.45 | 0.900 | 13,809.10 | 0.900 | 15,190.01 |
|-----------------------------------|------------------|---------------------------|---|-----------|-----------|-------|-----------|-------|-----------|-------|-----------|
| Business Solutions - Prescriptive | Energy Recovery  | CSG0025                   | Enthalpy Wheel Energy Recovery Unit (GO)                  | 15.00     | 15,343.45 | 1.000 | 15,343.45 | 0.900 | 13,809.10 | 0.900 | 15,190.01 |
| Business Solutions - Prescriptive | C&I Waterheating | CWE0010                   | Pipe Wrap - Domestic Hot Water - conditioned space (120F) | 20.00     | 60.11     | 1.000 | 60.11     | 0.900 | 54.10     | 0.900 | 59.51     |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0001                   | Pipe Wrap - Hydronic Space Heating                        | 20.00     | 620.52    | 0.881 | 546.68    | 0.900 | 492.01    | 0.793 | 541.22    |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0002                   | Gas Water Heater > 80 gal                                 | 15.00     | 292.38    | 0.881 | 257.58    | 0.900 | 231.82    | 0.793 | 255.01    |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0003                   | Gas Water Heater <= 80 gal                                | 15.00     | 9.04      | 0.881 | 7.96      | 0.900 | 7.17      | 0.793 | 7.88      |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0004                   | Gas tankless water heater                                 | 15.00     | 619.36    | 0.881 | 545.65    | 0.900 | 491.09    | 0.793 | 540.20    |
| Business Solutions - Prescriptive | Swimming Pool    | CWG0007                   | High Efficiency Pool Heater .84+ EF                       | 15.00     | 1,245.06  | 0.881 | 1,096.90  | 0.900 | 987.21    | 0.793 | 1,085.93  |
| Business Solutions - Prescriptive | Swimming Pool    | CWG0008                   | Pool Covers   | 10.00     | 742.48    | 0.881 | 654.13    | 0.900 | 588.71    | 0.793 | 647.59    |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0009                   | Pre Rinse Sprayers - < 1.6 gpm Gas HW                     | 5.00      | 5.83      | 0.881 | 5.14      | 0.900 | 4.62      | 0.793 | 4.62      |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0012                   | Pipe Wrap - Domestic Hot Water - conditioned space        | 20.00     | 6.26      | 0.881 | 5.51      | 0.900 | 4.96      | 0.793 | 5.46      |

|                                   |                  |         |        |   |       |          |          |       |          |       |          |       |          |
|-----------------------------------|------------------|---------|--------|---|-------|----------|----------|-------|----------|-------|----------|-------|----------|
| Business Solutions - Prescriptive | C&I Waterheating | CWG0013 | (140F) | Pipe Wrap - Steam Space Heating                             | 20.00 | 2,335.72 | 2,335.72 | 0.881 | 2,057.77 | 0.900 | 1,851.99 | 0.793 | 2,037.19 |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0014 |        | High Eff Domestic Water Heater (84% to 89%)                 | 15.00 | 697.64   | 697.64   | 0.881 | 614.62   | 0.900 | 553.16   | 0.793 | 608.47   |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0015 |        | High Eff Domestic Water Heater (90%)                        | 15.00 | 2,773.02 | 2,771.87 | 0.881 | 2,442.02 | 0.900 | 2,197.82 | 0.793 | 2,417.60 |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0016 |        | Domestic Water Heater Tune-Up (199 - 499 MBH)               | 2.00  | 569.49   | 569.49   | 0.881 | 501.72   | 0.900 | 451.55   | 0.793 | 451.55   |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0017 |        | Domestic Water Heater Tune-Up (500 - 1,199 MBH)             | 2.00  | 1,732.10 | 1,732.10 | 0.881 | 1,525.98 | 0.900 | 1,373.39 | 0.793 | 1,373.39 |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0019 |        | Domestic Water Heater Tune-Up (>= 1200 MBH)                 | 2.00  | 1,926.09 | 1,926.09 | 0.881 | 1,696.89 | 0.900 | 1,527.20 | 0.793 | 1,527.20 |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0023 |        | Pipe Wrap - Domestic Hot Water - unconditioned space (120F) | 20.00 | 20.95    | 20.95    | 1.000 | 20.95    | 0.900 | 18.85    | 0.900 | 20.74    |
| Business Solutions - Prescriptive | C&I Waterheating | CWG0024 |        | Gas Water Heater <= 80 gal                                  | 15.00 | 14.58    | 14.58    | 0.922 | 13.44    | 0.900 | 12.10    | 0.830 | 13.31    |
| Business Solutions -              | C&I Waterheating | CWG0025 |        | Natural Gas Domestic  | 20.00 | 22.16    | 22.16    | 0.922 | 20.43    | 0.900 | 18.39    | 0.830 | 20.23    |

| Prescriptive   |                                   |         | Hot Water -<br>Conditioned<br>Space<br>(120F) (GO)                  |       |           |               |       |               |           |               |       |  |  |  |  |           |  |
|--|-----------------------------------|---------|---|-------|-----------|---------------|-------|---------------|-----------|---------------|-------|--|--|--|--|-----------|--|
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Furnaces and<br>Heaters           | CHC0010 | Infrared<br>Heaters -<br>Combination<br>Customers                   | 15.00 | 2,334.07  | 2,334.0<br>7  | 0.881 | 2,056.3<br>1  | 0.90<br>0 | 1,850.6<br>8  | 0.793 |  |  |  |  | 2,035.75  |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | DCV and<br>Economizers            | CHC0027 | Demand<br>Control<br>Ventilation -<br>Combination<br>Customers      | 15.00 | 636.06    | 636.06        | 0.881 | 560.37        | 0.90<br>0 | 504.34        | 0.793 |  |  |  |  | 554.77    |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Furnaces and<br>Heaters           | CHG0010 | Infrared<br>Heaters -<br>Gas<br>Customer<br>Only                    | 15.00 | 1,511.21  | 1,511.2<br>1  | 0.881 | 1,331.3<br>8  | 0.90<br>0 | 1,198.2<br>4  | 0.793 |  |  |  |  | 1,318.07  |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Boilers and<br>Boiler<br>Controls | CHG0016 | High<br>Efficiency<br>Boiler with<br>AFUE >= 90%                    | 20.00 | 2,902.69  | 2,902.6<br>9  | 0.881 | 2,557.2<br>7  | 0.90<br>0 | 2,301.5<br>4  | 0.793 |  |  |  |  | 2,531.69  |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Boilers and<br>Boiler<br>Controls | CHG0026 | High<br>Efficiency<br>Process<br>Boiler<br>Replacement<br>(Water)   | 20.00 | 14,381.70 | 14,381.<br>70 | 0.881 | 12,670.<br>28 | 0.90<br>0 | 11,403.<br>25 | 0.793 |  |  |  |  | 12,543.58 |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Furnaces and<br>Heaters           | CHG0058 | High<br>Efficiency<br>Furnace or<br>Unit Heater<br>(92-94%<br>AFUE) | 15.00 | 209.65    | 209.65        | 0.922 | 193.30        | 0.90<br>0 | 173.97        | 0.830 |  |  |  |  | 191.36    |  |
| New<br>Construction<br>- Major<br>Renovation<br>2013 | Furnaces and<br>Heaters           | CHG0061 | High<br>Efficiency<br>Furnace or<br>Unit Heater<br>(>94%<br>AFUE)   | 15.00 | 102.14    | 101.68        | 0.922 | 93.75         | 0.90<br>0 | 84.37         | 0.821 |  |  |  |  | 92.81     |  |
| New<br>Construction                                  | Other                             | CSG0003 | Truck<br>Loading  | 10.00 | 1,502.52  | 1,502.5<br>1  | 0.881 | 1,323.7<br>1  | 0.90<br>0 | 1,191.3<br>4  | 0.793 |  |  |  |  | 1,310.48  |  |



| - Major Renovation 2013                  |                  |         | Dock Leveler Ramp Seals              |       |                   |                   |       |                   |       |                   |       |                   |  |  |  |  |  |
|--|------------------|---------|--------------------------------------|-------|-------------------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|--|--|--|--|--|
| New Construction - Major Renovation 2013 | C&I Waterheating | CWG0002 | Gas Water Heater > 80 gal            | 15.00 | 54.82             | 54.82             | 0.881 | 48.30             | 0.900 | 43.47             | 0.793 | 47.81             |  |  |  |  |  |
| New Construction - Major Renovation 2013 | C&I Waterheating | CWG0003 | Gas Water Heater <= 80 gal           | 15.00 | 3.01              | 3.01              | 0.881 | 2.65              | 0.900 | 2.39              | 0.793 | 2.63              |  |  |  |  |  |
| New Construction - Major Renovation 2013 | C&I Waterheating | CWG0015 | High Eff Domestic Water Heater (90%) | 15.00 | 767.33            | 767.02            | 0.881 | 675.74            | 0.900 | 608.17            | 0.793 | 668.98            |  |  |  |  |  |
| New Construction - Whole Building        | NEW CONSTRUCTION | CNE0001 | Design Incentive - Building Owner    | 0.00  | 9,856.76          | 9,856.76          | 0.881 | 8,683.80          | 0.900 | 7,815.42          | 0.793 | 7,815.42          |  |  |  |  |  |
| <b>TOTAL</b>                             |                  |         |                                      |       | <b>843,204.32</b> | <b>842,966.34</b> |       | <b>780,574.30</b> |       | <b>702,517.30</b> |       | <b>750,276.14</b> |  |  |  |  |  |

Table B-4: Small Business Solutions Program - Validated Electric Energy (kWh) Savings by Measure

| Program         | Measure Category            | Measure Code | Measure Description             | Measure Life | Reported kWh Savings | Adjusted Reported Gross kWh Savings | Verified Gross kWh Savings Adjustment Factor | Verified Gross kWh Savings | kWh NTG Adjustment Factor | Verified Net kWh Savings | kWh Realization Rate | Verified Net kWh Savings Incl Bonus |
|-----------------|-----------------------------|--------------|---------------------------------|--------------|----------------------|-------------------------------------|--|----------------------------|---------------------------|--------------------------|----------------------|-------------------------------------|
| CFL - Buydown   | Direct Install Non-lighting | CDE 0198     | CFL bulbs regular (buydown)     | 2.00         | 23,280,504.00        | 23,280,504.00                       | 0.955  | 22,232,881.32              | 0.900                     | 20,009,593.19            | 0.859                | 20,009,593.19                       |
| CFL - Buydown   | Direct Install Non-lighting | CDE 0199     | CFL bulbs specialty (buydown)   | 2.00         | 714,792.00           | 714,792.00                          | 0.955  | 682,626.36                 | 0.900                     | 614,363.72               | 0.859                | 614,363.72                          |
| CFL - Drop Ship | Direct Install Non-lighting | CDE 0068     | CFL Box - Door Delivery         | 2.00         | 22,685,520.00        | 22,685,520.00                       | 1.000  | 22,685,520.00              | 0.900                     | 20,416,968.00            | 0.900                | 20,416,968.00                       |
| CFL - Drop Ship | Direct Install Non-lighting | CDE 0069     | CFL Box - Door Delivery (TC)    | 2.00         | 2,609,100.00         | 2,609,100.00                        | 1.000  | 2,609,100.00               | 0.900                     | 2,348,190.00             | 0.900                | 2,348,190.00                        |
| Core DI         | Direct Install Lighting     | CDE 0050     | Lighting Controls               | 12.00        | 105,381.49           | 105,381.49                          | 0.999  | 105,276.11                 | 0.900                     | 94,748.50                | 0.899                | 104,223.35                          |
| Core DI         | Direct Install Lighting     | CDE 0051     | CFL Bulb - Screw-in             | 9.00         | 123,742.98           | 123,742.98                          | 0.995  | 123,124.26                 | 0.900                     | 110,811.83               | 0.896                | 110,811.83                          |
| Core DI         | Direct Install Lighting     | CDE 0052     | Hardwired CFL                   | 12.00        | 38,708.80            | 38,708.80                           | 0.999  | 38,670.09                  | 0.900                     | 34,803.08                | 0.899                | 38,283.39                           |
| Core DI         | Direct Install Lighting     | CDE 0053     | Specialty CFL                   | 2.00         | 58,529.90            | 58,529.90                           | 0.999  | 58,471.37                  | 0.900                     | 52,624.23                | 0.899                | 52,624.23                           |
| Core DI         | Direct Install Lighting     | CDE 0054     | T8s and U-Tube T8 Lamps         | 12.00        | 8,997.412.20         | 8,997,412.20                        | 0.999  | 8,988,414.78               | 0.900                     | 8,089,573.31             | 0.899                | 8,898,530.64                        |
| Core DI         | Direct Install Lighting     | CDE 0055     | T5 Lamps                        | 12.00        | 46,489.94            | 46,489.94                           | 0.999  | 46,443.45                  | 0.900                     | 41,799.10                | 0.899                | 45,979.01                           |
| Core DI         | Direct Install Lighting     | CDE 0057     | LEDs, LED Exit Signs, Induction | 15.00        | 5,844,959.91         | 5,844,959.91                        | 0.999  | 5,839,114.95               | 0.900                     | 5,255,203.46             | 0.899                | 5,780,723.80                        |
| Core DI         | Direct Install Non-lighting | CDE 0059     | Anti-sweat Heater Control       | 15.00        | 6,453,326.00         | 6,453,326.00                        | 0.999  | 6,446,872.67               | 0.900                     | 5,802,185.41             | 0.899                | 6,382,403.95                        |
| Core DI         | Direct Install Non-lighting | CDE 0064     | Small Business Custom Electric  | 0.00         | 39,602.26            | 39,602.26                           | 0.999  | 39,562.66                  | 0.900                     | 35,606.39                | 0.899                | 35,606.39                           |
| Core DI         | Direct Install Non-lighting | CDE 0080     | ECM Case Motor                  | 15.00        | 36,256.00            | 36,256.00                           | 0.999  | 36,219.74                  | 0.900                     | 32,597.77                | 0.899                | 35,857.55                           |
| Core DI         | Direct Install Non-lighting | CDE 0081     | ECM Walk-in Cooler and          | 15.00        | 412,230.00           | 412,230.00                          | 0.999  | 411,817.77                 | 0.900                     | 370,635.99               | 0.899                | 407,699.59                          |

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|                             |                                  |             | Incandescent<br>Lights                                     |       |                   |                   |       |                   |       |                   |       |  |  |  |  |                   |  |
|-----------------------------|----------------------------------|-------------|--|-------|-------------------|-------------------|-------|-------------------|-------|-------------------|-------|--|--|--|--|-------------------|--|
| Hospitality                 | Direct Install<br>-- Hospitality | CDE<br>0104 | 14 W CFL<br>Replacing 60 W<br>Globe Inc<br>(Halo)          | 2.00  | 13,332.<br>00     | 13,332.00         | 1.000 | 13,332.<br>00     | 0.900 | 11,998.<br>80     | 0.900 |  |  |  |  | 11,998.8<br>0     |  |
| Programmable<br>Thermostats | Direct Install<br>Non-lighting   | CDC<br>0058 | Programmable<br>Thermostats --<br>Combination<br>Customers | 9.00  | 974.66<br>5.09    | 974,665.0<br>9    | 0.993 | 967.84<br>2.43    | 0.900 | 871,05<br>8.19    | 0.894 |  |  |  |  | 871,058.<br>19    |  |
| Programmable<br>Thermostats | Direct Install<br>Non-lighting   | CDE<br>0058 | Programmable<br>Thermostats                                | 9.00  | 1,581,0<br>80.58  | 1,581,080<br>.58  | 0.993 | 1,570,0<br>13.02  | 0.900 | 1,413,0<br>11.71  | 0.894 |  |  |  |  | 1,413,01<br>1.71  |  |
| Programmable<br>Thermostats | Direct Install<br>Non-lighting   | CDE<br>0072 | Programmable<br>Thermostat -<br>DTE Shared -<br>Electric   | 9.00  | 280.41<br>0.54    | 280,410.5<br>4    | 0.993 | 278.44<br>7.66    | 0.900 | 250,60<br>2.90    | 0.894 |  |  |  |  | 250,602.<br>90    |  |
| Programmable<br>Thermostats | Direct Install<br>Lighting       | CFE<br>0014 | Linear<br>Fluorescent to<br>LED Retrofit                   | 14.00 | 128.61<br>3.21    | 128,613.2<br>1    | 1.000 | 128.61<br>3.21    | 0.900 | 115,75<br>1.89    | 0.900 |  |  |  |  | 127,327.<br>08    |  |
| TOTAL                       |                                  |             |  |       | 92,393,<br>647.24 | 92,393,64<br>7.24 |       | 91,070,<br>877.40 |       | 81,963,<br>789.66 |       |  |  |  |  | 84,184,2<br>43.32 |  |

Table B-5: Small Business Solutions Program - Validated Electric Demand (Kw) Savings by Measure

| Program         | Measure Category            | Measure Code | Measure Description                  | Measure Life | Reported kW Savings | Adjusted Reported Gross kW Savings | Verified Gross kW Savings Adjustment Factor | Verified Gross kW Savings | kW NTG Adjustment Factor | Verified Net kW Savings | kW Realization Rate | Verified Net kW Savings Incl Bonus |
|-----------------|-----------------------------|--------------|--------------------------------------|--------------|---------------------|------------------------------------|---|---------------------------|--------------------------|-------------------------|---------------------|------------------------------------|
| CFL - Buydown   | Direct Install Non-lighting | CDE0198      | CFL bulbs regular (buydown)          | 2.00         | 6,327.52            | 5,700.74                           | 0.955                                       | 5,444.21                  | 0.900                    | 4,899.79                | 0.774               | 4,899.79                           |
| CFL - Buydown   | Direct Install Non-lighting | CDE0199      | CFL bulbs specialty (buydown)        | 2.00         | 194.28              | 175.03                             | 0.955                                       | 167.16                    | 0.900                    | 150.44                  | 0.774               | 150.44                             |
| CFL - Drop Ship | Direct Install Non-lighting | CDE0068      | CFL Box - Door Delivery              | 2.00         | 5,549.23            | 5,549.23                           | 1.000                                       | 5,549.23                  | 0.900                    | 4,994.30                | 0.900               | 4,994.30                           |
| CFL - Drop Ship | Direct Install Non-lighting | CDE0069      | CFL Box - Door Delivery (TC)         | 2.00         | 638.23              | 638.23                             | 1.000                                       | 638.23                    | 0.900                    | 574.40                  | 0.900               | 574.40                             |
| Core DI         | Direct Install Lighting     | CDE0051      | CFL Bulb - Screw-in                  | 9.00         | 36.82               | 36.82                              | 0.925                                       | 34.06                     | 0.900                    | 30.65                   | 0.833               | 30.65                              |
| Core DI         | Direct Install Lighting     | CDE0052      | Hardwired CFL                        | 12.00        | 9.80                | 9.80                               | 0.873                                       | 8.55                      | 0.900                    | 7.70                    | 0.786               | 8.47                               |
| Core DI         | Direct Install Lighting     | CDE0053      | Specialty CFL                        | 2.00         | 15.51               | 15.51                              | 0.873                                       | 13.54                     | 0.900                    | 12.19                   | 0.786               | 12.19                              |
| Core DI         | Direct Install Lighting     | CDE0054      | T8s and U-Tube T8 Lamps              | 12.00        | 2,241.30            | 2,241.30                           | 0.873                                       | 1,956.65                  | 0.900                    | 1,760.99                | 0.786               | 1,937.09                           |
| Core DI         | Direct Install Lighting     | CDE0055      | T5 Lamps                             | 12.00        | 10.76               | 10.76                              | 0.873                                       | 9.39                      | 0.900                    | 8.45                    | 0.786               | 9.30                               |
| Core DI         | Direct Install Lighting     | CDE0057      | LEDs, LED Exit Signs, Induction      | 15.00        | 1,166.60            | 1,166.60                           | 0.873                                       | 1,018.44                  | 0.900                    | 916.59                  | 0.786               | 1,008.25                           |
| Core DI         | Direct Install Non-lighting | CDE0064      | Small Business Custom Electric       | 0.00         | 4.53                | 4.53                               | 0.873                                       | 3.96                      | 0.900                    | 3.56                    | 0.786               | 3.56                               |
| Core DI         | Direct Install Non-lighting | CDE0080      | ECM Case Motor                       | 15.00        | 4.14                | 3.72                               | 1.000                                       | 3.72                      | 0.900                    | 3.35                    | 0.809               | 3.69                               |
| Core DI         | Direct Install Non-lighting | CDE0081      | ECM Walk-in Cooler and Freezer Motor | 15.00        | 47.12               | 42.40                              | 0.873                                       | 37.02                     | 0.900                    | 33.31                   | 0.707               | 36.65                              |

|             |                              |         |  |       |          |          |       |          |       |          |       |          |
|-------------|------------------------------|---------|--|-------|----------|----------|-------|----------|-------|----------|-------|----------|
| Core DI     | Direct Install Lighting      | CDE0084 | Evaporator Fan Motor Controls on PSC motors                  | 5.00  | 1.00     | 0.90     | 1.000 | 0.90     | 0.900 | 0.81     | 0.811 | 0.81     |
| Core DI     | Direct Install Lighting      | CDE0200 | Miscellaneous Lighting                                       | 9.00  | 2,442.41 | 2,442.41 | 0.873 | 2,132.22 | 0.900 | 1,919.00 | 0.786 | 1,919.00 |
| Core DI     | Direct Install Lighting      | CDE0201 | Fixture Removal  | 12.00 | 216.90   | 216.90   | 0.873 | 189.36   | 0.900 | 170.42   | 0.786 | 187.46   |
| Hospitality | Direct Install - Hospitality | CDE0044 | LED Lighting - 12 W LED Lamps replacing incandescent lights  | 8.00  | 184.89   | 184.89   | 1.000 | 184.89   | 0.900 | 166.40   | 0.900 | 166.40   |
| Hospitality | Direct Install - Hospitality | CDE0045 | LED Lighting - 11 W LED Flood Lamp                           | 15.00 | 412.08   | 412.08   | 0.924 | 380.76   | 0.900 | 342.69   | 0.832 | 376.95   |
| Hospitality | Direct Install - Hospitality | CDE0046 | LED Lighting - 8 W LED Lamps replacing incandescent lights   | 8.00  | 128.28   | 128.28   | 0.924 | 118.53   | 0.900 | 106.67   | 0.832 | 106.67   |
| Hospitality | Direct Install Lighting      | CDE0087 | Vending Equipment Controller (Halo)                          | 10.00 | 0.50     | 0.50     | 1.000 | 0.50     | 0.900 | 0.45     | 0.900 | 0.50     |
| Hospitality | Direct Install - Hospitality | CDE0090 | 3.5 W LED Candelabra   | 8.00  | 26.27    | 26.27    | 1.000 | 26.27    | 0.900 | 23.65    | 0.900 | 23.65    |
| Hospitality | Direct Install - Hospitality | CDE0100 | 13W BR30 LED Downlight                                       | 15.00 | 0.14     | 0.14     | 1.000 | 0.14     | 0.900 | 0.13     | 0.900 | 0.14     |
| Hospitality | Direct Install - Hospitality | CDE0101 | LED Exit Sign  | 15.00 | 24.82    | 24.82    | 1.000 | 24.82    | 0.900 | 22.34    | 0.900 | 24.57    |
| Hospitality | Direct Install - Hospitality | CDE0102 | LED Lighting - 9.5 W LED Lamps Replacing Incandescent Lights | 8.00  | 310.87   | 310.87   | 1.000 | 310.87   | 0.900 | 279.78   | 0.900 | 279.78   |
| Hospitality | Direct Install - Hospitality | CDE0103 | LED Lighting - 6 W LED Lamps Replacing                       | 8.00  | 66.09    | 78.56    | 1.000 | 78.56    | 0.900 | 70.70    | 1.070 | 70.70    |

|                             |                                   |         |  |       |                       |                       |       |                       |       |                       |       |                       |
|-----------------------------|-----------------------------------|---------|--|-------|-----------------------|-----------------------|-------|-----------------------|-------|-----------------------|-------|-----------------------|
| Hospitality                 | Direct Install -<br>- Hospitality | CDE0104 | Incandescent<br>Lights                                     | 2.00  | 3.26                  | 3.26                  | 1.000 | 3.26                  | 0.900 | 2.93                  | 0.900 | 2.93                  |
| Programmable<br>Thermostats | Direct Install<br>Non-lighting    | CDC0058 | Programmable<br>Thermostats --<br>Combination<br>Customers | 9.00  | -106.49               | -106.49               | 0.993 | 105.75                | 0.900 | -95.17                | 0.894 | -95.17                |
| Programmable<br>Thermostats | Direct Install<br>Non-lighting    | CDE0058 | Programmable<br>Thermostats                                | 9.00  | -207.24               | -207.24               | 0.993 | 205.79                | 0.900 | 185.21                | 0.894 | 185.21                |
| Programmable<br>Thermostats | Direct Install<br>Non-lighting    | CDE0072 | Programmable<br>Thermostat -<br>DTE Shared -<br>Electric   | 9.00  | -41.68                | -41.68                | 0.993 | -41.38                | 0.900 | -37.25                | 0.894 | -37.25                |
| Programmable<br>Thermostats | Direct Install<br>Lighting        | CFE0014 | Linear<br>Fluorescent to<br>LED Retrofit                   | 14.00 | 34.92                 | 34.92                 | 1.000 | 34.92                 | 0.900 | 31.43                 | 0.900 | 34.57                 |
| <b>TOTAL</b>                |                                   |         |  |       | <b>19,742.<br/>85</b> | <b>19,104.<br/>06</b> |       | <b>18,01<br/>7.23</b> |       | <b>16,21<br/>5.51</b> |       | <b>16,54<br/>5.29</b> |

Table B-6: Small Business Solutions Program - Validated Natural Gas (MCF) Savings by Measure

| Program                  | Measure Category            | Measure Code | Measure Description                                 | Measure Life | Reported MCF Savings | Adjusted Reported Gross MCF Savings | Verified Gross MCF Savings Adjustment Factor | Verified Gross MCF Savings | MCF NTG Adjustment Factor | Verified Net MCF Savings | MCF Realization Rate | Verified Net MCF Savings Incl Bonus |
|--------------------------|-----------------------------|--------------|---|--------------|----------------------|-------------------------------------|--|----------------------------|---------------------------|--------------------------|----------------------|-------------------------------------|
| Furnace Tune-up          | Direct Install Non-lighting | CDG0011      | DI - Gas Furnace or RTU Tune-up (>=40 and <300 MBH) | 10.00        | 10,069.85            | 10,067.81                           | 1.000  | 10,067.81                  | 0.900                     | 9,061.03                 | 0.900                | 9,967.13                            |
| Furnace Tune-up          | Direct Install Non-lighting | CDG0012      | DI - Gas Furnace or RTU Tune-up (>=300 MBH)         | 10.00        | 3,170.77             | 3,170.77                            | 1.000  | 3,170.77                   | 0.900                     | 2,853.69                 | 0.900                | 3,139.06                            |
| Programmable Thermostats | Direct Install Non-lighting | CDC0058      | Programmable Thermostats -- Combination Customers   | 9.00         | 31,652.74            | 31,652.74                           | 0.993  | 31,431.17                  | 0.900                     | 28,288.05                | 0.894                | 28,288.05                           |
| Programmable Thermostats | Direct Install Non-lighting | CDG0033      | Programmable Thermostat - DTE Shared - Gas          | 9.00         | 10,468.42            | 10,468.42                           | 0.993  | 10,395.14                  | 0.900                     | 9,355.63                 | 0.894                | 9,355.63                            |
| Programmable Thermostats | Direct Install Non-lighting | CDG0058      | Programmable Thermostat - Gas Customers             | 9.00         | 91,598.70            | 91,598.70                           | 0.993  | 90,957.51                  | 0.900                     | 81,861.75                | 0.894                | 81,861.75                           |
| <b>TOTAL</b>             |                             |              |   |              | <b>146,960.47</b>    | <b>146,958.43</b>                   |  | <b>146,022.40</b>          |                           | <b>131,420.16</b>        |                      | <b>132,611.63</b>                   |



Table B-7: Multi-Family Program - Validated Electric Energy (kWh) Savings by Measure

| Program      | Measure Category | Measure Code | Measure Description  | Measure Life | Reported kWh Savings | Adjusted Reported Gross kWh Savings | Verified Gross kWh Savings Adjustment Factor | kWh NTG Adjustment Factor | Verified Net kWh Savings | kWh Realization Rate | Verified Net kWh Savings Incl Bonus |
|--------------|------------------|--------------|--|--------------|----------------------|-------------------------------------|--|---------------------------|--------------------------|----------------------|-------------------------------------|
| Multi-Family | C&I Multifamily  | CCE0001      | C_I Multifamily Custom - Electric                            | Varies       | 2,006,719.00         | 2,006,719.00                        | 1.000  | 0.900                     | 1,806,047.10             | 0.90                 | 1,982.0<br>23.38                    |
| Multi-Family | C&I Multifamily  | CTE0002      | Common Area - Hardwired CFL Fixture                          | 12.00        | 141,757.00           | 141,757.00                          | 1.000  | 0.900                     | 127,581.30               | 0.90                 | 140.33<br>9.43                      |
| Multi-Family | C&I Multifamily  | CTE0003      | Common Area -- LED Exit Signs (Retrofit Only)                | 15.00        | 66,330.00            | 66,330.00                           | 1.000  | 0.900                     | 59,697.00                | 0.90                 | 65,666.70                           |
| Multi-Family | C&I Multifamily  | CTE0004      | Low Flow Bath Faucet Aerators - Electric - DI                | 12.00        | 6,972.00             | 6,972.00                            | 1.004  | 0.900                     | 6,299.90                 | 0.90                 | 6,929.89                            |
| Multi-Family | C&I Multifamily  | CTE0019      | Low Flow Kitchen Faucet Aerators - Electric - DI             | 12.00        | 16,112.00            | 16,112.00                           | 1.004  | 0.900                     | 14,558.80                | 0.90                 | 16,014.68                           |
| Multi-Family | C&I Multifamily  | CTE0020      | T12 4-ft Lamp Removal (combined with T8/T5 ballast retrofit) | 12.00        | 12,524.40            | 12,524.40                           | 1.000  | 0.900                     | 11,271.96                | 0.90                 | 12,399.16                           |
| Multi-Family | C&I Multifamily  | CTE0023      | CFL bulbs - 13W  | 9.00         | 349,630.40           | 349,630.40                          | 0.948  | 0.900                     | 298,304.66               | 0.85                 | 298,304.66                          |
| Multi-Family | C&I Multifamily  | CTE0025      | CFL Bulbs - 23W  | 9.00         | 816.20               | 816.20                              | 0.948  | 0.900                     | 696.38                   | 0.85                 | 696.38                              |
| Multi-Family | C&I Multifamily  | CTE0026      | CFL Bulbs Regular (30W or less in common area)               | 2.00         | 55,800.00            | 55,800.00                           | 0.948  | 0.900                     | 47,608.56                | 0.85                 | 47,608.56                           |
| Multi-Family | C&I Multifamily  | CTE0027      | CFL Screw in - Prescriptive                                  | 9.00         | 60,324.60            | 60,324.60                           | 0.948  | 0.900                     | 51,468.95                | 0.85                 | 51,468.95                           |
| Multi-Family | C&I Multifamily  | CTE0029      | CFL Fixture - Prescriptive                                   | 12.00        | 30,264.00            | 30,264.00                           | 1.000  | 0.900                     | 27,237.60                | 0.90                 | 29,961.36                           |
| Multi-Family | C&I Multifamily  | CTE0031      | Occupancy Sensors under 500 W                                | 10.00        | 28,584.00            | 28,584.00                           | 1.000  | 0.900                     | 25,725.60                | 0.90                 | 28,298.16                           |
| Multi-Family | C&I Multifamily  | CTE0032      | Occupancy Sensors over 500 W                                 | 10.00        | 994.00               | 994.00                              | 1.000  | 0.900                     | 894.60                   | 0.90                 | 984.06                              |
| Multi-Family | C&I Multifamily  | CTE0033      | LED Downlight Fixture  | 15.00        | 27,690.00            | 27,690.00                           | 1.000  | 0.900                     | 24,921.00                | 0.90                 | 27,411.48                           |

|              |                 |         |   |       |            |            |       |            |       |            |       |            |
|--------------|-----------------|---------|---|-------|------------|------------|-------|------------|-------|------------|-------|------------|
| Multi-Family | C&I Multifamily | CTE0035 | LED/Induction (Night Only) <175W                      | 12.00 | 96,212.00  | 96,212.00  | 1.000 | 96,212.00  | 0.900 | 86,590.80  | 0.900 | 95,249.88  |
| Multi-Family | C&I Multifamily | CTE0036 | LED/Induction (Night Only) 175-250W                   | 12.00 | 12,270.00  | 12,270.00  | 1.000 | 12,270.00  | 0.900 | 11,043.00  | 0.900 | 12,147.30  |
| Multi-Family | C&I Multifamily | CTE0038 | LED/Induction (Night Only) 250-400W                   | 12.00 | 141,200.00 | 141,200.00 | 1.000 | 141,200.00 | 0.900 | 127,080.00 | 0.900 | 139,788.00 |
| Multi-Family | C&I Multifamily | CTE0039 | LED/Induction (24x7) <175W                            | 12.00 | 25,662.00  | 25,662.00  | 1.000 | 25,662.00  | 0.900 | 23,095.80  | 0.900 | 25,405.38  |
| Multi-Family | C&I Multifamily | CTE0040 | LED/Induction (24x7) 175-250W                         | 12.00 | 42,120.00  | 42,120.00  | 1.000 | 42,120.00  | 0.900 | 37,908.00  | 0.900 | 41,698.80  |
| Multi-Family | C&I Multifamily | CTE0045 | CFL Speciality - Common Area                          | 2.00  | 5,580.00   | 5,580.00   | 1.000 | 5,580.00   | 0.900 | 5,022.00   | 0.900 | 5,022.00   |
| Multi-Family | C&I Multifamily | CTE0046 | CFL Speciality - In-Unit - DI                         | 9.00  | 142,839.90 | 142,839.90 | 1.000 | 142,839.90 | 0.900 | 128,555.91 | 0.900 | 128,555.91 |
| Multi-Family | C&I Multifamily | CTE0050 | Low Flow Showerhead - 1.5 gpm - Electric              | 12.00 | 42,090.00  | 42,090.00  | 1.000 | 42,090.00  | 0.900 | 37,881.00  | 0.900 | 41,669.10  |
| Multi-Family | C&I Multifamily | CTE0051 | Low Flow Showerhead - 1.5 gpm - Electric - Handheld   | 12.00 | 13,110.00  | 13,110.00  | 1.000 | 13,110.00  | 0.900 | 11,799.00  | 0.900 | 12,978.90  |
| Multi-Family | C&I Multifamily | CTE0052 | 13W CFL - Common Area - Direct Install                | 2.00  | 30,318.00  | 30,318.00  | 1.000 | 30,318.00  | 0.900 | 27,286.20  | 0.900 | 27,286.20  |
| Multi-Family | C&I Multifamily | CTE0124 | 1L HPT8 replacing T12 - Common - 24/7                 | 8.00  | 4,738.00   | 4,738.00   | 1.000 | 4,738.00   | 0.900 | 4,264.20   | 0.900 | 4,264.20   |
| Multi-Family | C&I Multifamily | CTE0125 | 1L RW HPT8 replacing T12 - Common - 24/7              | 8.00  | 13,356.00  | 13,356.00  | 1.000 | 13,356.00  | 0.900 | 12,020.40  | 0.900 | 12,020.40  |
| Multi-Family | C&I Multifamily | CTE0126 | 2L HPT8 replacing T12 - Common - 24/7                 | 8.00  | 21,804.00  | 21,804.00  | 1.000 | 21,804.00  | 0.900 | 19,623.60  | 0.900 | 19,623.60  |
| Multi-Family | C&I Multifamily | CTE0127 | 2L RW HPT8 replacing T12 - Common - 24/7              | 8.00  | 47,340.00  | 47,340.00  | 1.000 | 47,340.00  | 0.900 | 42,606.00  | 0.900 | 42,606.00  |
| Multi-Family | C&I Multifamily | CTE0130 | 4L HPT8 replacing T12 - Common - 24/7                 | 8.00  | 8,448.00   | 8,448.00   | 1.000 | 8,448.00   | 0.900 | 7,603.20   | 0.900 | 7,603.20   |
| Multi-Family | C&I Multifamily | CTE0131 | 4L RW HPT8 replacing T12 - Common - 24/7              | 8.00  | 12,565.00  | 12,565.00  | 1.000 | 12,565.00  | 0.900 | 11,308.50  | 0.900 | 11,308.50  |
| Multi-Family | C&I Multifamily | CTE0139 | CFL Candelabra Lamp (5-13W) - Common - 24/7 operation | 1.00  | 3,576.00   | 3,576.00   | 1.000 | 3,576.00   | 0.900 | 3,218.40   | 0.900 | 3,218.40   |
| Multi-Family | C&I Multifamily | CTE0143 | DI - CFL Candelabra                                   | 1.00  | 44,402.00  | 44,402.00  | 1.000 | 44,402.00  | 0.900 | 39,961.00  | 0.900 | 39,961.00  |

|              |                 |         |  | Lamp (5-13W) - 24/7 operation - DI                    |       | 0          |            |       | 00         |       | .80        | 0    | 80         |
|--------------|-----------------|---------|--|---|-------|------------|------------|-------|------------|-------|------------|------|------------|
| Multi-Family | C&I Multifamily | CTE0144 |  | DI - CFL Candelabra Lamp (5-13W) - DI                 | 1.00  | 100,426.00 | 100,426.00 | 1,000 | 100.426.00 | 0.900 | 90,383.40  | 0.90 | 90,383.40  |
| Multi-Family | C&I Multifamily | CTE0145 |  | DI - LED Candelabra Lamp (3-5W) - 24/7 operation - DI | 2.80  | 450,034.00 | 450,034.00 | 1,000 | 450.034.00 | 0.900 | 405,030.60 | 0.90 | 405,030.60 |
| Multi-Family | C&I Multifamily | CTE0146 |  | DI - LED Candelabra Lamp (3-5W) - DI                  | 2.80  | 36,332.00  | 36,332.00  | 1,000 | 36.332.00  | 0.900 | 32,698.80  | 0.90 | 32,698.80  |
| Multi-Family | C&I Multifamily | CTE0147 |  | Exterior CFL (replacing d175W HID)                    | 12.00 | 98,208.00  | 98,208.00  | 1,000 | 98.208.00  | 0.900 | 88,387.20  | 0.90 | 97,225.92  |
| Multi-Family | C&I Multifamily | CTE0153 |  | HPT8 replacing T12 - per lamp - Common                | 12.00 | 57,507.00  | 57,507.00  | 1,000 | 57.507.00  | 0.900 | 51,756.30  | 0.90 | 56,931.93  |
| Multi-Family | C&I Multifamily | CTE0157 |  | LED Fixture - In Unit                                 | 15.00 | 2,288.00   | 2,288.00   | 1,000 | 2.288.00   | 0.900 | 2,059.20   | 0.90 | 2,265.12   |
| Multi-Family | C&I Multifamily | CTE0158 |  | LED Lamp - 100W Replacement - In Unit                 | 10.00 | 16,368.00  | 16,368.00  | 1,000 | 16.368.00  | 0.900 | 14,731.20  | 0.90 | 16,204.32  |
| Multi-Family | C&I Multifamily | CTE0160 |  | LED Lamp - 50-80W Replacement - Common                | 8.00  | 483,140.00 | 483,140.00 | 1,000 | 483.140.00 | 0.900 | 434,826.00 | 0.90 | 434,826.00 |
| Multi-Family | C&I Multifamily | CTE0161 |  | LED Lamp - 60W Replacement - In Unit                  | 10.00 | 920.00     | 920.00     | 1,000 | 920.00     | 0.900 | 828.00     | 0.90 | 910.80     |
| Multi-Family | C&I Multifamily | CTE0163 |  | LED Lamp - 80-100W Replacement - Common               | 8.00  | 21,930.00  | 21,930.00  | 1,000 | 21.930.00  | 0.900 | 19,737.00  | 0.90 | 19,737.00  |
| Multi-Family | C&I Multifamily | CTE0164 |  | LED Lamp - Flood/PAR - Common                         | 8.00  | 464.00     | 464.00     | 1,000 | 464.00     | 0.900 | 417.60     | 0.90 | 417.60     |
| Multi-Family | C&I Multifamily | CTE0166 |  | LED Lamp - PAR - In Unit                              | 10.00 | 1,998.00   | 1,998.00   | 1,000 | 1.998.00   | 0.900 | 1,798.20   | 0.90 | 1,978.02   |
| Multi-Family | C&I Multifamily | CTE0168 |  | PTHP - In Unit  | 15.00 | 8,308.80   | 8,308.80   | 1,000 | 8.308.80   | 0.900 | 7,477.92   | 0.90 | 8,225.71   |
| Multi-Family | C&I Multifamily | CTE0171 |  | VFD - Pump  | 10.00 | 7,095.78   | 7,095.78   | 1,000 | 7.095.78   | 0.900 | 6,386.20   | 0.90 | 7,024.82   |
| Multi-Family | C&I Multifamily | CTE0172 |  | Low Flow Bath Faucet Aerators 1.0gpm - Electric - DI  | 12.00 | 5,797.15   | 5,797.15   | 1,000 | 5.797.15   | 0.900 | 5,217.44   | 0.90 | 5,739.18   |
| Multi-Family | C&I Multifamily | CTE0174 |  | DI - LED Candelabra Lamp (3-5W) - In-Unit - DI        | 12.00 | 15,300.00  | 15,300.00  | 1,000 | 15.300.00  | 0.900 | 13,770.00  | 0.90 | 15,141.00  |



|              |                 |         |   |       |              |              |              |              |       |              |       |              |       |              |
|--------------|-----------------|---------|---|-------|--------------|--------------|--------------|--------------|-------|--------------|-------|--------------|-------|--------------|
| Multi-Family | C&I Multifamily | CTE0175 | DI - CFL Candelabra Lamp (5-13W) - In-Unit - DI | 9.00  | 2,954.70     | 2,954.70     | -142.47      | 2,954.70     | 1.000 | 2,954.70     | 0.900 | 2,659.23     | 0.900 | 2,659.23     |
| Multi-Family | C&I Multifamily | CTG0009 | Boiler Controls                                 | 15.00 | -142.47      | -142.47      | -142.47      | -142.47      | 1.000 | -142.47      | 1.000 | -142.47      | 1.000 | -142.47      |
| TOTAL        |                 |         |   |       | 4,821,077.46 | 4,821,077.46 | 4,821,077.46 | 4,796,908.09 |       | 4,317,203.04 |       | 4,575,764.77 |       | 4,575,764.77 |

Table B-8: Multi-Family Program - Validated Electric Demand (Kw) Savings by Measure

| Program      | Measure Category | Measure Code | Measure Description  | Measure Life | Reported kW Savings | Adjusted Reported Gross kW Savings | Verified Gross kW Savings Adjustment Factor | Verified Gross kW Savings | kW NTG Adjustment Factor | Verified Net kW Savings | kW Realization Rate | Verified Net kW Savings Incl Bonus |
|--------------|------------------|--------------|--|--------------|---------------------|------------------------------------|---|---------------------------|--------------------------|-------------------------|---------------------|------------------------------------|
| Multi-Family | C&I Multifamily  | CCE0001      | C_I Multifamily Custom - Electric                            | Varies       | 88.74               | 88.74                              | 1.000                                       | 88.74                     | 0.900                    | 79.86                   | 0.900               | 87.85                              |
| Multi-Family | C&I Multifamily  | CTE0003      | Common Area -- LED Exit Signs (Retrofit Only)                | 15.00        | 7.59                | 7.59                               | 1.000                                       | 7.59                      | 0.900                    | 6.83                    | 0.900               | 7.51                               |
| Multi-Family | C&I Multifamily  | CTE0004      | Low Flow Bath Faucet Aerators - Electric - DI                | 12.00        | 0.79                | 0.79                               | 1.004                                       | 0.80                      | 0.900                    | 0.72                    | 0.904               | 0.79                               |
| Multi-Family | C&I Multifamily  | CTE0019      | Low Flow Kitchen Faucet Aerators - Electric - DI             | 12.00        | 1.82                | 1.82                               | 1.004                                       | 1.82                      | 0.900                    | 1.64                    | 0.900               | 1.81                               |
| Multi-Family | C&I Multifamily  | CTE0020      | T12 4-ft Lamp Removal (combined with T8/T5 ballast retrofit) | 12.00        | 3.06                | 3.06                               | 1.000                                       | 3.06                      | 0.900                    | 2.76                    | 0.900               | 3.03                               |
| Multi-Family | C&I Multifamily  | CTE0023      | CFL bulbs - 13W  | 9.00         | 41.47               | 41.47                              | 0.948                                       | 39.31                     | 0.900                    | 35.38                   | 0.853               | 35.38                              |
| Multi-Family | C&I Multifamily  | CTE0025      | CFL Bulbs - 23W  | 9.00         | 0.10                | 0.10                               | 0.948                                       | 0.09                      | 0.900                    | 0.08                    | 0.853               | 0.08                               |
| Multi-Family | C&I Multifamily  | CTE0027      | CFL Screw in - Prescriptive                                  | 9.00         | 7.15                | 7.15                               | 0.948                                       | 6.78                      | 0.900                    | 6.10                    | 0.853               | 6.10                               |
| Multi-Family | C&I Multifamily  | CTE0029      | CFL Fixture - Prescriptive                                   | 12.00        | 3.61                | 3.61                               | 1.000                                       | 3.61                      | 0.900                    | 3.25                    | 0.900               | 3.57                               |
| Multi-Family | C&I Multifamily  | CTE0031      | Occupancy Sensors under 500 W                                | 10.00        | 7.13                | 7.13                               | 1.000                                       | 7.13                      | 0.900                    | 6.42                    | 0.900               | 7.06                               |
| Multi-Family | C&I Multifamily  | CTE0032      | Occupancy Sensors over 500 W                                 | 10.00        | 0.24                | 0.24                               | 1.000                                       | 0.24                      | 0.900                    | 0.22                    | 0.900               | 0.24                               |

|              |                 |          |   |       |       |       |       |       |       |       |       |       |
|--------------|-----------------|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Multi-Family | C&I Multifamily | CTE00 33 | LED Downlight Fixture                               | 15.00 | 6.77  | 6.77  | 1.000 | 6.77  | 0.900 | 6.10  | 0.900 | 6.71  |
| Multi-Family | C&I Multifamily | CTE00 39 | LED/Induction (24x7) <175W                          | 12.00 | 2.79  | 2.79  | 1.000 | 2.79  | 0.900 | 2.51  | 0.900 | 2.77  |
| Multi-Family | C&I Multifamily | CTE00 40 | LED/Induction (24x7) 175-250W                       | 12.00 | 4.58  | 4.58  | 1.000 | 4.58  | 0.900 | 4.12  | 0.900 | 4.53  |
| Multi-Family | C&I Multifamily | CTE00 46 | CFL Speciality - In-Unit - DI                       | 9.00  | 17.17 | 17.17 | 1.000 | 17.17 | 0.900 | 15.45 | 0.900 | 15.45 |
| Multi-Family | C&I Multifamily | CTE00 50 | Low Flow Showerhead - 1.5 gpm - Electric            | 12.00 | 4.76  | 4.76  | 1.000 | 4.76  | 0.900 | 4.28  | 0.900 | 4.71  |
| Multi-Family | C&I Multifamily | CTE00 51 | Low Flow Showerhead - 1.5 gpm - Electric - Handheld | 12.00 | 1.48  | 1.48  | 1.000 | 1.48  | 0.900 | 1.33  | 0.900 | 1.47  |
| Multi-Family | C&I Multifamily | CTE01 24 | 1L HPT8 replacing T12 - Common - 24/7               | 8.00  | 0.50  | 0.50  | 1.000 | 0.50  | 0.900 | 0.45  | 0.900 | 0.45  |
| Multi-Family | C&I Multifamily | CTE01 25 | 1L RW HPT8 replacing T12 - Common - 24/7            | 8.00  | 1.34  | 1.34  | 1.000 | 1.34  | 0.900 | 1.20  | 0.900 | 1.20  |
| Multi-Family | C&I Multifamily | CTE01 26 | 2L HPT8 replacing T12 - Common - 24/7               | 8.00  | 2.28  | 2.28  | 1.000 | 2.28  | 0.900 | 2.05  | 0.900 | 2.05  |
| Multi-Family | C&I Multifamily | CTE01 27 | 2L RW HPT8 replacing T12 - Common - 24/7            | 8.00  | 4.97  | 4.97  | 1.000 | 4.97  | 0.900 | 4.47  | 0.900 | 4.47  |
| Multi-Family | C&I Multifamily | CTE01 30 | 4L HPT8 replacing T12 - Common - 24/7               | 8.00  | 0.86  | 0.86  | 1.000 | 0.86  | 0.900 | 0.78  | 0.900 | 0.78  |
| Multi-Family | C&I Multifamily | CTE01 31 | 4L RW HPT8 replacing T12 - Common - 24/7            | 8.00  | 1.29  | 1.29  | 1.000 | 1.29  | 0.900 | 1.16  | 0.900 | 1.16  |

|              |                 |          |  |       |        |        |       |        |       |        |       |        |
|--------------|-----------------|----------|--|-------|--------|--------|-------|--------|-------|--------|-------|--------|
| Multi-Family | C&I Multifamily | CTE01 39 | CFL Candelabra Lamp (5-13W) - Common - 24/7 operation  | 1.00  | 0.41   | 0.41   | 1.000 | 0.41   | 0.900 | 0.37   | 0.900 | 0.37   |
| Multi-Family | C&I Multifamily | CTE01 43 | DI - CFL Candelabra Lamp (5-13W) - 24/7 operation - DI | 1.00  | 5.07   | 5.07   | 1.000 | 5.07   | 0.900 | 4.56   | 0.900 | 4.56   |
| Multi-Family | C&I Multifamily | CTE01 44 | DI - CFL Candelabra Lamp (5-13W) - DI                  | 1.00  | 22.92  | 22.92  | 1.000 | 22.92  | 0.900 | 20.62  | 0.900 | 20.62  |
| Multi-Family | C&I Multifamily | CTE01 45 | DI - LED Candelabra Lamp (3-5W) - 24/7 operation - DI  | 2.80  | 51.56  | 51.56  | 1.000 | 51.56  | 0.900 | 46.41  | 0.900 | 46.41  |
| Multi-Family | C&I Multifamily | CTE01 46 | DI - LED Candelabra Lamp (3-5W) - DI                   | 2.80  | 8.29   | 8.29   | 1.000 | 8.29   | 0.900 | 7.46   | 0.900 | 7.46   |
| Multi-Family | C&I Multifamily | CTE01 53 | HPT8 replacing T12 - per lamp - Common                 | 12.00 | 14.28  | 14.28  | 1.000 | 14.28  | 0.900 | 12.85  | 0.900 | 14.13  |
| Multi-Family | C&I Multifamily | CTE01 57 | LED Fixture - In Unit                                  | 15.00 | 0.28   | 0.28   | 1.000 | 0.28   | 0.900 | 0.25   | 0.900 | 0.27   |
| Multi-Family | C&I Multifamily | CTE01 58 | LED Lamp - 100W Replacement - In Unit                  | 10.00 | 1.93   | 1.93   | 1.000 | 1.93   | 0.900 | 1.74   | 0.900 | 1.92   |
| Multi-Family | C&I Multifamily | CTE01 60 | LED Lamp - 50-80W Replacement - Common                 | 8.00  | 118.07 | 118.07 | 1.000 | 118.07 | 0.900 | 106.27 | 0.900 | 106.27 |
| Multi-Family | C&I Multifamily | CTE01 61 | LED Lamp - 60W Replacement - In Unit                   | 10.00 | 0.11   | 0.11   | 1.000 | 0.11   | 0.900 | 0.10   | 0.900 | 0.11   |
| Multi-Family | C&I Multifamily | CTE01 63 | LED Lamp - 80-100W                                     | 8.00  | 5.36   | 5.36   | 1.000 | 5.36   | 0.900 | 4.82   | 0.900 | 4.82   |

|              |                 |          | Replacement - Common                                 |       |               |               |       |      |       |               |       |       |               |      |  |  |               |  |
|--------------|-----------------|----------|--|-------|---------------|---------------|-------|------|-------|---------------|-------|-------|---------------|------|--|--|---------------|--|
| Multi-Family | C&I Multifamily | CTE01 64 | LED Lamp - Flood/PAR - Common                        | 8.00  | 0.10          | 0.10          | 1.000 | 0.10 | 0.900 | 0.09          | 0.900 | 0.09  | 0.900         | 0.09 |  |  |               |  |
| Multi-Family | C&I Multifamily | CTE01 66 | LED Lamp - PAR - In Unit                             | 10.00 | 0.24          | 0.24          | 1.000 | 0.24 | 0.900 | 0.21          | 0.900 | 0.21  | 0.900         | 0.23 |  |  |               |  |
| Multi-Family | C&I Multifamily | CTE01 68 | PTHP - In Unit                                       | 15.00 | 3.15          | 3.15          | 1.000 | 3.15 | 0.900 | 2.84          | 0.900 | 2.84  | 0.900         | 3.12 |  |  |               |  |
| Multi-Family | C&I Multifamily | CTE01 71 | VFD - Pump   | 10.00 | 0.72          | 0.72          | 1.000 | 0.72 | 0.900 | 0.64          | 0.900 | 0.64  | 0.900         | 0.71 |  |  |               |  |
| Multi-Family | C&I Multifamily | CTE01 72 | Low Flow Bath Faucet Aerators 1.0gpm - Electric - DI | 12.00 | 0.53          | 0.66          | 1.000 | 0.66 | 0.900 | 0.59          |       | 1.114 |               | 0.65 |  |  |               |  |
| Multi-Family | C&I Multifamily | CTE01 74 | DI - LED Candelabra Lamp (3-5W) - In-Unit - DI       | 12.00 | 17.32         | 0.61          | 1.000 | 0.61 | 0.900 | 0.55          |       | 0.032 |               | 0.61 |  |  |               |  |
| Multi-Family | C&I Multifamily | CTE01 75 | DI - CFL Candelabra Lamp (5-13W) - In-Unit - DI      | 9.00  | 2.28          | 0.36          | 1.000 | 0.36 | 0.900 | 0.32          |       | 0.140 |               | 0.32 |  |  |               |  |
| <b>TOTAL</b> |                 |          |  |       | <b>463.09</b> | <b>444.58</b> |       |      |       | <b>397.85</b> |       |       | <b>442.06</b> |      |  |  | <b>411.83</b> |  |



Table B-9: Multi-Family Program - Validated Natural Gas (Mcf) Savings by Measure

| Program      | Measure Category | Measure Code | Measure Description                                    | Measure Life | Reported MCF Savings | Adjusted Reported Gross MCF Savings | Verified Gross MCF Savings Adjustment Factor | Verified Gross MCF Savings | MCF NTG Adjustment Factor | Verified Net MCF Savings | MCF Realization Rate | Verified Net MCF Savings Incl Bonus |
|--------------|------------------|--------------|--|--------------|----------------------|-------------------------------------|--|----------------------------|---------------------------|--------------------------|----------------------|-------------------------------------|
| Multi-Family | C&I Multifamily  | CCG0001      | C_I Multifamily Custom - Gas                           | Varies       | 2,285.10             | 2,285.10                            | 1.000  | 2,285.10                   | 0.900                     | 2,056.59                 | 0.900                | 2,256.39                            |
| Multi-Family | C&I Multifamily  | CTE0171      | VFD - Pump   | 10.00        | 1.49                 | 1.49                                | 1.000  | 1.49                       | 1.000                     | 1.49                     | 1.000                | 1.64                                |
| Multi-Family | C&I Multifamily  | CTG0004      | Low Flow Bath Faucet Aerators - Gas - DI               | 12.00        | 981.53               | 981.53                              | 1.004  | 985.45                     | 0.900                     | 886.91                   | 0.904                | 975.60                              |
| Multi-Family | C&I Multifamily  | CTG0007      | Pipe Wrap - Gas - DHW - Inunit                         | 6.00         | 921.68               | 921.68                              | 1.000  | 921.68                     | 0.900                     | 829.51                   | 0.900                | 829.51                              |
| Multi-Family | C&I Multifamily  | CTG0009      | Boiler Controls  | 15.00        | 319.71               | 319.71                              | 1.000  | 319.71                     | 0.900                     | 287.74                   | 0.900                | 316.51                              |
| Multi-Family | C&I Multifamily  | CTG0011      | Boiler tune-up   | 2.00         | 310.65               | 310.65                              | 1.000  | 310.65                     | 0.900                     | 279.59                   | 0.900                | 279.59                              |
| Multi-Family | C&I Multifamily  | CTG0014      | Low Flow Kitchen Faucet Aerators - Gas - DI            | 12.00        | 2,442.70             | 2,442.70                            | 1.004  | 2,452.48                   | 0.900                     | 2,207.23                 | 0.904                | 2,427.95                            |
| Multi-Family | C&I Multifamily  | CTG0035      | Energy Star Window                                     | 20.00        | 50.13                | 50.13                               | 1.000  | 50.13                      | 0.900                     | 45.11                    | 0.900                | 49.63                               |
| Multi-Family | C&I Multifamily  | CTG0040      | Setback thermostat - moderate setback -- Gas - In Unit | 9.00         | 975.42               | 975.42                              | 1.000  | 975.42                     | 0.900                     | 877.88                   | 0.900                | 877.88                              |
| Multi-Family | C&I Multifamily  | CTG0044      | Furnace Replacement (<=200MBH) 95% Eff. - Common       | 15.00        | 8.47                 | 8.47                                | 1.000  | 8.47                       | 0.900                     | 7.62                     | 0.900                | 8.38                                |
| Multi-Family | C&I Multifamily  | CTG0047      | High Efficiency Boiler Replacement > 92% Eff           | 20.00        | 2,591.40             | 2,591.40                            | 1.000  | 2,591.40                   | 0.900                     | 2,332.26                 | 0.900                | 2,565.49                            |
| Multi-Family | C&I Multifamily  | CTG0048      | High Efficiency Boiler                                 | 20.00        | 104.64               | 104.64                              | 1.000  | 104.64                     | 0.900                     | 94.18                    | 0.900                | 103.69                              |

|              |                 |          | Replacement ><br>95% Eff                           |       |           |           |           |       |          |       |           |       |           |  |  |  |  |
|--------------|-----------------|----------|--|-------|-----------|-----------|-----------|-------|----------|-------|-----------|-------|-----------|--|--|--|--|
| Multi-Family | C&I Multifamily | CTG00050 | Low Flow Showerhead - 1.5 gpm - DI                 | 12.00 | 6,575.00  | 6,575.00  | 6,575.00  | 1.000 | 6,575.00 | 0.900 | 5,917.50  | 0.900 | 6,509.25  |  |  |  |  |
| Multi-Family | C&I Multifamily | CTG00051 | Low Flow Showerhead - 1.5 gpm Handheld - DI        | 12.00 | 3,828.12  | 3,828.12  | 3,828.12  | 1.000 | 3,828.12 | 0.900 | 3,445.31  | 0.900 | 3,789.84  |  |  |  |  |
| Multi-Family | C&I Multifamily | CTG00052 | Pipe Wrap - DHW - Common - DI                      | 20.00 | 1,927.41  | 1,919.52  | 1,919.52  | 1.000 | 1,919.52 | 0.900 | 1,727.57  | 0.896 | 1,900.32  |  |  |  |  |
| Multi-Family | C&I Multifamily | CTG00104 | Low Flow Bath Faucet Aerators - Prescriptive Gas   | 12.00 | 24.79     | 24.79     | 24.89     | 1.004 | 24.89    | 0.900 | 22.40     | 0.904 | 24.64     |  |  |  |  |
| Multi-Family | C&I Multifamily | CTG00114 | Low Flow Kitchen Faucet Aerators- Prescriptive Gas | 12.00 | 32.45     | 32.45     | 32.58     | 1.004 | 32.58    | 0.900 | 29.33     | 0.904 | 32.26     |  |  |  |  |
| Multi-Family | C&I Multifamily | CTG00122 | DHW Boiler Tune-up                                 | 2.00  | 132.23    | 132.23    | 132.23    | 1.000 | 132.23   | 0.900 | 119.01    | 0.900 | 119.01    |  |  |  |  |
| Multi-Family | C&I Multifamily | CTG00131 | In-Direct Water Heater (e90% Eff)                  | 15.00 | 846.96    | 846.61    | 846.61    | 1.000 | 846.61   | 0.900 | 761.95    | 0.900 | 838.15    |  |  |  |  |
| Multi-Family | C&I Multifamily | CTG00141 | Low Flow Bath Faucet Aerators 1.0gpm - Gas - DI    | 12.00 | 2,657.60  | 2,657.60  | 2,657.60  | 1.000 | 2,657.60 | 0.900 | 2,391.84  | 0.900 | 2,631.02  |  |  |  |  |
| Multi-Family | C&I Multifamily | CTG00150 | Boiler Tune-Up                                     | 15.00 | 4,329.62  | 4,329.62  | 4,329.62  | 1.000 | 4,329.62 | 0.900 | 3,896.66  | 0.900 | 4,286.32  |  |  |  |  |
| TOTAL        |                 |          |  |       | 31,347.10 | 31,338.85 | 31,352.78 |       |          |       | 28,217.65 |       | 30,822.96 |  |  |  |  |

## Appendix C: Application Variances

Table C-1: Business Solutions Applications with Customer-Level Errors  
Table C-2: New Construction Pilot Program Applications with Customer-Level Errors  
Table C-3: Direct Install Applications with Customer-Level Errors  
Table C-4: Programmable Thermostat Program Application Variances  
Table C-5: Hospitality Initiative Application Variances  
Table C-6: Multi-Family Program Application Variances  
Table C-7: Furnace Tune-up Initiative Program Application Variances

**Table C-1. Business Solutions Program Applications with Customer-Level Errors**

| Project Number | Error Description   |
|----------------|---|
| CE-12-23023    | Address incorrect   |
| CE-12-24787    | Address incorrect   |
| CE-12-22765    | Address incorrect; Phone Number incorrect;<br>Customer type incorrect |
| CE-12-25360    | Address incorrect; Customer type incorrect                            |
| CE-12-23224    | Address incorrect; City incorrect                                     |
| CE-12-23223    | Contact name incorrect; Address incorrect;<br>City incorrect          |
| CE-12-23219    | Contact name incorrect; Address incorrect;<br>City incorrect          |
| CE-12-22549    | Phone number incorrect  |
| CE-12-25179    | Address incorrect   |
| CE-12-27968    | Contact name incorrect; Address incorrect                             |
| CE-12-24206    | Address incorrect   |
| CE-12-25720    | Customer type incorrect   |
| CE-12-26138    | Address incorrect   |
| CE-12-26580    | Customer name incorrect   |
| CE-12-25337    | Contact name incorrect; Customer type<br>incorrect                    |
| CE-12-27466    | Contact name incorrect; Customer type<br>incorrect                    |
| CE-12-26936    | Customer name incorrect   |
| CE-12-24921    | Contact name incorrect  |
| CE-12-27698    | Contact name incorrect  |
| CE-12-24228    | Contact name incorrect; Customer type<br>incorrect                    |
| CE-12-41386    | Customer name incorrect; Address incorrect                            |
| CE-12-27215    | Customer name incorrect; Phone number<br>incorrect                    |
| CE-12-25861    | Customer type incorrect   |
| CE-12-26529    | Contact name incorrect; Phone number<br>incorrect                     |
| CE-12-25071    | Phone number incorrect  |
| CE-12-23685    | Contact name incorrect; Address incorrect;<br>Customer type incorrect |
| CE-12-23681    | Contact name incorrect; Address incorrect;<br>Customer type incorrect |
| CE-12-25753    | Customer type incorrect   |
| CE-12-25069    | Customer name incorrect; City incorrect                               |
| CE-12-41345    | Address incorrect; Phone Number incorrect                             |

Appendix C: **Application Variances**

|             |  |
|-------------|--|
| CE-12-41338 | Address incorrect; Customer type incorrect                             |
| CE-12-41623 | Customer name incorrect; Address incorrect;<br>Customer type incorrect |
| CE-12-26463 | Customer type incorrect  |
| CE-12-27971 | Address incorrect  |
| CE-12-24418 | Customer name incorrect  |
| CE-12-27948 | Address incorrect  |
| CE-12-25837 | Phone number incorrect; Customer type<br>incorrect                     |
| CE-12-24888 | Customer name incorrect; City incorrect                                |
| CE-12-27696 | Contact name incorrect; Address incorrect;<br>Customer type incorrect  |
| CE-12-27881 | Contact name incorrect; Address incorrect;<br>Customer type incorrect  |
| CE-12-26793 | Contact name incorrect; City incorrect                                 |
| CE-12-21635 | Contact name incorrect; Address incorrect                              |
| CE-12-21634 | Contact name incorrect   |
| CE-12-26972 | Contact name incorrect   |
| CE-12-21822 | Address incorrect  |
| CE-12-25328 | Contact name incorrect; Customer type<br>incorrect                     |
| CE-12-20953 | Customer type incorrect  |
| CE-13-57546 | Address incorrect; Phone Number incorrect                              |
| CE-12-27549 | Contact name incorrect; Address incorrect                              |
| CE-13-57145 | Address incorrect  |
| CE-12-24101 | Contact name incorrect   |
| CE-12-56762 | Customer type incorrect  |
| CE-12-41973 | Address incorrect  |
| CE-12-26709 | Contact name incorrect   |
| CE-13-58492 | Address incorrect  |
| CE-13-58565 | Customer type incorrect  |
| CE-13-58642 | Address incorrect  |
| CE-13-58693 | Contact name incorrect; Address incorrect                              |
| CE-13-56885 | Contact name incorrect   |
| CE-13-57596 | Address incorrect  |
| CE-13-57711 | Contact name incorrect; Address incorrect;<br>Customer type incorrect  |
| CE-13-59056 | Customer type incorrect  |
| CE-13-59431 | Address incorrect  |

|             |   |
|-------------|---|
| CE-12-41683 | Address incorrect   |
| CE-13-59572 | Contact name incorrect; Address incorrect                             |
| CE-13-60059 | Contact name incorrect; Address incorrect                             |
| CE-13-56772 | Contact name incorrect; Address incorrect;<br>Customer type incorrect |
| CE-13-56878 | Address incorrect   |
| CE-13-57739 | Contact name incorrect  |
| CE-12-26761 | Contact name incorrect  |
| CE-13-56785 | Customer name incorrect   |
| CE-13-60810 | Contact name incorrect  |
| CE-13-57420 | Contact name incorrect; Address incorrect                             |
| CE-12-24893 | Address incorrect   |
| CE-13-58411 | Address incorrect   |
| CE-12-23025 | Contact name incorrect; Address incorrect                             |
| CE-13-76992 | Address incorrect   |
| CE-13-77538 | Address incorrect   |
| CE-13-77800 | Address incorrect   |
| CE-13-59236 | Contact name incorrect; Address incorrect                             |
| CE-13-78069 | Contact name incorrect; Customer type<br>incorrect                    |
| CE-13-58199 | Contact name incorrect; City incorrect;<br>Customer type incorrect    |
| CE-13-78425 | Contact name incorrect  |
| CE-13-58255 | Address incorrect; Customer type incorrect                            |
| CE-11-15036 | Address incorrect   |
| CE-13-58762 | Address incorrect   |
| CE-13-58669 | Contact name incorrect  |
| CE-12-26850 | City incorrect  |
| CE-13-59660 | Customer name incorrect   |
| CE-13-57606 | Address incorrect   |
| CE-13-57449 | Customer name incorrect; Address incorrect                            |
| CE-13-60702 | Customer name incorrect   |

**Table C-2. New Construction Pilot Program Applications with Customer-Level Errors**

| <b>Project Number</b> | <b>Error Description</b>                          |
|-----------------------|---|
| CE-12-25302           | Address incorrect                                 |
| CE-12-27338           | City incorrect                                    |
| CE-12-22507           | Address incorrect                                 |
| CE-12-23105           | Customer type incorrect                           |
| CE-12-25733           | Customer name incorrect;<br>Address incorrect     |
| CE-12-27248           | Customer name incorrect                           |
| CE-12-41695           | Contact name incorrect;<br>Phone number incorrect |
| CE-13-57221           | Address incorrect                                 |

**Table C-3. Direct Install Applications with Customer-Level Errors**

| Project Number | Error Description   |
|----------------|---|
| CEDI-13-19324  | Account number incorrect; Phone number incorrect                |
| CEDI-13-15081  | Customer name incorrect; Phone number incorrect                 |
| CEDI-13-15122  | Customer name incorrect; Phone number incorrect                 |
| CEDI-13-15123  | Customer name incorrect; Address incorrect                      |
| CEDI-13-15372  | Customer name incorrect; Phone number incorrect                 |
| CEDI-13-15579  | Customer name incorrect; Phone number incorrect                 |
| CEDI-13-15743  | Customer name incorrect   |
| CEDI-13-16313  | Customer name incorrect   |
| CEDI-13-16345  | Customer name incorrect   |
| CEDI-13-16490  | Customer name incorrect; Phone number incorrect                 |
| CEDI-13-16525  | Customer name incorrect; Phone number incorrect                 |
| CEDI-13-16727  | Customer name incorrect   |
| CEDI-13-16888  | Customer name incorrect   |
| CEDI-13-17226  | Customer name incorrect; City incorrect; Phone number incorrect |
| CEDI-13-17349  | Customer name incorrect   |
| CEDI-13-17535  | Customer name incorrect; City incorrect                         |
| CEDI-13-17834  | Customer name incorrect; Address incorrect                      |
| CEDI-13-18848  | Customer name incorrect; Phone number incorrect                 |
| CEDI-13-19324  | Customer name incorrect   |
| CEDI-13-15756  | Address incorrect   |
| CEDI-13-15866  | Address incorrect   |
| CEDI-13-17191  | Address incorrect   |
| CEDI-13-15436  | Address incorrect   |
| CEDI-13-15285  | ZIP code incorrect  |
| CEDI-13-15525  | ZIP code incorrect  |
| CEDI-13-15235  | Phone number incorrect  |
| CEDI-13-15513  | Phone number incorrect  |
| CEDI-13-15525  | Phone number incorrect  |



Appendix C: **Application Variances**

|               |                        |
|---------------|------------------------|
| CEDI-13-15832 | Phone number incorrect |
| CEDI-13-15870 | Phone number incorrect |
| CEDI-13-16037 | Phone number incorrect |
| CEDI-13-16060 | Phone number incorrect |
| CEDI-13-16086 | Phone number incorrect |
| CEDI-13-16176 | Phone number incorrect |
| CEDI-13-16345 | Phone number incorrect |
| CEDI-13-16401 | Phone number incorrect |
| CEDI-13-16526 | Phone number incorrect |
| CEDI-13-16888 | Phone number incorrect |
| CEDI-13-16947 | Phone number incorrect |
| CEDI-13-17477 | Phone number incorrect |
| CEDI-13-17542 | Phone number incorrect |
| CEDI-13-18240 | Phone number incorrect |
| CEDI-13-18305 | Phone number incorrect |
| CEDI-13-18568 | Phone number incorrect |
| CEDI-13-18590 | Phone number incorrect |
| CEDI-13-19026 | Phone number incorrect |
| CEDI-13-19229 | Phone number incorrect |
| CEDI-13-19284 | Phone number incorrect |
| CEDI-13-19480 | Phone number incorrect |
| CEDI-13-19486 | Phone number incorrect |

**Table C-4. Programmable Thermostat Program Application Variances**

| <b>Project Number</b> | <b>Error Description</b>                              |
|-----------------------|---|
| CEDF-13-57763         | Phone number incorrect; Energy type incorrect         |
| CEDF-13-58555         | Phone number incorrect                                |
| CEDF-13-59833         | Phone number incorrect                                |
| CEDF-13-59911         | Address incorrect                                     |
| CEDF-13-60090         | Phone number incorrect; Address incorrect             |
| CEDF-13-60332         | Phone number incorrect                                |
| CEDF-13-77367         | Phone number incorrect                                |
| CEDF-13-78361         | Address incorrect                                     |
| CEDF-13-78618         | Phone number incorrect                                |
| CEDF-13-78665         | City incorrect  |
| CEDF-13-78976         | City incorrect  |
| CEDF-13-79004         | Phone number incorrect; Customer name incorrect       |
| CEDF-13-79247         | City incorrect  |
| CEDF-13-79515         | Phone number incorrect                                |
| CEDF-13-79901         | Phone number incorrect; Customer name incorrect       |
| CEDF-13-80252         | Phone number incorrect                                |
| CEDF-13-80814         | Address incorrect; City incorrect; ZIP code incorrect |
| CEDF-13-92661         | Phone number incorrect; Customer name incorrect       |
| CEDF-13-92705         | Phone number incorrect                                |
| CEDF-13-92708         | Address incorrect; City incorrect                     |
| CEDF-13-93532         | Phone number incorrect; Address incorrect             |
| CEDF-13-93555         | Zip code incorrect                                    |

**Table C-5. Hospitality Initiative Application Variances**

| <b>Project Number</b> | <b>Error Description</b>  |
|-----------------------|---|
| CEDF-13-93237         | Customer name incorrect   |
| CEDF-13-93297         | Customer name incorrect   |
| CEDF-13-58066         | Customer name incorrect   |
| CEDF-13-58702         | Customer name incorrect; Phone number incorrect                   |
| CEDF-13-58755         | Customer name incorrect   |
| CEDF-13-60213         | Customer name incorrect   |
| CEDF-13-77268         | Customer name incorrect; Phone number incorrect                   |
| CEDF-13-78089         | Customer name incorrect   |
| CEDF-13-58739         | Customer name incorrect   |
| CEDF-13-60194         | Customer name incorrect; Phone number incorrect                   |
| CEDF-13-78126         | Customer name incorrect   |
| CEDF-13-77253         | Address incorrect   |
| CEDF-13-93297         | Address incorrect   |
| CEDF-13-58059         | Address incorrect   |
| CEDF-13-79746         | ZIP code incorrect; Phone number incorrect; Energy type incorrect |
| CEDF-13-60199         | Phone number incorrect  |
| CEDF-13-60376         | Phone number incorrect  |
| CEDF-13-77253         | Phone number incorrect  |
| CEDF-13-92891         | Phone number incorrect  |
| CEDF-13-93226         | Phone number incorrect  |
| CEDF-13-93237         | Phone number incorrect  |
| CEDF-13-93320         | Phone number incorrect  |
| CEDF-13-58706         | Phone number incorrect  |
| CEDF-13-58718         | Phone number incorrect  |
| CEDF-13-59155         | Phone number incorrect  |
| CEDF-13-59195         | Phone number incorrect  |
| CEDF-13-77292         | Phone number incorrect  |
| CEDF-13-77483         | Phone number incorrect  |
| CEDF-13-77785         | Phone number incorrect  |

|               |   |
|---------------|---|
| CEDF-13-78122 | Phone number incorrect                            |
| CEDF-13-78382 | Phone number incorrect                            |
| CEDF-13-78908 | Phone number incorrect                            |
| CEDF-13-58059 | Phone number incorrect                            |
| CEDF-13-92926 | Measure description incorrect; Quantity incorrect |

**Table C-6. Multi-Family Program Application Variances**

| <b>Project Number</b> | <b>Error Description</b>   |
|-----------------------|--|
| a0RC000000AZCd3MAH    | Customer name incorrect; Address incorrect; Phone number incorrect |
| a0RC000000CcFJMMA3    | Customer name incorrect; Phone number incorrect                    |
| a0RC000000D4IEqMAJ    | Customer name incorrect; Phone number incorrect                    |
| a0RC0000007cYIZMAU    | Address incorrect  |
| a0RC000000CbvOLMAZ    | Address incorrect  |
| a0RC000000CdCEEMA3    | Address incorrect; Phone number incorrect                          |
| a0RC000000CdfcrMAB    | Address incorrect; Phone number incorrect                          |
| a0RC000000Cbh7jMAB    | Address incorrect; Phone number incorrect                          |
| a0RC0000004CGfPMAW    | Phone number incorrect   |
| a0RC0000007ca1fMAA    | Phone number incorrect   |
| a0RC000000AaOJvMAN    | Phone number incorrect   |
| a0RC000000AbtCKMAZ    | Phone number incorrect   |
| a0RC000000AcdT4MAJ    | Phone number incorrect   |
| a0RC000000AcQOYMA3    | Phone number incorrect   |
| a0RC000000AYoFHMA1    | Phone number incorrect   |
| a0RC000000AZOU5MAP    | Phone number incorrect   |
| a0RC000000C3cdCMAR    | Phone number incorrect   |
| a0RC000000C3OceMAF    | Phone number incorrect   |
| a0RC000000C4U3IMAF    | Phone number incorrect   |
| a0RC000000C5EwmMAF    | Phone number incorrect   |
| a0RC000000C5oulMAB    | Phone number incorrect   |
| a0RC000000C688JMAR    | Phone number incorrect   |
| a0RC000000C6HIFMAV    | Phone number incorrect   |
| a0RC000000C6IFZMA3    | Phone number incorrect   |
| a0RC000000C6kLzMAJ    | Phone number incorrect   |
| a0RC000000C6QerMAF    | Phone number incorrect   |
| a0RC000000C6ryZMAR    | Phone number incorrect   |
| a0RC000000C6w2LMAR    | Phone number incorrect   |
| a0RC000000Ccpy6MAB    | Phone number incorrect   |

|                    |                        |
|--------------------|------------------------|
| a0RC000000CdfYpMAJ | Phone number incorrect |
| a0RC000000CeLEGMA3 | Phone number incorrect |
| a0RC000000CKhTJMA1 | Phone number incorrect |
| a0RC000000CMdvUMAT | Phone number incorrect |
| a0RC000000CN2CrMAL | Phone number incorrect |
| a0RC000000CNlxeMAH | Phone number incorrect |
| a0RC000000CNrtlMAT | Phone number incorrect |
| a0RC000000D62dGMAR | Phone number incorrect |
| a0RC000000D6SJVMA3 | Phone number incorrect |
| a0RC000000DO0VjMAL | Phone number incorrect |
| a0RC000000C6w2LMAR | Quantity incorrect     |

**Table C-7. Furnace Tune-up Initiative Program Application Variances**

| <b>Project Number</b> | <b>Error Description</b>   |
|-----------------------|--|
| CEDF-13-57084         | Account number incorrect   |
| CEDF-13-57108         | Account number incorrect; Customer name incorrect; Address incorrect   |
| CEDF-13-59395         | Account number incorrect   |
| CEDF-13-56906         | Customer name incorrect; Phone number incorrect                        |
| CEDF-13-56916         | Customer name incorrect; Phone number incorrect; Energy type incorrect |
| CEDF-13-57139         | Customer name incorrect  |
| CEDF-13-57265         | Customer name incorrect  |
| CEDF-13-57833         | Customer name incorrect  |
| CEDF-13-57929         | Customer name incorrect; Phone number incorrect                        |
| CEDF-13-58514         | Customer name incorrect; Phone number incorrect                        |
| CEDF-13-58515         | Customer name incorrect; Phone number incorrect                        |
| CEDF-13-58583         | Customer name incorrect; Phone number incorrect                        |
| CEDF-13-58588         | Customer name incorrect; Address incorrect                             |
| CEDF-13-59395         | Customer name incorrect  |
| CEDF-13-59396         | Customer name incorrect  |
| CEDF-13-59466         | Customer name incorrect  |
| CEDF-13-59536         | Customer name incorrect; Phone number incorrect                        |
| CEDF-13-57264         | Address incorrect; Energy type incorrect                               |
| CEDF-13-58792         | Address incorrect; Phone number incorrect                              |
| CEDF-13-59405         | Address incorrect  |
| CEDF-13-57631         | ZIP code incorrect   |
| CEDF-12-56676         | Phone number incorrect   |
| CEDF-12-56719         | Phone number incorrect   |
| CEDF-12-56727         | Phone number incorrect   |
| CEDF-13-56943         | Phone number incorrect   |
| CEDF-13-56948         | Phone number incorrect   |
| CEDF-13-56952         | Phone number incorrect   |
| CEDF-13-57084         | Phone number incorrect   |

|               |                        |
|---------------|------------------------|
| CEDF-13-57101 | Phone number incorrect |
| CEDF-13-57139 | Phone number incorrect |
| CEDF-13-57254 | Phone number incorrect |
| CEDF-13-57257 | Phone number incorrect |
| CEDF-13-57260 | Phone number incorrect |
| CEDF-13-57277 | Phone number incorrect |
| CEDF-13-57395 | Phone number incorrect |
| CEDF-13-57631 | Phone number incorrect |
| CEDF-13-57833 | Phone number incorrect |
| CEDF-13-57837 | Phone number incorrect |
| CEDF-13-57840 | Phone number incorrect |
| CEDF-13-58345 | Phone number incorrect |
| CEDF-13-58513 | Phone number incorrect |
| CEDF-13-59134 | Phone number incorrect |
| CEDF-13-59138 | Phone number incorrect |
| CEDF-13-59246 | Phone number incorrect |
| CEDF-13-59276 | Phone number incorrect |
| CEDF-13-59281 | Phone number incorrect |
| CEDF-13-59286 | Phone number incorrect |
| CEDF-13-59290 | Phone number incorrect |
| CEDF-13-59379 | Phone number incorrect |
| CEDF-13-59395 | Phone number incorrect |
| CEDF-13-59396 | Phone number incorrect |
| CEDF-13-59405 | Phone number incorrect |
| CEDF-13-59466 | Phone number incorrect |
| CEDF-13-59513 | Phone number incorrect |
| CEDF-13-59526 | Phone number incorrect |
| CEDF-13-59543 | Phone number incorrect |
| CEDF-13-59600 | Phone number incorrect |



STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**DIRECT TESTIMONY**

**OF**

**LAURA M. COLLINS**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

LAURA M. COLLINS  
DIRECT TESTIMONY

1 Q. Please state your name and business address.

2 A. Laura M. Collins, One Energy Plaza, Jackson, Michigan.

3 Q. By whom are you employed and in what capacity?

4 A. I am employed by Consumers Energy Company (“Consumers Energy” or the  
5 “Company”) as a Senior Rate Analyst II in the Pricing section of the Rates Department.

6 Q. Please describe your educational background and business experience.

7 A. I received a Bachelor of Business Administration degree in Finance in December 2000  
8 from the University of Michigan – Flint. In January 2001, I joined Consumers Energy as  
9 a Rate Analyst in the Revenue Requirements section of the Rates Department. In August  
10 2003, I was promoted to a General Rate Analyst. In August 2007, I was promoted to a  
11 Senior Rate Analyst I and in July 2010 I was promoted to a Senior Rate Analyst II. In  
12 April 2012 I joined the Pricing section of the Rates Department.

13 Q. What are your responsibilities as a Senior Rate Analyst II for Consumers Energy?

14 A. My current responsibilities include rate design, research and development of additional  
15 services, analyses for Senior Management, and customer-specific rate analyses.

16 Q. Have you previously filed testimony with the Michigan Public Service Commission  
17 (“MPSC” or the “Commission”)?

18 A. Yes. I filed testimony in the Gas Cost Recovery (“GCR”) Plan Case Nos. U-13220,  
19 U-13570, U-13916, U-14403, U-14716, and U-15454 and the GCR Reconciliation Case  
20 Nos. U-12752-R, U-13570-R, U-14403-R, and U-14716-R. I also filed testimony in the  
21 Gas General Rate Case Nos. U-13730 and U-17197; Power Supply Cost Recovery  
22 (“PSCR”) Plan Case Nos. U-16045, U-16432, and U-16890; PSCR Reconciliation Case  
23 Nos. U-13917-R, U-14274-R, U-14701-R, U-15001-R, U-15415-R, U-15675-R,

LAURA M. COLLINS  
DIRECT TESTIMONY

1 U-16045-R, and U-16432-R; and Energy Optimization (“EO”) Reconciliation Case Nos.  
2 U-16736 and U-17281. In addition, I testified in the Electric General Rate Case No.  
3 U-14347.

4 Q. What is the purpose of your testimony in this proceeding?

5 A. The purpose of my testimony is to present a comparison of the actual EO surcharge  
6 revenue collected during 2013 to the anticipated 2013 revenue for the Company’s  
7 Commission-approved EO Plan. I will also discuss the Company’s proposal for recovery  
8 of the EO program performance incentives earned in 2013 and introduce the proposed  
9 tariff sheets for the surcharges.

10 Q. Are you sponsoring any exhibits?

11 A. Yes, I am sponsoring the following exhibits:

|    |                     |   |
|----|---------------------|---|
| 12 | Exhibit A-6 (LMC-1) | Electric EO Surcharge Incentive Component |
| 13 | Exhibit A-7 (LMC-2) | Gas EO Surcharge Incentive Component      |
| 14 | Exhibit A-8 (LMC-3) | Electric Surcharge Tariff Sheet           |
| 15 | Exhibit A-9 (LMC-4) | Gas Surcharge Tariff Sheet                |

16 Q. Were these exhibits prepared by you or under your supervision?

17 A. Yes.

18 Q. What amount of EO revenue was collected during the year 2013?

19 A. As shown on Exhibit A-1 (KLA-1), page 1 of 4, the actual 2013 electric EO surcharge  
20 collections of \$66.1 million were \$3.1 million lower than the Company’s electric plan  
21 spending of approximately \$69.2 million. As shown on Exhibit A-2 (KLA-2), page 1  
22 of 4, the actual 2013 gas EO surcharge collections of \$48.0 million were \$172,000 higher  
23 than the Company’s gas plan spending of approximately \$47.8 million.

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DIRECT TESTIMONY

1 Q. Given your observations of the actual program collections during 2013 versus the Plan  
2 program spending, are you proposing any adjustments to the program surcharges at this  
3 time?

4 A. No, the Company does not believe it necessary to propose any surcharge adjustments for  
5 the programs at this time. The EO program is funded by surcharges that are leveled  
6 over multiple years and re-evaluated with each EO Plan case filing. Therefore, it is not  
7 necessary to make any surcharge adjustments in the Reconciliation case.

8 Q. Did the Company earn an EO program performance incentive in 2013?

9 A. Yes. As testified to by Company witness James P. Schwanitz, the Company earned a  
10 \$10.4 million performance incentive in 2013 for its electric business and a \$7.2 million  
11 performance incentive in 2013 for its gas business.

12 Q. Please describe the manner in which the Company proposes to recover the earned  
13 program performance incentive.

14 A. The Company proposes to recover this performance incentive through a 12-month  
15 surcharge to its electric and gas EO customers. As shown on Exhibits A-16 (JPS-1) and  
16 A-17 (JPS-2), \$10.4 million would be recovered from electric customers, while  
17 \$7.2 million would be recovered from gas customers. In addition to these amounts, the  
18 Company will roll-in the cumulative over-collection amounts from the 2010 and 2011  
19 incentive surcharges, as shown on Exhibit A-3 (KLA-3) and Exhibit A-4 (KLA-4). The  
20 Company is proposing that the 12-month performance incentive surcharge be  
21 implemented prospectively, beginning with the January 2015 billing cycle for a period of  
22 12 months.

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DIRECT TESTIMONY

1 Q. Why is the Company proposing to collect the incentive over 12 months?

2 A. As discussed by Company witness Katherine L. Allen, based on accounting rules the  
3 incentive needs to be fully collected no later than December 31, 2015. Ms. Allen  
4 discusses this further in her testimony.

5 Q. Is the Company proposing to collect interest on the incentive?

6 A. No. While the Company feels that spreading the collection of the incentive out over  
7 12 months reduces the value of the award due to the time value of money, the Company  
8 recognizes that the collection of interest has been rejected in prior EO Reconciliation  
9 cases.

10 Q. Typically surcharges are issued beginning with the first cycle of the first billing month  
11 30 days following the issuance of a Commission order approving the surcharge. Why is  
12 the Company proposing to start the 12-month performance incentive surcharge with the  
13 January 2015 billing cycle instead?

14 A. There is currently an incentive surcharge in place from the 2012 EO Reconciliation case  
15 Order (Case No. U-17281). This surcharge will be completed in December of 2014. In  
16 order to avoid having two incentive surcharges in place at the same time and to minimize  
17 the burden on customers, the Company is proposing to wait until the 2012 performance  
18 incentive surcharge is complete before implementing the surcharge for the  
19 2013 performance incentive.

20 Q. How would the incentive be allocated to each customer rate class and in what amount?

21 A. The Company proposes that the rate design for any incentive approved for collection be  
22 allocated to each customer class in the same manner the approved low-income expenses  
23 were allocated to each customer class in the approved EO Plan, on the basis of Plan year

LAURA M. COLLINS  
DIRECT TESTIMONY

customer class program cost allocation. As reflected in Exhibit A-6 (LMC-1), the total electric surcharge obligation of each customer group (col. D, line 1-9) was established utilizing a proration factor derived from the customer group low-income cost responsibility of the approved EO Plan. The customer obligation was divided by the forecasted billing determinants (col. E, lines 1-9) for each customer group to establish the EO incentive component (col. F, line 1-9) to be added to their existing surcharge for the months of application. The surcharges should be billed on the same basis as the current EO surcharges, i.e., the gas customers billed on a volumetric per Mcf basis, electric residential customers on a volumetric per kWh basis, and the electric commercial and industrial customers on a per customer meter basis.

The calculations of the gas customer EO incentive surcharge components are shown on Exhibit A-7 (LMC-2) and follow the same derivation as explained above for the electric surcharges. The Company proposes that any difference between the incentive amount collected and that amount approved be rolled into the following year's EO Reconciliation filing.

Q. Please describe Exhibit A-8 (LMC-3) Electric Surcharge Tariff Sheet.

A. Exhibit A-8 (LMC-3) provides the surcharges proposed to be billed to electric customers, inclusive of both the approved EO program costs and the proposed EO earned performance incentives starting in January 2015.

Q. Please describe Exhibit A-9 (LMC-4) Gas Surcharge Tariff Sheet.

A. Exhibit A-9 (LMC-4) provides the surcharges proposed to be billed to gas customers, inclusive of both the approved EO program costs and the proposed EO earned performance incentives starting in January 2015.

LAURA M. COLLINS  
DIRECT TESTIMONY

1 Q. What impact will the incentive surcharge proposed in this docket have on a typical  
2 residential electric customer's bill?

3 A. Moving from the 2012 incentive surcharge amount to the 2013 surcharge will have no  
4 impact on the average residential electric customer's bill.

5 Q. What impact will the incentive surcharge have on a typical residential gas customer's  
6 bill?

7 A. Moving from the 2012 incentive surcharge amount to the 2013 surcharge will decrease  
8 the average residential gas customer's bill by about \$0.02/month.

9 Q. Does this conclude your testimony?

10 A. Yes.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**EXHIBITS**

**OF**

**LAURA M. COLLINS**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014



**Consumers Energy Company**  
Electric EO Surcharge Incentive Component  
Calculated Without Interest and Collected over 12 Months

| Line | Description      | Low-Income<br>Cost<br>Responsibility (1) | Proration<br>Factor (2) | Surcharge<br>Obligation (3) | Customer Group<br>Surcharge Annual<br>Determinants (4) | Monthly                  |   |
|------|------------------|--|-------------------------|-----------------------------|--|--------------------------|---|
|      |                  |  |                         |                             |  | Electric EO<br>Surcharge | Incentive Component<br>(per kWh or Cust.) (5) |
|      | (a)              | (b)                                      | (c)                     | (d)                         | (e)  |                          | (f)   |
| 1    | Residential      | \$1,623,215                              | 0.4333                  | \$ 4,267,380                | 12,519,297,000   | \$                       | <b>0.000341</b>                               |
| 2    | Small Secondary  | 129,920                                  | 0.0347                  | \$ 341,554                  | 1,660,396  | \$                       | <b>0.21</b>                                   |
| 3    | Medium Secondary | 227,950                                  | 0.0609                  | \$ 599,273                  | 535,291  | \$                       | <b>1.12</b>                                   |
| 4    | Large Secondary  | 823,218                                  | 0.2198                  | \$ 2,164,213                | 318,709  | \$                       | <b>6.79</b>                                   |
| 5    | Small Primary    | 847                                      | 0.0002                  | \$ 2,228                    | 5,275  | \$                       | <b>0.42</b>                                   |
| 6    | Sm. Med.Primary  | 2,637                                    | 0.0007                  | \$ 6,932                    | 2,223  | \$                       | <b>3.12</b>                                   |
| 7    | Medium Primary   | 16,950                                   | 0.0045                  | \$ 44,560                   | 5,715  | \$                       | <b>7.80</b>                                   |
| 8    | Lg. Med. Primary | 27,308                                   | 0.0073                  | \$ 71,791                   | 3,836  | \$                       | <b>18.72</b>                                  |
| 9    | Large Primary    | 893,902                                  | 0.2386                  | \$ 2,350,039                | 25,827   | \$                       | <b>90.99</b>                                  |
| 10   | Total            | \$3,745,945                              | 1.00                    | <b>\$ 9,847,969</b>         |  |                          |   |

- (1) Case No. U-17351, WP-TAY-2  
(2) Proration factor developed per customer group share (col. b, lines 1-9) of total (col. b, line 10).  
(3) Customer group surcharge obligation based on customer group share (col. c, lines 1-9) of total obligation (col. d, line 10).  
(4) Case No U-17351, Exhibit A-5 (HWM-5)  
(5) Residential group surcharge on a \$/kWh basis, while C&I customer surcharge on a \$/customer meter basis.  
(6) Surcharge obligation of \$10,364,556 per Exhibit A-16 (JPS-1) less 2010 Over-Recovery of \$241,728 per Exhibit A-3 (KLA-3), pg 2,  
and 2011 Over-Recovery of \$274,859 per Exhibit A-4 (KLA-4), pg. 2

**Consumers Energy Company**  
Gas EO Surcharge Incentive Component  
Calculated Without Interest and Collected over 12 Months

| Line | Description              | Low-Income         | Proration | Surcharge        | Customer Group   | Monthly             |
|------|--------------------------|--------------------|-----------|------------------|------------------|---------------------|
|      |                          | Cost               |           |                  |                  |                     |
|      |                          | Responsibility (1) |           |                  | Determinants (4) | Incentive Component |
|      |                          | (\$)               | (c)       | (\$)             | (Mcf)            | (per Mcf)           |
|      | (a)                      | (b)                |           | (d)              | (e)              | (f)                 |
| 1    | Residential              | \$5,327,975        | 0.6751    | \$ 4,542,894     | 151,355,000      | \$ 0.0300           |
| 2    | Small C&I (<100,000 Mcf) | 2,506,946          | 0.3176    | \$ 2,137,545     | 85,372,051       | \$ 0.0250           |
| 3    | Large C&I (>100,000 Mcf) | 57,705             | 0.0073    | \$ 49,202        | 50,815,949       | \$ 0.0010           |
| 4    | Total                    | \$7,892,626        | 1.00      | \$ 6,729,641 (5) |                  |                     |

- (1) Case No. U-17351, WP-TAY-2  
(2) Proration factor developed per customer group share (col. b, lines 1-3) of total (col. b, line 4).  
(3) Customer group surcharge obligation based on customer group share (col. c, lines 1-3) of total obligation (col. d, line 4).  
(4) Case No U-17351, Exhibit A-7 (HWM-7)  
(5) Surcharge obligation of \$7,166,544 per Exhibit A-17 (JPS-2) less 2010 Over-Recovery of \$103,658 per Exhibit A-3 (KLA-3), pg 3, and 2011 Over-Recovery of \$333,245 per Exhibit A-4 (KLA-4), pg. 3

**M.P.S.C. No. 13 - Electric  
Consumers Energy Company**

**Sheet No. D-2.10**

**SURCHARGES**

| <b>Rate Schedule</b>                       | <b>Renewable Energy<br/>Plan Surcharge<br/>(Case No. U-16581)<br/>Effective beginning the<br/>August 2012 Bill Month<sup>(5)</sup></b> | <b>Energy Efficiency<br/>Electric Program Surcharge<br/>(Case No. U-17601)<br/>Effective beginning the<br/>January 2015 Bill Month<sup>(3)</sup></b> | <b>Energy Efficiency<br/>Self-Directed<br/>Customer Surcharge<br/>(Case No. U-17351)<br/>Effective beginning the<br/>January 2014 Bill Month<sup>(2)</sup></b> |
|--|--|--|--|
| Residential Rates                          | \$ 0.52/billing meter  | \$0.002843/kWh   | NA   |
| Rate GS and GSD <sup>(1)</sup>             |  |  |  |
| Tier 1: 0 – 1,250 kWh/mo.                  | \$ 0.90/billing meter  | \$ 1.64/billing meter  | \$ 0.08 /billing meter   |
| Tier 2: 1,251 – 5,000 kWh/mo.              | \$ 3.60/billing meter  | \$ 8.91 /billing meter   | \$ 0.42 /billing meter   |
| Tier 3: 5,001 – 30,000 kWh/mo.             | \$ 7.20/billing meter  | \$ 54.05 /billing meter  | \$ 2.54 /billing meter   |
| Tier 4: 30,001 – 50,000 kWh/mo.            | \$ 10.80/billing meter   | \$ 54.05 /billing meter  | \$ 2.54 /billing meter   |
| Tier 5: > 50,000 kWh/mo.                   | \$ 14.40/billing meter   | \$ 54.05 /billing meter  | \$ 2.54 /billing meter   |
| Rate GP, GPD, GPTU and MMPP <sup>(1)</sup> |  |  |  |
| Tier 1: 0 – 5,000 kWh/mo.                  | \$ 3.60/billing meter  | \$ 3.31 /billing meter   | \$ 0.16 /billing meter   |
| Tier 2: 5,001 – 10,000 kWh/mo.             | \$ 10.80/billing meter   | \$ 24.42 /billing meter  | \$ 1.18 /billing meter   |
| Tier 3: 10,001 – 30,000 kWh/mo.            | \$ 18.00/billing meter   | \$ 61.05 /billing meter  | \$ 2.95 /billing meter   |
| Tier 4: 30,001 – 50,000 kWh/mo.            | \$ 36.00/billing meter   | \$ 146.53 /billing meter   | \$ 7.04 /billing meter   |
| Tier 5: > 50,000 kWh/mo.                   | \$ 90.00/billing meter   | \$ 709.10 /billing meter   | \$ 31.88 /billing meter  |
| Rate E-1                                   | NA   | NA   | NA   |
| Rate GSG-1                                 | NA   | NA   | NA   |
| Rate GSG-2                                 | NA   | NA <sup>(4)</sup>  | NA   |
| Rate GML <sup>(6)</sup>                    |  |  |  |
| Tier 1: 0 – 1,250 kWh/mo.                  | \$ 0.90/billing meter  | NA   | NA   |
| Tier 2: 1,251 – 5,000 kWh/mo.              | \$ 1.80/billing meter  | NA   | NA   |
| Tier 3: >5,000 kWh/mo.                     | \$ 2.70/billing meter  | NA   | NA   |
| Rate GUL <sup>(6)</sup>                    | \$ 0.25/luminaire  | NA   | NA   |
| Rate GU-XL <sup>(6)</sup>                  | \$ 0.25/luminaire  | NA   | NA   |
| Rate GU                                    |  |  |  |
| Tier 1: 0 – 1,250 kWh/mo.                  | \$ 0.20/billed account   | NA   | NA   |
| Tier 2: 1,251 – 5,000 kWh/mo.              | \$ 0.80/billed account   | NA   | NA   |
| Tier 3: >5,000 kWh/mo.                     | \$ 1.40/billed account   | NA   | NA   |
| Rate PA                                    | NA   | NA   | NA   |
| Rate ROA-R, ROA-S, ROA-P                   | NA   | As in Delivery Rate Schedule   | As in Delivery Rate Schedule   |

All Surcharges shall be applied on a monthly basis. The customer's consumption will be reviewed annually in the January bill month. Following the annual review, the customer may be subsequently moved to the Surcharge level for their applicable rate for the next billing period based on the customer's average consumption for the previous year. In situations where no historical consumption is available, the monthly Surcharge level will be based on the lowest consumption category for the secondary rate schedules or the lowest consumption category for primary rate schedules. No retroactive adjustment will be made due to the application of the REP or EE Surcharges associated with increases or decreases in consumption.

<sup>(1)</sup>Municipal Pumping customers shall be excluded from the Renewable Energy Plan Surcharge.

<sup>(2)</sup>An eligible customer who files and implements a self-directed plan in compliance with Rule C12 is required to pay the Energy Efficiency Self-Directed Program Surcharge.

<sup>(3)</sup>An Energy Efficiency Program Surcharge will be in effect for the period of the June 2009 Bill Month through the December 2015 Bill Month. The amount may vary during specific months as authorized by the Michigan Public Service Commission. Applicable cases include Case Nos. U-15805, U-16302, U-16303, U-16412, U-16670, U-16736, U-17281, U-17351, and U-17601. The Surcharge for the period of the January 2015 Bill Month through the December 2015 Bill Month includes a financial incentive award approved by the Michigan Public Service Commission in Case No. U-17601. The Company will file a new tariff sheet to reflect the change in surcharges once the financial incentive recovery period has been completed.

<sup>(4)</sup>Rate GSG-2 Customers are eligible to opt-in to the Energy Efficiency Electric Program Surcharge for a two year pilot program beginning with the June 2012 bill month. A GSG-2 customer electing to participate in the Energy Efficiency Electric Program will be charged the GPD, Tier 5: > 50,000 kWh/mo rate of \$709.10 per billing meter per month.

<sup>(5)</sup>A Renewable Energy Plan Surcharge will be in effect for the period of the September 2009 Bill Month through the August 2029 Bill Month. The amount may vary during specific months as authorized by the Michigan Public Service Commission. Applicable cases include Case Nos. U-15805, U-16543 and U-16581.

<sup>(6)</sup>Customer-Owned lighting fixtures served on Rate GML, GUL and Rate GU-XL are eligible to opt-in to the Energy Efficiency Electric Program Surcharge. A GML, GUL or GU-XL customer electing to participate in the Energy Efficiency Electric Program will be charged the applicable surcharge as shown for Rate GS and GSD or rate GP, GPD, GPTU and MMPP as applicable per participating account per month.

**Issued XXXXX XX, 2014 by  
J. G. Russell,  
President and Chief Executive Officer,  
Jackson, Michigan**

**Effective for bills rendered on and after  
the Company's January 2015 Billing Month**

**Issued under authority of the  
Michigan Public Service Commission  
dated XXXXX XX, 2014  
in Case No. U-17601**

M.P.S.C. No. 2 - Gas  
Consumers Energy Company

Sheet No. D-1.10

## SURCHARGES

Each Rate Schedule may be subject to Rule No. C8., Customer Attachment Program.

| <u>Rate Schedule</u> | <u>Energy Efficiency<sup>(1)</sup><br/>Program Surcharge<br/>(Case No. U-17601)<br/>Effective beginning the<sup>(2)</sup><br/>January 2015 Bill Month</u> | <u>Energy Efficiency<br/>Large Gas Transportation<br/>Opt-Out Pilot<br/>Program Surcharge<br/>(Case No. U-16670)<sup>(3)</sup></u> |
|----------------------|---|--|
| Rate A               | \$0.2108/Mcf  | NA   |
| Rate A-1             | \$0.2108/Mcf  | NA   |
| Rate GS-1            | \$0.1387/Mcf  | NA   |
| Rate GS-2            | \$0.1387/Mcf  | NA   |
| Rate GS-3            |   | NA   |
| 0 – 100,000 Year     | \$0.1387/Mcf  | NA   |
| > 100,000 Year       | \$0.0049/Mcf  | NA   |
| Rate GL              | NA  | NA   |
| Rate ST              |   |  |
| 0 – 100,000 Year     | \$0.1387/Mcf  | NA   |
| > 100,000 Year       | \$0.0049/Mcf  | \$0.0018/Mcf   |
| Rate LT              |   |  |
| 0 – 100,000 Year     | \$0.1387/Mcf  | NA   |
| > 100,000 Year       | \$0.0049/Mcf  | \$0.0018/Mcf   |
| Rate XLT             |   |  |
| 0 – 100,000 Year     | \$0.1387/Mcf  | NA   |
| > 100,000 Year       | \$0.0049/Mcf  | \$0.0018/Mcf   |
| Rate CC              | Per applicable distribution<br>Rate Schedule  | NA   |

<sup>(1)</sup> All surcharges shall be applied on a monthly basis. The customer's consumption will be reviewed annually in the January bill month. Following the annual review, the customer may be subsequently moved to the surcharge level for their applicable rate for the next billing period based on the customer's average consumption for the previous year. No retroactive adjustment will be made due to the application of EE surcharges associated with increases or decreases in consumption.

<sup>(2)</sup> An Energy Efficiency Program Surcharge will be in effect for the period of the June 2009 Bill Month through the December 2015 Bill Month. The amount may vary during specific months as authorized by the Michigan Public Service Commission. Applicable cases include Case Nos. U-15889, U-16302, U-16303, U-16412, U-16770, U-16736, U-17281, U-17351, and 17601. The surcharge for the period of the January 2015 Bill Month through the December 2015 Bill Month includes a financial incentive award approved by the Michigan Public Service Commission in Case No. U-17601. The Company will file a new tariff sheet to reflect the change in surcharges once the financial incentive recovery period has been completed.

<sup>(3)</sup> Gas Transportation customers on Rate ST, LT or XLT using more than 100,000 Mcf per year may be eligible to opt-out of the Energy Efficiency program. Eligible customers who elect to opt-out of the Energy Efficiency program will pay the Energy Efficiency Large Gas Transportation Opt-Out Pilot Program surcharge per Mcf on a monthly basis. Eligibility is determined solely by the Company and is dependent upon terms and conditions of the Energy Efficiency Large Gas Transportation Customer Opt-Out Pilot Program as authorized in the April 17, 2012 order in Case No. U-16670.

Issued XXXXX XX, 2014 by  
J. G. Russell,  
President and Chief Executive Officer,  
Jackson, Michigan

Effective for bills rendered on and after  
the Company's January 2015 Billing Month

Issued under authority of the  
Michigan Public Service Commission  
dated XXXXX XX, 2014  
in Case No. U-17601

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**DIRECT TESTIMONY**

**OF**

**M. SAMI KHAWAJA**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

M. SAMI KHAWAJA  
DIRECT TESTIMONY

1 Q. Please state your name and business address.

2 A. My name is M. Sami Khawaja. My business address is 720 SW Washington, Suite 400,  
3 Portland, Oregon 97205.

4 Q. Please describe your position and responsibilities.

5 A. I am employed by The Cadmus Group, Inc. ("Cadmus"). My title is Executive  
6 Consultant in the Energy Services Division ("ESD"). ESD provides program and market  
7 analysis, statistical and economic analysis, and measurement and engineering services.  
8 We currently employ over 200 Demand Side Management ("DSM") professionals in five  
9 major offices. Our clients include investor-owned utilities, public utilities commissions,  
10 state agencies, and international organizations. We currently run portfolio evaluations in:  
11 Ohio, Illinois, Missouri, New York, Massachusetts, Oregon, Washington, Idaho, Utah,  
12 Arizona, Maryland, Pennsylvania, Indiana, Arkansas, Wisconsin, South Carolina, North  
13 Carolina, and California.

14 Q. Please describe your education and professional experience.

15 A. I hold a Ph.D. in Systems Science and Economics from Portland State University. Prior  
16 to my present position with Cadmus, I owned and ran Quantec, LLC for ten years.  
17 Quantec was a DSM planning and evaluation consulting firm with offices in Portland,  
18 Oregon and Boulder, Colorado. Earlier in my career, I was employed as a Project  
19 Director at Barakat and Chamberlin (another DSM planning and evaluation firm). I also  
20 was employed as a Senior Analyst at PacifiCorp. I am currently an adjunct professor of  
21 economics at the Graduate Applied Energy Economics and Policy Program at Portland  
22 State University. I have conducted various kinds of energy-efficiency program  
23 evaluations for international and domestic clients. Throughout my 30 years of work in

M. SAMI KHAWAJA  
DIRECT TESTIMONY

the energy industry, I have performed and directed over 100 DSM program evaluations. I have also written extensively on the subject. I have presented at over 50 conferences. I am published in Public Utilities Fortnightly, Energy Journal, American Journal of Agricultural Economics, Contemporary Policy Issues, Journal of Applied Mathematics and Decision Sciences, and Home Energy. I have taught workshops to clients in the United States and internationally on Evaluation, Statistics, Financial Modeling, Cost Effectiveness Analysis, and Introductory Demand Side Management. I am a contributing author to national and international protocols for conducting evaluations, measurement, and verification of DSM programs. In particular, I have contributed to the following guides and protocols:

- International Performance Measurement and Verification Protocol (“IPMVP”);
- Program Impact Evaluation Guide for the National Action Plan for Energy Efficiency (“NAPEE”);
- Impact Evaluation Guide for the Electric Power Research Institute (“EPRI”); and
- United States Department of Energy (“DOE”) Uniform Method Protocols (“UMP”).

I have also provided expert testimony to the following entities:

- Washington Utilities and Transportation Commission;
- Public Utilities Commission of Ohio;
- Utah Public Utilities Commission; and
- Oregon Public Utilities Commission.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to present certified energy savings produced by Consumers Energy Company (“Consumers Energy” or the “Company”) for its residential programs for the 2013 program year.

M. SAMI KHAWAJA  
DIRECT TESTIMONY

1 Q. Are you sponsoring any exhibits with your direct testimony?

2 A. Yes, I am sponsoring one exhibit.

- 3 • Exhibit A-10 (MSK-1): Consumers Energy 2013 Residential Energy Optimization  
4 Certification Report.

5 This is a 129-page report produced by Cadmus. Cadmus has worked with the  
6 Company as an independent, third-party evaluator. In this capacity, Cadmus audited and  
7 certified the 2013 residential electric and gas energy savings achieved by the Company's  
8 residential Energy Optimization ("EO") programs.

9 Q. Has this exhibit been prepared by you or under your supervision?

10 A. Yes.

11 Q. How has Cadmus certified the Company's 2013 residential EO program energy and  
12 demand savings?

13 A. The Company engaged Cadmus to perform this duty. Cadmus employed a rigorous  
14 process to certify energy and demand savings for the Company's residential EO programs  
15 that included:

- 16 • Comparison of reported savings results to data maintained in Consumers Energy's  
17 and implementation contractor's tracking systems to ensure utilization of an accurate  
18 process for calculating total savings values by measure, program, and the total  
19 portfolio;
- 20 • Confirmation that the equipment specified on the incentive applications and logged in  
21 the tracking system met program incentive requirements;
- 22 • Review of random, statistically significant samples of incentive applications for each  
23 program to determine that data were consistently and accurately represented in the  
24 tracking systems; and
- 25 • Verification that correct factors were used to calculate savings, including: Michigan  
26 Energy Measures Database ("MEMD") saving values; evaluation derived installation  
27 rates and engineering adjustments; appropriate net-to gross factors; and the  
28 application of the long-life equipment savings multiplier for measures with lives  
29 greater than ten years.



M. SAMI KHAWAJA  
DIRECT TESTIMONY

1 Q. Has Cadmus reviewed other performance metrics related to the Company's residential  
2 EO program?

3 A. Yes. Cadmus verified savings from the low-income programs and compared those to the  
4 targets established in the Company's EO plan filed with the Michigan Public Service  
5 Commission in Case No. U-16670. In addition, Cadmus verified the number of  
6 ENERGY STAR<sup>®</sup> homes constructed under the New Homes Program in 2013 and  
7 compared that to the number verified in 2012.

8 Q. What are Cadmus' qualifications for certifying the residential energy savings and other  
9 performance metrics?

10 A. In more than two decades of working in the energy industry, Cadmus has conducted more  
11 than 1,000 process, impact, and program evaluations. Much of this work has involved  
12 multi-year, multi-program (portfolio) projects, most of which were residential  
13 evaluations. Cadmus team members have contributed to some of the most widely used  
14 evaluation protocols, including the IPMVP, NAPEE Evaluation Guidelines, DOE UMP,  
15 EPRI Impact Evaluation Guide, and the California Evaluation Protocols.

16 Q. What were Cadmus' conclusions regarding the amount of electric savings for the  
17 Company's 2013 residential EO programs?

18 A. Table 7 in Cadmus' certification report, (Exhibit A-10 (MSK-1)), shows that the  
19 Company calculated 186,208,777 kWh of net savings. Cadmus' audit of this calculation  
20 validated that the Company saved 99.85% of that amount, 185,935,693 kWh.

M. SAMI KHAWAJA  
DIRECT TESTIMONY

1 Q. What were Cadmus' conclusions regarding the amount of electric demand savings for the  
2 Company's 2013 residential EO programs?

3 A. Table 9 in Cadmus' certification report (Exhibit A-10 (MSK-1)) shows that the Company  
4 calculated 19,709 kW of net demand savings. Cadmus' audit of this calculation validated  
5 that the Company saved 99.17% of that amount, 19,546 kW.

6 Q. What were Cadmus' conclusions regarding the amount of gas savings for the Company's  
7 2013 residential EO programs?

8 A. Table 11 of Cadmus' certification report (Exhibit A-10 (MSK-1)) shows that the  
9 Company calculated 1,117,621 MCF of net residential savings. Cadmus' audit of the  
10 Company's calculation validated that the Company saved 100.76% of that amount,  
11 1,126,119 MCF.

12 Q. What were Cadmus' conclusions regarding the amount of savings from the Company's  
13 2013 programs for low-income customers?

14 A. Table 13 of Cadmus' certification report (Exhibit A-10 (MSK-1)) shows that Cadmus  
15 calculated electric savings from low-income programs of 2,075,472 kWh. This is  
16 134.77% of the established savings target of 1,540,000 kWh. In addition, Cadmus  
17 calculated gas savings of 89,201 MCF. Gas savings were 138.58% of the savings target  
18 of 64,366 MCF.

19 Q. What were Cadmus' conclusions regarding the number of ENERGY STAR<sup>®</sup> 3.0 new  
20 homes constructed?

21 A. Table 14 of Cadmus' certification report (Exhibit A-10 (MSK-1)) shows that Cadmus  
22 verified 318 ENERGY STAR<sup>®</sup> 3.0 homes were constructed through the Company's new  
23 construction program in 2013. This compares to 194 ENERGY STAR<sup>®</sup> 3.0 program

M. SAMI KHAWAJA  
DIRECT TESTIMONY

1 homes constructed in 2012. Participation in 2013 represents a 163.92% increase over  
2 2012 participation.

3 Q. Does that conclude your testimony?

4 A. Yes.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_ )

Case No. U-17601

**EXHIBIT**

**OF**

**M. SAMI KHAWAJA**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014



**CADMUS**

# Residential Energy Optimization Certification Report

## 2013 Program Year

May 21, 2014

### Presented to:

Joseph Forcillo  
Director, Energy Efficiency Research & Evaluation  
Consumers Energy Company  
One Energy Plaza  
Jackson, MI 49201

### Presented by:

Cadmus  
333 Albert Avenue | Suite 610  
East Lansing, MI 48823  
517.333.3361



The Cadmus Group, Inc.

An Employee-Owned Company • [www.cadmusgroup.com](http://www.cadmusgroup.com)

This report is a deliverable submitted to Consumers Energy as part of a multiyear, independent evaluation contract to conduct impact, process, and market assessment studies of residential Energy Optimization programs administered by Consumers Energy.

The independent evaluation team includes the following firms:

**Cadmus, Contract Lead**

**Tetra Tech**

**NMR Group**

**Prepared by:**

**M. Sami Khawaja, Ph.D.**

**Jill Steiner**

**Tyler Browne**

**David Molner**

**Adam Wirtshafter**

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May 21, 2013

Consumers Energy Company  
One Energy Plaza Drive  
Jackson, MI 49201-2357

RE: Residential Energy Optimization Certification Report: 2013 Program Year

Dear Consumers Energy Company:

This document reports the certified 2013 electric demand and energy savings and natural gas savings from the Residential Energy Optimization Programs offered by Consumers Energy. Cadmus performed a comprehensive audit of the Consumers Energy and Program Implementer data tracking systems for the following programs: (1) ENERGY STAR® Lighting; (2) ENERGY STAR Appliances; (3) HVAC and Water Heating; (4) Income Qualified Weatherization; (5) Appliance Recycling; (6) Multifamily; (7) Think! Energy; (8) Home Performance with ENERGY STAR; (9) Home Energy Analysis; (10) Insulation and Windows; (11) New Home Construction; and (12) Home Energy Reports.

The objective of this certification was to review the accuracy of the electric and gas savings of the 2013 programs tracked by Consumers Energy and its implementation contractors. As indicated in the attached report, Cadmus hereby certifies the following:

- 185,935,693 kWh of annual energy savings, or 99.85% of the 186,208,777 kWh tracked by Consumers Energy for all residential programs;
- 19,546 kW savings, or 99.17% of the 19,709 kW tracked by Consumers Energy for all residential programs; and
- 1,126,119 MCF savings, or 100.76% of the 1,117,621 MCF tracked by Consumers Energy for all residential programs.

The certified savings include savings from the Long-Life Equipment Savings Multiplier of 1,195,677 kWh, 218 kW, and 78,417 MCF.

A second objective of this certification is to review Consumers Energy's achievements against the following performance metrics defined by the Michigan Public Service Commission (MPSC):

- Savings from the Income Qualified Program exceed targets established in Consumers Energy's Energy Optimization Plan (Case No. U-16670) by more than 20%; and
- The number of ENERGY STAR 3.0 new homes constructed and incented through the New Home Construction Program in 2013 increase by more than 60% over 2012 levels.

Consumers Energy Company  
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Page 2

As indicated in the attached report, Cadmus also certifies the following:

- Income Qualified Program electric energy savings are 2,075,472 kWh and exceed the established target of 1,540,000 kWh by 34.77%;
- Income Qualified Program natural gas energy savings are 89,201 MCF and exceed the established target of 64,366 MCF by 38.58%; and
- The number of ENERGY STAR 3.0 homes constructed and incented through the New Home Construction Program in 2013 is 318 and exceeds the 2012 number of 194 by 63.92%.

The certification did not include evaluation of the achieved energy impact results from the 2013 Residential Energy Optimization programs. Results of comprehensive impact evaluations will be documented in subsequent reports submitted under separate cover.

Sincerely,

A handwritten signature in black ink, appearing to read 'MSK', followed by a long horizontal line.

M. Sami Khawaja, Ph.D.  
Executive Consultant, The Cadmus Group, Inc.

## Introduction

### Overview

This report presents certified energy savings from all 2013 residential energy optimization (EO) programs administered by Consumers Energy Company. Cadmus reviewed and certified these energy savings as part of our comprehensive evaluation of Consumers Energy's residential EO portfolio.

### Objective and Scope

The purpose of this certification was for Cadmus to review, reconcile, and certify program-level energy savings tracked by both Consumers Energy and third-party implementation firms. Cadmus reviewed reported participation and installation data as well as reported kWh, kW, and MCF savings data for each program in the Consumers Energy residential EO portfolio. Table 1 lists the Consumers Energy residential EO programs and their respective third-party implementers.

**Table 1. Consumers Energy Residential EO Programs and Third-Party Implementers**

| Program                           | Third-Party Implementer    |
|-----------------------------------|----------------------------|
| ENERGY STAR® Lighting             | ICF International          |
| ENERGY STAR Appliances            | ICF International          |
| HVAC and Water Heating            | ICF International          |
| Income Qualified                  | CLEAResult                 |
| Appliance Recycling               | JACO Environmental         |
| Multifamily                       | Franklin Energy            |
| THINK! Energy®                    | National Energy Foundation |
| Home Performance with ENERGY STAR | ICF International          |
| Home Energy Analysis              | ICF International          |
| Insulation and Windows            | ICF International          |
| New Home Construction             | CLEAResult                 |
| Home Energy Reports               | ICF International          |

Cadmus completed the following actions for this certification:

- Compared 2013 reported net savings results to certified net savings results for each program and for the entire portfolio of residential EO programs.
- Reviewed participation and installation data in Consumers Energy and implementer databases and confirmed that they accurately reflect actual program participation and measure installation throughout the 2013 program year.
- For each program with customer applications, installation reports, or other hard copy documentation, reviewed a random and statistically significant sample of documents to ensure that data are consistently and accurately represented in tracking databases.
- Confirmed that the kWh, kW, and MCF savings attributed to individual program measures accurately reflect the values maintained in the 2013 Michigan Energy Measures Database

(MEMD) or, when savings are weather sensitive, confirmed that weighted values were independently calculated by a third party.

- Verified the application of appropriate installation rates and net-to-gross (NTG) values to accurately calculate net savings for each measure and each program in the 2013 Consumers Energy residential EO portfolio.
- Verified measure life and applied a 10% long-life equipment savings multiplier (LLESIM) to qualifying measures that had measure lives of 10 years or greater, as authorized by the Michigan Public Service Commission (MPSC).
- Calculated lifetime kWh and MCF net certified savings.

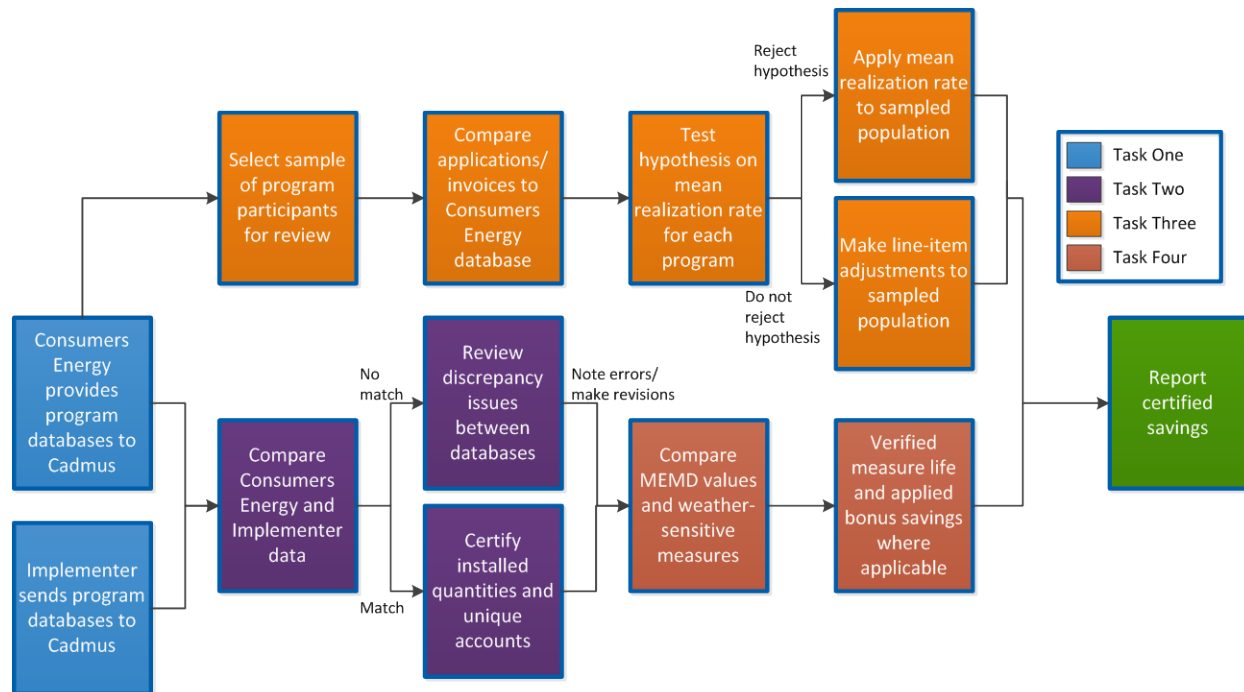
## **Methodology**

Cadmus performed four primary tasks to certify the energy savings for each residential EO program:

1. **Task 1: Database Collection:** Cadmus collected tracking databases for each program from implementation contractors and Consumers Energy.
2. **Task 2: Database Review:** Cadmus reviewed and compared the Consumers Energy and implementer tracking databases for each program, then documented and reconciled all discrepancies.
3. **Task 3: Documentation Review:** For all programs with hard copy documentation, Cadmus reviewed a random and statistically significant sample of program documents, such as incentive applications, installation tally sheets, and product invoices.
4. **Task 4: Measure-Level Savings Analysis:** Cadmus reviewed and certified reported measure-level savings values, measure lives, and installation rates, as referenced in the 2013 MEMD, as well as third-party calculation workbooks and 2013 evaluation reports.

Details about each of these tasks are discussed in the following sections. Figure 1 presents the general steps Cadmus took to certify energy savings from the 2013 program year.

Figure 1. Methodology Overview



### Task 1: Database Collection

Our first step was to reach out to the implementation contractors and retrieve their program tracking databases. Cadmus simultaneously worked with Consumers Energy to secure its equivalent tracking databases, which are managed on a web-based tracking system, Etracker.

### Task 2: Database Review

Once Cadmus received databases from both Consumers Energy and the implementation contractor for each program, we reviewed these databases to verify that:

- The number of participants matched;
- Reported quantities of installed measures matched for each measure code;
- Energy savings for installed measures were applied appropriately according to customer type (e.g., that a gas customer received only MCF savings); and
- Reported measures were installed during the 2013 program year.

### Task 3: Documentation Review

For all programs with hard copy documentation, Cadmus reviewed a random and statistically significant sample of the available documentation, including customer applications, purchase orders and/or receipts, and installation documents. Cadmus certified that the following data matched between documents and their respective entries in Consumers Energy's program tracking databases:

- Customer type (gas, electric, or combination);
- Rebate amount;
- Measure types; and
- Measure installation quantities.

Consumers Energy does not use customer-level applications for the ENERGY STAR Lighting Program, unlike its other residential programs. Instead, for this program, Cadmus reviewed memorandums of understanding (MOUs) and invoices from the retailers, and certified total bulb sales under those MOUs.

For some other programs, customer-level applications and/or installation forms were unavailable, due to either the program design or the delivery method. Task 3 was not applicable for the programs and measures outlined in Table 2.

**Table 2. Alternate Application and Installation Documentation**

| Program                | Alternate Delivery Approach or Documentation  |
|------------------------|---|
| Appliance Recycling    | Participants apply online, by telephone, or through a participating retailer and therefore do not complete a paper application.   |
| THINK! Energy          | For this program, Consumers Energy provides Energy Efficiency Kits to teachers at participating schools, who subsequently deliver the kits to their students. Individual program participants do not apply for incentives. The program implementer tracks the number of kits administered to each school, but does not create customer-level documentation. |
| Home Energy Reports    | Customers selected to receive these reports are identified by the program implementer. Customers opting out (requesting to not receive the reports), as well as customers that move or otherwise cease participation, are also tracked by the program implementer.  |
| ENERGY STAR Appliances | For this program, Consumers Energy delivers Energy Efficiency Kits by mail to combination customers. The program implementer tracks the kits sent to each customer through the program database.  |

### ***Sampling and Calculating Realization Rates***

Cadmus reviewed program documentation for a random, representative sample of each relevant program's participant population. Using a finite population adjustment factor, we designed sample sizes to support findings with at least 90% confidence and 10% precision at the program level.

Table 3 summarizes our sampling effort for each residential EO program.

Table 3. Selected Sample Sizes and Descriptions by Program

| Program                           | Sample Size (n) | Achieved Precision at 90% Confidence Level | Sample Description                    |
|-----------------------------------|-----------------|--|---------------------------------------|
| ENERGY STAR Lighting              | 69              | 9.95%                                      | Random sample at Job ID level         |
| ENERGY STAR Appliances*           | 68              | 9.94%                                      | Random sample at Account Number level |
| HVAC and Water Heating            | 70              | 9.93%                                      | Random sample at Account Number level |
| Income Qualified                  | 69              | 9.95%                                      | Random sample at Account Number level |
| Appliance Recycling               | N/A             | N/A  | No application review                 |
| Multifamily                       | 59              | 9.72%                                      | Random sample at Account Number level |
| THINK! Energy                     | N/A             | N/A  | No application review                 |
| Home Performance with ENERGY STAR | 68              | 9.94%                                      | Random sample at Account Number level |
| Home Energy Analysis              | 69              | 9.99%                                      | Random sample at Account Number level |
| Insulation and Windows            | 69              | 9.97%                                      | Random sample at Account Number level |
| New Home Construction             | 55              | 9.97%                                      | Random sample at Job ID level         |
| Home Energy Reports               | N/A             | N/A  | No application review                 |

\* Excluding Energy Efficiency Kits

Cadmus determined inconsistencies between data recorded in program documents and data reported in program tracking databases. We then identified those inconsistencies as being random or systematic errors. In general, random errors are unpredictable mistakes in transcription or data entry, while systematic errors result from some inaccuracy persistent across numerous records.

To determine whether a given sample contained random or systematic errors, we tested whether each sample's mean kWh, kW, and MCF realization ratios were statistically equal to one (or a realization rate of 100%). If we determined a sample's mean realization ratio to be *statistically equal* to one at the 90% confidence level, we considered the errors as random and did not apply the sample mean realization ratio to the relevant participant population. In these cases, we included individual data discrepancies in final net savings calculations. If, on the other hand, we determined a sample's mean realization ratio to be *statistically unequal* to one at the 90% confidence level, we considered the errors as systematic and applied the sample's mean realization ratio to the relevant participant population.

Cadmus first calculated kWh, kW, and MCF realization rates for individual records in each program's sample (calculations were identical for kWh, kW, and MCF). To do this, we compared reported and certified savings by fuel type (shown by the equation below). Differences between reported and certified savings occurred due to discrepancies in customer types, measure types, or installed measure quantities.

$$kW\ RR_i = \frac{\sum_j \text{Certified } kW\ Savings_j}{\sum_j \text{Reported } kW\ Savings_j}$$



Where:

- RR = Calculated realization rate
- $i$  = Unique record 'i'
- $j$  = Individual application, invoice, etc.

We then used the following equation to calculate mean realization rates for each fuel type at the sample level (calculations were identical for kW, kWh, and MCF):

$$\overline{kW\ RR} = \frac{\sum_i kW\ RR_i}{n}$$

Where:

- $n$  = Number of unique records in the sample

Next, for each fuel type, we calculated a t-statistic for the null hypothesis that the sample's mean realization ratio was equal to one (or realization rate equal to 100%). The resulting t-statistics revealed whether or not the errors discovered during the documentation review were random or systematic. We calculated t-statistics using the following equations (calculations were identical for kW, kWh, and MCF):

$$StdDev_{kW\ RR} = \sqrt{\frac{\sum_i (kW\ RR_i - \overline{kW\ RR})^2}{n}}$$

$$SE_{kW\ RR} = \frac{StdDev_{kW\ RR}}{\sqrt{n}}$$

$$t_{kW\ RR} = \left| \frac{100\% - \overline{kW\ RR}}{SE_{kW\ RR}} \right|$$

Where:

- $StdDev$  = Standard deviation
- $SE$  = Standard error

#### Task 4: Measure-Level Savings Analysis

Cadmus retrieved measure-level data for each residential EO program from Consumers Energy's web-based tracking system, Etracker. Each of the measure-level databases in Etracker includes: information about measure codes and descriptions; units of measure; kWh, kW, and MCF savings per unit of measure; sensitivities to weather; evaluated installation rates; and verified measure lives.

First, we mapped each program measure to appropriate source data. This included mapping non-weather-sensitive measures to the 2013 MEMD. We also mapped weather-sensitive measures to databases developed independently by Navigant Consulting, Inc. Navigant weighted the kWh, kW, and MCF savings for each weather-sensitive measure, according to characteristics of program measure

installations (i.e., geographic distribution, size). The results from Navigant's analysis represent program-specific kWh, kW, and MCF savings for each unique weather-sensitive measure installed during the 2013 program year. We mapped other measures with efficiency levels that varied from MEMD measures—faucet aerators and showerheads in particular—to savings calculation workbooks developed using MEMD supporting documentation.

Once we had mapped each measure to an appropriate data source, we certified kWh, kW, and MCF savings per unit of measure. Cadmus documented and corrected any discrepancies as necessary. We also confirmed installation rates matched those calculated through program evaluation activities. Finally, we verified that each measure life was accurate, based on appropriate source data, then documented and corrected discrepancies as necessary.

### *Summary of Certified Savings*

This section presents a summary of certified net savings as well as certified net savings with an additional 10% long-life equipment savings multiplier for measures lasting 10 or more years, by program and fuel type.

Table 4 presents the certified net savings without the long-life equipment savings multiplier for each residential EO program by fuel type.

**Table 4. Residential EO Program Certified Net Savings without Long-Life Equipment Savings Multiplier by Fuel Type\***

| Program                           | 2013 Certified Net Savings without LLESMS |                    |                       |
|-----------------------------------|---|--------------------|-----------------------|
|                                   | kWh                                       | kW                 | MCF                   |
| ENERGY STAR Lighting              | 101,877,868.1497                          | 12,087.5081        | —                     |
| ENERGY STAR Appliances            | 421,385.3097                              | 94.2268            | 8,491.4825            |
| HVAC and Water Heating            | 5,501,506.4120                            | 1,095.9078         | 410,921.9816          |
| Income Qualified                  | 2,032,722.3424                            | 213.4483           | 84,675.7302           |
| Appliance Recycling               | 31,357,336.5000                           | 3,706.6689         | —                     |
| Multifamily                       | 7,626,133.7319                            | 916.3936           | 184,682.1291          |
| THINK! Energy                     | 2,640,580.0538                            | 260.1595           | 64,948.3223           |
| Home Performance with ENERGY STAR | 706,388.6650                              | 223.9941           | 46,787.9061           |
| Home Energy Analysis              | 3,354,479.3142                            | 367.3659           | 116,929.1788          |
| Insulation and Windows            | 659,673.5475                              | 361.3660           | 65,421.0030           |
| New Home Construction             | 152,052.3393                              | 0.1584             | 12,985.7886           |
| Home Energy Reports               | 28,409,888.6773                           | —                  | 51,858.2914           |
| <b>Total</b>                      | <b>184,740,015.0427</b>                   | <b>19,327.1974</b> | <b>1,047,701.8135</b> |

\*Columns in all tables may not sum to totals due to rounding.

Table 5 presents the certified net savings with the long-life savings multiplier for each residential EO program by fuel type.

**Table 5. Residential EO Program Certified Net Savings with Long-Life Equipment Savings Multiplier by Fuel Type**

| Program                           | 2013 Certified Net Savings with LLESMS |                    |                       |
|-----------------------------------|--|--------------------|-----------------------|
|                                   | kWh                                    | kW                 | MCF                   |
| ENERGY STAR Lighting              | 101,918,308.5157                       | 12,090.8671        | –                     |
| ENERGY STAR Appliances            | 446,495.5576                           | 101.9897           | 9,037.7253            |
| HVAC and Water Heating            | 6,001,640.2052                         | 1,197.2427         | 444,640.7327          |
| Income Qualified                  | 2,075,471.6734                         | 218.0604           | 89,201.0039           |
| Appliance Recycling               | 31,357,336.5000                        | 3,706.6689         | –                     |
| Multifamily                       | 7,955,182.2794                         | 955.4525           | 199,005.6580          |
| THINK! Energy                     | 2,685,276.2570                         | 260.1595           | 71,443.1545           |
| Home Performance with ENERGY STAR | 758,870.4500                           | 242.9232           | 50,999.3418           |
| Home Energy Analysis              | 3,434,594.2780                         | 374.5671           | 123,693.1102          |
| Insulation and Windows            | 725,640.9022                           | 397.5026           | 71,963.1033           |
| New Home Construction             | 166,987.2093                           | 0.1584             | 14,276.5931           |
| Home Energy Reports               | 28,409,888.6773                        | –                  | 51,858.2914           |
| <b>Total</b>                      | <b>185,935,692.5052</b>                | <b>19,545.5923</b> | <b>1,126,118.7144</b> |

The reported and certified net savings, both with and without the long-life equipment savings multiplier, from the 2013 program year are presented by fuel type in the following sections. The realization rates represent differences between Consumers Energy's and Cadmus' net savings analyses. These differences could be a result of:

- Reconciled discrepancies between the Consumers Energy and third-party implementer tracking databases;
- Differences between randomly selected participant records in the Consumers Energy tracking database and associated documentation, such as incentive applications or installation tally sheets; and/or
- Discrepancies in measure-level savings between those reported in the Consumers Energy tracking database and either: 1) values maintained in the MEMD; or 2) weighted, weather-sensitive savings calculated by Navigant or EWG stakeholders.

Specific discrepancies are identified and discussed in Appendices A through L.

### Certified Net kWh Savings

Table 6 summarizes reported gross and certified net kWh savings without the long-life equipment savings multiplier for each program and the entire portfolio.

**Table 6. Summary of Reported Gross and Certified Net kWh Savings without Long-Life Equipment Savings Multiplier by Program**

| Program                           | 2013 Reported Gross kWh Savings | 2013 Certified Net kWh Savings | Realization Rate |
|-----------------------------------|---------------------------------|--------------------------------|------------------|
| ENERGY STAR Lighting              | 118,720,951.0000                | 101,877,868.1497               | 85.81%           |
| ENERGY STAR Appliances            | 476,731.0522                    | 421,385.3097                   | 88.39%           |
| HVAC and Water Heating            | 6,112,784.9022                  | 5,501,506.4120                 | 90.00%           |
| Income Qualified                  | 2,412,736.1538                  | 2,032,722.3424                 | 84.25%           |
| Appliance Recycling               | 34,841,485.0000                 | 31,357,336.5000                | 90.00%           |
| Multifamily                       | 8,583,011.3200                  | 7,626,133.7319                 | 88.85%           |
| THINK! Energy                     | 3,102,157.6000                  | 2,640,580.0538                 | 85.12%           |
| Home Performance with ENERGY STAR | 816,124.4444                    | 706,388.6650                   | 86.55%           |
| Home Energy Analysis              | 3,858,172.1166                  | 3,354,479.3142                 | 86.94%           |
| Insulation and Windows            | 732,970.6083                    | 659,673.5475                   | 90.00%           |
| New Home Construction             | 168,680.1643                    | 152,052.3393                   | 90.14%           |
| Home Energy Reports               | 32,955,512.7929                 | 28,409,888.6773                | 86.21%           |
| <b>Total</b>                      | <b>212,781,317.15</b>           | <b>184,740,015.0427</b>        | <b>86.82%</b>    |

Table 7 summarizes reported and certified net kWh savings with the long-life equipment savings multiplier for each program and the entire portfolio.

**Table 7. Summary of Reported and Certified Net kWh Savings with Long-Life Equipment Savings Multiplier by Program**

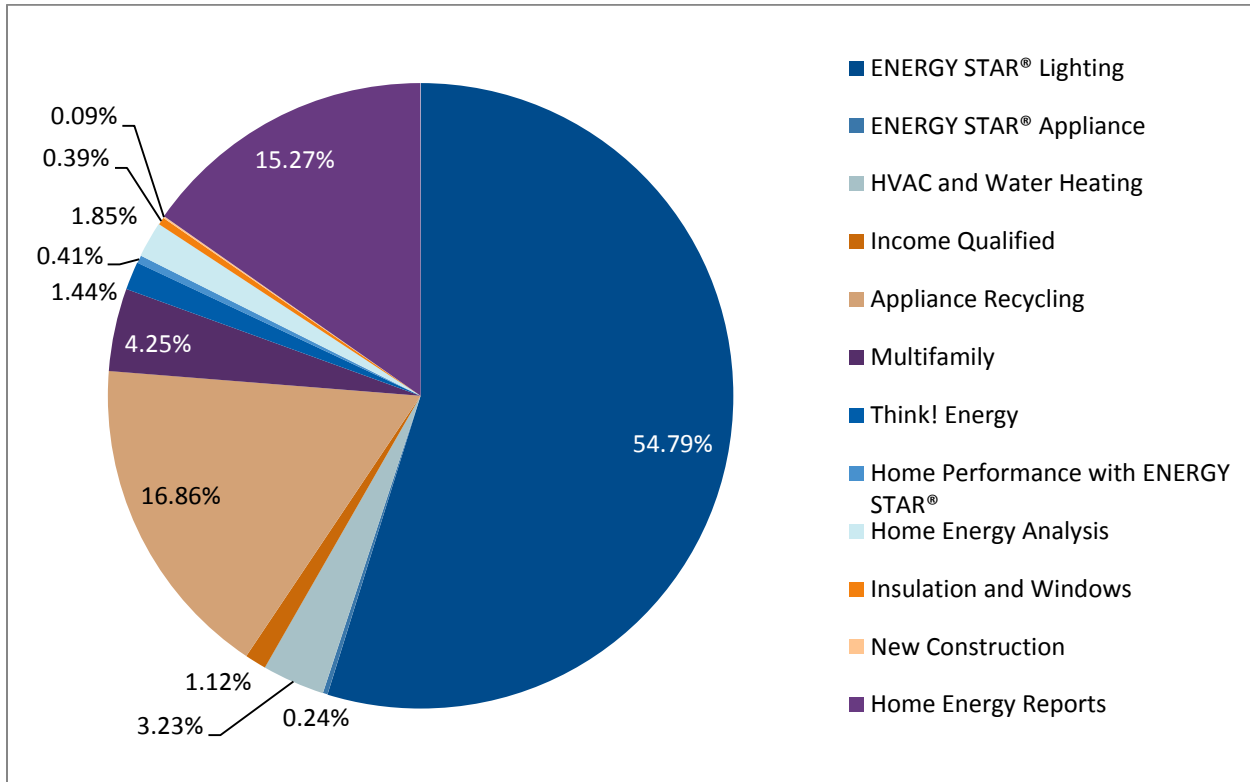
| Program                           | 2013 Reported Net kWh Savings | 2013 Certified Net kWh Savings | Certified Net kWh Savings/Reported Net kWh Savings |
|-----------------------------------|-------------------------------|--------------------------------|--|
| ENERGY STAR Lighting              | 102,099,296.6222              | 101,918,308.5157               | 99.82%   |
| ENERGY STAR Appliances            | 446,495.6373                  | 446,495.5576                   | 100.00%  |
| HVAC and Water Heating            | 5,999,144.2493                | 6,001,640.2052                 | 100.04%  |
| Income Qualified                  | 2,200,638.6403                | 2,075,471.6734                 | 94.31%   |
| Appliance Recycling               | 31,357,326.3300               | 31,357,336.5000                | 100.00%  |
| Multifamily                       | 7,945,386.7820                | 7,955,182.2794                 | 100.12%  |
| THINK! Energy                     | 2,685,276.2581                | 2,685,276.2570                 | 100.00%  |
| Home Performance with ENERGY STAR | 758,870.4490                  | 758,870.4500                   | 100.00%  |
| Home Energy Analysis              | 3,414,979.0324                | 3,434,594.2780                 | 100.57%  |
| Insulation and Windows            | 725,640.8689                  | 725,640.9022                   | 100.00%  |
| New Home Construction             | 165,835.1763                  | 166,987.2093                   | 100.69%  |
| Home Energy Reports               | 28,409,887.0904               | 28,409,888.6773                | 100.00%  |
| <b>Total</b>                      | <b>186,208,777.1362</b>       | <b>185,935,692.5052</b>        | <b>99.85%</b>                                      |

Over half of the portfolio kWh savings with the long-life equipment savings multiplier came from the ENERGY STAR Lighting Program, over 16% of the portfolio kWh savings with the long-life equipment

savings multiplier came from the Appliance Recycling Program, and more than 15% of the portfolio kWh savings with the long-life equipment savings multiplier came from the Home Energy Reports Program.

Figure 2 depicts how each residential EO program contributed to the overall certified kWh savings with the long-life equipment savings multiplier.

**Figure 2. Summary of Certified Net kWh Savings with Long-Life Equipment Savings Multiplier by Program**



### Certified Net kW Savings

Table 8 summarizes reported gross and certified net kW savings without the long-life equipment savings multiplier for each program and the entire portfolio.

**Table 8. Summary of Reported Gross and Certified Net kW Savings without Long-Life Equipment Savings Multiplier by Program**

| Program                           | 2013 Reported Gross kW Savings | 2013 Certified Net kW Savings | Realization Rate |
|-----------------------------------|--------------------------------|-------------------------------|------------------|
| ENERGY STAR Lighting              | 14,086.6734                    | 12,087.5081                   | 85.81%           |
| ENERGY STAR Appliances            | 105.7349                       | 94.2268                       | 89.12%           |
| HVAC and Water Heating            | 1,217.6753                     | 1,095.9078                    | 90.00%           |
| Income Qualified                  | 242.5718                       | 213.4483                      | 87.99%           |
| Appliance Recycling               | 4,118.5210                     | 3,706.6689                    | 90.00%           |
| Multifamily                       | 1,119.5425                     | 916.3936                      | 81.85%           |
| THINK! Energy                     | 307.1904                       | 260.1595                      | 84.69%           |
| Home Performance with ENERGY STAR | 250.8681                       | 223.9941                      | 89.29%           |
| Home Energy Analysis              | 495.3412                       | 367.3659                      | 74.16%           |
| Insulation and Windows            | 401.5178                       | 361.3660                      | 90.00%           |
| New Home Construction             | 0.1760                         | 0.1584                        | 90.00%           |
| Home Energy Reports               | -                              | -                             | N/A              |
| <b>Total</b>                      | <b>22,345.8124</b>             | <b>19,327.1974</b>            | <b>86.49%</b>    |

Table 9 summarizes reported and certified net kW savings with the long-life equipment savings multiplier for each program and the entire portfolio.

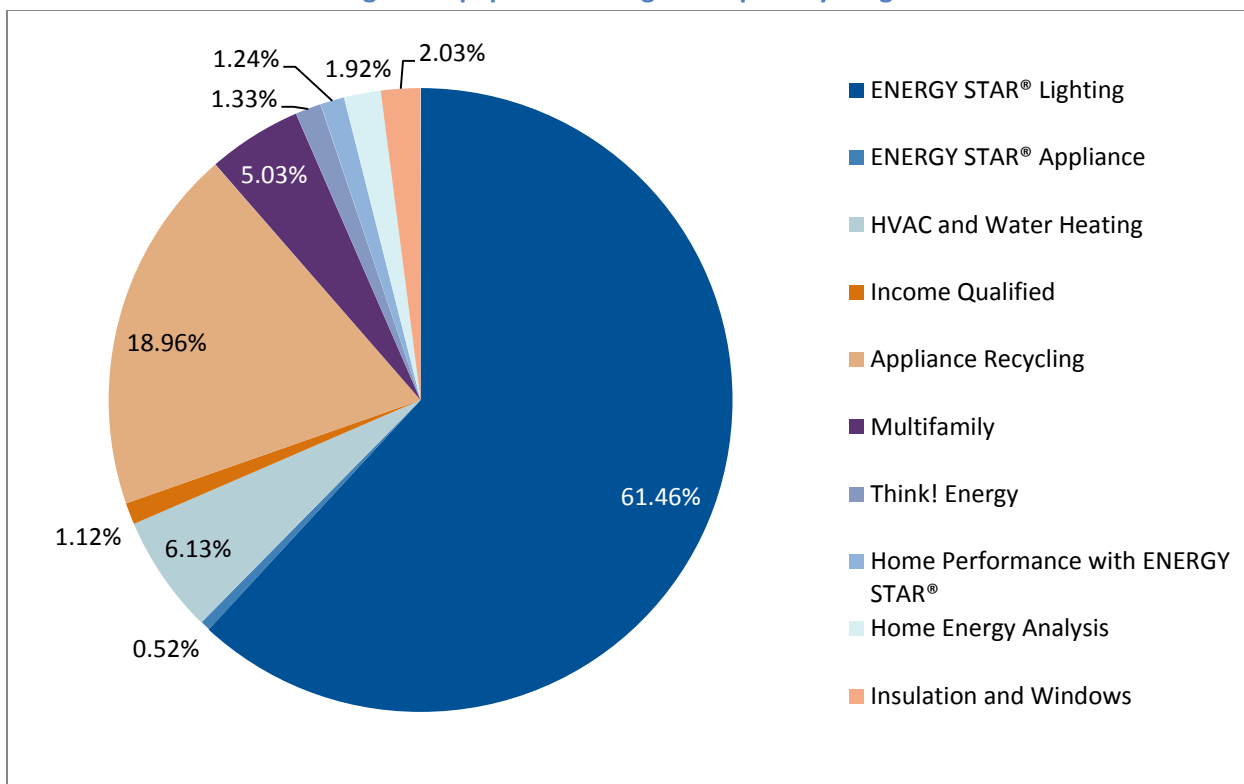
**Table 9. Summary of Reported and Certified Net kW Savings with Long-Life Equipment Savings Multiplier by Program**

| Program                           | 2013 Reported Net kW Savings | 2013 Certified Net kW Savings | Certified Net kW Savings/Reported Net kW Savings |
|-----------------------------------|------------------------------|-------------------------------|--|
| ENERGY STAR Lighting              | 12,112.3620                  | 12,090.8671                   | 99.82%   |
| ENERGY STAR Appliances            | 101.9515                     | 101.9897                      | 100.04%  |
| HVAC and Water Heating            | 1,196.9553                   | 1,197.2427                    | 100.02%  |
| Income Qualified                  | 217.9672                     | 218.0604                      | 100.04%  |
| Appliance Recycling               | 3,706.6593                   | 3,706.6689                    | 100.00%  |
| Multifamily                       | 1,034.2332                   | 955.4525                      | 92.38%   |
| THINK! Energy                     | 260.1600                     | 260.1595                      | 100.00%  |
| Home Performance with ENERGY STAR | 241.6818                     | 242.9232                      | 100.51%  |
| Home Energy Analysis              | 439.7723                     | 374.5671                      | 85.17%   |
| Insulation and Windows            | 397.5910                     | 397.5026                      | 99.98%   |
| New Home Construction             | 0.1584                       | 0.1584                        | 100.00%  |
| Home Energy Reports               | -                            | -                             | N/A  |
| <b>Total</b>                      | <b>19,709.4920</b>           | <b>19,545.5923</b>            | <b>99.17%</b>                                    |

Almost two-thirds of the portfolio kW savings with the long-life equipment savings multiplier came from the ENERGY STAR Lighting Program. The Appliance Recycling Program contributed almost one-fifth of all 2013 kW savings with the long-life equipment savings multiplier.

Figure 3 depicts how each residential EO program contributed to the overall certified kW savings with the long-life equipment savings multiplier.

**Figure 3. Summary of Certified Net kW Savings with Long-Life Equipment Savings Multiplier by Program**



### Certified Net MCF Savings

Table 10 summarizes reported gross and certified MCF savings for each program and the entire portfolio.

**Table 10. Summary of Reported Gross and Certified Net MCF Savings without Long-Life Equipment Savings Multiplier by Program**

| Program                           | 2013 Reported Gross MCF Savings | 2013 Certified Net MCF Savings | Realization Rate |
|-----------------------------------|---------------------------------|--------------------------------|------------------|
| ENERGY STAR Lighting              | -                               | -                              | N/A              |
| ENERGY STAR Appliances            | 11,948.5282                     | 8,491.4825                     | 71.07%           |
| HVAC and Water Heating            | 456,583.8492                    | 410,921.9816                   | 90.00%           |
| Income Qualified                  | 97,071.8179                     | 84,675.7302                    | 87.23%           |
| Appliance Recycling               | -                               | -                              | N/A              |
| Multifamily                       | 205,293.1563                    | 184,682.1291                   | 89.96%           |
| THINK! Energy                     | 127,512.4032                    | 64,948.3223                    | 50.93%           |
| Home Performance with ENERGY STAR | 53,690.4591                     | 46,787.9061                    | 87.14%           |
| Home Energy Analysis              | 127,919.0755                    | 116,929.1788                   | 91.41%           |
| Insulation and Windows            | 72,690.0034                     | 65,421.0030                    | 90.00%           |
| New Home Construction             | 14,428.6540                     | 12,985.7886                    | 90.00%           |
| Home Energy Reports               | 59,704.6063                     | 51,858.2914                    | 86.86%           |
| <b>Total</b>                      | <b>1,226,842.5531</b>           | <b>1,047,701.8135</b>          | <b>85.40%</b>    |

Table 11 summarizes reported and certified MCF savings with the long-life equipment savings multiplier for each program and the entire portfolio.

**Table 11. Summary of Reported and Certified Net MCF Savings with Long-Life Equipment Savings Multiplier by Program**

| Program                           | 2013 Reported Net MCF Savings | 2013 Certified Net MCF Savings | Certified Net MCF Savings/Reported Net MCF Savings |
|-----------------------------------|-------------------------------|--------------------------------|--|
| ENERGY STAR Lighting              | -                             | -                              | N/A  |
| ENERGY STAR Appliances            | 9,085.3434                    | 9,037.7253                     | 99.48%   |
| HVAC and Water Heating            | 444,644.8637                  | 444,640.7327                   | 100.00%  |
| Income Qualified                  | 89,006.7860                   | 89,201.0039                    | 100.22%  |
| Appliance Recycling               | -                             | -                              | N/A  |
| Multifamily                       | 196,369.5416                  | 199,005.6580                   | 101.34%  |
| THINK! Energy                     | 71,443.1539                   | 71,443.1545                    | 100.00%  |
| Home Performance with ENERGY STAR | 50,999.3304                   | 50,999.3418                    | 100.00%  |
| Home Energy Analysis              | 117,972.9904                  | 123,693.1102                   | 104.85%  |
| Insulation and Windows            | 71,963.1110                   | 71,963.1033                    | 100.00%  |
| New Home Construction             | 14,276.5949                   | 14,276.5931                    | 100.00%  |
| Home Energy Reports               | 51,859.2817                   | 51,858.2914                    | 100.00%  |
| <b>Total</b>                      | <b>1,117,620.9970</b>         | <b>1,126,118.7144</b>          | <b>100.76%</b>                                     |

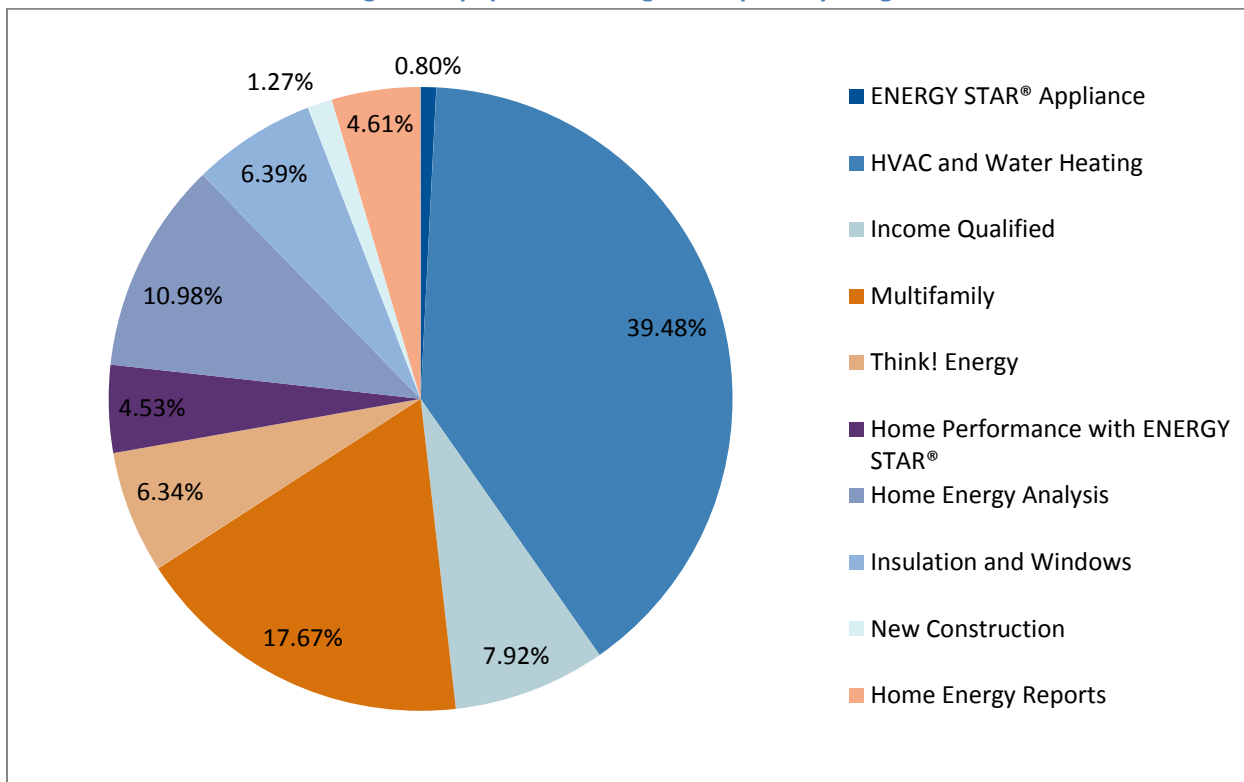
Over one-third of all MCF savings with the long-life equipment savings multiplier came from the HVAC and Water Heating Program. Other programs that contributed significantly to overall MCF savings with



the long-life equipment savings multiplier include the Multifamily Program and the Home Energy Analysis Program.

Figure 4 depicts how each Consumers Energy residential EO program contributed to the overall certified MCF savings with the long-life equipment savings multiplier.

**Figure 4. Summary of Certified Net MCF Savings with Long-Life Equipment Savings Multiplier by Program**



### Measure Life and Lifetime Savings

Cadmus calculated lifetime savings and the weighted average measure life for each program, verifying that appropriate measure lifetime values from the MEMD were used for these calculations

Table 12 summarizes the lifetime kWh and MCF savings for each program and provides the weighted average measure life by fuel type.

**Table 12. Lifetime Savings and Weighted Average Measure Life**

| Program                           | Lifetime Savings          |                        | Weighted Average Measure Life (years) |              |
|-----------------------------------|---------------------------|------------------------|---------------------------------------|--------------|
|                                   | kWh                       | MCF                    | Electric                              | Natural Gas  |
| ENERGY STAR Lighting              | 921,349,253.6073          | –                      | 9.04                                  | N/A          |
| ENERGY STAR Appliances            | 4,329,416.7730            | 90,038.5831            | 10.27                                 | 10.60        |
| HVAC and Water Heating            | 79,107,952.6760           | 5,704,407.6868         | 14.38                                 | 13.88        |
| Income Qualified                  | 18,598,427.6305           | 773,894.6959           | 9.15                                  | 9.14         |
| Appliance Recycling               | 250,858,692.0000          | –                      | 8.00                                  | N/A          |
| Multifamily                       | 75,725,181.1804           | 2,414,799.8449         | 9.93                                  | 13.08        |
| THINK! Energy                     | 25,106,106.5806           | 779,379.8673           | 9.51                                  | 12.00        |
| Home Performance with ENERGY STAR | 9,694,841.5130            | 708,523.6256           | 13.72                                 | 15.14        |
| Home Energy Analysis              | 31,617,596.6414           | 1,132,574.9519         | 9.43                                  | 9.69         |
| Insulation and Windows            | 13,193,470.9494           | 1,308,420.0606         | 20.00                                 | 20.00        |
| New Home Construction             | 3,011,306.7540            | 255,035.3134           | 19.80                                 | 19.64        |
| Home Energy Reports               | 28,409,888.6773           | 51,858.2914            | 1.00                                  | 1.00         |
| <b>Total/Weighted Average</b>     | <b>1,461,002,134.9829</b> | <b>13,218,932.9208</b> | <b>7.91</b>                           | <b>12.62</b> |

### Certification of Other Performance Incentive Metrics

Consumers Energy had the two following performance metrics that Cadmus reviewed in addition to energy savings:

- Savings from the Income Qualified Program exceeded the targets established in Consumers Energy's Energy Optimization Plan (Case No. U-16670) by more than 20%.
- The number of ENERGY STAR 3.0 new homes constructed and incented through the New Home Construction Program in 2013 increased by more than 60% over 2012 levels.

Table 13 compares the actual savings achievement in 2013 to the established metrics. Cadmus certifies that the net kWh and MCF savings from the Income Qualified Program exceeded the targets by more than 20%. The kW savings and target are shown but are not part of the performance metric.

**Table 13. Income Qualified Program Savings Achievements**

|                           | kWh            | kW             | MCF            |
|---------------------------|----------------|----------------|----------------|
| 2013 Targets              | 1,540,000      | 200            | 64,366         |
| 2013 Achievement          | 2,075,472      | 219            | 89,201         |
| <b>Achievement/Target</b> | <b>134.77%</b> | <b>109.50%</b> | <b>138.58%</b> |

Table 14 shows the number of ENERGY STAR new homes constructed through the New Home Construction Program in 2012 and 2013, along with the percentage increase in the number of certified homes across those years.

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**Table 14. Number of ENERGY STAR 3.0 Homes, by Fuel Type**

|   | Number of ENERGY<br>STAR 3.0 Homes<br>(Combination) | Number of ENERGY<br>STAR 3.0 Homes<br>(Gas Only) | Number of ENERGY<br>STAR 3.0 Homes<br>(Total) |
|---|---|--|---|
| 2012 Achievement                              | 137   | 57   | 194   |
| 2013 Achievement                              | 202   | 116  | 318   |
| <b>2013 Achievement/<br/>2012 Achievement</b> | <b>147.44%</b>                                      | <b>203.51%</b>                                   | <b>163.92%</b>                                |

## Appendix A: ENERGY STAR Lighting Program

Table 15 presents reported gross and certified net energy savings for the ENERGY STAR Lighting Program by fuel type. The realization rates reflect the adjustments Cadmus made, based on our certification tasks and the application of installation rate and NTG adjustments. The following sections discuss changes we made to reported gross energy savings.

**Table 15. ENERGY STAR Lighting Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 3,147,691           | 118,720,951.0000  | 14,086.6734      | 0.0000            |
| Certified Net    | 3,147,690           | 101,877,868.1497  | 12,087.5081      | 0.0000            |
| Difference       | -1                  | -16,843,082.8503  | -1,999.1653      | 0.0000            |
| Realization Rate | 100.00%             | 85.81%            | 85.81%           | N/A               |

Table 16 presents reported and certified net energy savings with the long-life equipment savings multiplier for the ENERGY STAR Lighting Program by fuel type.

**Table 16. ENERGY STAR Lighting Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 3,147,691           | 102,099,296.6222  | 12,112.3620      | 0.0000            |
| Certified Net      | 3,147,690           | 101,918,308.5157  | 12,090.8671      | 0.0000            |
| Difference         | -1                  | -180,988.1065     | -21.4949         | 0.0000            |
| Certified/Reported | 100.00%             | 99.82%            | 99.82%           | N/A               |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

Cadmus reviewed program documents<sup>1</sup> from a sample of 69 randomly selected Job ID numbers. Table 17 documents reported and certified sales, as well as reported and certified energy savings by fuel type.

<sup>1</sup> Customer-level documents were not available due to program design. Instead, Cadmus reviewed weekly sales invoices and MOUs from participating retailers and manufacturers.

**Table 17. ENERGY STAR Lighting Program Sample Participation and Savings by End Use**

| Measure Code | Reported      |                       |                 |          | Certified     |                       |                 |          |
|--------------|---------------|-----------------------|-----------------|----------|---------------|-----------------------|-----------------|----------|
|              | n             | kWh                   | kW              | MCF      | n             | kWh                   | kW              | MCF      |
| RBE0002      | 31,287        | 1,160,747.7000        | 137.6628        | -        | 31,286        | 1,160,710.6000        | 137.6584        | -        |
| RBE0003      | 2,515         | 110,911.5000          | 13.3295         | -        | 2,515         | 110,911.5000          | 13.3295         | -        |
| RLE0009      | 87            | 3,480.0000            | 0.4176          | -        | 87            | 3,480.0000            | 0.4176          | -        |
| RLE0010      | -1            | -50.0000              | -0.0059         | -        | -1            | -50.0000              | -0.0059         | -        |
| <b>Total</b> | <b>33,888</b> | <b>1,275,089.2000</b> | <b>151.4040</b> | <b>-</b> | <b>33,887</b> | <b>1,275,052.1000</b> | <b>151.3996</b> | <b>-</b> |

The reported sale quantities for one Job ID sample record did not match its associated invoice. In total, the database sample overstated bulb sales quantity by 1, for measure RBE0002 (CFL bulbs regular, buydown). A statistical t-test indicated that the error was unique to sampled records, and therefore not applicable to the program population.

Table 18 provides the sample realization rates by fuel type and the t-test statistics Cadmus used to analyze errors in the sample.

**Table 18. ENERGY STAR Lighting Program Sample Realization Rates and t-Statistic**

|                                     | kWh       | kW        | MCF        |
|-------------------------------------|-----------|-----------|------------|
| Sample Realization Rate             | 99.99%    | 99.99%    | N/A        |
| Standard Error                      | 0.0001    | 0.0001    | N/A        |
| t-Statistic                         | 1.0000    | 1.0000    | N/A        |
| p-Value                             | 0.3209    | 0.3209    | N/A        |
| <b>Apply to Program Population?</b> | <b>No</b> | <b>No</b> | <b>N/A</b> |

As a result of this analysis, we considered specific errors in reported bulb sales and savings as random and included all discrepancies discovered during the documentation review in the final net savings calculations. We did not apply calculated realization rates to the program population.

#### **Task 4: Measure-Level Savings Analysis**

Cadmus found no discrepancies between per-unit measure savings or measure lives reported by Consumers Energy and values either maintained in the MEMD or calculated by Navigant. When reviewing the installation rates, however, Cadmus found measures RBE0002 and RBE0003 to have the incorrect installation rate value of 0.9553. Cadmus adjusted the installation rate to 0.9533 for both measure codes in the final certified savings values.

Table 19 presents the reported and certified per-unit savings for all measures delivered through the 2013 ENERGY STAR Lighting Program.

Table 19. ENERGY STAR Lighting Program Reported and Certified Per-Unit Measure Savings

| Measure Code | Reported |        |        | Certified |        |        | Certified LLES |         |        |        |
|--------------|----------|--------|--------|-----------|--------|--------|----------------|---------|--------|--------|
|              | kWh      | kW     | MCF    | kWh       | kW     | MCF    | Measure Life   | kWh     | kW     | MCF    |
| RBE0002      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9              | 37.1000 | 0.0044 | 0.0000 |
| RBE0003      | 44.1000  | 0.0053 | 0.0000 | 44.1000   | 0.0053 | 0.0000 | 9              | 44.1000 | 0.0053 | 0.0000 |
| RBE0005      | 10.6000  | 0.0000 | 0.0000 | 10.6000   | 0.0000 | 0.0000 | 20             | 11.6600 | 0.0000 | 0.0000 |
| RLE0009      | 40.0000  | 0.0048 | 0.0000 | 40.0000   | 0.0048 | 0.0000 | 20             | 44.0000 | 0.0053 | 0.0000 |
| RLE0010      | 50.0000  | 0.0059 | 0.0000 | 50.0000   | 0.0059 | 0.0000 | 20             | 55.0000 | 0.0065 | 0.0000 |
| RLE0012      | 54.0000  | 0.0064 | 0.0000 | 54.0000   | 0.0064 | 0.0000 | 20             | 59.4000 | 0.0070 | 0.0000 |

### Major Findings by Fuel Type

The tables below present certified program participation and energy savings by measure. Table 20 and Table 21 document kWh savings, while Table 22 documents kW savings. The ENERGY STAR Lighting Program did not result in any MCF savings.

Table 20. Certified ENERGY STAR Lighting Program Participation and First-Year kWh Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RBE0002      | 2,804,319                         | 2,804,318                         | 104,040,234.9000                    | 104,040,197.8000                    | 0.9533                                | 99,181,520.5627                                | 0.9000                                    | 89,263,368.5065                              |
| RBE0003      | 322,707                           | 322,707                           | 14,231,378.7000                     | 14,231,378.7000                     | 0.9533                                | 13,566,773.3147                                | 0.9000                                    | 12,210,095.9832                              |
| RBE0005      | 13,019                            | 13,019                            | 138,001.4000                        | 138,001.4000                        | 1.0000                                | 138,001.4000                                   | 0.9000                                    | 124,201.2600                                 |
| RLE0009      | 7,212                             | 7,212                             | 288,480.0000                        | 288,480.0000                        | 1.0000                                | 288,480.0000                                   | 0.9000                                    | 259,632.0000                                 |
| RLE0010      | 145                               | 145                               | 7,250.0000                          | 7,250.0000                          | 1.0000                                | 7,250.0000                                     | 0.9000                                    | 6,525.0000                                   |
| RLE0012      | 289                               | 289                               | 15,606.0000                         | 15,606.0000                         | 1.0000                                | 15,606.0000                                    | 0.9000                                    | 14,045.4000                                  |
| <b>Total</b> | <b>3,147,691</b>                  | <b>3,147,690</b>                  | <b>118,720,951.0000</b>             | <b>118,720,913.9000</b>             |                                       | <b>113,197,631.2775</b>                        | <b>0.9000</b>                             | <b>101,877,868.1497</b>                      |

Table 21. Certified ENERGY STAR Lighting Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID   | 2013 Certified Net kWh Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kWh LLESMS Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) | Lifetime kWh Savings (J) = (F x G) |
|--------------|--|------------------|--|-----------------------------------|------------------------------------|
| RBE0002      | 89,263,368.5065                              | 9                | 89,263,368.5065  | 85.80%                            | 803,370,316.5582                   |
| RBE0003      | 12,210,095.9832                              | 9                | 12,210,095.9832  | 85.80%                            | 109,890,863.8492                   |
| RBE0005      | 124,201.2600                                 | 20               | 136,621.3860   | 90.00%                            | 2,484,025.2000                     |
| RLE0009      | 259,632.0000                                 | 20               | 285,595.2000   | 90.00%                            | 5,192,640.0000                     |
| RLE0010      | 6,525.0000                                   | 20               | 7,177.5000   | 90.00%                            | 130,500.0000                       |
| RLE0012      | 14,045.4000                                  | 20               | 15,449.9400  | 90.00%                            | 280,908.0000                       |
| <b>Total</b> | <b>101,877,868.1497</b>                      |                  | <b>101,918,308.5157</b>                                | <b>85.81%</b>                     | <b>921,349,253.6073</b>            |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 22. Certified ENERGY STAR Lighting Program Participation and kW Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Reported Gross Savings (A) | 2013 Adjusted Gross Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kW LLESMS Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------------|--|---|---|------------------|---|-----------------------------------|
| RBE0002      | 2,804,319                         | 12,339.0036                     | 12,338.9992                     | 0.9533                                | 11,762.7679                                | 0.9000                                    | 10,586.4911                                 | 9                | 10,586.4911   | 85.80%                            |
| RBE0003      | 322,707                           | 1,710.3471                      | 1,710.3471                      | 0.9533                                | 1,630.4739                                 | 0.9000                                    | 1,467.4265                                  | 9                | 1,467.4265  | 85.80%                            |
| RLE0009      | 7,212                             | 34.6176                         | 34.6176                         | 1.0000                                | 34.6176                                    | 0.9000                                    | 31.1558                                     | 20               | 34.2714   | 90.00%                            |
| RLE0010      | 145                               | 0.8555                          | 0.8555                          | 1.0000                                | 0.8555                                     | 0.9000                                    | 0.7700                                      | 20               | 0.8469  | 90.00%                            |
| RLE0012      | 289                               | 1.8496                          | 1.8496                          | 1.0000                                | 1.8496                                     | 0.9000                                    | 1.6646                                      | 20               | 1.8311  | 90.00%                            |
| <b>Total</b> | <b>3,134,672</b>                  | <b>14,086.6734</b>              | <b>14,086.6690</b>              |                                       | <b>13,430.5645</b>                         | <b>0.9000</b>                             | <b>12,087.5081</b>                          |                  | <b>12,090.8671</b>                                    | <b>85.81%</b>                     |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.



## Appendix B: ENERGY STAR Appliances Program

Table 23 presents reported gross and certified net energy savings for the ENERGY STAR Appliances Program by fuel type. The realization rates reflect the adjustments Cadmus made, based on our certification tasks and applying installation rate and NTG adjustments. The following sections discuss the changes we made to reported gross energy savings.

**Table 23. ENERGY STAR Appliances Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 14,483              | 476,731.0522      | 105.7349         | 11,948.5282       |
| Certified Net    | 14,483              | 421,385.3097      | 94.2268          | 8,491.4825        |
| Difference       | 0                   | -55,345.7425      | -11.5081         | -3,457.0457       |
| Realization Rate | 100.00%             | 88.39%            | 89.12%           | 71.07%            |

Table 24 presents reported and certified net energy savings with the long-life equipment savings multiplier for the ENERGY STAR Appliances Program by fuel type.

**Table 24. ENERGY STAR Appliances Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 14,483              | 446,495.6373      | 101.9515         | 9,085.3434        |
| Certified Net      | 14,483              | 446,495.5576      | 101.9897         | 9,037.7253        |
| Difference         | 0                   | -0.0797           | 0.0382           | -47.6181          |
| Certified/Reported | 100.00%             | 100.00%           | 100.04%          | 99.48%            |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

Cadmus reviewed the rebate applications from a sample of 68 randomly selected account numbers. Table 25 documents reported and certified measure counts as well as reported and certified energy savings by fuel type for the general population sample.

**Table 25. ENERGY STAR Appliances Program General Sample Participation and Savings by End Use\***

| Measure Code | Reported  |                   |               |                 | Certified |                   |               |                 |
|--------------|-----------|-------------------|---------------|-----------------|-----------|-------------------|---------------|-----------------|
|              | n         | kWh               | kW            | MCF             | n         | kWh               | kW            | MCF             |
| RAC0100      | 1         | 132.6325          | -             | 7.1919          | 1         | 132.6325          | -             | 7.1919          |
| RAE0002      | 1         | 84.1000           | 0.0520        | -               | 1         | 84.1000           | 0.0520        | -               |
| RAE0003      | 1         | 44.0000           | 0.0760        | -               | 1         | 44.0000           | 0.0760        | -               |
| RAE0005      | 2         | 267.0364          | -             | -               | 2         | 267.0364          | -             | -               |
| RAE0006      | 2         | 644.0000          | .2198         | -               | 2         | 644.0000          | .2198         | -               |
| RAE0008      | 1         | 123.0000          | 0.0420        | -               | 1         | 123.0000          | 0.0420        | -               |
| RAE0010      | 3         | 1,116.0000        | 0.3810        | -               | 3         | 1,116.0000        | 0.3810        | -               |
| RAE0012      | 2         | 308.0000          | 0.1052        | -               | 2         | 308.0000          | 0.1052        | -               |
| RAE0013      | 6         | 45.0000           | 0.0156        | -               | 6         | 45.0000           | 0.0156        | -               |
| RAE9010      | 1         | 372.0000          | 0.1270        | -               | 1         | 372.0000          | 0.1270        | -               |
| RAE9011      | 1         | 225.0000          | 0.0768        | 0.5735          | 1         | 225.0000          | 0.0768        | 0.5735          |
| RAG0005      | 8         | -                 | -             | 55.7576         | 8         | -                 | -             | 55.7576         |
| RAG0008      | 2         | -                 | -             | 1.7496          | 2         | -                 | -             | 1.7496          |
| RAG0009      | 6         | -                 | -             | 7.9896          | 6         | -                 | -             | 7.9896          |
| RAG0011      | 2         | -                 | -             | 1.1470          | 2         | -                 | -             | 1.1470          |
| RAG0012      | 3         | -                 | -             | 2.8578          | 3         | -                 | -             | 2.8578          |
| RAG0013      | 11        | -                 | -             | 16.7860         | 11        | -                 | -             | 16.7860         |
| RAG9008      | 2         | 246.0000          | 0.0840        | 1.7496          | 2         | 246.0000          | 0.0840        | 1.7496          |
| RAG9009      | 1         | 7.5000            | 0.0026        | 1.3316          | 1         | 7.5000            | 0.0026        | 1.3316          |
| RAG9012      | 7         | 1,078.0000        | .3682         | 6.6682          | 7         | 1,078.0000        | .3682         | 6.6682          |
| RAG9013      | 5         | 37.5000           | 0.0130        | 7.6300          | 5         | 37.5000           | 0.0130        | 7.6300          |
| <b>Total</b> | <b>68</b> | <b>4,729.7689</b> | <b>1.5632</b> | <b>111.4324</b> | <b>68</b> | <b>4,729.7689</b> | <b>1.5632</b> | <b>111.4324</b> |

\* This sample does not include Energy Efficiency Kit measures.

With our documentation review, Cadmus found zero discrepancies between the Consumers Energy Etracker database and invoices, applications, and any other additional documentation that may have been uploaded to support validation of the measure installation. Table 26 provides the sample realization rates by fuel type and the t-test statistics Cadmus used to analyze errors in the general sample.

**Table 26. ENERGY STAR Appliances Program General Sample Realization Rates and t-Statistic\***

|                                     | kWh        | kW         | MCF        |
|-------------------------------------|------------|------------|------------|
| Sample Realization Rate             | 100.00%    | 100.00%    | 100.00%    |
| Standard Error                      | N/A        | N/A        | N/A        |
| t-Statistic                         | N/A        | N/A        | N/A        |
| p-Value                             | N/A        | N/A        | N/A        |
| <b>Apply to Program Population?</b> | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |

\* The sample realization rates do not apply to Energy Efficiency Kit measures.

#### Task 4: Measure-Level Savings Analysis

Cadmus conducted a measure-level savings review and found only one difference between what was reported by Consumers Energy and what could be verified in the MEMD. Cadmus found that measure RAG9020 had an incorrect value of 1.812 MCF due to a unit conversion error. Cadmus updated the savings to reflect the appropriate conversion from the MEMD value of 18.12 therms to 1.7611 MCF. We then applied the updated savings value to the certified installation quantity for that measure.

Table 27 presents the reported and certified per-unit savings for all measures delivered through the 2013 ENERGY STAR Appliances Program.

**Table 27. ENERGY STAR Appliances Program Reported and Certified Per-Unit Measure Savings**

| Measure Code | Reported |        |        | Certified |        |        | Certified LLES |          |        |        |
|--------------|----------|--------|--------|-----------|--------|--------|----------------|----------|--------|--------|
|              | kWh      | kW     | MCF    | kWh       | kW     | MCF    | Measure Life   | kWh      | kW     | MCF    |
| RAC0100      | 132.6325 | 0.0000 | 7.1919 | 132.6325  | 0.0000 | 7.1919 | 9              | 132.6325 | 0.0000 | 7.1919 |
| RAE0002      | 84.1000  | 0.0520 | 0.0000 | 84.1000   | 0.0520 | 0.0000 | 12             | 92.5100  | 0.0572 | 0.0000 |
| RAE0003      | 44.0000  | 0.0760 | 0.0000 | 44.0000   | 0.0760 | 0.0000 | 15             | 48.4000  | 0.0836 | 0.0000 |
| RAE0005      | 133.5182 | 0.0000 | 0.0000 | 133.5182  | 0.0000 | 0.0000 | 9              | 133.5182 | 0.0000 | 0.0000 |
| RAE0006      | 322.0000 | 0.1099 | 0.0000 | 322.0000  | 0.1099 | 0.0000 | 11             | 354.2000 | 0.1209 | 0.0000 |
| RAE0007      | 207.0000 | 0.0706 | 0.0000 | 207.0000  | 0.0706 | 0.0000 | 11             | 227.7000 | 0.0777 | 0.0000 |
| RAE0008      | 123.0000 | 0.0420 | 0.0000 | 123.0000  | 0.0420 | 0.0000 | 11             | 135.3000 | 0.0462 | 0.0000 |
| RAE0009      | 7.5000   | 0.0026 | 0.0000 | 7.5000    | 0.0026 | 0.0000 | 11             | 8.2500   | 0.0029 | 0.0000 |
| RAE0010      | 372.0000 | 0.1270 | 0.0000 | 372.0000  | 0.1270 | 0.0000 | 11             | 409.2000 | 0.1397 | 0.0000 |
| RAE0011      | 225.0000 | 0.0768 | 0.0000 | 225.0000  | 0.0768 | 0.0000 | 11             | 247.5000 | 0.0845 | 0.0000 |
| RAE0012      | 154.0000 | 0.0526 | 0.0000 | 154.0000  | 0.0526 | 0.0000 | 11             | 169.4000 | 0.0579 | 0.0000 |
| RAE0013      | 7.5000   | 0.0026 | 0.0000 | 7.5000    | 0.0026 | 0.0000 | 11             | 8.2500   | 0.0029 | 0.0000 |
| RAE9001      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9              | 37.1000  | 0.0044 | 0.0000 |
| RAE9006      | 322.0000 | 0.1099 | 0.0000 | 322.0000  | 0.1099 | 0.0000 | 11             | 354.2000 | 0.1209 | 0.0000 |
| RAE9007      | 207.0000 | 0.0706 | 0.4568 | 207.0000  | 0.0706 | 0.4568 | 11             | 227.7000 | 0.0777 | 0.5025 |
| RAE9010      | 372.0000 | 0.1270 | 0.0000 | 372.0000  | 0.1270 | 0.0000 | 11             | 409.2000 | 0.1397 | 0.0000 |
| RAE9011      | 225.0000 | 0.0768 | 0.5735 | 225.0000  | 0.0768 | 0.5735 | 11             | 247.5000 | 0.0845 | 0.6309 |
| RAE9018      | 22.0000  | 0.0000 | 0.0000 | 22.0000   | 0.0000 | 0.0000 | 12             | 24.2000  | 0.0000 | 0.0000 |
| RAG0004      | 0.0000   | 0.0000 | 2.6244 | 0.0000    | 0.0000 | 2.6244 | 12             | 0.0000   | 0.0000 | 2.8868 |
| RAG0005      | 0.0000   | 0.0000 | 6.9697 | 0.0000    | 0.0000 | 6.9697 | 9              | 0.0000   | 0.0000 | 6.9697 |
| RAG0007      | 0.0000   | 0.0000 | 0.4568 | 0.0000    | 0.0000 | 0.4568 | 11             | 0.0000   | 0.0000 | 0.5025 |
| RAG0008      | 0.0000   | 0.0000 | 0.8748 | 0.0000    | 0.0000 | 0.8748 | 11             | 0.0000   | 0.0000 | 0.9623 |
| RAG0009      | 0.0000   | 0.0000 | 1.3316 | 0.0000    | 0.0000 | 1.3316 | 11             | 0.0000   | 0.0000 | 1.4648 |
| RAG0011      | 0.0000   | 0.0000 | 0.5735 | 0.0000    | 0.0000 | 0.5735 | 11             | 0.0000   | 0.0000 | 0.6309 |
| RAG0012      | 0.0000   | 0.0000 | 0.9526 | 0.0000    | 0.0000 | 0.9526 | 11             | 0.0000   | 0.0000 | 1.0479 |
| RAG0013      | 0.0000   | 0.0000 | 1.5260 | 0.0000    | 0.0000 | 1.5260 | 11             | 0.0000   | 0.0000 | 1.6786 |
| RAG9002      | 0.0000   | 0.0000 | 0.8262 | 0.0000    | 0.0000 | 0.8262 | 12             | 0.0000   | 0.0000 | 0.9088 |
| RAG9003      | 0.0000   | 0.0000 | 0.8262 | 0.0000    | 0.0000 | 0.8262 | 12             | 0.0000   | 0.0000 | 0.9088 |

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| Measure Code | Reported |        |        | Certified |        |        | Certified LLES |          |        |        |
|--------------|----------|--------|--------|-----------|--------|--------|----------------|----------|--------|--------|
|              | kWh      | kW     | MCF    | kWh       | kW     | MCF    | Measure Life   | kWh      | kW     | MCF    |
| RAG9008      | 123.0000 | 0.0420 | 0.8748 | 123.0000  | 0.0420 | 0.8748 | 11             | 135.3000 | 0.0462 | 0.9623 |
| RAG9009      | 7.5000   | 0.0026 | 1.3316 | 7.5000    | 0.0026 | 1.3316 | 11             | 8.2500   | 0.0029 | 1.4648 |
| RAG9012      | 154.0000 | 0.0526 | 0.9526 | 154.0000  | 0.0526 | 0.9526 | 11             | 169.4000 | 0.0579 | 1.0479 |
| RAG9013      | 7.5000   | 0.0026 | 1.5260 | 7.5000    | 0.0026 | 1.5260 | 11             | 8.2500   | 0.0029 | 1.6786 |
| RAG9020      | 0.0000   | 0.0000 | 1.8120 | 0.0000    | 0.0000 | 1.7611 | 12             | 0.0000   | 0.0000 | 1.9372 |

### Major Findings by Fuel Type

The tables below present the certified program participation and energy savings by measure. Table 28 and Table 29 document kWh savings, Table 30 documents kW savings, and Table 31 and Table 32 document MCF savings.

Table 28. Certified ENERGY STAR Appliances Program Participation and First-Year kWh Savings by Measure

| Measure ID | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RAC0100    | 140                               | 140                               | 18,568.5500                         | 18,568.5500                         | 0.9700                                | 18,011.4935                                    | 0.9000                                    | 16,210.3442                                  |
| RAE0002    | 49                                | 49                                | 4,120.9000                          | 4,120.9000                          | 0.9720                                | 4,005.5148                                     | 0.9000                                    | 3,604.9633                                   |
| RAE0003    | 15                                | 15                                | 660.0000                            | 660.0000                            | 0.9140                                | 603.2400                                       | 0.9000                                    | 542.9160                                     |
| RAE0005    | 121                               | 121                               | 16,155.7022                         | 16,155.7022                         | 0.9710                                | 15,687.1868                                    | 0.9000                                    | 14,118.4682                                  |
| RAE0006    | 47                                | 47                                | 15,134.0000                         | 15,134.0000                         | 1.0000                                | 15,134.0000                                    | 0.9000                                    | 13,620.6000                                  |
| RAE0007    | 8                                 | 8                                 | 1,656.0000                          | 1,656.0000                          | 1.0000                                | 1,656.0000                                     | 0.9000                                    | 1,490.4000                                   |
| RAE0008    | 41                                | 41                                | 5,043.0000                          | 5,043.0000                          | 1.0000                                | 5,043.0000                                     | 0.9000                                    | 4,538.7000                                   |
| RAE0009    | 56                                | 56                                | 420.0000                            | 420.0000                            | 1.0000                                | 420.0000                                       | 0.9000                                    | 378.0000                                     |
| RAE0010    | 181                               | 181                               | 67,332.0000                         | 67,332.0000                         | 1.0000                                | 67,332.0000                                    | 0.9000                                    | 60,598.8000                                  |
| RAE0011    | 32                                | 32                                | 7,200.0000                          | 7,200.0000                          | 1.0000                                | 7,200.0000                                     | 0.9000                                    | 6,480.0000                                   |
| RAE0012    | 206                               | 206                               | 31,724.0000                         | 31,724.0000                         | 1.0000                                | 31,724.0000                                    | 0.9000                                    | 28,551.6000                                  |
| RAE0013    | 287                               | 287                               | 2,152.5000                          | 2,152.5000                          | 1.0000                                | 2,152.5000                                     | 0.9000                                    | 1,937.2500                                   |
| RAE9001    | 4,389                             | 4,389                             | 162,831.9000                        | 162,831.9000                        | 0.9550                                | 155,504.4645                                   | 0.9000                                    | 139,954.0181                                 |
| RAE9006    | 12                                | 12                                | 3,864.0000                          | 3,864.0000                          | 1.0000                                | 3,864.0000                                     | 0.9000                                    | 3,477.6000                                   |
| RAE9007    | 2                                 | 2                                 | 414.0000                            | 414.0000                            | 1.0000                                | 414.0000                                       | 0.9000                                    | 372.6000                                     |
| RAE9010    | 67                                | 67                                | 24,924.0000                         | 24,924.0000                         | 1.0000                                | 24,924.0000                                    | 0.9000                                    | 22,431.6000                                  |
| RAE9011    | 26                                | 26                                | 5,850.0000                          | 5,850.0000                          | 1.0000                                | 5,850.0000                                     | 0.9000                                    | 5,265.0000                                   |
| RAE9018    | 1,463                             | 1,463                             | 32,186.0000                         | 32,186.0000                         | 1.0000                                | 32,186.0000                                    | 0.9000                                    | 28,967.4000                                  |
| RAG9008    | 71                                | 71                                | 8,733.0000                          | 8,733.0000                          | 1.0000                                | 8,733.0000                                     | 0.9000                                    | 7,859.7000                                   |
| RAG9009    | 75                                | 75                                | 562.5000                            | 562.5000                            | 1.0000                                | 562.5000                                       | 0.9000                                    | 506.2500                                     |

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RAG9012      | 416                               | 416                               | 64,064.0000                         | 64,064.0000                         | 1.0000                                | 64,064.0000                                    | 0.9000                                    | 57,657.6000                                  |
| RAG9013      | 418                               | 418                               | 3,135.0000                          | 3,135.0000                          | 1.0000                                | 3,135.0000                                     | 0.9000                                    | 2,821.5000                                   |
| <b>Total</b> | <b>8,122</b>                      | <b>8,122</b>                      | <b>476,731.0522</b>                 | <b>476,731.0522</b>                 |                                       | <b>468,205.8996</b>                            | <b>0.9000</b>                             | <b>421,385.3097</b>                          |

Table 29. Certified ENERGY STAR Appliances Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID | 2013 Certified Net kWh Savings (F) = (D x E) | Measure Life (G) | 2013 Certified New kWh LLESMS Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) | Lifetime kWh Savings (J) = (F x G) |
|------------|--|------------------|--|-----------------------------------|------------------------------------|
| RAC0100    | 16,210.3442                                  | 9                | 16,210.3442  | 87.30%                            | 145,893.0974                       |
| RAE0002    | 3,604.9633                                   | 12               | 3,965.4597   | 87.48%                            | 43,259.5598                        |
| RAE0003    | 542.9160                                     | 15               | 597.2076   | 82.26%                            | 8,143.7400                         |
| RAE0005    | 14,118.4682                                  | 9                | 14,118.4682  | 87.39%                            | 127,066.2134                       |
| RAE0006    | 13,620.6000                                  | 11               | 14,982.6600  | 90.00%                            | 149,826.6000                       |
| RAE0007    | 1,490.4000                                   | 11               | 1,639.4400   | 90.00%                            | 16,394.4000                        |
| RAE0008    | 4,538.7000                                   | 11               | 4,992.5700   | 90.00%                            | 49,925.7000                        |
| RAE0009    | 378.0000                                     | 11               | 415.8000   | 90.00%                            | 4,158.0000                         |
| RAE0010    | 60,598.8000                                  | 11               | 66,658.6800  | 90.00%                            | 666,586.8000                       |
| RAE0011    | 6,480.0000                                   | 11               | 7,128.0000   | 90.00%                            | 71,280.0000                        |
| RAE0012    | 28,551.6000                                  | 11               | 31,406.7600  | 90.00%                            | 314,067.6000                       |
| RAE0013    | 1,937.2500                                   | 11               | 2,130.9750   | 90.00%                            | 21,309.7500                        |
| RAE9001    | 139,954.0181                                 | 9                | 139,954.0181   | 85.95%                            | 1,259,586.1625                     |
| RAE9006    | 3,477.6000                                   | 11               | 3,825.3600   | 90.00%                            | 38,253.6000                        |
| RAE9007    | 372.6000                                     | 11               | 409.8600   | 90.00%                            | 4,098.6000                         |

| Measure ID   | 2013 Certified Net kWh Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified New kWh LLESMS Savings<br>(H) = (F x 1.1)* | 2013 Realization Rate<br>(I) = (F/A) | Lifetime kWh Savings<br>(J) = (F x G) |
|--------------|---|---------------------|---|--------------------------------------|---------------------------------------|
| RAE9010      | 22,431.6000                                     | 11                  | 24,674.7600   | 90.00%                               | 246,747.6000                          |
| RAE9011      | 5,265.0000                                      | 11                  | 5,791.5000  | 90.00%                               | 57,915.0000                           |
| RAE9018      | 28,967.4000                                     | 12                  | 31,864.1400   | 90.00%                               | 347,608.8000                          |
| RAG9008      | 7,859.7000                                      | 11                  | 8,645.6700  | 90.00%                               | 86,456.7000                           |
| RAG9009      | 506.2500  | 11                  | 556.8750  | 90.00%                               | 5,568.7500                            |
| RAG9012      | 57,657.6000                                     | 11                  | 63,423.3600   | 90.00%                               | 634,233.6000                          |
| RAG9013      | 2,821.5000                                      | 11                  | 3,103.6500  | 90.00%                               | 31,036.5000                           |
| <b>Total</b> | <b>421,385.3097</b>                             |                     | <b>446,495.5576</b>                                       | <b>88.39%</b>                        | <b>4,329,416.7730</b>                 |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 30. Certified ENERGY STAR Appliances Program Participation and kW Savings by Measure

| Measure ID | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified New kW LLESMS Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) |
|------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|---|-----------------------------------|
| RAE0002    | 49                                | 49                                | 2.5480                             | 2.5480                             | 0.9720                                | 2.4767  | 0.9000                                    | 2.2290                                      | 12               | 2.4519  | 87.48%                            |
| RAE0003    | 15                                | 15                                | 1.1400                             | 1.1400                             | 0.9140                                | 1.0420  | 0.9000                                    | 0.9378                                      | 15               | 1.0315  | 82.26%                            |
| RAE0006    | 47                                | 47                                | 5.1653                             | 5.1653                             | 1.0000                                | 5.1653  | 0.9000                                    | 4.6488                                      | 11               | 5.1136  | 90.00%                            |
| RAE0007    | 8                                 | 8                                 | 0.5648                             | 0.5648                             | 1.0000                                | 0.5648  | 0.9000                                    | 0.5083                                      | 11               | 0.5592  | 90.00%                            |
| RAE0008    | 41                                | 41                                | 1.7220                             | 1.7220                             | 1.0000                                | 1.7220  | 0.9000                                    | 1.5498                                      | 11               | 1.7048  | 90.00%                            |
| RAE0009    | 56                                | 56                                | 0.1456                             | 0.1456                             | 1.0000                                | 0.1456  | 0.9000                                    | 0.1310                                      | 11               | 0.1441  | 90.00%                            |

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| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified New kW LLESMSavings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|---|-----------------------------------|
| RAE0010      | 181                               | 181                               | 22.9870                            | 22.9870                            | 1.0000                                | 22.9870                                       | 0.9000                                    | 20.6883                                     | 11               | 22.7571   | 90.00%                            |
| RAE0011      | 32                                | 32                                | 2.4576                             | 2.4576                             | 1.0000                                | 2.4576  | 0.9000                                    | 2.2118                                      | 11               | 2.4330  | 90.00%                            |
| RAE0012      | 206                               | 206                               | 10.8356                            | 10.8356                            | 1.0000                                | 10.8356                                       | 0.9000                                    | 9.7520                                      | 11               | 10.7272   | 90.00%                            |
| RAE0013      | 287                               | 287                               | 0.7462                             | 0.7462                             | 1.0000                                | 0.7462  | 0.9000                                    | 0.6716                                      | 11               | 0.7387  | 90.00%                            |
| RAE9001      | 4,389                             | 4,389                             | 19.3116                            | 19.3116                            | 0.9550                                | 18.4426                                       | 0.9000                                    | 16.5983                                     | 9                | 16.5983   | 85.95%                            |
| RAE9006      | 12                                | 12                                | 1.3188                             | 1.3188                             | 1.0000                                | 1.3188  | 0.9000                                    | 1.1869                                      | 11               | 1.3056  | 90.00%                            |
| RAE9007      | 2                                 | 2                                 | 0.1412                             | 0.1412                             | 1.0000                                | 0.1412  | 0.9000                                    | 0.1271                                      | 11               | 0.1398  | 90.00%                            |
| RAE9010      | 67                                | 67                                | 8.5090                             | 8.5090                             | 1.0000                                | 8.5090  | 0.9000                                    | 7.6581                                      | 11               | 8.4239  | 90.00%                            |
| RAE9011      | 26                                | 26                                | 1.9968                             | 1.9968                             | 1.0000                                | 1.9968  | 0.9000                                    | 1.7971                                      | 11               | 1.9768  | 90.00%                            |
| RAG9008      | 71                                | 71                                | 2.9820                             | 2.9820                             | 1.0000                                | 2.9820  | 0.9000                                    | 2.6838                                      | 11               | 2.9522  | 90.00%                            |
| RAG9009      | 75                                | 75                                | 0.1950                             | 0.1950                             | 1.0000                                | 0.1950  | 0.9000                                    | 0.1755                                      | 11               | 0.1931  | 90.00%                            |
| RAG9012      | 416                               | 416                               | 21.8816                            | 21.8816                            | 1.0000                                | 21.8816                                       | 0.9000                                    | 19.6934                                     | 11               | 21.6628   | 90.00%                            |
| RAG9013      | 418                               | 418                               | 1.0868                             | 1.0868                             | 1.0000                                | 1.0868  | 0.9000                                    | 0.9781                                      | 11               | 1.0759  | 90.00%                            |
| <b>Total</b> | <b>6,398</b>                      | <b>6,398</b>                      | <b>105.7349</b>                    | <b>105.7349</b>                    |                                       | <b>104.6965</b>                               | <b>0.9000</b>                             | <b>94.2268</b>                              |                  | <b>101.9897</b>                                     | <b>89.12%</b>                     |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.



Table 31. Certified ENERGY STAR Appliances Program Participation and First-Year MCF Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2012 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RAC0100      | 140                               | 140                               | 1,006.8660                          | 1,006.8660                          | 0.9700                                | 976.6600                                       | 0.9000                                    | 878.9940                                     |
| RAE9007      | 2                                 | 2                                 | 0.9136                              | 0.9136                              | 1.0000                                | 0.9136   | 0.9000                                    | 0.8222                                       |
| RAE9011      | 26                                | 26                                | 14.9110                             | 14.9110                             | 1.0000                                | 14.9110  | 0.9000                                    | 13.4199                                      |
| RAG0004      | 45                                | 45                                | 118.0980                            | 118.0980                            | 0.8890                                | 104.9891                                       | 0.9000                                    | 94.4902                                      |
| RAG0005      | 353                               | 353                               | 2,460.3041                          | 2,460.3041                          | 0.9710                                | 2,388.9553                                     | 0.9000                                    | 2,150.0598                                   |
| RAG0007      | 6                                 | 6                                 | 2.7408                              | 2.7408                              | 1.0000                                | 2.7408   | 0.9000                                    | 2.4667                                       |
| RAG0008      | 47                                | 47                                | 41.1156                             | 41.1156                             | 1.0000                                | 41.1156  | 0.9000                                    | 37.0040                                      |
| RAG0009      | 162                               | 162                               | 215.7192                            | 215.7192                            | 1.0000                                | 215.7192                                       | 0.9000                                    | 194.1473                                     |
| RAG0011      | 31                                | 31                                | 17.7785                             | 17.7785                             | 1.0000                                | 17.7785  | 0.9000                                    | 16.0007                                      |
| RAG0012      | 265                               | 265                               | 252.4390                            | 252.4390                            | 1.0000                                | 252.4390                                       | 0.9000                                    | 227.1951                                     |
| RAG0013      | 874                               | 874                               | 1,333.7240                          | 1,333.7240                          | 1.0000                                | 1,333.7240                                     | 0.9000                                    | 1,200.3516                                   |
| RAG9002      | 1,525                             | 1,525                             | 1,259.9550                          | 1,259.9550                          | 0.5190                                | 653.9166                                       | 0.9000                                    | 588.5250                                     |
| RAG9003      | 1,525                             | 1,525                             | 1,259.9550                          | 1,259.9550                          | 0.5190                                | 653.9166                                       | 0.9000                                    | 588.5250                                     |
| RAG9008      | 71                                | 71                                | 62.1108                             | 62.1108                             | 1.0000                                | 62.1108  | 0.9000                                    | 55.8997                                      |
| RAG9009      | 75                                | 75                                | 99.8700                             | 99.8700                             | 1.0000                                | 99.8700  | 0.9000                                    | 89.8830                                      |
| RAG9012      | 416                               | 416                               | 396.2816                            | 396.2816                            | 1.0000                                | 396.2816                                       | 0.9000                                    | 356.6534                                     |
| RAG9013      | 421                               | 421                               | 642.4460                            | 642.4460                            | 1.0000                                | 642.4460                                       | 0.9000                                    | 578.2014                                     |
| RAG9020      | 1,525                             | 1,525                             | 2,763.3000                          | 2,685.6775                          | 0.5870                                | 1,576.4927                                     | 0.9000                                    | 1,418.8434                                   |
| <b>Total</b> | <b>7,509</b>                      | <b>7,509</b>                      | <b>11,948.5282</b>                  | <b>11,870.9057</b>                  |                                       | <b>9,434.9805</b>                              | <b>0.9000</b>                             | <b>8,491.4825</b>                            |

Table 32. Certified ENERGY STAR Appliances Program Long-Life Equipment Savings Multiplier and Lifetime MCF Savings by Measure

| Measure ID   | 2013 Certified Net MCF Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net MCF LLESMSavings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) | Lifetime MCF Savings (J) = (F x G) |
|--------------|--|------------------|--|-----------------------------------|------------------------------------|
| RAC0100      | 878.9940                                     | 9                | 878.9940   | 87.30%                            | 7,910.9462                         |
| RAE9007      | 0.8222                                       | 11               | 0.9045   | 90.00%                            | 9.0446                             |
| RAE9011      | 13.4199                                      | 11               | 14.7619  | 90.00%                            | 147.6189                           |
| RAG0004      | 94.4902                                      | 12               | 103.9392   | 80.01%                            | 1,133.8825                         |
| RAG0005      | 2,150.0598                                   | 9                | 2,150.0598   | 87.39%                            | 19,350.5378                        |
| RAG0007      | 2.4667                                       | 11               | 2.7134   | 90.00%                            | 27.1339                            |
| RAG0008      | 37.0040                                      | 11               | 40.7044  | 90.00%                            | 407.0444                           |
| RAG0009      | 194.1473                                     | 11               | 213.5620   | 90.00%                            | 2,135.6201                         |
| RAG0011      | 16.0007                                      | 11               | 17.6007  | 90.00%                            | 176.0072                           |
| RAG0012      | 227.1951                                     | 11               | 249.9146   | 90.00%                            | 2,499.1461                         |
| RAG0013      | 1,200.3516                                   | 11               | 1,320.3868   | 90.00%                            | 13,203.8676                        |
| RAG9002      | 588.5250                                     | 12               | 647.3775   | 46.71%                            | 7,062.2998                         |
| RAG9003      | 588.5250                                     | 12               | 647.3775   | 46.71%                            | 7,062.2998                         |
| RAG9008      | 55.8997                                      | 11               | 61.4897  | 90.00%                            | 614.8969                           |
| RAG9009      | 89.8830                                      | 11               | 98.8713  | 90.00%                            | 988.7130                           |
| RAG9012      | 356.6534                                     | 11               | 392.3188   | 90.00%                            | 3,923.1878                         |
| RAG9013      | 578.2014                                     | 11               | 636.0215   | 90.00%                            | 6,360.2154                         |
| RAG9020      | 1,418.8434                                   | 12               | 1,560.7278   | 51.35%                            | 17,026.1211                        |
| <b>Total</b> | <b>8,491.4825</b>                            |                  | <b>9,037.7253</b>                                    | <b>71.07%</b>                     | <b>90,038.5831</b>                 |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

## Appendix C: HVAC and Water Heating Program

Table 33 presents reported gross and certified net energy savings for the HVAC and Water Heating Program by fuel type. The realization rates reflect the adjustments Cadmus made based on our certification tasks and applying installation rate and NTG adjustments. The changes we made to reported gross energy savings are discussed in the following sections.

**Table 33. HVAC and Water Heating Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 38,605              | 6,112,784.9022    | 1,217.6753       | 456,583.8492      |
| Certified Net    | 38,605              | 5,501,506.4120    | 1,095.9078       | 410,921.9816      |
| Difference       | 0                   | -611,278.4902     | -121.7675        | -45,661.8676      |
| Realization Rate | 100.00%             | 90.00%            | 90.00%           | 90.00%            |

Table 34 presents reported and certified net energy savings with the long-life equipment savings multiplier for the HVAC and Water Heating Program by fuel type.

**Table 34. HVAC and Water Heating Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 38,605              | 5,999,144.2493    | 1,196.9553       | 444,644.8637      |
| Certified Net      | 38,605              | 6,001,640.2052    | 1,197.2427       | 444,640.7327      |
| Difference         | 0                   | 2,495.9559        | 0.2874           | -4.1310           |
| Certified/Reported | 100.00%             | 100.04%           | 100.02%          | 100.00%           |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

Cadmus reviewed program documents from a sample of 70 randomly selected account numbers. Table 35 documents reported and certified measure counts as well as reported and certified energy savings by fuel type.

**Table 35. HVAC and Water Heating Program Sample Participation and Savings by End Use**

| Measure Code | Reported   |                    |               |                   | Certified  |                    |               |                   |
|--------------|------------|--------------------|---------------|-------------------|------------|--------------------|---------------|-------------------|
|              | n          | kWh                | kW            | MCF               | n          | kWh                | kW            | MCF               |
| RHC0100      | 3          | 419.8050           | -             | 22.6167           | 3          | 419.8050           | -             | 22.6167           |
| RHE0001      | 18         | 13,140.0000        | 1.1826        | -                 | 18         | 13,140.0000        | 1.1826        | -                 |
| RHE0004      | 4          | 602.6824           | -             | -                 | 4          | 602.6824           | -             | -                 |
| RHE0006      | 3          | 1,447.0137         | 0.9330        | -                 | 3          | 1,447.0137         | 0.9330        | -                 |
| RHE0007      | 2          | 699.7896           | 0.6958        | -                 | 2          | 699.7896           | 0.6958        | -                 |
| RHE0016      | 7          | 643.9902           | 0.9527        | -                 | 7          | 643.9902           | 0.9527        | -                 |
| RHG0004      | 24         | -                  | -             | 166.5384          | 24         | -                  | -             | 166.5384          |
| RHG0010      | 17         | -                  | -             | 341.9907          | 17         | -                  | -             | 341.9907          |
| RHG0011      | 22         | -                  | -             | 502.3150          | 22         | -                  | -             | 502.3150          |
| RHG0012      | 8          | -                  | -             | 191.4776          | 9          | -                  | -             | 215.4123          |
| RHG0013      | 1          | -                  | -             | 27.8044           | -          | -                  | -             | -                 |
| RHG0017      | 8          | -                  | -             | 57.4120           | 8          | -                  | -             | 57.4120           |
| <b>Total</b> | <b>117</b> | <b>16,953.2809</b> | <b>3.7641</b> | <b>1,310.1548</b> | <b>117</b> | <b>16,953.2809</b> | <b>3.7641</b> | <b>1,306.2851</b> |

Cadmus' documentation review revealed a single discrepancy between the Consumers Energy tracking database and application documents uploaded to the Consumers Energy Etracker website. Consumers Energy provided a furnace savings value based on 98% AFUE efficiency, while the documentation revealed an actual 97% AFUE efficiency. This finding led Cadmus to remove one installed quantity from measure RHG0013 and to add one installed quantity to RHG0012.

Table 36 provides the sample realization rates by fuel type and the t-test statistics Cadmus used to analyze errors in the sample.

**Table 36. HVAC and Water Heating Program Sample Realization Rates and t-Statistic**

|                                     | kWh        | kW         | MCF       |
|-------------------------------------|------------|------------|-----------|
| Sample Realization Rate             | 100.00%    | 100.00%    | 99.80%    |
| Standard Error                      | N/A        | N/A        | 0.0020    |
| t-Statistic                         | N/A        | N/A        | 1.0000    |
| p-Value                             | N/A        | N/A        | 0.3218    |
| <b>Apply to Program Population?</b> | <b>N/A</b> | <b>N/A</b> | <b>No</b> |

#### **Task 4: Measure-Level Savings Analysis**

Cadmus found no discrepancies between per-unit measure savings reported by Consumers Energy and values either maintained in the MEMD or calculated by Navigant.

Table 37 presents the reported and certified per-unit savings for all measures delivered through the 2013 HVAC and Water Heating Program.

Table 37. HVAC and Water Heating Program Reported and Certified Per-Unit Measure Savings

| Measure Code | Reported   |        |         | Certified  |        |         | Certified LLESMS |            |        |         |
|--------------|------------|--------|---------|------------|--------|---------|------------------|------------|--------|---------|
|              | kWh        | kW     | MCF     | kWh        | kW     | MCF     | Measure Life     | kWh        | kW     | MCF     |
| RHC0100      | 139.9350   | 0.0000 | 7.5389  | 139.9350   | 0.0000 | 7.5389  | 9                | 139.9350   | 0.0000 | 7.5389  |
| RHE0001      | 730.0000   | 0.0657 | 0.0000  | 730.0000   | 0.0657 | 0.0000  | 15               | 803.0000   | 0.0723 | 0.0000  |
| RHE0004      | 150.6706   | 0.0000 | 0.0000  | 150.6706   | 0.0000 | 0.0000  | 9                | 150.6706   | 0.0000 | 0.0000  |
| RHE0006      | 482.3379   | 0.3110 | 0.0000  | 482.3379   | 0.3110 | 0.0000  | 15               | 530.5717   | 0.3421 | 0.0000  |
| RHE0007      | 349.8948   | 0.3479 | 0.0000  | 349.8948   | 0.3479 | 0.0000  | 15               | 384.8843   | 0.3827 | 0.0000  |
| RHE0008      | 1,418.4206 | 0.2557 | 0.0000  | 1,418.4206 | 0.2557 | 0.0000  | 15               | 1,560.2627 | 0.2813 | 0.0000  |
| RHE0009      | 2,218.9722 | 0.4667 | 0.0000  | 2,218.9722 | 0.4667 | 0.0000  | 15               | 2,440.8694 | 0.5134 | 0.0000  |
| RHE0011      | 904.2776   | 0.5942 | 0.0000  | 904.2776   | 0.5942 | 0.0000  | 15               | 994.7054   | 0.6536 | 0.0000  |
| RHE0012      | 1,421.4139 | 0.5915 | 0.0000  | 1,421.4139 | 0.5915 | 0.0000  | 15               | 1,563.5553 | 0.6507 | 0.0000  |
| RHE0016      | 91.9986    | 0.1361 | 0.0000  | 91.9986    | 0.1361 | 0.0000  | 5                | 91.9986    | 0.1361 | 0.0000  |
| RHG0002      | 0.0000     | 0.0000 | 6.5124  | 0.0000     | 0.0000 | 6.5124  | 15               | 0.0000     | 0.0000 | 7.1636  |
| RHG0004      | 150.7432   | 0.0000 | 6.9391  | 150.7432   | 0.0000 | 6.9391  | 9                | 150.7432   | 0.0000 | 6.9391  |
| RHG0006      | 0.0000     | 0.0000 | 10.2232 | 0.0000     | 0.0000 | 10.2232 | 20               | 0.0000     | 0.0000 | 11.2455 |
| RHG0007      | 0.0000     | 0.0000 | 17.1646 | 0.0000     | 0.0000 | 17.1646 | 15               | 0.0000     | 0.0000 | 18.8811 |
| RHG0008      | 0.0000     | 0.0000 | 3.4992  | 0.0000     | 0.0000 | 3.4992  | 15               | 0.0000     | 0.0000 | 3.8491  |
| RHG0010      | 0.0000     | 0.0000 | 20.1171 | 0.0000     | 0.0000 | 20.1171 | 15               | 0.0000     | 0.0000 | 22.1288 |
| RHG0011      | 0.0000     | 0.0000 | 22.8325 | 0.0000     | 0.0000 | 22.8325 | 15               | 0.0000     | 0.0000 | 25.1158 |
| RHG0012      | 0.0000     | 0.0000 | 23.9347 | 0.0000     | 0.0000 | 23.9347 | 15               | 0.0000     | 0.0000 | 26.3282 |
| RHG0013      | 0.0000     | 0.0000 | 27.8044 | 0.0000     | 0.0000 | 27.8044 | 15               | 0.0000     | 0.0000 | 30.5848 |
| RHG0015      | -336.9148  | 0.0000 | 47.7263 | -336.9148  | 0.0000 | 47.7263 | 20               | -370.6063  | 0.0000 | 52.4989 |
| RHG0016      | -314.6976  | 0.0000 | 47.8956 | -314.6976  | 0.0000 | 47.8956 | 20               | -346.1674  | 0.0000 | 52.6852 |
| RHG0017      | 0.0000     | 0.0000 | 7.1765  | 0.0000     | 0.0000 | 7.1765  | 5                | 0.0000     | 0.0000 | 7.1765  |
| RHG0018      | -444.9094  | 0.0000 | 53.4546 | -444.9094  | 0.0000 | 53.4546 | 20               | -489.4003  | 0.0000 | 58.8001 |

### Major Findings by Fuel Type

The tables below present certified program participation and energy savings by measure. Table 38 and Table 39 document kWh savings, Table 40 documents kW savings, and Table 41 and Table 42 document MCF savings.

Table 38. Certified HVAC and Water Heating Program Participation and First-Year kWh Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RHC0100      | 2,303                             | 2,303                             | 322,270.3050                        | 322,270.3050                        | 1.0000                                | 322,270.3050                                   | 0.9000                                    | 290,043.2745                                 |
| RHE0001      | 6,315                             | 6,315                             | 4,609,950.0000                      | 4,609,950.0000                      | 1.0000                                | 4,609,950.0000                                 | 0.9000                                    | 4,148,955.0000                               |
| RHE0004      | 1,107                             | 1,107                             | 166,792.3542                        | 166,792.3542                        | 1.0000                                | 166,792.3542                                   | 0.9000                                    | 150,113.1188                                 |
| RHE0006      | 599                               | 599                               | 288,920.4021                        | 288,920.4021                        | 1.0000                                | 288,920.4021                                   | 0.9000                                    | 260,028.3619                                 |
| RHE0007      | 1,305                             | 1,305                             | 456,612.7140                        | 456,612.7140                        | 1.0000                                | 456,612.7140                                   | 0.9000                                    | 410,951.4426                                 |
| RHE0008      | 4                                 | 4                                 | 5,673.6824                          | 5,673.6824                          | 1.0000                                | 5,673.6824                                     | 0.9000                                    | 5,106.3142                                   |
| RHE0009      | 72                                | 72                                | 159,765.9984                        | 159,765.9984                        | 1.0000                                | 159,765.9984                                   | 0.9000                                    | 143,789.3986                                 |
| RHE0011      | 16                                | 16                                | 14,468.4416                         | 14,468.4416                         | 1.0000                                | 14,468.4416                                    | 0.9000                                    | 13,021.5974                                  |
| RHE0012      | 45                                | 45                                | 63,963.6255                         | 63,963.6255                         | 1.0000                                | 63,963.6255                                    | 0.9000                                    | 57,567.2630                                  |
| RHE0016      | 674                               | 674                               | 62,007.0564                         | 62,007.0564                         | 1.0000                                | 62,007.0564                                    | 0.9000                                    | 55,806.3508                                  |
| RHG0004      | 31                                | 31                                | 4,673.0392                          | 4,673.0392                          | 1.0000                                | 4,673.0392                                     | 0.9000                                    | 4,205.7353                                   |
| RHG0015      | 5                                 | 5                                 | -1,684.5740                         | -1,684.5740                         | 1.0000                                | -1,684.5740                                    | 0.9000                                    | -1,516.1166                                  |
| RHG0016      | 57                                | 57                                | -17,937.7632                        | -17,937.7632                        | 1.0000                                | -17,937.7632                                   | 0.9000                                    | -16,143.9869                                 |
| RHG0018      | 51                                | 51                                | -22,690.3794                        | -22,690.3794                        | 1.0000                                | -22,690.3794                                   | 0.9000                                    | -20,421.3415                                 |
| <b>Total</b> | <b>12,584</b>                     | <b>12,584</b>                     | <b>6,112,784.9022</b>               | <b>6,112,784.9022</b>               |                                       | <b>6,112,784.9022</b>                          | <b>0.9000</b>                             | <b>5,501,506.4120</b>                        |

Table 39. Certified HVAC and Water Heating Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID   | 2013 Certified Net<br>kWh Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net<br>kWh LLESM<br>Savings<br>(H) = (F x 1.1) * | 2013 Realization<br>Rate<br>(I) = (F/A) | Lifetime kWh<br>Savings<br>(J) = (F x G) |
|--------------|--|---------------------|---|---|--|
| RHC0100      | 290,043.2745                                       | 9                   | 290,043.2745  | 90.00%                                  | 2,610,389.4705                           |
| RHE0001      | 4,148,955.0000                                     | 15                  | 4,563,850.5000  | 90.00%                                  | 62,234,325.0000                          |
| RHE0004      | 150,113.1188                                       | 9                   | 150,113.1188  | 90.00%                                  | 1,351,018.0690                           |
| RHE0006      | 260,028.3619                                       | 15                  | 286,031.1981  | 90.00%                                  | 3,900,425.4284                           |
| RHE0007      | 410,951.4426                                       | 15                  | 452,046.5869  | 90.00%                                  | 6,164,271.6390                           |
| RHE0008      | 5,106.3142   | 15                  | 5,616.9456  | 90.00%                                  | 76,594.7124                              |
| RHE0009      | 143,789.3986                                       | 15                  | 158,168.3384  | 90.00%                                  | 2,156,840.9784                           |
| RHE0011      | 13,021.5974  | 15                  | 14,323.7572   | 90.00%                                  | 195,323.9616                             |
| RHE0012      | 57,567.2630  | 15                  | 63,323.9892   | 90.00%                                  | 863,508.9443                             |
| RHE0016      | 55,806.3508  | 5                   | 55,806.3508   | 90.00%                                  | 279,031.7538                             |
| RHG0004      | 4,205.7353   | 9                   | 4,205.7353  | 90.00%                                  | 37,851.6175                              |
| RHG0015      | -1,516.1166  | 20                  | -1,667.7283   | 90.00%                                  | -30,322.3320                             |
| RHG0016      | -16,143.9869                                       | 20                  | -17,758.3856  | 90.00%                                  | -322,879.7376                            |
| RHG0018      | -20,421.3415                                       | 20                  | -22,463.4756  | 90.00%                                  | -408,426.8292                            |
| <b>Total</b> | <b>5,501,506.4120</b>                              |                     | <b>6,001,640.2052</b>   | <b>90.00%</b>                           | <b>79,107,952.6760</b>                   |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 40. Certified HVAC and Water Heating Program Participation and kW Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified New kW LLESMSavings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|---|-----------------------------------|
| RHE0001      | 6,315                             | 6,315                             | 414.8955                           | 414.8955                           | 1.0000                                | 414.8955                                      | 0.9000                                    | 373.4060                                    | 15               | 410.7465  | 90.00%                            |
| RHE0006      | 599                               | 599                               | 186.2890                           | 186.2890                           | 1.0000                                | 186.2890                                      | 0.9000                                    | 167.6601                                    | 15               | 184.4261  | 90.00%                            |
| RHE0007      | 1,305                             | 1,305                             | 454.0095                           | 454.0095                           | 1.0000                                | 454.0095                                      | 0.9000                                    | 408.6086                                    | 15               | 449.4694  | 90.00%                            |
| RHE0008      | 4                                 | 4                                 | 1.0228                             | 1.0228                             | 1.0000                                | 1.0228  | 0.9000                                    | 0.9205                                      | 15               | 1.0126  | 90.00%                            |
| RHE0009      | 72                                | 72                                | 33.6024                            | 33.6024                            | 1.0000                                | 33.6024                                       | 0.9000                                    | 30.2422                                     | 15               | 33.2664   | 90.00%                            |
| RHE0011      | 16                                | 16                                | 9.5072                             | 9.5072                             | 1.0000                                | 9.5072  | 0.9000                                    | 8.5565                                      | 15               | 9.4121  | 90.00%                            |
| RHE0012      | 45                                | 45                                | 26.6175                            | 26.6175                            | 1.0000                                | 26.6175                                       | 0.9000                                    | 23.9558                                     | 15               | 26.3513   | 90.00%                            |
| RHE0016      | 674                               | 674                               | 91.7314                            | 91.7314                            | 1.0000                                | 91.7314                                       | 0.9000                                    | 82.5583                                     | 5                | 82.5583   | 90.00%                            |
| <b>Total</b> | <b>9,030</b>                      | <b>9,030</b>                      | <b>1,217.6753</b>                  | <b>1,217.6753</b>                  |                                       | <b>1,217.6753</b>                             | <b>0.9000</b>                             | <b>1,095.9078</b>                           |                  | <b>1,197.2427</b>                                   | <b>90.00%</b>                     |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.



Table 41. Certified HVAC and Water Heating Program Participation and First-Year MCF Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RHC0100      | 2,303                             | 2,303                             | 17,362.0867                         | 17,362.0867                         | 1.0000                                | 17,362.0867                                    | 0.9000                                    | 15,625.8780                                  |
| RHG0002      | 136                               | 136                               | 885.6864                            | 885.6864                            | 1.0000                                | 885.6864                                       | 0.9000                                    | 797.1178                                     |
| RHG0004      | 6,477                             | 6,477                             | 44,944.5507                         | 44,944.5507                         | 1.0000                                | 44,944.5507                                    | 0.9000                                    | 40,450.0956                                  |
| RHG0006      | 11                                | 11                                | 112.4552                            | 112.4552                            | 1.0000                                | 112.4552                                       | 0.9000                                    | 101.2097                                     |
| RHG0007      | 2                                 | 2                                 | 34.3292                             | 34.3292                             | 1.0000                                | 34.3292  | 0.9000                                    | 30.8963                                      |
| RHG0008      | 124                               | 124                               | 433.9008                            | 433.9008                            | 1.0000                                | 433.9008                                       | 0.9000                                    | 390.5107                                     |
| RHG0010      | 6,173                             | 6,173                             | 124,182.8583                        | 124,182.8583                        | 1.0000                                | 124,182.8583                                   | 0.9000                                    | 111,764.5725                                 |
| RHG0011      | 8,407                             | 8,407                             | 191,952.8275                        | 191,952.8275                        | 1.0000                                | 191,952.8275                                   | 0.9000                                    | 172,757.5448                                 |
| RHG0012      | 1,728                             | 1,729                             | 41,359.1616                         | 41,383.0963                         | 1.0000                                | 41,383.0963                                    | 0.9000                                    | 37,244.7867                                  |
| RHG0013      | 140                               | 139                               | 3,892.6160                          | 3,864.8116                          | 1.0000                                | 3,864.8116                                     | 0.9000                                    | 3,478.3304                                   |
| RHG0015      | 10                                | 10                                | 477.2630                            | 477.2630                            | 1.0000                                | 477.2630                                       | 0.9000                                    | 429.5367                                     |
| RHG0016      | 107                               | 107                               | 5,124.8292                          | 5,124.8292                          | 1.0000                                | 5,124.8292                                     | 0.9000                                    | 4,612.3463                                   |
| RHG0017      | 2,734                             | 2,734                             | 19,620.5510                         | 19,620.5510                         | 1.0000                                | 19,620.5510                                    | 0.9000                                    | 17,658.4959                                  |
| RHG0018      | 116                               | 116                               | 6,200.7336                          | 6,200.7336                          | 1.0000                                | 6,200.7336                                     | 0.9000                                    | 5,580.6602                                   |
| <b>Total</b> | <b>28,468</b>                     | <b>28,468</b>                     | <b>456,583.8492</b>                 | <b>456,579.9795</b>                 |                                       | <b>456,579.9795</b>                            | <b>0.9000</b>                             | <b>410,921.9816</b>                          |

Table 42. Certified HVAC and Water Heating Program Long-Life Equipment Savings Multiplier and Lifetime MCF Savings by Measure

| Measure ID   | 2013 Certified Net<br>MCF Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net<br>MCF LLESMS Savings<br>(H) = (F x 1.1)* | 2013<br>Realization<br>Rate (I) = (F/A) | Lifetime MCF<br>Savings<br>(J) = (F x G) |
|--------------|--|---------------------|--|---|--|
| RHC0100      | 15,625.8780  | 9                   | 15,625.8780  | 90.00%                                  | 140,632.9023                             |
| RHG0002      | 797.1178   | 15                  | 876.8295   | 90.00%                                  | 11,956.7664                              |
| RHG0004      | 40,450.0956  | 9                   | 40,450.0956  | 90.00%                                  | 364,050.8607                             |
| RHG0006      | 101.2097   | 20                  | 111.3306   | 90.00%                                  | 2,024.1936                               |
| RHG0007      | 30.8963  | 15                  | 33.9859  | 90.00%                                  | 463.4442                                 |
| RHG0008      | 390.5107   | 15                  | 429.5618   | 90.00%                                  | 5,857.6608                               |
| RHG0010      | 111,764.5725                                       | 15                  | 122,941.0297   | 90.00%                                  | 1,676,468.5871                           |
| RHG0011      | 172,757.5448                                       | 15                  | 190,033.2992   | 90.00%                                  | 2,591,363.1713                           |
| RHG0012      | 37,244.7867  | 15                  | 40,969.2653  | 90.05%                                  | 558,671.8001                             |
| RHG0013      | 3,478.3304   | 15                  | 3,826.1635   | 89.36%                                  | 52,174.9566                              |
| RHG0015      | 429.5367   | 20                  | 472.4904   | 90.00%                                  | 8,590.7340                               |
| RHG0016      | 4,612.3463   | 20                  | 5,073.5809   | 90.00%                                  | 92,246.9256                              |
| RHG0017      | 17,658.4959  | 5                   | 17,658.4959  | 90.00%                                  | 88,292.4795                              |
| RHG0018      | 5,580.6602   | 20                  | 6,138.7263   | 90.00%                                  | 111,613.2048                             |
| <b>Total</b> | <b>410,921.9816</b>                                |                     | <b>444,640.7327</b>  | <b>90.00%</b>                           | <b>5,704,407.6868</b>                    |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

## Appendix D: Income Qualified Program

Table 43 presents reported gross and certified net energy savings for the Income Qualified Program by fuel type. The realization rates reflect the adjustments Cadmus made based on our certification tasks and applying installation rate and NTG adjustments. The following sections discuss changes we made to reported gross energy savings.

**Table 43. Income Qualified Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 2,861,057.8         | 2,412,736.1538    | 242.5718         | 97,071.8179       |
| Certified Net    | 2,861,058.8         | 2,032,722.3424    | 213.4483         | 84,675.7302       |
| Difference       | 1                   | -380,013.8114     | -29.1235         | -12,396.0877      |
| Realization Rate | 100.00%             | 84.25%            | 87.99%           | 87.23%            |

Table 44 presents reported and certified net energy savings with the long-life equipment savings multiplier for the Income Qualified Program by fuel type.

**Table 44. Income Qualified Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 2,861,057.8         | 2,200,638.6403    | 217.9672         | 89,006.7860       |
| Certified Net      | 2,861,058.8         | 2,075,471.6734    | 218.0604         | 89,201.0039       |
| Difference         | 1                   | -125,166.9669     | 0.0932           | 194.2179          |
| Certified/Reported | 100.00%             | 94.31%            | 100.04%          | 100.22%           |

### Task 2: Database Review

The Consumers Energy and implementer databases matched according to the number of participants and quantities of installed measures. Cadmus found, however, that the appropriate application of savings according to customer type was not correctly labeled for several accounts.

A minor discrepancy occurred between the Consumers Energy and implementer tracking databases. To correct this, we reviewed the relevant program documentation available electronically through the Consumers Energy Etracker system and applied the following corrections:

- There were 632 accounts in the Consumers Energy database labeled as electric only while showing gas savings. Cadmus certified each of these accounts and determined that the issue was in multifamily complexes: tenants had their own electric accounts, while gas accounts were associated with a property rather than individual houses. The implementer's database had two columns for gas and electric accounts that helped Cadmus verify that no account was given incorrect savings.

Cadmus also verified that measures were installed during the 2013 program year. Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

Cadmus reviewed program documents from a sample of 69 randomly selected account numbers.

Table 45 documents reported and certified measure counts as well as reported and certified energy savings by fuel type.

**Table 45. Income Qualified Program Sample Participation and Savings by End Use**

| Measure Code | Reported |             |        |          | Certified |             |        |          |
|--------------|----------|-------------|--------|----------|-----------|-------------|--------|----------|
|              | n        | kWh         | kW     | MCF      | n         | kWh         | kW     | MCF      |
| RIE0001      | 16       | 593.6000    | 0.0704 | -        | 16        | 593.6000    | 0.0704 | -        |
| RIE0002      | 3        | 3,654.0000  | -      | -        | 3         | 3,654.0000  | -      | -        |
| RIE0012      | 1        | 166.0000    | 0.0189 | -        | 1         | 166.0000    | 0.0189 | -        |
| RIE0013      | 1        | 255.0000    | 0.0290 | -        | 1         | 255.0000    | 0.0290 | -        |
| RIE0016      | 291      | 10,796.1000 | 1.2804 | -        | 291       | 10,796.1000 | 1.2804 | -        |
| RIE0035      | 1        | 690.0000    | 0.0778 | -        | 1         | 690.0000    | 0.0778 | -        |
| RIE0036      | 1        | 690.0000    | 0.0778 | -        | 1         | 690.0000    | 0.0778 | -        |
| RIE0049      | 2        | 414.0824    | 0.0468 | -        | 2         | 414.0824    | 0.0468 | -        |
| RIG0008      | 1        | -           | -      | 2.6244   | 1         | -           | -      | 2.6244   |
| RIG0009      | 14       | -           | -      | 11.5668  | 14        | -           | -      | 9.9144   |
| RIG0010      | 8        | -           | -      | 10.1088  | 8         | -           | -      | 10.1088  |
| RIG0011      | 7        | -           | -      | 92.8235  | 7         | -           | -      | 92.8235  |
| RIG0016      | 6        | -           | -      | 25.9746  | 6         | -           | -      | 25.9746  |
| RIG0017      | 4,570    | -           | -      | 24.2210  | 4,570     | -           | -      | 24.2210  |
| RIG0018      | 840      | -           | -      | 3.5280   | 840       | -           | -      | 3.5280   |
| RIG0020      | 174      | -           | -      | 0.3480   | 174       | -           | -      | 0.3480   |
| RIG0029      | 1        | -           | -      | 16.9775  | 1         | -           | -      | 16.9775  |
| RIG0035      | 5,820    | -           | -      | 32.0100  | 5,820     | -           | -      | 32.0100  |
| RIG0036      | 1,056    | -           | -      | 10.0320  | 1,056     | -           | -      | 10.0320  |
| RIG0038      | 1        | -           | -      | 6.8115   | 1         | -           | -      | 6.8115   |
| RIG0047      | 15       | -           | -      | 73.8720  | 15        | -           | -      | 73.8720  |
| RIG0049      | 31       | -           | -      | 108.4752 | 31        | -           | -      | 108.4752 |
| RIG0050      | 19       | -           | -      | 66.4848  | 19        | -           | -      | 66.4848  |
| RIG0052      | 11       | -           | -      | 169.5276 | 11        | -           | -      | 169.5276 |
| RIG0053      | 39       | -           | -      | 32.2218  | 39        | -           | -      | 33.8742  |
| RIG0086      | 1,868    | -           | -      | 3.3624   | 1,868     | -           | -      | 3.3624   |
| RIG0088      | 2,568    | -           | -      | 8.4744   | 2,568     | -           | -      | 8.4744   |
| RIG0093      | 34       | -           | -      | 35.9278  | 35        | -           | -      | 36.9845  |
| RIG0095      | 1        | -           | -      | 0.2444   | 1         | -           | -      | 0.2444   |

| Measure Code | Reported      |                    |               |                 | Certified     |                    |               |                 |
|--------------|---------------|--------------------|---------------|-----------------|---------------|--------------------|---------------|-----------------|
|              | n             | kWh                | kW            | MCF             | n             | kWh                | kW            | MCF             |
| RIG0096      | 10,255        | -                  | -             | 55.3770         | 10,255        | -                  | -             | 55.3770         |
| RIG0097      | 194           | -                  | -             | 49.0238         | 194           | -                  | -             | 49.0238         |
| <b>Total</b> | <b>27,849</b> | <b>17,258.7824</b> | <b>1.6011</b> | <b>840.0173</b> | <b>27,850</b> | <b>17,258.7824</b> | <b>1.6011</b> | <b>841.0740</b> |

The reported measure quantity for one database record did not match its associated documentation. In total, the database sample understated the installation of measure RIG0035 by one. A statistical t-test indicated that this error was unique to sampled records, and therefore not applicable to the program population. However, Cadmus did account for this discrepancy in the final net savings calculations. Table 46 provides the sample realization rates by fuel type and the t-test statistics Cadmus used to analyze errors in the sample.

**Table 46. Income Qualified Program Sample Realization Rates and t-Statistic**

|                                     | kWh        | kW         | MCF       |
|-------------------------------------|------------|------------|-----------|
| Sample Realization Rate             | 100.00%    | 100.00%    | 100.04%   |
| Standard Error                      | N/A        | N/A        | 0.0004    |
| t-Statistic                         | N/A        | N/A        | 1.0000    |
| p-Value                             | N/A        | N/A        | 0.3213    |
| <b>Apply to Program Population?</b> | <b>N/A</b> | <b>N/A</b> | <b>No</b> |

#### **Task 4: Measure-Level Savings Analysis**

Cadmus found discrepancies between the reported per-unit measure savings and the values either maintained in the MEMD or calculated by Navigant for the program measures shown in Table 47.

**Table 47. Per-Unit Measure Discrepancies for the Income Qualified Program**

| Measure Code and End Use                        | Reported Savings | Certified Savings |
|---|------------------|-------------------|
| RIE0002 – Refrigerator Replacement              | 1,218 kWh        | 811 kWh           |
| RIG0086 – Infiltration Reduction 10% (Non-CAA)* | 0.0018 MCF       | 0.0019 MCF        |
| RIG0087 – Infiltration Reduction 15% (Non-CAA)  | 0.0023 MCF       | 0.0028 MCF        |
| RIG0088 – Infiltration Reduction 20% (Non-CAA)  | 0.0033 MCF       | 0.0039 MCF        |
| RIG0089 – Infiltration Reduction 30% (Non-CAA)  | 0.0053 MCF       | 0.0058 MCF        |
| RIG0090 – Infiltration Reduction 50% (Non-CAA)  | 0.0094 MCF       | 0.0096 MCF        |

\*CAA = Community Action Agency

Cadmus also calculated weighted average measure lives for custom measures installed for the Income Qualified Program. We divided the custom gas measure RIG0002 into two separate end uses for this report:

- RCG0002 – Residential Income Qualified Custom – Gas (Measure life < 10 yrs)
- RCG0002 – Residential Income Qualified Custom – Gas (Measure life ≥ 10 yrs)

Table 48 presents the reported and certified per-unit savings for all measures delivered through the 2013 Income Qualified Program.

**Table 48. Income Qualified Program Reported and Certified Per-Unit Measure Savings**

| Measure Code | Reported   |        |         | Certified |        |         | Certified LLESMS |          |        |         |
|--------------|------------|--------|---------|-----------|--------|---------|------------------|----------|--------|---------|
|              | kWh        | kW     | MCF     | kWh       | kW     | MCF     | Measure Life     | kWh      | kW     | MCF     |
| RCE0002      | Custom     | Custom | Custom  | Custom    | Custom | Custom  | 13.7562          | Custom   | Custom | Custom  |
| RCG0002      | Custom     | Custom | Custom  | Custom    | Custom | Custom  | 5                | Custom   | Custom | Custom  |
| RCG0002      | Custom     | Custom | Custom  | Custom    | Custom | Custom  | 15               | Custom   | Custom | Custom  |
| RIE0001      | 37.1000    | 0.0044 | 0.0000  | 37.1000   | 0.0044 | 0.0000  | 9                | 37.1000  | 0.0044 | 0.0000  |
| RIE0002      | 1,218.0000 | 0.0000 | 0.0000  | 811.0000  | 0.0000 | 0.0000  | 8.3896           | 811.0000 | 0.0000 | 0.0000  |
| RIE0012      | 166.0000   | 0.0189 | 0.0000  | 166.0000  | 0.0189 | 0.0000  | 10               | 182.6000 | 0.0208 | 0.0000  |
| RIE0013      | 255.0000   | 0.0290 | 0.0000  | 255.0000  | 0.0290 | 0.0000  | 6                | 255.0000 | 0.0290 | 0.0000  |
| RIE0016      | 37.1000    | 0.0044 | 0.0000  | 37.1000   | 0.0044 | 0.0000  | 9                | 37.1000  | 0.0044 | 0.0000  |
| RIE0018      | 730.0000   | 0.0657 | 0.0000  | 730.0000  | 0.0657 | 0.0000  | 15               | 803.0000 | 0.0723 | 0.0000  |
| RIE0030      | 518.0000   | 0.0584 | 0.0000  | 518.0000  | 0.0584 | 0.0000  | 10               | 569.8000 | 0.0642 | 0.0000  |
| RIE0032      | 166.0000   | 0.0189 | 0.0000  | 166.0000  | 0.0189 | 0.0000  | 10               | 182.6000 | 0.0208 | 0.0000  |
| RIE0035      | 690.0000   | 0.0778 | 0.0000  | 690.0000  | 0.0780 | 0.0000  | 10               | 759.0000 | 0.0858 | 0.0000  |
| RIE0036      | 690.0000   | 0.0778 | 0.0000  | 690.0000  | 0.0780 | 0.0000  | 10               | 759.0000 | 0.0858 | 0.0000  |
| RIE0037      | 730.0000   | 0.0657 | 0.0000  | 730.0000  | 0.0657 | 0.0000  | 15               | 803.0000 | 0.0723 | 0.0000  |
| RIE0038      | 37.1000    | 0.0044 | 0.0000  | 37.1000   | 0.0044 | 0.0000  | 9                | 37.1000  | 0.0044 | 0.0000  |
| RIE0039      | 166.0000   | 0.0189 | 0.0000  | 166.0000  | 0.0189 | 0.0000  | 10               | 182.6000 | 0.0208 | 0.0000  |
| RIE0048      | 207.0412   | 0.0234 | 0.0000  | 207.0412  | 0.0234 | 0.0000  | 10               | 227.7453 | 0.0257 | 0.0000  |
| RIE0049      | 207.0412   | 0.0234 | 0.0000  | 207.0412  | 0.0234 | 0.0000  | 10               | 227.7453 | 0.0257 | 0.0000  |
| RIE0050      | 51.0000    | 0.0058 | 0.0000  | 51.0000   | 0.0058 | 0.0000  | 6                | 51.0000  | 0.0058 | 0.0000  |
| RIG0004      | 0.0000     | 0.0000 | 11.2392 | 0.0000    | 0.0000 | 11.2392 | 9                | 0.0000   | 0.0000 | 11.2392 |
| RIG0006      | 0.0000     | 0.0000 | 14.1761 | 0.0000    | 0.0000 | 14.1761 | 15               | 0.0000   | 0.0000 | 15.5937 |
| RIG0008      | 0.0000     | 0.0000 | 2.6244  | 0.0000    | 0.0000 | 2.6244  | 10               | 0.0000   | 0.0000 | 2.8868  |
| RIG0009      | 0.0000     | 0.0000 | 0.8262  | 0.0000    | 0.0000 | 0.8262  | 10               | 0.0000   | 0.0000 | 0.9088  |
| RIG0010      | 0.0000     | 0.0000 | 1.2636  | 0.0000    | 0.0000 | 1.2636  | 6                | 0.0000   | 0.0000 | 1.2636  |
| RIG0011      | 0.0000     | 0.0000 | 13.2605 | 0.0000    | 0.0000 | 13.2605 | 9                | 0.0000   | 0.0000 | 13.2605 |
| RIG0016      | 0.0000     | 0.0000 | 4.3291  | 0.0000    | 0.0000 | 4.3291  | 9                | 0.0000   | 0.0000 | 4.3291  |
| RIG0017      | 0.0000     | 0.0000 | 0.0053  | 0.0000    | 0.0000 | 0.0053  | 20               | 0.0000   | 0.0000 | 0.0058  |
| RIG0018      | 0.0000     | 0.0000 | 0.0042  | 0.0000    | 0.0000 | 0.0042  | 20               | 0.0000   | 0.0000 | 0.0046  |
| RIG0019      | 0.0000     | 0.0000 | 0.0052  | 0.0000    | 0.0000 | 0.0052  | 20               | 0.0000   | 0.0000 | 0.0057  |
| RIG0020      | 0.0000     | 0.0000 | 0.0020  | 0.0000    | 0.0000 | 0.0020  | 20               | 0.0000   | 0.0000 | 0.0022  |
| RIG0021      | 0.0000     | 0.0000 | 0.0016  | 0.0000    | 0.0000 | 0.0016  | 13               | 0.0000   | 0.0000 | 0.0018  |
| RIG0023      | 0.0000     | 0.0000 | 5.9233  | 0.0000    | 0.0000 | 5.9233  | 3                | 0.0000   | 0.0000 | 5.9233  |
| RIG0027      | 0.0000     | 0.0000 | 2.6244  | 0.0000    | 0.0000 | 2.6244  | 10               | 0.0000   | 0.0000 | 2.8868  |
| RIG0029      | 0.0000     | 0.0000 | 16.9775 | 0.0000    | 0.0000 | 16.9775 | 15               | 0.0000   | 0.0000 | 18.6753 |
| RIG0030      | 0.0000     | 0.0000 | 18.7672 | 0.0000    | 0.0000 | 18.7672 | 15               | 0.0000   | 0.0000 | 20.6439 |
| RIG0033      | 0.0000     | 0.0000 | 0.0025  | 0.0000    | 0.0000 | 0.0025  | 13               | 0.0000   | 0.0000 | 0.0028  |

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| Measure Code | Reported  |        |         | Certified |        |         | Certified LLES |           |        |         |
|--------------|-----------|--------|---------|-----------|--------|---------|----------------|-----------|--------|---------|
|              | kWh       | kW     | MCF     | kWh       | kW     | MCF     | Measure Life   | kWh       | kW     | MCF     |
| RIG0034      | 0.0000    | 0.0000 | 0.0035  | 0.0000    | 0.0000 | 0.0035  | 13             | 0.0000    | 0.0000 | 0.0039  |
| RIG0035      | 0.0000    | 0.0000 | 0.0055  | 0.0000    | 0.0000 | 0.0055  | 13             | 0.0000    | 0.0000 | 0.0061  |
| RIG0036      | 0.0000    | 0.0000 | 0.0095  | 0.0000    | 0.0000 | 0.0095  | 13             | 0.0000    | 0.0000 | 0.0105  |
| RIG0038      | 0.0000    | 0.0000 | 6.8115  | 0.0000    | 0.0000 | 6.8115  | 3              | 0.0000    | 0.0000 | 6.8115  |
| RIG0039      | 0.0000    | 0.0000 | 2.6240  | 0.0000    | 0.0000 | 2.6244  | 10             | 0.0000    | 0.0000 | 2.8868  |
| RIG0041      | 0.0000    | 0.0000 | 2.6240  | 0.0000    | 0.0000 | 2.6244  | 10             | 0.0000    | 0.0000 | 2.8868  |
| RIG0042      | 0.0000    | 0.0000 | 2.6240  | 0.0000    | 0.0000 | 2.6244  | 10             | 0.0000    | 0.0000 | 2.8868  |
| RIG0043      | 0.0000    | 0.0000 | 0.8262  | 0.0000    | 0.0000 | 0.8262  | 10             | 0.0000    | 0.0000 | 0.9088  |
| RIG0044      | 0.0000    | 0.0000 | 0.8262  | 0.0000    | 0.0000 | 0.8262  | 10             | 0.0000    | 0.0000 | 0.9088  |
| RIG0046      | 0.0000    | 0.0000 | 1.2636  | 0.0000    | 0.0000 | 1.2636  | 6              | 0.0000    | 0.0000 | 1.2636  |
| RIG0047      | 0.0000    | 0.0000 | 4.9248  | 0.0000    | 0.0000 | 4.9248  | 3              | 0.0000    | 0.0000 | 4.9248  |
| RIG0048      | 0.0000    | 0.0000 | 8.9158  | 0.0000    | 0.0000 | 8.9158  | 9              | 0.0000    | 0.0000 | 8.9158  |
| RIG0049      | 0.0000    | 0.0000 | 3.4992  | 0.0000    | 0.0000 | 3.4992  | 10             | 0.0000    | 0.0000 | 3.8491  |
| RIG0050      | 0.0000    | 0.0000 | 3.4992  | 0.0000    | 0.0000 | 3.4992  | 10             | 0.0000    | 0.0000 | 3.8491  |
| RIG0051      | 0.0000    | 0.0000 | 20.1796 | 0.0000    | 0.0000 | 20.1796 | 15             | 0.0000    | 0.0000 | 22.1976 |
| RIG0052      | 0.0000    | 0.0000 | 15.4116 | 0.0000    | 0.0000 | 15.4116 | 3              | 0.0000    | 0.0000 | 15.4116 |
| RIG0053      | 0.0000    | 0.0000 | 0.8262  | 0.0000    | 0.0000 | 0.8262  | 10             | 0.0000    | 0.0000 | 0.9088  |
| RIG0060      | 0.0000    | 0.0000 | 0.0019  | 0.0000    | 0.0000 | 0.0019  | 13             | 0.0000    | 0.0000 | 0.0021  |
| RIG0061      | 0.0000    | 0.0000 | 0.0029  | 0.0000    | 0.0000 | 0.0029  | 13             | 0.0000    | 0.0000 | 0.0032  |
| RIG0062      | 0.0000    | 0.0000 | 0.0039  | 0.0000    | 0.0000 | 0.0039  | 13             | 0.0000    | 0.0000 | 0.0043  |
| RIG0063      | 0.0000    | 0.0000 | 0.0058  | 0.0000    | 0.0000 | 0.0058  | 13             | 0.0000    | 0.0000 | 0.0064  |
| RIG0064      | 0.0000    | 0.0000 | 0.0099  | 0.0000    | 0.0000 | 0.0099  | 13             | 0.0000    | 0.0000 | 0.0109  |
| RIG0066      | 0.0000    | 0.0000 | 0.0055  | 0.0000    | 0.0000 | 0.0055  | 20             | 0.0000    | 0.0000 | 0.0061  |
| RIG0067      | 0.0000    | 0.0000 | 0.0054  | 0.0000    | 0.0000 | 0.0054  | 20             | 0.0000    | 0.0000 | 0.0059  |
| RIG0068      | 0.0000    | 0.0000 | 0.0021  | 0.0000    | 0.0000 | 0.0021  | 20             | 0.0000    | 0.0000 | 0.0023  |
| RIG0070      | 0.0000    | 0.0000 | 15.4116 | 0.0000    | 0.0000 | 15.4116 | 15             | 0.0000    | 0.0000 | 16.9528 |
| RIG0071      | 0.0000    | 0.0000 | 20.0883 | 0.0000    | 0.0000 | 20.0883 | 15             | 0.0000    | 0.0000 | 22.0971 |
| RIG0073      | -306.9151 | 0.0000 | 48.1190 | -306.9151 | 0.0000 | 48.1190 | 15             | -337.6066 | 0.0000 | 52.9309 |
| RIG0086      | 0.0000    | 0.0000 | 0.0018  | 0.0000    | 0.0000 | 0.0019  | 13             | 0.0000    | 0.0000 | 0.0021  |
| RIG0087      | 0.0000    | 0.0000 | 0.0023  | 0.0000    | 0.0000 | 0.0028  | 15             | 0.0000    | 0.0000 | 0.0031  |
| RIG0088      | 0.0000    | 0.0000 | 0.0033  | 0.0000    | 0.0000 | 0.0039  | 15             | 0.0000    | 0.0000 | 0.0043  |
| RIG0089      | 0.0000    | 0.0000 | 0.0053  | 0.0000    | 0.0000 | 0.0058  | 15             | 0.0000    | 0.0000 | 0.0064  |
| RIG0090      | 0.0000    | 0.0000 | 0.0094  | 0.0000    | 0.0000 | 0.0096  | 15             | 0.0000    | 0.0000 | 0.0105  |
| RIG0092      | 0.0000    | 0.0000 | 0.0021  | 0.0000    | 0.0000 | 0.0021  | 20             | 0.0000    | 0.0000 | 0.0023  |
| RIG0093      | 0.0000    | 0.0000 | 1.0567  | 0.0000    | 0.0000 | 1.0567  | 10             | 0.0000    | 0.0000 | 1.1624  |
| RIG0095      | 0.0000    | 0.0000 | 0.2444  | 0.0000    | 0.0000 | 0.2444  | 5              | 0.0000    | 0.0000 | 0.2444  |
| RIG0096      | 0.0000    | 0.0000 | 0.0054  | 0.0000    | 0.0000 | 0.0055  | 20             | 0.0000    | 0.0000 | 0.0061  |
| RIG0097      | 0.0000    | 0.0000 | 0.2527  | 0.0000    | 0.0000 | 0.2527  | 6              | 0.0000    | 0.0000 | 0.2527  |
| RIG0100      | 0.0000    | 0.0000 | 7.8460  | 0.0000    | 0.0000 | 7.8460  | 5              | 0.0000    | 0.0000 | 7.8460  |

### Major Findings by Fuel Type

The tables below present certified program participation and energy savings by measure. Table 49 and Table 50 document kWh savings, Table 51 document kW savings, and Table 52 and Table 53 document MCF savings.

Table 49. Certified Income Qualified Program Participation and First-Year kWh Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RCE0002      | 83                                | 83                                | 17,626.0000                         | 17,626.0000                         | 1.0000                                | 17,626.0000                                    | 0.9000                                    | 15,863.4000                                  |
| RIE0001      | 2,882                             | 2,882                             | 106,922.2000                        | 106,922.2000                        | 0.9800                                | 104,783.7560                                   | 0.9000                                    | 94,305.3804                                  |
| RIE0002      | 263                               | 263                               | 320,334.0000                        | 213,293.0000                        | 1.0000                                | 213,293.0000                                   | 0.9000                                    | 191,963.7000                                 |
| RIE0012      | 79                                | 79                                | 13,114.0000                         | 13,114.0000                         | 0.9600                                | 12,589.4400                                    | 0.9000                                    | 11,330.4960                                  |
| RIE0013      | 95                                | 95                                | 24,225.0000                         | 24,225.0000                         | 0.9500                                | 23,013.7500                                    | 0.9000                                    | 20,712.3750                                  |
| RIE0016      | 38,459                            | 38,459                            | 1,426,828.9000                      | 1,426,828.9000                      | 0.9800                                | 1,398,292.3220                                 | 0.9000                                    | 1,258,463.0898                               |
| RIE0018      | 28                                | 28                                | 20,440.0000                         | 20,440.0000                         | 1.0000                                | 20,440.0000                                    | 0.9000                                    | 18,396.0000                                  |
| RIE0030      | 3                                 | 3                                 | 1,554.0000                          | 1,554.0000                          | 0.9300                                | 1,445.2200                                     | 0.9000                                    | 1,300.6980                                   |
| RIE0032      | 5                                 | 5                                 | 830.0000                            | 830.0000                            | 0.9600                                | 796.8000                                       | 0.9000                                    | 717.1200                                     |
| RIE0035      | 206                               | 206                               | 142,140.0000                        | 142,140.0000                        | 0.9300                                | 132,190.2000                                   | 0.9000                                    | 118,971.1800                                 |
| RIE0036      | 256                               | 256                               | 176,640.0000                        | 176,640.0000                        | 1.0000                                | 176,640.0000                                   | 0.9000                                    | 158,976.0000                                 |
| RIE0037      | 6                                 | 6                                 | 4,380.0000                          | 4,380.0000                          | 1.0000                                | 4,380.0000                                     | 0.9000                                    | 3,942.0000                                   |
| RIE0038      | 67                                | 67                                | 2,485.7000                          | 2,485.7000                          | 0.9800                                | 2,435.9860                                     | 0.9000                                    | 2,192.3874                                   |
| RIE0039      | 288                               | 288                               | 47,808.0000                         | 47,808.0000                         | 0.9600                                | 45,895.6800                                    | 0.9000                                    | 41,306.1120                                  |
| RIE0048      | 262                               | 262                               | 54,244.7944                         | 54,244.7944                         | 0.9600                                | 52,075.0026                                    | 0.9000                                    | 46,867.5024                                  |
| RIE0049      | 58                                | 58                                | 12,008.3896                         | 12,008.3896                         | 0.9600                                | 11,528.0540                                    | 0.9000                                    | 10,375.2486                                  |
| RIE0050      | 819                               | 819                               | 41,769.0000                         | 41,769.0000                         | 1.0000                                | 41,769.0000                                    | 0.9000                                    | 37,592.1000                                  |
| RIG0073      | 2                                 | 2                                 | -613.8302                           | -613.8302                           | 1.0000                                | -613.8302                                      | 0.9000                                    | -552.4472                                    |
| <b>Total</b> | <b>43,861</b>                     | <b>43,861</b>                     | <b>2,412,736.1538</b>               | <b>2,305,695.1538</b>               |                                       | <b>2,258,580.3804</b>                          | <b>0.9000</b>                             | <b>2,032,722.3424</b>                        |



Table 50. Certified Income Qualified Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID   | 2013 Certified Net kWh Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net kWh LLESMS Savings<br>(H) = (F x 1.1)* | 2013 Realization Rate<br>(I) = (F/A) | Lifetime kWh Savings<br>(J) = (F x G) |
|--------------|---|---------------------|---|--------------------------------------|---------------------------------------|
| RCE0002      | 15,863.4000                                     | 13.7562             | 17,449.7400   | 90.00%                               | 218,219.4000                          |
| RIE0001      | 94,305.3804                                     | 9                   | 94,305.3804   | 88.20%                               | 848,748.4236                          |
| RIE0002      | 191,963.7000                                    | 8.3896              | 191,963.7000  | 59.93%                               | 1,610,506.8000                        |
| RIE0012      | 11,330.4960                                     | 10                  | 12,463.5456   | 86.40%                               | 113,304.9600                          |
| RIE0013      | 20,712.3750                                     | 6                   | 20,712.3750   | 85.50%                               | 124,274.2500                          |
| RIE0016      | 1,258,463.0898                                  | 9                   | 1,258,463.0898  | 88.20%                               | 11,326,167.8082                       |
| RIE0018      | 18,396.0000                                     | 15                  | 20,235.6000   | 90.00%                               | 275,940.0000                          |
| RIE0030      | 1,300.6980                                      | 10                  | 1,430.7678  | 83.70%                               | 13,006.9800                           |
| RIE0032      | 717.1200  | 10                  | 788.8320  | 86.40%                               | 7,171.2000                            |
| RIE0035      | 118,971.1800                                    | 10                  | 130,868.2980  | 83.70%                               | 1,189,711.8000                        |
| RIE0036      | 158,976.0000                                    | 10                  | 174,873.6000  | 90.00%                               | 1,589,760.0000                        |
| RIE0037      | 3,942.0000                                      | 15                  | 4,336.2000  | 90.00%                               | 59,130.0000                           |
| RIE0038      | 2,192.3874                                      | 9                   | 2,192.3874  | 88.20%                               | 19,731.4866                           |
| RIE0039      | 41,306.1120                                     | 10                  | 45,436.7232   | 86.40%                               | 413,061.1200                          |
| RIE0048      | 46,867.5024                                     | 10                  | 51,554.2526   | 86.40%                               | 468,675.0236                          |
| RIE0049      | 10,375.2486                                     | 10                  | 11,412.7735   | 86.40%                               | 103,752.4861                          |
| RIE0050      | 37,592.1000                                     | 6                   | 37,592.1000   | 90.00%                               | 225,552.6000                          |
| RIG0073      | -552.4472                                       | 15                  | -607.6919   | 90.00%                               | -8,286.7077                           |
| <b>Total</b> | <b>2,032,722.3424</b>                           |                     | <b>2,075,471.6734</b>                                     | <b>84.25%</b>                        | <b>18,598,427.6305</b>                |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 51. Certified Income Qualified Program Participation and kW Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified New kW LLESM Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|--|-----------------------------------|
| RIE0001      | 2,882                             | 2,882                             | 12.6808                            | 12.6808                            | 0.9800                                | 12.4272                                       | 0.9000                                    | 11.1845                                     | 9                | 11.1845  | 88.20%                            |
| RIE0012      | 79                                | 79                                | 1.4931                             | 1.4931                             | 0.9600                                | 1.4334  | 0.9000                                    | 1.2900                                      | 10               | 1.4190   | 86.40%                            |
| RIE0013      | 95                                | 95                                | 2.7550                             | 2.7550                             | 0.9500                                | 2.6173  | 0.9000                                    | 2.3555                                      | 6                | 2.3555   | 85.50%                            |
| RIE0016      | 38,459                            | 38,459                            | 169.2196                           | 169.2196                           | 0.9800                                | 165.8352                                      | 0.9000                                    | 149.2517                                    | 9                | 149.2517   | 88.20%                            |
| RIE0018      | 28                                | 28                                | 1.8396                             | 1.8396                             | 1.0000                                | 1.8396  | 0.9000                                    | 1.6556                                      | 15               | 1.8212   | 90.00%                            |
| RIE0030      | 3                                 | 3                                 | 0.1752                             | 0.1752                             | 0.9300                                | 0.1629  | 0.9000                                    | 0.1466                                      | 10               | 0.1613   | 83.70%                            |
| RIE0032      | 5                                 | 5                                 | 0.0945                             | 0.0945                             | 0.9600                                | 0.0907  | 0.9000                                    | 0.0816                                      | 10               | 0.0898   | 86.40%                            |
| RIE0035      | 206                               | 206                               | 16.0268                            | 16.0680                            | 0.9300                                | 14.9432                                       | 0.9000                                    | 13.4489                                     | 10               | 14.7938  | 83.92%                            |
| RIE0036      | 256                               | 256                               | 19.9168                            | 19.9680                            | 1.0000                                | 19.9680                                       | 0.9000                                    | 17.9712                                     | 10               | 19.7683  | 90.23%                            |
| RIE0037      | 6                                 | 6                                 | 0.3942                             | 0.3942                             | 1.0000                                | 0.3942  | 0.9000                                    | 0.3548                                      | 15               | 0.3903   | 90.00%                            |
| RIE0038      | 67                                | 67                                | 0.2948                             | 0.2948                             | 0.9800                                | 0.2889  | 0.9000                                    | 0.2600                                      | 9                | 0.2600   | 88.20%                            |
| RIE0039      | 288                               | 288                               | 5.4432                             | 5.4432                             | 0.9600                                | 5.2255  | 0.9000                                    | 4.7029                                      | 10               | 5.1732   | 86.40%                            |
| RIE0048      | 262                               | 262                               | 6.1308                             | 6.1308                             | 0.9600                                | 5.8356  | 0.9000                                    | 5.2970                                      | 10               | 5.8267   | 86.40%                            |
| RIE0049      | 58                                | 58                                | 1.3572                             | 1.3572                             | 0.9600                                | 1.3029  | 0.9000                                    | 1.1726                                      | 10               | 1.2899   | 86.40%                            |
| RIE0050      | 819                               | 819                               | 4.7502                             | 4.7502                             | 1.0000                                | 4.7502  | 0.9000                                    | 4.2752                                      | 6                | 4.2752   | 90.00%                            |
| <b>Total</b> | <b>43,513</b>                     | <b>43,513</b>                     | <b>242.5718</b>                    | <b>242.6642</b>                    |                                       | <b>237.1648</b>                               | <b>0.9000</b>                             | <b>213.4483</b>                             |                  | <b>218.0604</b>                                      | <b>87.99%</b>                     |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 52. Certified Income Qualified Program Participation and First-Year MCF Savings by Measure

| Measure ID | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RCG0002    | 6                                 | 6                                 | 2,640.9217                          | 2,640.9217                          | 1.0000                                | 2,640.9217                                     | 0.9000                                    | 2,376.8295                                   |
| RCG0002    | 44                                | 44                                | 245.5200                            | 245.5200                            | 1.0000                                | 245.5200                                       | 0.9000                                    | 220.9680                                     |
| RIG0004    | 16                                | 16                                | 179.8272                            | 179.8272                            | 0.8700                                | 156.4497                                       | 0.9000                                    | 140.8047                                     |
| RIG0006    | 34                                | 34                                | 481.9874                            | 481.9874                            | 1.0000                                | 481.9874                                       | 0.9000                                    | 433.7887                                     |
| RIG0008    | 435                               | 435                               | 1,141.6140                          | 1,141.6140                          | 0.9300                                | 1,061.7010                                     | 0.9000                                    | 955.5309                                     |
| RIG0009    | 3,097                             | 3,095                             | 2,558.7414                          | 2,557.0890                          | 0.9600                                | 2,454.8054                                     | 0.9000                                    | 2,209.3249                                   |
| RIG0010    | 1,458                             | 1,458                             | 1,842.3288                          | 1,842.3288                          | 0.9500                                | 1,750.2124                                     | 0.9000                                    | 1,575.1911                                   |
| RIG0011    | 562                               | 562                               | 7,452.4010                          | 7,452.4010                          | 0.8700                                | 6,483.5889                                     | 0.9000                                    | 5,835.2300                                   |
| RIG0016    | 915                               | 915                               | 3,961.1265                          | 3,961.1265                          | 0.8700                                | 3,446.1801                                     | 0.9000                                    | 3,101.5620                                   |
| RIG0017    | 283,082                           | 283,082                           | 1,500.3346                          | 1,500.3346                          | 0.9360                                | 1,404.3132                                     | 0.9000                                    | 1,263.8819                                   |
| RIG0018    | 10,965                            | 10,965                            | 46.0530                             | 46.0530                             | 0.9090                                | 41.8622  | 0.9000                                    | 37.6760                                      |
| RIG0019    | 154,537                           | 154,537                           | 803.5924                            | 803.5924                            | 1.0000                                | 803.5924                                       | 0.9000                                    | 723.2332                                     |
| RIG0020    | 18,840                            | 18,840                            | 37.6800                             | 37.6800                             | 1.0000                                | 37.6800  | 0.9000                                    | 33.9120                                      |
| RIG0021    | 22,248                            | 22,248                            | 35.5968                             | 35.5968                             | 1.0000                                | 35.5968  | 0.9000                                    | 32.0371                                      |
| RIG0023    | 48                                | 48                                | 284.3184                            | 284.3184                            | 1.0000                                | 284.3184                                       | 0.9000                                    | 255.8866                                     |
| RIG0027    | 127                               | 127                               | 333.2988                            | 333.2988                            | 1.0000                                | 333.2988                                       | 0.9000                                    | 299.9689                                     |
| RIG0029    | 63                                | 63                                | 1,069.5825                          | 1,069.5825                          | 1.0000                                | 1,069.5825                                     | 0.9000                                    | 962.6243                                     |
| RIG0030    | 99                                | 99                                | 1,857.9528                          | 1,857.9528                          | 1.0000                                | 1,857.9528                                     | 0.9000                                    | 1,672.1575                                   |
| RIG0033    | 38,140                            | 38,140                            | 95.3500                             | 95.3500                             | 1.0000                                | 95.3500  | 0.9000                                    | 85.8150                                      |
| RIG0034    | 146,842                           | 146,842                           | 513.9470                            | 513.9470                            | 1.0000                                | 513.9470                                       | 0.9000                                    | 462.5523                                     |
| RIG0035    | 261,943                           | 261,943                           | 1,440.6865                          | 1,440.6865                          | 1.0000                                | 1,440.6865                                     | 0.9000                                    | 1,296.6179                                   |
| RIG0036    | 70,649                            | 70,649                            | 671.1655                            | 671.1655                            | 1.0000                                | 671.1655                                       | 0.9000                                    | 604.0490                                     |
| RIG0038    | 80                                | 80                                | 544.9200                            | 544.9200                            | 1.0000                                | 544.9200                                       | 0.9000                                    | 490.4280                                     |
| RIG0039    | 1                                 | 1                                 | 2.6240                              | 2.6244                              | 1.0000                                | 2.6244   | 0.9000                                    | 2.3620                                       |

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| Measure ID | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RIG0041    | 2                                 | 2                                 | 5,2480                              | 5,2488                              | 0.9300                                | 4,8814   | 0.9000                                    | 4,3932                                       |
| RIG0042    | 103                               | 103                               | 270.2720                            | 270.3132                            | 0.9300                                | 251.3913                                       | 0.9000                                    | 226.2521                                     |
| RIG0043    | 8                                 | 8                                 | 6,6096                              | 6,6096                              | 0.9600                                | 6,3452   | 0.9000                                    | 5,7107                                       |
| RIG0044    | 203                               | 203                               | 167.7186                            | 167.7186                            | 0.9600                                | 161.0099                                       | 0.9000                                    | 144.9089                                     |
| RIG0046    | 101                               | 101                               | 127.6236                            | 127.6236                            | 0.9500                                | 121.2424                                       | 0.9000                                    | 109.1182                                     |
| RIG0047    | 1,984                             | 1,984                             | 9,770.8032                          | 9,770.8032                          | 1.0000                                | 9,770.8032                                     | 0.9000                                    | 8,793.7229                                   |
| RIG0048    | 57                                | 57                                | 508.2006                            | 508.2006                            | 0.8700                                | 442.1345                                       | 0.9000                                    | 397.9211                                     |
| RIG0049    | 3,508                             | 3,508                             | 12,275.1936                         | 12,275.1936                         | 0.9300                                | 11,415.9300                                    | 0.9000                                    | 10,274.3370                                  |
| RIG0050    | 2,059                             | 2,059                             | 7,204.8528                          | 7,204.8528                          | 1.0000                                | 7,204.8528                                     | 0.9000                                    | 6,484.3675                                   |
| RIG0051    | 9                                 | 9                                 | 181.6164                            | 181.6164                            | 1.0000                                | 181.6164                                       | 0.9000                                    | 163.4548                                     |
| RIG0052    | 884                               | 884                               | 13,623.8544                         | 13,623.8544                         | 1.0000                                | 13,623.8544                                    | 0.9000                                    | 12,261.4690                                  |
| RIG0053    | 4,930                             | 4,932                             | 4,073.1660                          | 4,074.8184                          | 0.9600                                | 3,911.8257                                     | 0.9000                                    | 3,520.6431                                   |
| RIG0060    | 13,471                            | 13,471                            | 25,5949                             | 25,5949                             | 1.0000                                | 25,5949  | 0.9000                                    | 23,0354                                      |
| RIG0061    | 4,393                             | 4,393                             | 12,7397                             | 12,7397                             | 1.0000                                | 12,7397  | 0.9000                                    | 11,4657                                      |
| RIG0062    | 8,751                             | 8,751                             | 34,1289                             | 34,1289                             | 1.0000                                | 34,1289  | 0.9000                                    | 30,7160                                      |
| RIG0063    | 30,870                            | 30,870                            | 179,0460                            | 179,0460                            | 1.0000                                | 179,0460                                       | 0.9000                                    | 161,1414                                     |
| RIG0064    | 16,553                            | 16,553                            | 163,8747                            | 163,8747                            | 1.0000                                | 163,8747                                       | 0.9000                                    | 147,4872                                     |
| RIG0066    | 39,013                            | 39,013                            | 214,5715                            | 214,5715                            | 1.0000                                | 214,5715                                       | 0.9000                                    | 193,1144                                     |
| RIG0067    | 24,362.8                          | 24,362.8                          | 131,5591                            | 131,5591                            | 1.0000                                | 131,5591                                       | 0.9000                                    | 118,4032                                     |
| RIG0068    | 3,745                             | 3,745                             | 7,8645                              | 7,8645                              | 1.0000                                | 7,8645   | 0.9000                                    | 7,0781                                       |
| RIG0070    | 4                                 | 4                                 | 61,6464                             | 61,6464                             | 1.0000                                | 61,6464  | 0.9000                                    | 55,4818                                      |
| RIG0071    | 64                                | 64                                | 1,285.6512                          | 1,285.6512                          | 1.0000                                | 1,285.6512                                     | 0.9000                                    | 1,157,0861                                   |
| RIG0073    | 2                                 | 2                                 | 96,2380                             | 96,2380                             | 1.0000                                | 96,2380  | 0.9000                                    | 86,6142                                      |
| RIG0086    | 202,277                           | 202,277                           | 364,0986                            | 378,2175                            | 1.0000                                | 378,2175                                       | 0.9000                                    | 340,3958                                     |
| RIG0087    | 43,245                            | 43,245                            | 99,4635                             | 120,5584                            | 1.0000                                | 120,5584                                       | 0.9000                                    | 108,5026                                     |

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| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RIG0088      | 39,029                            | 39,029                            | 128.7957                            | 151.2764                            | 1.0000                                | 151.2764                                       | 0.9000                                    | 136.1488                                     |
| RIG0089      | 8,312                             | 8,312                             | 44.0536                             | 48.2744                             | 1.0000                                | 48.2744  | 0.9000                                    | 43.4470                                      |
| RIG0090      | 1,976                             | 1,976                             | 18.5744                             | 18.9076                             | 1.0000                                | 18.9076  | 0.9000                                    | 17.0168                                      |
| RIG0092      | 3,697                             | 3,697                             | 7.7637                              | 7.7637                              | 1.0000                                | 7.7637   | 0.9000                                    | 6.9873                                       |
| RIG0093      | 4,286                             | 4,287                             | 4,529.0162                          | 4,530.0729                          | 0.9600                                | 4,348.8700                                     | 0.9000                                    | 3,913.9830                                   |
| RIG0095      | 176                               | 176                               | 43.0144                             | 43.0144                             | 1.0000                                | 43.0144  | 0.9000                                    | 38.7130                                      |
| RIG0096      | 1,328,094                         | 1,328,094                         | 7,171.7076                          | 7,304.5170                          | 1.0000                                | 7,304.5170                                     | 0.9000                                    | 6,574.0653                                   |
| RIG0097      | 16,766                            | 16,766                            | 4,236.7682                          | 4,236.7682                          | 1.0000                                | 4,236.7682                                     | 0.9000                                    | 3,813.0914                                   |
| RIG0100      | 33                                | 33                                | 258.9180                            | 258.9180                            | 1.0000                                | 258.9180                                       | 0.9000                                    | 233.0262                                     |
| <b>Total</b> | <b>2,817,198.8</b>                | <b>2,817,199.8</b>                | <b>97,071.8179</b>                  | <b>97,267.9750</b>                  |                                       | <b>94,084.1447</b>                             | <b>0.9000</b>                             | <b>84,675.7302</b>                           |

Table 53. Certified Income Qualified Program Long-Life Equipment Savings Multiplier and Lifetime MCF Savings by Measure

| Measure ID | 2013 Certified Net MCF Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net MCF LLESM Savings<br>(H) = (F x 1.1)* | 2013 Realization Rate<br>(I) = (F/A) | Lifetime MCF Savings<br>(J) = (F x G) |
|------------|---|---------------------|--|--------------------------------------|---------------------------------------|
| RCG0002    | 2,376.8295                                      | 5                   | 2,376.8295   | 90.00%                               | 11,884.1477                           |
| RCG0002    | 220.9680  | 15                  | 243.0648   | 90.00%                               | 3,314.5200                            |
| RIG0004    | 140.8047  | 9                   | 140.8047   | 78.30%                               | 1,267.2423                            |
| RIG0006    | 433.7887  | 15                  | 477.1675   | 90.00%                               | 6,506.8299                            |
| RIG0008    | 955.5309  | 10                  | 1,051.0840   | 83.70%                               | 9,555.3092                            |
| RIG0009    | 2,209.3249                                      | 10                  | 2,430.2574   | 86.34%                               | 22,093.2490                           |
| RIG0010    | 1,575.1911                                      | 6                   | 1,575.1911   | 85.50%                               | 9,451.1467                            |
| RIG0011    | 5,835.2300                                      | 9                   | 5,835.2300   | 78.30%                               | 52,517.0698                           |
| RIG0016    | 3,101.5620                                      | 9                   | 3,101.5620   | 78.30%                               | 27,914.0584                           |
| RIG0017    | 1,263.8819                                      | 20                  | 1,390.2701   | 84.24%                               | 25,277.6373                           |
| RIG0018    | 37.6760   | 20                  | 41.4436  | 81.81%                               | 753.5192                              |
| RIG0019    | 723.2332  | 20                  | 795.5565   | 90.00%                               | 14,464.6632                           |
| RIG0020    | 33.9120   | 20                  | 37.3032  | 90.00%                               | 678.2400                              |
| RIG0021    | 32.0371   | 13                  | 35.2408  | 90.00%                               | 416.4826                              |
| RIG0023    | 255.8866  | 3                   | 255.8866   | 90.00%                               | 767.6597                              |
| RIG0027    | 299.9689  | 10                  | 329.9658   | 90.00%                               | 2,999.6892                            |
| RIG0029    | 962.6243  | 15                  | 1,058.8867   | 90.00%                               | 14,439.3638                           |
| RIG0030    | 1,672.1575                                      | 15                  | 1,839.3733   | 90.00%                               | 25,082.3628                           |
| RIG0033    | 85.8150   | 13                  | 94.3965  | 90.00%                               | 1,115.5950                            |
| RIG0034    | 462.5523  | 13                  | 508.8075   | 90.00%                               | 6,013.1799                            |
| RIG0035    | 1,296.6179                                      | 13                  | 1,426.2796   | 90.00%                               | 16,856.0321                           |
| RIG0036    | 604.0490  | 13                  | 664.4538   | 90.00%                               | 7,852.6364                            |
| RIG0038    | 490.4280  | 3                   | 490.4280   | 90.00%                               | 1,471.2840                            |
| RIG0039    | 2.3620  | 10                  | 2.5982   | 90.01%                               | 23.6196                               |
| RIG0041    | 4.3932  | 10                  | 4.8326   | 83.71%                               | 43.9325                               |

| Measure ID | 2013 Certified Net MCF Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net MCF LLESM Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) | Lifetime MCF Savings (J) = (F x G) |
|------------|--|------------------|---|-----------------------------------|------------------------------------|
| RIG0042    | 226.2521                                     | 10               | 248.8774  | 83.71%                            | 2,262.5215                         |
| RIG0043    | 5.7107                                       | 10               | 6.2818  | 86.40%                            | 57.1069                            |
| RIG0044    | 144.9089                                     | 10               | 159.3998  | 86.40%                            | 1,449.0887                         |
| RIG0046    | 109.1182                                     | 6                | 109.1182  | 85.50%                            | 654.7091                           |
| RIG0047    | 8,793.7229                                   | 3                | 8,793.7229  | 90.00%                            | 26,381.1686                        |
| RIG0048    | 397.9211                                     | 9                | 397.9211  | 78.30%                            | 3,581.2896                         |
| RIG0049    | 10,274.3370                                  | 10               | 11,301.7707   | 83.70%                            | 102,743.3704                       |
| RIG0050    | 6,484.3675                                   | 10               | 7,132.8043  | 90.00%                            | 64,843.6752                        |
| RIG0051    | 163.4548                                     | 15               | 179.8002  | 90.00%                            | 2,451.8214                         |
| RIG0052    | 12,261.4690                                  | 3                | 12,261.4690   | 90.00%                            | 36,784.4069                        |
| RIG0053    | 3,520.6431                                   | 10               | 3,872.7074  | 86.44%                            | 35,206.4310                        |
| RIG0060    | 23.0354                                      | 13               | 25.3390   | 90.00%                            | 299.4603                           |
| RIG0061    | 11.4657                                      | 13               | 12.6123   | 90.00%                            | 149.0545                           |
| RIG0062    | 30.7160                                      | 13               | 33.7876   | 90.00%                            | 399.3081                           |
| RIG0063    | 161.1414                                     | 13               | 177.2555  | 90.00%                            | 2,094.8382                         |
| RIG0064    | 147.4872                                     | 13               | 162.2360  | 90.00%                            | 1,917.3340                         |
| RIG0066    | 193.1144                                     | 20               | 212.4258  | 90.00%                            | 3,862.2870                         |
| RIG0067    | 118.4032                                     | 20               | 130.2435  | 90.00%                            | 2,368.0642                         |
| RIG0068    | 7.0781                                       | 20               | 7.7859  | 90.00%                            | 141.5610                           |
| RIG0070    | 55.4818                                      | 15               | 61.0299   | 90.00%                            | 832.2264                           |
| RIG0071    | 1,157.0861                                   | 15               | 1,272.7947  | 90.00%                            | 17,356.2912                        |
| RIG0073    | 86.6142                                      | 15               | 95.2756   | 90.00%                            | 1,299.2130                         |
| RIG0086    | 340.3958                                     | 13               | 374.4354  | 93.49%                            | 4,425.1452                         |
| RIG0087    | 108.5026                                     | 15               | 119.3528  | 109.09%                           | 1,627.5385                         |
| RIG0088    | 136.1488                                     | 15               | 149.7636  | 105.71%                           | 2,042.2315                         |
| RIG0089    | 43.4470                                      | 15               | 47.7917   | 98.62%                            | 651.7049                           |

| Measure ID   | 2013 Certified Net MCF Savings<br>(F) = (D x E) | Measure Life (G) | 2013 Certified Net MCF LLESM Savings<br>(H) = (F x 1.1)* | 2013 Realization Rate<br>(I) = (F/A) | Lifetime MCF Savings<br>(J) = (F x G) |
|--------------|---|------------------|--|--------------------------------------|---------------------------------------|
| RIG0090      | 17,0168   | 15               | 18,7185  | 91.61%                               | 255,2520                              |
| RIG0092      | 6,9873  | 20               | 7,6861   | 90.00%                               | 139,7466                              |
| RIG0093      | 3,913.9830                                      | 10               | 4,305.3813   | 86.42%                               | 39,139.8299                           |
| RIG0095      | 38,7130   | 5                | 38,7130  | 90.00%                               | 193,5648                              |
| RIG0096      | 6,574.0653                                      | 20               | 7,231.4718   | 91.67%                               | 131,481.3060                          |
| RIG0097      | 3,813.0914                                      | 6                | 3,813.0914   | 90.00%                               | 22,878.5483                           |
| RIG0100      | 233.0262  | 5                | 233.0262   | 90.00%                               | 1,165.1310                            |
| <b>Total</b> | <b>84,675.7302</b>                              |                  | <b>89,201.0039</b>                                       | <b>87.23%</b>                        | <b>773,894.6959</b>                   |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.



## Appendix E: Appliance Recycling Program

Table 54 presents reported gross and certified net energy savings for the Appliance Recycling Program by fuel type. The realization rates reflect the adjustments Cadmus made based on our certification tasks and on applying installation rate and NTG adjustments. The following sections discuss the changes we made to reported gross energy savings.

**Table 54. Appliance Recycling Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 29,087              | 34,841,485.0000   | 4,118.5210       | 0.0000            |
| Certified Net    | 29,087              | 31,357,336.5000   | 3,706.6689       | 0.0000            |
| Difference       | 0                   | -3,484,148.5000   | -411.8521        | 0.0000            |
| Realization Rate | 100.00%             | 90.00%            | 90.00%           | N/A               |

Table 55 presents reported and certified net energy savings with the long-life equipment savings multiplier for the Appliance Recycling Program by fuel type.

**Table 55. Appliance Recycling Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 29,087              | 31,357,326.3300   | 3,706.6593       | 0.0000            |
| Certified Net      | 29,087              | 31,357,336.5000   | 3,706.6689       | 0.0000            |
| Difference         | 0                   | 10.1700           | 0.0096           | 0.0000            |
| Certified/Reported | 100.00%             | 100.00%           | 100.00%          | N/A               |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

The Appliance Recycling Program did not have customer-level documents available for review; therefore, Cadmus did not conduct a documentation review of this program.

### Task 4: Measure-Level Savings Analysis

Cadmus did not find discrepancies between the per-unit measure savings reported by Consumers Energy and values either maintained in the MEMD or calculated by Navigant.

Table 56 presents the reported and certified per-unit savings for all measures delivered through the 2013 Appliance Recycling Program.

**Table 56. Appliance Recycling Program Reported and Certified Per-Unit Measure Savings**

| Measure Code | Reported   |        |        | Certified  |        |        | Certified LLES |            |        |        |
|--------------|------------|--------|--------|------------|--------|--------|----------------|------------|--------|--------|
|              | kWh        | kW     | MCF    | kWh        | kW     | MCF    | Measure Life   | kWh        | kW     | MCF    |
| RTE0001      | 1,261.0000 | 0.1460 | 0.0000 | 1,261.0000 | 0.1460 | 0.0000 | 8              | 1,261.0000 | 0.1460 | 0.0000 |
| RTE0009      | 1,261.0000 | 0.1460 | 0.0000 | 1,261.0000 | 0.1460 | 0.0000 | 8              | 1,261.0000 | 0.1460 | 0.0000 |
| RTE0002      | 1,111.0000 | 0.1360 | 0.0000 | 1,111.0000 | 0.1360 | 0.0000 | 8              | 1,111.0000 | 0.1360 | 0.0000 |
| RTE0010      | 1,111.0000 | 0.1360 | 0.0000 | 1,111.0000 | 0.1360 | 0.0000 | 8              | 1,111.0000 | 0.1360 | 0.0000 |
| RTE0007      | 139.0000   | 0.0350 | 0.0000 | 139.0000   | 0.0350 | 0.0000 | 8              | 139.0000   | 0.0350 | 0.0000 |
| RTE0008      | 113.0000   | 0.1070 | 0.0000 | 113.0000   | 0.1070 | 0.0000 | 8              | 113.0000   | 0.1070 | 0.0000 |

### Major Findings by Fuel Type

The tables below present the certified program participation and energy savings by measure. Table 57 and Table 58 document kWh savings and Table 59 documents kW savings. No MCF savings are reported for this program.

Table 57. Certified Appliance Recycling Program Participation and First-Year kWh Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RTE0001      | 20,895                            | 20,895                            | 26,348,595.0000                     | 26,348,595.0000                     | 1.0000                                | 26,348,595.0000                                | 0.9000                                    | 23,713,735.5000                              |
| RTE0009      | 1,885                             | 1,885                             | 2,376,985.0000                      | 2,376,985.0000                      | 1.0000                                | 2,376,985.0000                                 | 0.9000                                    | 2,139,286.5000                               |
| RTE0002      | 5,286                             | 5,286                             | 5,872,746.0000                      | 5,872,746.0000                      | 1.0000                                | 5,872,746.0000                                 | 0.9000                                    | 5,285,471.4000                               |
| RTE0010      | 114                               | 114                               | 126,654.0000                        | 126,654.0000                        | 1.0000                                | 126,654.0000                                   | 0.9000                                    | 113,988.6000                                 |
| RTE0007      | 539                               | 539                               | 74,921.0000                         | 74,921.0000                         | 1.0000                                | 74,921.0000                                    | 0.9000                                    | 67,428.9000                                  |
| RTE0008      | 368                               | 368                               | 41,584.0000                         | 41,584.0000                         | 1.0000                                | 41,584.0000                                    | 0.9000                                    | 37,425.6000                                  |
| <b>Total</b> | <b>29,087</b>                     | <b>29,087</b>                     | <b>34,841,485.0000</b>              | <b>34,841,485.0000</b>              |                                       | <b>34,841,485.0000</b>                         | <b>0.9000</b>                             | <b>31,357,336.5000</b>                       |

Table 58. Certified Appliance Recycling Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID   | 2013 Certified Net kWh Savings (F) = (D x E) | Measure Life (G) | 2013 Certified New kWh LLESMS Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) | Lifetime kWh Savings (J) = (H x G) |
|--------------|--|------------------|--|-----------------------------------|------------------------------------|
| RTE0001      | 23,713,735.5000                              | 8                | 23,713,735.5000  | 90.00%                            | 189,709,884.0000                   |
| RTE0009      | 2,139,286.5000                               | 8                | 2,139,286.5000   | 90.00%                            | 17,114,292.0000                    |
| RTE0002      | 5,285,471.4000                               | 8                | 5,285,471.4000   | 90.00%                            | 42,283,771.2000                    |
| RTE0010      | 113,988.6000                                 | 8                | 113,988.6000   | 90.00%                            | 911,908.8000                       |
| RTE0007      | 67,428.9000                                  | 8                | 67,428.9000  | 90.00%                            | 539,431.2000                       |
| RTE0008      | 37,425.6000                                  | 8                | 37,425.6000  | 90.00%                            | 299,404.8000                       |
| <b>Total</b> | <b>31,357,336.5000</b>                       |                  | <b>31,357,336.5000</b>                                 | <b>90.00%</b>                     | <b>250,858,692.0000</b>            |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 59. Certified Appliance Recycling Program Participation and kW Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Reported Gross Savings (A) | 2013 Adjusted Gross Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kW LLESMS Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------------|--|---|---|------------------|---|-----------------------------------|
| RTE0001      | 20,895                            | 3,050.6700                      | 3,050.6700                      | 1.0000                                | 3,050.6700                                 | 0.9000                                    | 2,745.6030                                  | 8                | 2,745.6030  | 90.00%                            |
| RTE0009      | 1,885                             | 275.2100                        | 275.2100                        | 1.0000                                | 275.2100                                   | 0.9000                                    | 247.6890                                    | 8                | 247.6890  | 90.00%                            |
| RTE0002      | 5,286                             | 718.8960                        | 718.8960                        | 1.0000                                | 718.8960                                   | 0.9000                                    | 647.0064                                    | 8                | 647.0064  | 90.00%                            |
| RTE0010      | 114                               | 15.5040                         | 15.5040                         | 1.0000                                | 15.5040                                    | 0.9000                                    | 13.9536                                     | 8                | 13.9536   | 90.00%                            |
| RTE0007      | 539                               | 18.8650                         | 18.8650                         | 1.0000                                | 18.8650                                    | 0.9000                                    | 16.9785                                     | 8                | 16.9785   | 90.00%                            |
| RTE0008      | 368                               | 39.3760                         | 39.3760                         | 1.0000                                | 39.3760                                    | 0.9000                                    | 35.4384                                     | 8                | 35.4384   | 90.00%                            |
| <b>Total</b> | <b>29,087</b>                     | <b>4,118.5210</b>               | <b>4,118.5210</b>               |                                       | <b>4,118.5210</b>                          | <b>0.9000</b>                             | <b>3,706.6689</b>                           |                  | <b>3,706.6689</b>                                     | <b>90.00%</b>                     |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

## Appendix F: Multifamily Program

Table 60 presents reported gross and certified net energy savings for the Multifamily Program by fuel type. The realization rates reflect the adjustments Cadmus made based on our certification tasks and applying installation rate and NTG adjustments. The following sections discuss changes we made to reported gross energy savings.

**Table 60. Multifamily Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 596,153.3           | 8,583,011.3200    | 1,119.5425       | 205,293.1563      |
| Certified Net    | 596,153.3           | 7,626,133.7319    | 916.3936         | 184,682.1291      |
| Difference       | 0                   | -956,877.5881     | -203.1489        | -20,611.0272      |
| Realization Rate | 100.00%             | 88.85%            | 81.85%           | 89.96%            |

Table 61 presents reported and certified net energy savings with the long-life equipment savings multiplier for the Multifamily Program by fuel type.

**Table 61. Multifamily Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 596,153.3           | 7,945,386.7820    | 1,034.2332       | 196,369.5416      |
| Certified Net      | 596,153.3           | 7,955,182.2794    | 955.4525         | 199,005.6580      |
| Difference         | 0                   | 9,795.4974        | -78.7807         | 2,636.1164        |
| Certified/Reported | 100.00%             | 100.12%           | 92.38%           | 101.34%           |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

Cadmus reviewed program documents from a sample of 59 randomly selected account numbers. Table 62 documents reported and certified measure counts as well as reported and certified energy savings by fuel type.

Table 62. Multifamily Program Sample Participation and Savings by End Use

| Measure Code | Reported |              |         |            | Certified |              |         |            |
|--------------|----------|--------------|---------|------------|-----------|--------------|---------|------------|
|              | n        | kWh          | kW      | MCF        | n         | kWh          | kW      | MCF        |
| RCG0001      | 4        | -            | -       | 2,156.4306 | 4         | -            | -       | 2,156.4306 |
| RME0004      | 183      | 30,378.0000  | 3.4587  | -          | 183       | 30,378.0000  | 3.4587  | -          |
| RME0019      | 135      | 28,620.0000  | 3.2400  | -          | 135       | 28,620.0000  | 3.2400  | -          |
| RME0023      | 4,861    | 180,343.1000 | 21.3884 | -          | 4,861     | 180,343.1000 | 21.3884 | -          |
| RME0046      | 39       | 1,719.9000   | 0.2067  | -          | 39        | 1,719.9000   | 0.2067  | -          |
| RME0050      | 148      | 102,120.0000 | 11.5440 | -          | 148       | 102,120.0000 | 11.5440 | -          |
| RME0051      | 4        | 2,760.0000   | 0.3120  | -          | 4         | 2,760.0000   | 0.3120  | -          |
| RME0123      | 9        | 1,674.0000   | -       | -          | 9         | 1,674.0000   | -       | -          |
| RME0178      | 8        | 1,656.3296   | 0.1512  | -          | 8         | 1,656.3296   | 0.1512  | -          |
| RME0181      | 496      | 21,873.6000  | 16.8640 | -          | 496       | 21,873.6000  | 16.8640 | -          |
| RME0194      | 2,427    | 97,080.0000  | 11.6496 | -          | 2,427     | 97,080.0000  | 11.6496 | -          |
| RMG0004      | 112      | -            | -       | 92.5344    | 112       | -            | -       | 92.5344    |
| RMG0007      | 3,948    | -            | -       | 882.7728   | 3,948     | -            | -       | 882.7728   |
| RMG0009      | 1,200    | -            | -       | 68.6400    | 1,200     | -            | -       | 68.6400    |
| RMG0014      | 1,292    | -            | -       | 1,397.6856 | 1,292     | -            | -       | 1,397.6856 |
| RMG0016      | 248      | -            | -       | 96.4224    | 248       | -            | -       | 96.4224    |
| RMG0030      | 9        | -            | -       | 13.9707    | 9         | -            | -       | 13.9707    |
| RMG0031      | 31       | -            | -       | 7.5361     | 31        | -            | -       | 7.5361     |
| RMG0034      | 12       | -            | -       | 7.9260     | 12        | -            | -       | 7.9260     |
| RMG0035      | 21,030   | -            | -       | 866.4319   | 21,030    | -            | -       | 866.4319   |
| RMG0050      | 1,157    | -            | -       | 4,048.5744 | 1,157     | -            | -       | 4,048.5744 |
| RMG0051      | 545      | -            | -       | 1,907.0640 | 545       | -            | -       | 1,907.0640 |
| RMG0108      | 216      | -            | -       | 279.8712   | 216       | -            | -       | 279.8712   |
| RMG0115      | 177      | -            | -       | 499.7064   | 177       | -            | -       | 499.7064   |
| RMG0116      | 2        | -            | -       | 9.3504     | 2         | -            | -       | 9.3504     |
| RMG0119      | 162      | -            | -       | 175.2516   | 162       | -            | -       | 175.2516   |
| RMG0120      | 197      | -            | -       | 162.7614   | 197       | -            | -       | 162.7614   |
| RMG0123      | 9,608    | -            | -       | 2,345.3128 | 9,608     | -            | -       | 2,345.3128 |
| RMG0132      | 403      | -            | -       | 1,365.4849 | 403       | -            | -       | 1,365.4849 |
| RMG0133      | 2        | -            | -       | 7.8972     | 2         | -            | -       | 7.8972     |
| RMG0137      | 25       | -            | -       | 285.1825   | 25        | -            | -       | 285.1825   |
| RMG0143      | 800      | -            | -       | 332.0800   | 800       | -            | -       | 332.0800   |
| RMG0144      | 798      | -            | -       | 365.5974   | 798       | -            | -       | 365.5974   |
| RMG0145      | 1,598    | -            | -       | 385.5974   | 1,598     | -            | -       | 385.5974   |
| RMG0146      | 198      | -            | -       | 20.4732    | 198       | -            | -       | 20.4732    |
| RMG0149      | 197      | -            | -       | 689.3424   | 197       | -            | -       | 689.3424   |
| RMG0152      | 101      | -            | -       | 246.3794   | 101       | -            | -       | 246.3794   |

| Measure Code | Reported      |                     |                |                    | Certified     |                     |                |                    |
|--------------|---------------|---------------------|----------------|--------------------|---------------|---------------------|----------------|--------------------|
|              | n             | kWh                 | kW             | MCF                | n             | kWh                 | kW             | MCF                |
| RMG0154      | 1,655         | -                   | -              | 1,748.8385         | 1,655         | -                   | -              | 1,748.8385         |
| RMG0163      | 4,949         | -                   | -              | 531.5226           | 4,949         | -                   | -              | 531.5226           |
| <b>Total</b> | <b>58,986</b> | <b>468,224.9296</b> | <b>68.8146</b> | <b>20,996.5248</b> | <b>58,986</b> | <b>468,224.9296</b> | <b>68.8146</b> | <b>20,996.5248</b> |

The reported measure quantities for all database records matched the associated documentation. Table 63 provides the sample realization rates by fuel type and the t-test statistics Cadmus used to analyze errors in the sample.

**Table 63. Multifamily Program Sample Realization Rates and t-Statistic**

|                                     | kWh        | kW         | MCF        |
|-------------------------------------|------------|------------|------------|
| Sample Realization Rate             | 100.00%    | 100.00%    | 100.00%    |
| Standard Error                      | N/A        | N/A        | N/A        |
| t-Statistic                         | N/A        | N/A        | N/A        |
| p-Value                             | N/A        | N/A        | N/A        |
| <b>Apply to Program Population?</b> | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |

#### **Task 4: Measure-Level Savings Analysis**

Cadmus found discrepancies between the reported per-unit measure savings and values either maintained in the MEMD or calculated by Navigant for the program measures shown in Table 64.

**Table 64. Per-Unit Measure Discrepancies for the Multifamily Program**

| Measure Code and End Use                     | Reported Savings     | Certified Savings    |
|--|----------------------|----------------------|
| RME0150 – CFL Candelabra Lamps (Common Area) | 149 kWh<br>0.0340 kW | 156 kWh<br>0.0382 kW |
| RME0178 – Low-Flow Bath Aerator 1.0 GPM      | 0.0189 kW            | 0.0234 kW            |
| RME0180 – LED Candelabra                     | 0.0234 kW            | 0.0010 kW            |
| RME0183 – CFL Candelabra Lamps (In-Unit)     | 0.0340 kW            | 0.0052 kW            |
| RMG0118 – Pipe Wrap (Common Area)            | 0.1657 MCF           | 0.2431 MCF           |
| RMG0123 – Pipe Wrap (Common Area)            | 0.2441 MCF           | 0.2431 MCF           |

Cadmus also certified RME0180 with a nine-year measure life, while Etracker reported it to have a two-year measure life. RMG0113 and RMG0123 were reported with a six-year measure life; Cadmus verified a measure life of 20 years based on the MEMD.

Table 65 presents the reported and certified per-unit savings for all measures delivered through the 2013 Multifamily Program.

Table 65. Multifamily Program Reported and Certified Per-Unit Measure Savings

| Measure Code | Reported |        |        | Certified |        |        | Certified LLES |          |        |        |
|--------------|----------|--------|--------|-----------|--------|--------|----------------|----------|--------|--------|
|              | kWh      | kW     | MCF    | kWh       | kW     | MCF    | Measure Life   | kWh      | kW     | MCF    |
| RCE0001      | Custom   | Custom | Custom | Custom    | Custom | Custom | 8.7667         | Custom   | Custom | Custom |
| RCE0001      | Custom   | Custom | Custom | Custom    | Custom | Custom | 12.1374        | Custom   | Custom | Custom |
| RCG0001      | Custom   | Custom | Custom | Custom    | Custom | Custom | 5.1729         | Custom   | Custom | Custom |
| RCG0001      | Custom   | Custom | Custom | Custom    | Custom | Custom | 17.1398        | Custom   | Custom | Custom |
| RME0004      | 166.0000 | 0.0189 | 0.0000 | 166.0000  | 0.0189 | 0.0000 | 12             | 182.6000 | 0.0208 | 0.0000 |
| RME0019      | 212.0000 | 0.0240 | 0.0000 | 212.0000  | 0.0240 | 0.0000 | 12             | 233.2000 | 0.0264 | 0.0000 |
| RME0023      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9              | 37.1000  | 0.0044 | 0.0000 |
| RME0027      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9              | 37.1000  | 0.0044 | 0.0000 |
| RME0029      | 78.0000  | 0.0093 | 0.0000 | 78.0000   | 0.0093 | 0.0000 | 12             | 85.8000  | 0.0102 | 0.0000 |
| RME0031      | 397.0000 | 0.0990 | 0.0000 | 397.0000  | 0.0990 | 0.0000 | 10             | 436.7000 | 0.1089 | 0.0000 |
| RME0035      | 268.0000 | 0.0000 | 0.0000 | 268.0000  | 0.0000 | 0.0000 | 11             | 294.8000 | 0.0000 | 0.0000 |
| RME0036      | 409.0000 | 0.0000 | 0.0000 | 409.0000  | 0.0000 | 0.0000 | 11             | 449.9000 | 0.0000 | 0.0000 |
| RME0038      | 706.0000 | 0.0000 | 0.0000 | 706.0000  | 0.0000 | 0.0000 | 11             | 776.6000 | 0.0000 | 0.0000 |
| RME0039      | 611.0000 | 0.0665 | 0.0000 | 611.0000  | 0.0665 | 0.0000 | 8              | 611.0000 | 0.0665 | 0.0000 |
| RME0046      | 44.1000  | 0.0053 | 0.0000 | 44.1000   | 0.0053 | 0.0000 | 9              | 44.1000  | 0.0053 | 0.0000 |
| RME0050      | 690.0000 | 0.0780 | 0.0000 | 690.0000  | 0.0780 | 0.0000 | 12             | 759.0000 | 0.0858 | 0.0000 |
| RME0051      | 690.0000 | 0.0780 | 0.0000 | 690.0000  | 0.0780 | 0.0000 | 12             | 759.0000 | 0.0858 | 0.0000 |
| RME0104      | 166.0000 | 0.0189 | 0.0000 | 166.0000  | 0.0189 | 0.0000 | 12             | 182.6000 | 0.0208 | 0.0000 |
| RME0105      | 518.0000 | 0.0580 | 0.0000 | 518.0000  | 0.0580 | 0.0000 | 12             | 569.8000 | 0.0638 | 0.0000 |
| RME0119      | 212.0000 | 0.0240 | 0.0000 | 212.0000  | 0.0240 | 0.0000 | 12             | 233.2000 | 0.0264 | 0.0000 |
| RME0121      | 690.0000 | 0.0780 | 0.0000 | 690.0000  | 0.0780 | 0.0000 | 12             | 759.0000 | 0.0858 | 0.0000 |
| RME0123      | 186.0000 | 0.0000 | 0.0000 | 186.0000  | 0.0000 | 0.0000 | 2              | 186.0000 | 0.0000 | 0.0000 |
| RME0133      | 180.0000 | 0.0189 | 0.0000 | 180.0000  | 0.0189 | 0.0000 | 8              | 180.0000 | 0.0189 | 0.0000 |
| RME0142      | 72.7933  | 0.0637 | 0.0000 | 72.7933   | 0.0637 | 0.0000 | 15             | 80.0726  | 0.0701 | 0.0000 |
| RME0147      | 44.1000  | 0.0053 | 0.0000 | 44.1000   | 0.0053 | 0.0000 | 9              | 44.1000  | 0.0053 | 0.0000 |
| RME0150      | 149.0000 | 0.0340 | 0.0000 | 156.0000  | 0.0382 | 0.0000 | 2              | 156.0000 | 0.0382 | 0.0000 |
| RME0159      | 29.0000  | 0.0072 | 0.0000 | 29.0000   | 0.0072 | 0.0000 | 8              | 29.0000  | 0.0072 | 0.0000 |
| RME0167      | 196.0000 | 0.0479 | 0.0000 | 196.0000  | 0.0479 | 0.0000 | 10             | 215.6000 | 0.0527 | 0.0000 |
| RME0175      | 80.0000  | 0.1380 | 0.0000 | 80.0000   | 0.1380 | 0.0000 | 12             | 88.0000  | 0.1518 | 0.0000 |
| RME0178      | 207.0412 | 0.0189 | 0.0000 | 207.0412  | 0.0234 | 0.0000 | 12             | 227.7453 | 0.0257 | 0.0000 |
| RME0180      | 25.0000  | 0.0283 | 0.0000 | 25.0000   | 0.0010 | 0.0000 | 12             | 27.5000  | 0.0011 | 0.0000 |
| RME0181      | 44.1000  | 0.0340 | 0.0000 | 44.1000   | 0.0053 | 0.0000 | 9              | 44.1000  | 0.0053 | 0.0000 |
| RME0184      | 201.0000 | 0.0230 | 0.0000 | 201.0000  | 0.0230 | 0.0000 | 15             | 221.1000 | 0.0253 | 0.0000 |
| RME0194      | 40.0000  | 0.0048 | 0.0000 | 40.0000   | 0.0048 | 0.0000 | 10             | 44.0000  | 0.0053 | 0.0000 |
| RMG0004      | 0.0000   | 0.0000 | 0.8262 | 0.0000    | 0.0000 | 0.8262 | 12             | 0.0000   | 0.0000 | 0.9088 |
| RMG0007      | 0.0000   | 0.0000 | 0.2236 | 0.0000    | 0.0000 | 0.2236 | 6              | 0.0000   | 0.0000 | 0.2236 |
| RMG0009      | 0.0000   | 0.0000 | 0.0572 | 0.0000    | 0.0000 | 0.0572 | 15             | 0.0000   | 0.0000 | 0.0629 |
| RMG0011      | 0.0000   | 0.0000 | 0.1085 | 0.0000    | 0.0000 | 0.1085 | 5              | 0.0000   | 0.0000 | 0.1085 |



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| Measure Code | Reported |        |         | Certified |        |         | Certified LLESIM |         |        |         |
|--------------|----------|--------|---------|-----------|--------|---------|------------------|---------|--------|---------|
|              | kWh      | kW     | MCF     | kWh       | kW     | MCF     | Measure Life     | kWh     | kW     | MCF     |
| RMG0012      | 0.0000   | 0.0000 | 0.3699  | 0.0000    | 0.0000 | 0.3699  | 15               | 0.0000  | 0.0000 | 0.4069  |
| RMG0014      | 0.0000   | 0.0000 | 1.0818  | 0.0000    | 0.0000 | 1.0818  | 12               | 0.0000  | 0.0000 | 1.1900  |
| RMG0016      | 0.0000   | 0.0000 | 0.3888  | 0.0000    | 0.0000 | 0.3888  | 20               | 0.0000  | 0.0000 | 0.4277  |
| RMG0018      | 0.0000   | 0.0000 | 18.2736 | 0.0000    | 0.0000 | 18.2736 | 15               | 0.0000  | 0.0000 | 20.1010 |
| RMG0020      | 0.0000   | 0.0000 | 2.8163  | 0.0000    | 0.0000 | 2.8163  | 5                | 0.0000  | 0.0000 | 2.8163  |
| RMG0030      | 0.0000   | 0.0000 | 1.5523  | 0.0000    | 0.0000 | 1.5523  | 20               | 0.0000  | 0.0000 | 1.7075  |
| RMG0031      | 0.0000   | 0.0000 | 0.2431  | 0.0000    | 0.0000 | 0.2431  | 5                | 0.0000  | 0.0000 | 0.2431  |
| RMG0034      | 0.0000   | 0.0000 | 0.6605  | 0.0000    | 0.0000 | 0.6605  | 15               | 0.0000  | 0.0000 | 0.7266  |
| RMG0035      | 0.0000   | 0.0000 | 0.0412  | 0.0000    | 0.0000 | 0.0412  | 20               | 0.0000  | 0.0000 | 0.0453  |
| RMG0050      | 0.0000   | 0.0000 | 3.4992  | 0.0000    | 0.0000 | 3.4992  | 12               | 0.0000  | 0.0000 | 3.8491  |
| RMG0051      | 0.0000   | 0.0000 | 3.4992  | 0.0000    | 0.0000 | 3.4992  | 12               | 0.0000  | 0.0000 | 3.8491  |
| RMG0108      | 0.0000   | 0.0000 | 1.2957  | 0.0000    | 0.0000 | 1.2957  | 9                | 0.0000  | 0.0000 | 1.2957  |
| RMG0115      | 0.0000   | 0.0000 | 2.8232  | 0.0000    | 0.0000 | 2.8232  | 5                | 0.0000  | 0.0000 | 2.8232  |
| RMG0116      | 0.0000   | 0.0000 | 4.6752  | 0.0000    | 0.0000 | 4.6752  | 5                | 0.0000  | 0.0000 | 4.6752  |
| RMG0118      | 0.0000   | 0.0000 | 0.1657  | 0.0000    | 0.0000 | 0.2431  | 20               | 0.0000  | 0.0000 | 0.2674  |
| RMG0119      | 0.0000   | 0.0000 | 1.0818  | 0.0000    | 0.0000 | 1.0818  | 12               | 0.0000  | 0.0000 | 1.1900  |
| RMG0120      | 0.0000   | 0.0000 | 0.8262  | 0.0000    | 0.0000 | 0.8262  | 12               | 0.0000  | 0.0000 | 0.9088  |
| RMG0121      | 0.0000   | 0.0000 | 12.4564 | 0.0000    | 0.0000 | 12.4564 | 15               | 0.0000  | 0.0000 | 13.7020 |
| RMG0122      | 0.0000   | 0.0000 | 0.3888  | 0.0000    | 0.0000 | 0.3888  | 6                | 0.0000  | 0.0000 | 0.3888  |
| RMG0123      | 0.0000   | 0.0000 | 0.2441  | 0.0000    | 0.0000 | 0.2431  | 20               | 0.0000  | 0.0000 | 0.2674  |
| RMG0131      | 0.0000   | 0.0000 | 0.0557  | 0.0000    | 0.0000 | 0.0557  | 5                | 0.0000  | 0.0000 | 0.0557  |
| RMG0132      | 0.0000   | 0.0000 | 3.3883  | 0.0000    | 0.0000 | 3.3883  | 5                | 0.0000  | 0.0000 | 3.3883  |
| RMG0133      | 0.0000   | 0.0000 | 3.9486  | 0.0000    | 0.0000 | 3.9486  | 5                | 0.0000  | 0.0000 | 3.9486  |
| RMG0136      | 0.0000   | 0.0000 | 20.7924 | 0.0000    | 0.0000 | 20.7924 | 15               | 0.0000  | 0.0000 | 22.8716 |
| RMG0137      | 0.0000   | 0.0000 | 11.4073 | 0.0000    | 0.0000 | 11.4073 | 15               | 0.0000  | 0.0000 | 12.5480 |
| RMG0143      | -6.4659  | 0.0000 | 0.4151  | -6.4659   | 0.0000 | 0.4151  | 15               | -7.1125 | 0.0000 | 0.4566  |
| RMG0144      | -6.3605  | 0.0000 | 0.4580  | -6.3605   | 0.0000 | 0.4580  | 15               | -6.9966 | 0.0000 | 0.5038  |
| RMG0145      | 0.0000   | 0.0000 | 0.2413  | 0.0000    | 0.0000 | 0.2413  | 15               | 0.0000  | 0.0000 | 0.2654  |
| RMG0146      | 0.0000   | 0.0000 | 0.1034  | 0.0000    | 0.0000 | 0.1034  | 15               | 0.0000  | 0.0000 | 0.1137  |
| RMG0149      | 0.0000   | 0.0000 | 3.4992  | 0.0000    | 0.0000 | 3.4992  | 12               | 0.0000  | 0.0000 | 3.8491  |
| RMG0152      | 0.0000   | 0.0000 | 2.4394  | 0.0000    | 0.0000 | 2.4394  | 20               | 0.0000  | 0.0000 | 2.6833  |
| RMG0154      | 0.0000   | 0.0000 | 1.0567  | 0.0000    | 0.0000 | 1.0567  | 12               | 0.0000  | 0.0000 | 1.1624  |
| RMG0157      | 0.0000   | 0.0000 | 4.0727  | 0.0000    | 0.0000 | 4.0727  | 3                | 0.0000  | 0.0000 | 4.0727  |
| RMG0163      | 0.0000   | 0.0000 | 0.1074  | 0.0000    | 0.0000 | 0.1074  | 5                | 0.0000  | 0.0000 | 0.1074  |

### Major Findings by Fuel Type

The table below present the certified program participation and energy savings by measure. Table 66 and Table 67 document kWh savings, Table 68 documents kW savings, and Table 69 and Table 70 document MCF savings.

Table 66. Certified Multifamily Program Participation and First-Year kWh Savings by Measure

| Measure ID | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RCE0001    | 1                                 | 1                                 | 9,634.0000                          | 9,634.0000                          | 1.0000                                | 9,634.0000                                     | 0.9000                                    | 8,670.6000                                   |
| RCE0001    | 8                                 | 8                                 | 455,268.0460                        | 455,268.0460                        | 1.0000                                | 455,268.0460                                   | 0.9000                                    | 409,741.2414                                 |
| RME0004    | 861                               | 861                               | 142,926.0000                        | 142,926.0000                        | 1.0040                                | 143,497.7040                                   | 0.9000                                    | 129,147.9336                                 |
| RME0019    | 1,394                             | 1,394                             | 295,528.0000                        | 295,528.0000                        | 1.0040                                | 296,710.1120                                   | 0.9000                                    | 267,039.1008                                 |
| RME0023    | 99,905                            | 99,905                            | 3,706,475.5000                      | 3,706,475.5000                      | 0.9690                                | 3,591,574.7595                                 | 0.9000                                    | 3,232,417.2836                               |
| RME0027    | 72                                | 72                                | 2,671.2000                          | 2,671.2000                          | 0.9690                                | 2,588.3928                                     | 0.9000                                    | 2,329.5535                                   |
| RME0029    | 174                               | 174                               | 13,572.0000                         | 13,572.0000                         | 1.0000                                | 13,572.0000                                    | 0.9000                                    | 12,214.8000                                  |
| RME0031    | 14                                | 14                                | 5,558.0000                          | 5,558.0000                          | 1.0000                                | 5,558.0000                                     | 0.9000                                    | 5,002.2000                                   |
| RME0035    | 51                                | 51                                | 13,668.0000                         | 13,668.0000                         | 1.0000                                | 13,668.0000                                    | 0.9000                                    | 12,301.2000                                  |
| RME0036    | 37                                | 37                                | 15,133.0000                         | 15,133.0000                         | 1.0000                                | 15,133.0000                                    | 0.9000                                    | 13,619.7000                                  |
| RME0038    | 4                                 | 4                                 | 2,824.0000                          | 2,824.0000                          | 1.0000                                | 2,824.0000                                     | 0.9000                                    | 2,541.6000                                   |
| RME0039    | 37                                | 37                                | 22,607.0000                         | 22,607.0000                         | 1.0000                                | 22,607.0000                                    | 0.9000                                    | 20,346.3000                                  |
| RME0046    | 22,982                            | 22,982                            | 1,013,506.2000                      | 1,013,506.2000                      | 1.0000                                | 1,013,506.2000                                 | 0.9000                                    | 912,155.5800                                 |
| RME0050    | 1,635                             | 1,635                             | 1,128,150.0000                      | 1,128,150.0000                      | 1.0000                                | 1,128,150.0000                                 | 0.9000                                    | 1,015,335.0000                               |
| RME0051    | 88                                | 88                                | 60,720.0000                         | 60,720.0000                         | 1.0000                                | 60,720.0000                                    | 0.9000                                    | 54,648.0000                                  |
| RME0104    | 104                               | 104                               | 17,264.0000                         | 17,264.0000                         | 1.0040                                | 17,333.0560                                    | 0.9000                                    | 15,599.7504                                  |
| RME0105    | 4                                 | 4                                 | 2,072.0000                          | 2,072.0000                          | 0.9650                                | 1,999.4800                                     | 0.9000                                    | 1,799.5320                                   |
| RME0119    | 100                               | 100                               | 21,200.0000                         | 21,200.0000                         | 1.0040                                | 21,284.8000                                    | 0.9000                                    | 19,156.3200                                  |
| RME0121    | 100                               | 100                               | 69,000.0000                         | 69,000.0000                         | 1.0000                                | 69,000.0000                                    | 0.9000                                    | 62,100.0000                                  |
| RME0123    | 9                                 | 9                                 | 1,674.0000                          | 1,674.0000                          | 1.0000                                | 1,674.0000                                     | 0.9000                                    | 1,506.6000                                   |

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| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RME0133      | 71                                | 71                                | 12,780.0000                         | 12,780.0000                         | 1.0000                                | 12,780.0000                                    | 0.9000                                    | 11,502.0000                                  |
| RME0142      | 39.4                              | 39.4                              | 2,868.0560                          | 2,868.0560                          | 1.0000                                | 2,868.0560                                     | 0.9000                                    | 2,581.2504                                   |
| RME0147      | 3                                 | 3                                 | 132.3000                            | 132.3000                            | 1.0000                                | 132.3000                                       | 0.9000                                    | 119.0700                                     |
| RME0150      | 517                               | 517                               | 77,033.0000                         | 80,652.0000                         | 1.0000                                | 80,652.0000                                    | 0.9000                                    | 72,586.8000                                  |
| RME0159      | 94                                | 94                                | 2,726.0000                          | 2,726.0000                          | 1.0000                                | 2,726.0000                                     | 0.9000                                    | 2,453.4000                                   |
| RME0167      | 582                               | 582                               | 114,072.0000                        | 114,072.0000                        | 1.0000                                | 114,072.0000                                   | 0.9000                                    | 102,664.8000                                 |
| RME0175      | 11                                | 11                                | 880.0000                            | 880.0000                            | 1.0000                                | 880.0000                                       | 0.9000                                    | 792.0000                                     |
| RME0178      | 990                               | 990                               | 204,970.7880                        | 204,970.7880                        | 1.0000                                | 204,970.7880                                   | 0.9000                                    | 184,473.7092                                 |
| RME0180      | 1,567                             | 1,567                             | 39,175.0000                         | 39,175.0000                         | 1.0000                                | 39,175.0000                                    | 0.9000                                    | 35,257.5000                                  |
| RME0181      | 1,803                             | 1,803                             | 79,512.3000                         | 79,512.3000                         | 1.0000                                | 79,512.3000                                    | 0.9000                                    | 71,561.0700                                  |
| RME0184      | 1                                 | 1                                 | 201.0000                            | 201.0000                            | 1.0000                                | 201.0000                                       | 0.9000                                    | 180.9000                                     |
| RME0194      | 27,112                            | 27,112                            | 1,084,480.0000                      | 1,084,480.0000                      | 1.0000                                | 1,084,480.0000                                 | 0.9000                                    | 976,032.0000                                 |
| RMG0143      | 4,295                             | 4,295                             | -27,771.0405                        | -27,771.0405                        | 1.0000                                | -27,771.0405                                   | 0.9000                                    | -24,993.9365                                 |
| RMG0144      | 1,179                             | 1,179                             | -7,499.0295                         | -7,499.0295                         | 1.0000                                | -7,499.0295                                    | 0.9000                                    | -6,749.1266                                  |
| <b>Total</b> | <b>165,844.4</b>                  | <b>165,844.4</b>                  | <b>8,583,011.3200</b>               | <b>8,586,630.3200</b>               |                                       | <b>8,473,481.9243</b>                          | <b>0.9000</b>                             | <b>7,626,133.7319</b>                        |

Table 67. Certified Multifamily Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID | 2013 Certified Net kWh Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net kWh LLESMS Savings<br>(H) = (F x 1.1)* | 2013 Realization Rate<br>(I) = (F/A) | Lifetime kWh Savings<br>(J) = (F x G) |
|------------|---|---------------------|---|--------------------------------------|---------------------------------------|
| RCE0001    | 8,670.6000                                      | 8.7667              | 8,670.6000  | 90.00%                               | 76,012.2600                           |
| RCE0001    | 409,741.2414                                    | 12.1374             | 450,715.3655  | 90.00%                               | 4,973,197.9435                        |
| RME0004    | 129,147.9336                                    | 12                  | 142,062.7270  | 90.36%                               | 1,549,775.2032                        |
| RME0019    | 267,039.1008                                    | 12                  | 293,743.0109  | 90.36%                               | 3,204,469.2096                        |
| RME0023    | 3,232,417.2836                                  | 9                   | 3,232,417.2836  | 87.21%                               | 29,091,755.5520                       |
| RME0027    | 2,329.5535                                      | 9                   | 2,329.5535  | 87.21%                               | 20,965.9817                           |
| RME0029    | 12,214.8000                                     | 12                  | 13,436.2800   | 90.00%                               | 146,577.6000                          |
| RME0031    | 5,002.2000                                      | 10                  | 5,502.4200  | 90.00%                               | 50,022.0000                           |
| RME0035    | 12,301.2000                                     | 11                  | 13,531.3200   | 90.00%                               | 135,313.2000                          |
| RME0036    | 13,619.7000                                     | 11                  | 14,981.6700   | 90.00%                               | 149,816.7000                          |
| RME0038    | 2,541.6000                                      | 11                  | 2,795.7600  | 90.00%                               | 27,957.6000                           |
| RME0039    | 20,346.3000                                     | 8                   | 20,346.3000   | 90.00%                               | 162,770.4000                          |
| RME0046    | 912,155.5800                                    | 9                   | 912,155.5800  | 90.00%                               | 8,209,400.2200                        |
| RME0050    | 1,015,335.0000                                  | 12                  | 1,116,868.5000  | 90.00%                               | 12,184,020.0000                       |
| RME0051    | 54,648.0000                                     | 12                  | 60,112.8000   | 90.00%                               | 655,776.0000                          |
| RME0104    | 15,599.7504                                     | 12                  | 17,159.7254   | 90.36%                               | 187,197.0048                          |
| RME0105    | 1,799.5320                                      | 12                  | 1,979.4852  | 86.85%                               | 21,594.3840                           |
| RME0119    | 19,156.3200                                     | 12                  | 21,071.9520   | 90.36%                               | 229,875.8400                          |
| RME0121    | 62,100.0000                                     | 12                  | 68,310.0000   | 90.00%                               | 745,200.0000                          |
| RME0123    | 1,506.6000                                      | 2                   | 1,506.6000  | 90.00%                               | 3,013.2000                            |
| RME0133    | 11,502.0000                                     | 8                   | 11,502.0000   | 90.00%                               | 92,016.0000                           |
| RME0142    | 2,581.2504                                      | 15                  | 2,839.3755  | 90.00%                               | 38,718.7563                           |
| RME0147    | 119.0700  | 9                   | 119.0700  | 90.00%                               | 1,071.6300                            |
| RME0150    | 72,586.8000                                     | 2                   | 72,586.8000   | 94.23%                               | 145,173.6000                          |
| RME0159    | 2,453.4000                                      | 8                   | 2,453.4000  | 90.00%                               | 19,627.2000                           |
| RME0167    | 102,664.8000                                    | 10                  | 112,931.2800  | 90.00%                               | 1,026,648.0000                        |

| Measure ID   | 2013 Certified Net kWh Savings<br>(F) = (D x E) | Measure Life (G) | 2013 Certified Net kWh LLESM Savings<br>(H) = (F x 1.1)* | 2013 Realization Rate<br>(I) = (F/A) | Lifetime kWh Savings<br>(J) = (F x G) |
|--------------|---|------------------|--|--------------------------------------|---------------------------------------|
| RME0175      | 792.0000  | 12               | 871.2000   | 90.00%                               | 9,504.0000                            |
| RME0178      | 184,473.7092                                    | 12               | 202,921.0801   | 90.00%                               | 2,213,684.5104                        |
| RME0180      | 35,257.5000                                     | 12               | 38,783.2500  | 90.00%                               | 423,090.0000                          |
| RME0181      | 71,561.0700                                     | 9                | 71,561.0700  | 90.00%                               | 644,049.6300                          |
| RME0184      | 180.9000  | 15               | 198.9900   | 90.00%                               | 2,713.5000                            |
| RME0194      | 976,032.0000                                    | 10               | 1,073,635.2000   | 90.00%                               | 9,760,320.0000                        |
| RM/G0143     | -24,993.9365                                    | 15               | -27,493.3301   | 90.00%                               | -374,909.0468                         |
| RM/G0144     | -6,749.1266                                     | 15               | -7,424.0392  | 90.00%                               | -101,236.8983                         |
| <b>Total</b> | <b>7,626,133.7319</b>                           |                  | <b>7,955,182.2794</b>                                    | <b>88.85%</b>                        | <b>75,725,181.1804</b>                |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 68. Certified Multifamily Program Participation and kW Savings by Measure

| Measure ID | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kW LESM Savings (H) = (F x 1.1) * | 2013 Realization Rate (I) = (F/A) |
|------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|--|-----------------------------------|
| RCE0001    | 1                                 | 1                                 | 2.3600                             | 2.3600                             | 1.0000                                | 2.3600  | 0.9000                                    | 2.1240                                      | 8.7667           | 2.1240   | 90.00%                            |
| RCE0001    | 8                                 | 8                                 | 47.4560                            | 47.4560                            | 1.0000                                | 47.4560                                       | 0.9000                                    | 42.7104                                     | 12.1374          | 46.9814  | 90.00%                            |
| RME0004    | 861                               | 861                               | 16.2729                            | 16.2729                            | 1.0040                                | 16.3380                                       | 0.9000                                    | 14.7042                                     | 12               | 16.1746  | 90.36%                            |
| RME0019    | 1,394                             | 1,394                             | 33.4560                            | 33.4560                            | 1.0040                                | 33.5898                                       | 0.9000                                    | 30.2308                                     | 12               | 33.2539  | 90.36%                            |
| RME0023    | 99,905                            | 99,905                            | 439.5820                           | 439.5820                           | 0.9690                                | 425.9550                                      | 0.9000                                    | 383.3595                                    | 9                | 383.3595   | 87.21%                            |
| RME0027    | 72                                | 72                                | 0.3168                             | 0.3168                             | 0.9690                                | 0.3070  | 0.9000                                    | 0.2763                                      | 9                | 0.2763   | 87.21%                            |
| RME0029    | 174                               | 174                               | 1.6182                             | 1.6182                             | 1.0000                                | 1.6182  | 0.9000                                    | 1.4564                                      | 12               | 1.6020   | 90.00%                            |
| RME0031    | 14                                | 14                                | 1.3860                             | 1.3860                             | 1.0000                                | 1.3860  | 0.9000                                    | 1.2474                                      | 10               | 1.3721   | 90.00%                            |
| RME0039    | 37                                | 37                                | 2.4605                             | 2.4605                             | 1.0000                                | 2.4605  | 0.9000                                    | 2.2145                                      | 8                | 2.2145   | 90.00%                            |
| RME0046    | 22,982                            | 22,982                            | 121.8046                           | 121.8046                           | 1.0000                                | 121.8046                                      | 0.9000                                    | 109.6241                                    | 9                | 109.6241   | 90.00%                            |
| RME0050    | 1,635                             | 1,635                             | 127.5300                           | 127.5300                           | 1.0000                                | 127.5300                                      | 0.9000                                    | 114.7770                                    | 12               | 126.2547   | 90.00%                            |
| RME0051    | 88                                | 88                                | 6.8640                             | 6.8640                             | 1.0000                                | 6.8640  | 0.9000                                    | 6.1776                                      | 12               | 6.7954   | 90.00%                            |
| RME0104    | 104                               | 104                               | 1.9656                             | 1.9656                             | 1.0040                                | 1.9735  | 0.9000                                    | 1.7761                                      | 12               | 1.9537   | 90.36%                            |
| RME0105    | 4                                 | 4                                 | 0.2320                             | 0.2320                             | 0.9650                                | 0.2239  | 0.9000                                    | 0.2015                                      | 12               | 0.2216   | 86.85%                            |
| RME0119    | 100                               | 100                               | 2.4000                             | 2.4000                             | 1.0040                                | 2.4096  | 0.9000                                    | 2.1686                                      | 12               | 2.3855   | 90.36%                            |
| RME0121    | 100                               | 100                               | 7.8000                             | 7.8000                             | 1.0000                                | 7.8000  | 0.9000                                    | 7.0200                                      | 12               | 7.7220   | 90.00%                            |
| RME0133    | 71                                | 71                                | 1.3419                             | 1.3419                             | 1.0000                                | 1.3419  | 0.9000                                    | 1.2077                                      | 8                | 1.2077   | 90.00%                            |
| RME0142    | 39.4                              | 39.4                              | 2.5098                             | 2.5098                             | 1.0000                                | 2.5098  | 0.9000                                    | 2.2588                                      | 15               | 2.4847   | 90.00%                            |
| RME0147    | 3                                 | 3                                 | 0.0159                             | 0.0159                             | 1.0000                                | 0.0159  | 0.9000                                    | 0.0143                                      | 9                | 0.0143   | 90.00%                            |
| RME0150    | 517                               | 517                               | 17.5780                            | 19.7494                            | 1.0000                                | 19.7494                                       | 0.9000                                    | 17.7745                                     | 2                | 17.7745  | 101.12%                           |
| RME0159    | 94                                | 94                                | 0.6768                             | 0.6768                             | 1.0000                                | 0.6768  | 0.9000                                    | 0.6091                                      | 8                | 0.6091   | 90.00%                            |
| RME0167    | 582                               | 582                               | 27.8778                            | 27.8778                            | 1.0000                                | 27.8778                                       | 0.9000                                    | 25.0900                                     | 10               | 27.5990  | 90.00%                            |

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kW LLESMSavings (H) = (F x 1.1) * | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|--|-----------------------------------|
| RME0175      | 11                                | 11                                | 1.5180                             | 1.5180                             | 1.0000                                | 1.5180  | 0.9000                                    | 1.3662                                      | 12               | 1.5028   | 90.00%                            |
| RME0178      | 990                               | 990                               | 18.7110                            | 23.1660                            | 1.0000                                | 23.1660                                       | 0.9000                                    | 20.8494                                     | 12               | 22.9343  | 111.43%                           |
| RME0180      | 1,567                             | 1,567                             | 44.3461                            | 1.5670                             | 1.0000                                | 1.5670  | 0.9000                                    | 1.4103                                      | 12               | 1.5513   | 3.18%                             |
| RME0181      | 1,803                             | 1,803                             | 61.3020                            | 9.5559                             | 1.0000                                | 9.5559  | 0.9000                                    | 8.6003                                      | 9                | 8.6003   | 14.03%                            |
| RME0184      | 1                                 | 1                                 | 0.0230                             | 0.0230                             | 1.0000                                | 0.0230  | 0.9000                                    | 0.0207                                      | 15               | 0.0228   | 90.00%                            |
| RME0194      | 27,112                            | 27,112                            | 130.1376                           | 130.1376                           | 1.0000                                | 130.1376                                      | 0.9000                                    | 117.1238                                    | 10               | 128.8362   | 90.00%                            |
| <b>Total</b> | <b>160,269.4</b>                  | <b>160,269.4</b>                  | <b>1,119.5425</b>                  | <b>1,031.6437</b>                  |                                       | <b>1,018.2151</b>                             | <b>0.9000</b>                             | <b>916.3936</b>                             |                  | <b>955.4525</b>                                      | <b>81.85%</b>                     |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 69. Certified Multifamily Program Participation and First-Year MCF Savings by Measure

| Measure ID | 2013<br>Reported<br>Gross<br>Participation | 2013 Adjusted<br>Gross<br>Participation | 2013<br>Reported<br>Gross MCF<br>Savings<br>(A) | 2013<br>Adjusted<br>Gross MCF<br>Savings<br>(B) | Certified<br>Gross<br>Adjustment<br>Factor<br>(C) | 2013<br>Certified<br>Gross MCF<br>Savings<br>(D) = (B x C) | Deemed Net-<br>to-Gross<br>Adjustment<br>Factor<br>(E) | 2013<br>Certified Net<br>MCF Savings<br>(F) = (D x E) |
|------------|--|---|---|---|---|--|--|---|
| RCG0001    | 26   | 26                                      | 3,480.6892                                      | 3,480.6892                                      | 1.0000  | 3,480.6892   | 0.9000   | 3,132.6203  |
| RCG0001    | 24   | 24                                      | 19,278.1599                                     | 19,278.1599                                     | 1.0000  | 19,278.1599  | 0.9000   | 17,350.3439   |
| RMG0004    | 3,285                                      | 3,285                                   | 2,714.0670                                      | 2,714.0670                                      | 1.0040  | 2,724.9233   | 0.9000   | 2,452.4309  |
| RMG0007    | 39,866                                     | 39,866                                  | 8,914.0376                                      | 8,914.0376                                      | 1.0000  | 8,914.0376   | 0.9000   | 8,022.6338  |
| RMG0009    | 3,684                                      | 3,684                                   | 210.7248  | 210.7248  | 1.0000  | 210.7248   | 0.9000   | 189.6523  |
| RMG0011    | 14,065                                     | 14,065                                  | 1,526.0525                                      | 1,526.0525                                      | 1.0000  | 1,526.0525   | 0.9000   | 1,373.4473  |
| RMG0012    | 495  | 495                                     | 183.1005  | 183.1005  | 1.0000  | 183.1005   | 0.9000   | 164.7905  |
| RMG0014    | 11,339                                     | 11,339                                  | 12,266.5302                                     | 12,266.5302                                     | 1.0040  | 12,315.5963  | 0.9000   | 11,084.0367   |
| RMG0016    | 15,668                                     | 15,668                                  | 6,091.7184                                      | 6,091.7184                                      | 1.0000  | 6,091.7184   | 0.9000   | 5,482.5466  |
| RMG0018    | 4  | 4                                       | 73.0944   | 73.0944   | 1.0000  | 73.0944  | 0.9000   | 65.7850   |
| RMG0020    | 168  | 168                                     | 473.1384  | 473.1384  | 1.0000  | 473.1384   | 0.9000   | 425.8246  |
| RMG0030    | 37   | 37                                      | 57.4351   | 57.4351   | 1.0000  | 57.4351  | 0.9000   | 51.6916   |
| RMG0031    | 31   | 31                                      | 7.5361  | 7.5361  | 1.0000  | 7.5361   | 0.9000   | 6.7825  |
| RMG0034    | 17   | 17                                      | 11.2285   | 11.2285   | 1.0000  | 11.2285  | 0.9000   | 10.1057   |
| RMG0035    | 50,107.4                                   | 50,107.4                                | 2,064.4249                                      | 2,064.4249                                      | 1.0000  | 2,064.4249   | 0.9000   | 1,857.9824  |
| RMG0050    | 10,659                                     | 10,659                                  | 37,297.9728                                     | 37,297.9728                                     | 1.0000  | 37,297.9728  | 0.9000   | 33,568.1755   |
| RMG0051    | 2,344                                      | 2,344                                   | 8,202.1248                                      | 8,202.1248                                      | 1.0000  | 8,202.1248   | 0.9000   | 7,381.9123  |
| RMG0108    | 577  | 577                                     | 747.6189  | 747.6189  | 1.0000  | 747.6189   | 0.9000   | 672.8570  |
| RMG0115    | 5,988                                      | 5,988                                   | 16,905.3216                                     | 16,905.3216                                     | 1.0000  | 16,905.3216  | 0.9000   | 15,214.7894   |
| RMG0116    | 195  | 195                                     | 911.6640  | 911.6640  | 1.0000  | 911.6640   | 0.9000   | 820.4976  |
| RMG0118    | 140  | 140                                     | 23.1980   | 34.0340   | 1.0000  | 34.0340  | 0.9000   | 30.6306   |
| RMG0119    | 803  | 803                                     | 868.6854  | 868.6854  | 1.0000  | 868.6854   | 0.9000   | 781.8169  |
| RMG0120    | 1,006                                      | 1,006                                   | 831.1572  | 831.1572  | 1.0000  | 831.1572   | 0.9000   | 748.0415  |



# CADMUS

| Measure ID   | 2013<br>Reported<br>Gross<br>Participation | 2013 Adjusted<br>Gross<br>Participation | 2013<br>Reported<br>Gross MCF<br>Savings<br>(A) | 2013<br>Adjusted<br>Gross MCF<br>Savings<br>(B) | Certified<br>Gross<br>Adjustment<br>Factor<br>(C) | 2013<br>Certified<br>Gross MCF<br>Savings<br>(D) = (B x C) | Deemed Net-<br>to-Gross<br>Adjustment<br>Factor<br>(E) | 2013<br>Certified Net<br>MCF Savings<br>(F) = (D x E) |
|--------------|--|---|---|---|---|--|--|---|
| RMG0121      | 36   | 36                                      | 448.4304  | 448.4304  | 1.0000  | 448.4304   | 0.9000   | 403.5874  |
| RMG0122      | 2,673                                      | 2,673                                   | 1,039.2624                                      | 1,039.2624                                      | 1.0000  | 1,039.2624   | 0.9000   | 935.3362  |
| RMG0123      | 161,549                                    | 161,549                                 | 39,434.1109                                     | 39,272.5619                                     | 1.0000  | 39,272.5619  | 0.9000   | 35,345.3057   |
| RMG0131      | 7,180                                      | 7,180                                   | 399.9260  | 399.9260  | 1.0000  | 399.9260   | 0.9000   | 359.9334  |
| RMG0132      | 1,189                                      | 1,189                                   | 4,028.6887                                      | 4,028.6887                                      | 1.0000  | 4,028.6887   | 0.9000   | 3,625.8198  |
| RMG0133      | 172  | 172                                     | 679.1592  | 679.1592  | 1.0000  | 679.1592   | 0.9000   | 611.2433  |
| RMG0136      | 6  | 6                                       | 124.7544  | 124.7544  | 1.0000  | 124.7544   | 0.9000   | 112.2790  |
| RMG0137      | 216  | 216                                     | 2,463.9768                                      | 2,463.9768                                      | 1.0000  | 2,463.9768   | 0.9000   | 2,217.5791  |
| RMG0143      | 9,995                                      | 9,995                                   | 4,148.9245                                      | 4,148.9245                                      | 1.0000  | 4,148.9245   | 0.9000   | 3,734.0321  |
| RMG0144      | 10,347                                     | 10,347                                  | 4,738.9260                                      | 4,738.9260                                      | 1.0000  | 4,738.9260   | 0.9000   | 4,265.0334  |
| RMG0145      | 9,018                                      | 9,018                                   | 2,176.0434                                      | 2,176.0434                                      | 1.0000  | 2,176.0434   | 0.9000   | 1,958.4391  |
| RMG0146      | 1,188                                      | 1,188                                   | 122.8392  | 122.8392  | 1.0000  | 122.8392   | 0.9000   | 110.5553  |
| RMG0149      | 913  | 913                                     | 3,194.7696                                      | 3,194.7696                                      | 1.0000  | 3,194.7696   | 0.9000   | 2,875.2926  |
| RMG0152      | 370.5                                      | 370.5                                   | 903.7977  | 903.7977  | 1.0000  | 903.7977   | 0.9000   | 813.4179  |
| RMG0154      | 10,704                                     | 10,704                                  | 11,310.9168                                     | 11,310.9168                                     | 1.0000  | 11,310.9168  | 0.9000   | 10,179.8251   |
| RMG0157      | 133  | 133                                     | 541.6691  | 541.6691  | 1.0000  | 541.6691   | 0.9000   | 487.5022  |
| RMG0163      | 59,565                                     | 59,565                                  | 6,397.2810                                      | 6,397.2810                                      | 1.0000  | 6,397.2810   | 0.9000   | 5,757.5529  |
| <b>Total</b> | <b>435,782.9</b>                           | <b>435,782.9</b>                        | <b>205,293.1563</b>                             | <b>205,142.4433</b>                             |   | <b>205,202.3657</b>  | <b>0.9000</b>  | <b>184,682.1291</b>                                   |

Table 70. Certified Multifamily Program Long-Life Equipment Savings Multiplier and Lifetime MCF Savings by Measure

| Measure ID | 2013 Certified Net<br>MCF Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net<br>MCF LLESMS Savings<br>(H) = (F x 1.1)* | 2013 Realization<br>Rate<br>(I) = (F/A) | Lifetime MCF<br>Savings<br>(J) = (F x G) |
|------------|--|---------------------|--|---|--|
| RCG0001    | 3,132.6203   | 5.1729              | 3,132.6203   | 90.00%                                  | 16,204.7776                              |
| RCG0001    | 17,350.3439  | 17.1398             | 19,085.3783  | 90.00%                                  | 297,382.1203                             |
| RMG0004    | 2,452.4309   | 12                  | 2,697.6740   | 90.36%                                  | 29,429.1713                              |
| RMG0007    | 8,022.6338   | 6                   | 8,022.6338   | 90.00%                                  | 48,135.8030                              |
| RMG0009    | 189.6523   | 15                  | 208.6176   | 90.00%                                  | 2,844.7848                               |
| RMG0011    | 1,373.4473   | 5                   | 1,373.4473   | 90.00%                                  | 6,867.2363                               |
| RMG0012    | 164.7905   | 15                  | 181.2695   | 90.00%                                  | 2,471.8568                               |
| RMG0014    | 11,084.0367  | 12                  | 12,192.4404  | 90.36%                                  | 133,008.4403                             |
| RMG0016    | 5,482.5466   | 20                  | 6,030.8012   | 90.00%                                  | 109,650.9312                             |
| RMG0018    | 65.7850  | 15                  | 72.3635  | 90.00%                                  | 986.7744                                 |
| RMG0020    | 425.8246   | 5                   | 425.8246   | 90.00%                                  | 2,129.1228                               |
| RMG0030    | 51.6916  | 20                  | 56.8607  | 90.00%                                  | 1,033.8318                               |
| RMG0031    | 6.7825   | 5                   | 6.7825   | 90.00%                                  | 33.9125                                  |
| RMG0034    | 10.1057  | 15                  | 11.1162  | 90.00%                                  | 151.5848                                 |
| RMG0035    | 1,857.9824   | 20                  | 2,043.7806   | 90.00%                                  | 37,159.6478                              |
| RMG0050    | 33,568.1755  | 12                  | 36,924.9931  | 90.00%                                  | 402,818.1062                             |
| RMG0051    | 7,381.9123   | 12                  | 8,120.1036   | 90.00%                                  | 88,582.9478                              |
| RMG0108    | 672.8570   | 9                   | 672.8570   | 90.00%                                  | 6,055.7131                               |
| RMG0115    | 15,214.7894  | 5                   | 15,214.7894  | 90.00%                                  | 76,073.9472                              |
| RMG0116    | 820.4976   | 5                   | 820.4976   | 90.00%                                  | 4,102.4880                               |
| RMG0118    | 30.6306  | 20                  | 33.6937  | 132.04%                                 | 612.6120                                 |
| RMG0119    | 781.8169   | 12                  | 859.9985   | 90.00%                                  | 9,381.8023                               |
| RMG0120    | 748.0415   | 12                  | 822.8456   | 90.00%                                  | 8,976.4978                               |
| RMG0121    | 403.5874   | 15                  | 443.9461   | 90.00%                                  | 6,053.8104                               |
| RMG0122    | 935.3362   | 6                   | 935.3362   | 90.00%                                  | 5,612.0170                               |
| RMG0123    | 35,345.3057  | 20                  | 38,879.8363  | 89.63%                                  | 706,906.1142                             |

# CADMUS

| Measure ID   | 2013 Certified Net<br>MCF Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net<br>MCF LLESMS Savings<br>(H) = (F x 1.1) * | 2013 Realization<br>Rate<br>(I) = (F/A) | Lifetime MCF<br>Savings<br>(J) = (F x G) |
|--------------|--|---------------------|---|---|--|
| RMG0131      | 359.9334   | 5                   | 359.9334  | 90.00%                                  | 1,799.6670                               |
| RMG0132      | 3,625.8198   | 5                   | 3,625.8198  | 90.00%                                  | 18,129.0992                              |
| RMG0133      | 611.2433   | 5                   | 611.2433  | 90.00%                                  | 3,056.2164                               |
| RMG0136      | 112.2790   | 15                  | 123.5069  | 90.00%                                  | 1,684.1844                               |
| RMG0137      | 2,217.5791   | 15                  | 2,439.3370  | 90.00%                                  | 33,263.6868                              |
| RMG0143      | 3,734.0321   | 15                  | 4,107.4353  | 90.00%                                  | 56,010.4808                              |
| RMG0144      | 4,265.0334   | 15                  | 4,691.5367  | 90.00%                                  | 63,975.5010                              |
| RMG0145      | 1,958.4391   | 15                  | 2,154.2830  | 90.00%                                  | 29,376.5859                              |
| RMG0146      | 110.5553   | 15                  | 121.6108  | 90.00%                                  | 1,658.3292                               |
| RMG0149      | 2,875.2926   | 12                  | 3,162.8219  | 90.00%                                  | 34,503.5117                              |
| RMG0152      | 813.4179   | 20                  | 894.7597  | 90.00%                                  | 16,268.3586                              |
| RMG0154      | 10,179.8251  | 12                  | 11,197.8076   | 90.00%                                  | 122,157.9014                             |
| RMG0157      | 487.5022   | 3                   | 487.5022  | 90.00%                                  | 1,462.5066                               |
| RMG0163      | 5,757.5529   | 5                   | 5,757.5529  | 90.00%                                  | 28,787.7645                              |
| <b>Total</b> | <b>184,682.1291</b>                                |                     | <b>199,005.6580</b>   | <b>89.96%</b>                           | <b>2,414,799.8449</b>                    |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

## Appendix G: THINK! Energy Program

Table 71 presents reported gross and certified net energy savings for the THINK! Energy Program by fuel type. The realization rates reflect the adjustments Cadmus made based on our certification tasks and applying installation rate and NTG adjustments. The following sections discuss changes we made to reported gross energy savings.

**Table 71. THINK! Energy Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 167,344             | 3,102,157.6000    | 307.1904         | 127,512.4032      |
| Certified Net    | 167,344             | 2,640,580.0538    | 260.1595         | 64,948.3223       |
| Difference       | 0                   | -461,577.5462     | -47.0309         | -62,564.0809      |
| Realization Rate | 100.00%             | 85.12%            | 84.69%           | 50.93%            |

Table 72 presents reported and certified net energy savings with the long-life equipment savings multiplier for the THINK! Energy Program by fuel type.

**Table 72. THINK! Energy Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 167,344             | 2,685,276.2581    | 260.1600         | 71,443.1539       |
| Certified Net      | 167,344             | 2,685,276.2570    | 260.1595         | 71,443.1545       |
| Difference         | 0                   | -0.0011           | -0.0005          | 0.0006            |
| Certified/Reported | 100.00%             | 100.00%           | 100.00%          | 100.00%           |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

The THINK! Energy Program does not have customer-level program documents available for review; therefore, Cadmus did not conduct a documentation review of this program.

### Task 4: Measure-Level Savings Analysis

Cadmus found no discrepancies between per-unit measure savings reported by Consumers Energy and values either maintained in the MEMD or calculated by Navigant. However, Etracker provided an

incorrect installation rate for all gas measures (REG0003, REG0004, and REG0005), producing a realization rate of 50.9% for MCF in the THINK! Energy Program. Table 73 presents the reported and certified per-unit savings for all measures delivered through the 2013 THINK! Energy Program.

**Table 73. THINK! Energy Program Reported and Certified Per-Unit Measure Savings**

| Measure Code | Reported |        |        | Certified |        |        | Certified LLES |         |        |        |
|--------------|----------|--------|--------|-----------|--------|--------|----------------|---------|--------|--------|
|              | kWh      | kW     | MCF    | kWh       | kW     | MCF    | Measure Life   | kWh     | kW     | MCF    |
| REE0001      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9              | 37.1000 | 0.0044 | 0.0000 |
| REE0005      | 22.0000  | 0.0000 | 0.0000 | 22.0000   | 0.0000 | 0.0000 | 12             | 24.2000 | 0.0000 | 0.0000 |
| REG0003      | 0.0000   | 0.0000 | 3.4992 | 0.0000    | 0.0000 | 3.4992 | 12             | 0.0000  | 0.0000 | 3.8491 |
| REG0004      | 0.0000   | 0.0000 | 0.8262 | 0.0000    | 0.0000 | 0.8262 | 12             | 0.0000  | 0.0000 | 0.9088 |
| REG0005      | 0.0000   | 0.0000 | 0.8262 | 0.0000    | 0.0000 | 0.8262 | 12             | 0.0000  | 0.0000 | 0.9088 |

### Major Findings by Fuel Type

The tables below present certified program participation and energy savings by measure. Table 74 and Table 75 document kWh savings, Table 76 documents kW savings, and Table 77 and Table 78 document MCF savings.

Table 74. Certified THINK! Energy Program Participation and First-Year kWh Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| REE0001      | 69,816                            | 69,816                            | 2,590,173.6000                      | 2,590,173.6000                      | 0.9410                                | 2,437,353.3576                                 | 0.9000                                    | 2,193,618.0218                               |
| REE0005      | 23,272                            | 23,272                            | 511,984.0000                        | 511,984.0000                        | 0.9700                                | 496,624.4800                                   | 0.9000                                    | 446,962.0320                                 |
| <b>Total</b> | <b>93,088</b>                     | <b>93,088</b>                     | <b>3,102,157.6000</b>               | <b>3,102,157.6000</b>               |                                       | <b>2,933,977.8376</b>                          | <b>0.9000</b>                             | <b>2,640,580.0538</b>                        |

Table 75. Certified THINK! Energy Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID   | 2013 Certified Net kWh Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kWh LLESMS Savings (H) = (F x 1.1) * | 2013 Realization Rate (I) = (F/A) | Lifetime kWh Savings (J) = (F x G) |
|--------------|--|------------------|---|-----------------------------------|------------------------------------|
| REE0001      | 2,193,618.0218                               | 9                | 2,193,618.0218  | 84.69%                            | 19,742,562.1966                    |
| REE0005      | 446,962.0320                                 | 12               | 491,658.2352  | 87.30%                            | 5,363,544.3840                     |
| <b>Total</b> | <b>2,640,580.0538</b>                        |                  | <b>2,685,276.2570</b>                                   | <b>85.12%</b>                     | <b>25,106,106.5806</b>             |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 76. Certified THINK! Energy Program Participation and kW Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kW LLESMS Savings (H) = (F x 1.1) * | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|--|-----------------------------------|
| REE0001      | 69,816                            | 69,816                            | 307.1904                           | 307.1904                           | 0.9410                                | 289.0662                                      | 0.9000                                    | 260.1595                                    | 9                | 260.1595   | 84.69%                            |
| <b>Total</b> | <b>69,816</b>                     | <b>69,816</b>                     | <b>307.1904</b>                    | <b>307.1904</b>                    |                                       | <b>289.0662</b>                               | <b>0.9000</b>                             | <b>260.1595</b>                             |                  | <b>260.1595</b>  | <b>84.69%</b>                     |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 77. Certified THINK! Energy Program Participation and First-Year MCF Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| REG0003      | 24,752                            | 24,752                            | 86,612.1984                         | 86,612.1984                         | 0.5900                                | 51,101.1971                                    | 0.9000                                    | 45,991.0774                                  |
| REG0004      | 24,752                            | 24,752                            | 20,450.1024                         | 20,450.1024                         | 0.5200                                | 10,634.0532                                    | 0.9000                                    | 9,570.6479                                   |
| REG0005      | 24,752                            | 24,752                            | 20,450.1024                         | 20,450.1024                         | 0.5100                                | 10,429.5522                                    | 0.9000                                    | 9,386.5970                                   |
| <b>Total</b> | <b>74,256</b>                     | <b>74,256</b>                     | <b>127,512.4032</b>                 | <b>127,512.4032</b>                 |                                       | <b>72,164.8025</b>                             | <b>0.9000</b>                             | <b>64,948.3223</b>                           |

Table 78. Certified THINK! Energy Program Long-Life Equipment Savings Multiplier and Lifetime MCF Savings by Measure

| Measure ID   | 2013 Certified Net MCF Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net MCF LLESMS Savings<br>(H) = (F x 1.1)* | 2013 Realization Rate<br>(I) = (F/A) | Lifetime MCF Savings<br>(J) = (F x G) |
|--------------|---|---------------------|---|--------------------------------------|---------------------------------------|
| REG0003      | 45,991.0774                                     | 12                  | 50,590.1851   | 53.10%                               | 551,892.9282                          |
| REG0004      | 9,570.6479                                      | 12                  | 10,527.7127   | 46.80%                               | 114,847.7751                          |
| REG0005      | 9,386.5970                                      | 12                  | 10,325.2567   | 45.90%                               | 112,639.1640                          |
| <b>Total</b> | <b>64,948.3223</b>                              |                     | <b>71,443.1545</b>  | <b>50.94%</b>                        | <b>779,379.8673</b>                   |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.



## Appendix H: Home Performance with ENERGY STAR Program

Table 79 presents reported gross and certified net energy savings for the Home Performance with ENERGY STAR Program by fuel type. The realization rates reflect the adjustments Cadmus made based on our certification tasks and applying installation rate and NTG adjustments. The following sections discuss changes we made to reported gross energy savings.

**Table 79. Home Performance with ENERGY STAR Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 35,101              | 816,124.4444      | 250.8681         | 53,690.4591       |
| Certified Net    | 35,101              | 706,388.6650      | 223.9941         | 46,787.9061       |
| Difference       | 0                   | -109,735.7794     | -26.8740         | -6,902.5530       |
| Realization Rate | 100.00%             | 86.55%            | 89.29%           | 87.14%            |

Table 80 presents reported and certified net energy savings with the long-life equipment savings multiplier for the Home Performance with ENERGY STAR Program by fuel type.

**Table 80. Home Performance with ENERGY STAR Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 35,101              | 758,870.4490      | 241.6818         | 50,999.3304       |
| Certified Net      | 35,101              | 758,870.4500      | 242.9232         | 50,999.3418       |
| Difference         | 0                   | 0.0010            | 1.2414           | 0.0114            |
| Certified/Reported | 100.00%             | 100.00%           | 100.51%          | 100.00%           |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

Cadmus reviewed program documents from a sample of 68 randomly selected account numbers. Table 81 documents reported and certified measure counts as well as reported and certified energy savings by fuel type.

**Table 81. Home Performance with ENERGY STAR Program Sample Participation and Savings by End Use**

| Measure Code | Reported |            |         |          | Certified |            |         |          |
|--------------|----------|------------|---------|----------|-----------|------------|---------|----------|
|              | n        | kWh        | kW      | MCF      | n         | kWh        | kW      | MCF      |
| RZC0007      | 1        | 27.4260    | -0.0330 | 6.3647   | 1         | 27.4260    | -0.0330 | 6.3647   |
| RZC0009      | 1        | 15.5860    | 0.0211  | 3.3791   | 1         | 15.5860    | 0.0211  | 3.3791   |
| RZC0010      | 4        | 134.7760   | 0.0732  | 5.8100   | 4         | 134.7760   | 0.0732  | 5.8100   |
| RZC0018      | 7        | 883.4602   | 0.3941  | 61.5874  | 7         | 883.4602   | 0.3941  | 61.5874  |
| RZC0019      | 1        | 185.7724   | 0.0867  | 13.1479  | 1         | 185.7724   | 0.0867  | 13.1479  |
| RZC0020      | 1        | 307.5421   | 0.1710  | 21.3241  | 1         | 307.5421   | 0.1710  | 21.3241  |
| RZC0022      | 9        | 1,070.5878 | 0.5040  | 68.4018  | 9         | 1,070.5878 | 0.5040  | 68.4018  |
| RZC0023      | 3        | 268.7397   | 0.0810  | 17.5962  | 3         | 268.7397   | 0.0810  | 17.5962  |
| RZC0055      | 11       | 845.1993   | 0.2442  | 59.1701  | 11        | 845.1993   | 0.2422  | 59.1701  |
| RZC0060      | 16       | 23.0896    | 0.0176  | 0.8416   | 16        | 23.0896    | 0.0176  | 0.8416   |
| RZE0007      | 1        | 45.2876    | -0.0255 | -        | 1         | 45.2876    | -0.0255 | -        |
| RZE0018      | 2        | 268.3988   | 0.0826  | -        | 2         | 268.3988   | 0.0826  | -        |
| RZE0021      | 1        | 100.4081   | 0.1459  | -        | 1         | 100.4081   | 0.1459  | -        |
| RZE0022      | 1        | 121.7476   | 0.0429  | -        | 1         | 121.7476   | 0.0429  | -        |
| RZE0050      | 54       | 2,003.4000 | 0.2376  | -        | 54        | 2,003.4000 | 0.2376  | -        |
| RZE0055      | 4        | 336.3156   | 0.0996  | -        | 4         | 336.3156   | 0.0996  | -        |
| RZE0058      | 1        | 612.8715   | 0.4475  | -        | 1         | 612.8715   | 0.4475  | -        |
| RZE0060      | 2        | 806.3930   | 0.9070  | -        | 2         | 806.3930   | 0.9070  | -        |
| RZE0063      | 194      | 274.5100   | 0.1552  | -        | 194       | 274.5100   | 0.1552  | -        |
| RZE0064      | 4        | 2,920.0000 | 0.2628  | -        | 4         | 2,920.0000 | 0.2628  | -        |
| RZE0109      | 37       | 1,372.7000 | 0.1628  | -        | 37        | 1,372.7000 | 0.1628  | -        |
| RZG0008      | 3        | -          | -       | 18.8925  | 3         | -          | -       | 18.8925  |
| RZG0009      | 1        | -          | -       | 2.8436   | 1         | -          | -       | 2.8436   |
| RZG0011      | 1        | -          | -       | 3.7315   | 1         | -          | -       | 3.7315   |
| RZG0012      | 1        | -          | -       | 5.0327   | 1         | -          | -       | 5.0327   |
| RZG0014      | 2        | -          | -       | 50.9604  | 2         | -          | -       | 50.9604  |
| RZG0015      | 2        | -          | -       | 53.6798  | 2         | -          | -       | 53.6798  |
| RZG0018      | 8        | -          | -       | 55.5568  | 8         | -          | -       | 55.5568  |
| RZG0019      | 11       | -          | -       | 108.5799 | 11        | -          | -       | 108.5799 |
| RZG0021      | 10       | -          | -       | 74.8400  | 10        | -          | -       | 74.8400  |
| RZG0022      | 14       | -          | -       | 82.3550  | 14        | -          | -       | 82.3550  |
| RZG0023      | 5        | -          | -       | 24.6800  | 5         | -          | -       | 24.6800  |
| RZG0051      | 42       | -          | -       | 34.7004  | 42        | -          | -       | 34.7004  |
| RZG0052      | 14       | -          | -       | 48.9888  | 14        | -          | -       | 48.9888  |
| RZG0055      | 15       | -          | -       | 64.2690  | 15        | -          | -       | 64.2690  |
| RZG0056      | 2        | -          | -       | 6.9984   | 2         | -          | -       | 6.9984   |
| RZG0060      | 14       | -          | -       | 0.6958   | 14        | -          | -       | 0.6958   |
| RZG0062      | 42       | -          | -       | 31.8444  | 42        | -          | -       | 31.8444  |

| Measure Code | Reported   |                    |               |                   | Certified  |                    |               |                   |
|--------------|------------|--------------------|---------------|-------------------|------------|--------------------|---------------|-------------------|
|              | n          | kWh                | kW            | MCF               | n          | kWh                | kW            | MCF               |
| RZG0109      | 33         | -                  | -             | 27.2646           | 33         | -                  | -             | 27.2646           |
| RZG0110      | 12         | -                  | -             | 41.9904           | 12         | -                  | -             | 41.9904           |
| RZG0111      | 12         | -                  | -             | 9.0984            | 12         | -                  | -             | 9.0984            |
| <b>Total</b> | <b>599</b> | <b>12,624.2113</b> | <b>4.0783</b> | <b>1,004.6253</b> | <b>599</b> | <b>12,624.2113</b> | <b>4.0783</b> | <b>1,004.6253</b> |

The reported measure quantities for all database records matched the associated documentation. Table 82 provides the sample realization rates by fuel type and the t-test statistics Cadmus used to analyze errors in the sample.

**Table 82. Home Performance with ENERGY STAR Program Sample Realization Rates and t-Statistic**

|                                     | kWh        | kW         | MCF        |
|-------------------------------------|------------|------------|------------|
| Sample Realization Rate             | 100.00%    | 100.00%    | 100.00%    |
| Standard Error                      | N/A        | N/A        | N/A        |
| t-Statistic                         | N/A        | N/A        | N/A        |
| p-Value                             | N/A        | N/A        | N/A        |
| <b>Apply to Program Population?</b> | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |

### Task 3: Measure-Level Savings Analysis

Cadmus found discrepancies between the reported per-unit measure savings and values either maintained in the MEMD or calculated by Navigant for the program measures shown in Table 83.

**Table 83. Per-Unit Measure Discrepancies for the Home Performance with ENERGY STAR Program**

| Measure Code and End Use                  | Reported Savings | Certified Savings |
|---|------------------|-------------------|
| RZE0052 – Low-Flow Showerheads – Electric | 0.0584 kW        | 0.0779 kW         |

There were also gas-only customers for which negative kWh saving were tracked for measure RZG0053 – Natural Gas Boiler (92% AFUE); Cadmus removed the negative kWh savings for these customers.

Table 84 presents the reported and certified per-unit savings for all measures delivered through the 2013 Home Performance with ENERGY STAR Program.

**Table 84. Home Performance with ENERGY STAR Program Reported and Certified Per-Unit Measure Savings**

| Measure Code | Reported |         |        | Certified |         |        |              | Certified LLES |         |        |
|--------------|----------|---------|--------|-----------|---------|--------|--------------|----------------|---------|--------|
|              | kWh      | kW      | MCF    | kWh       | kW      | MCF    | Measure Life | kWh            | kW      | MCF    |
| RZC0007      | 27.4260  | -0.0330 | 6.3647 | 27.4260   | -0.0330 | 6.3647 | 20           | 30.1686        | -0.0363 | 7.0012 |
| RZC0008      | -8.2137  | -0.0330 | 4.3812 | -8.2137   | -0.0330 | 4.3812 | 20           | -9.0351        | -0.0363 | 4.8193 |
| RZC0009      | 15.5860  | 0.0211  | 3.3791 | 15.5860   | 0.0211  | 3.3791 | 20           | 17.1446        | 0.0232  | 3.7170 |
| RZC0010      | 33.6940  | 0.0183  | 1.4525 | 33.6940   | 0.0183  | 1.4525 | 18           | 37.0634        | 0.0201  | 1.5978 |

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| Measure Code | Reported   |         |         | Certified  |         |         |              | Certified LLESMS |         |         |
|--------------|------------|---------|---------|------------|---------|---------|--------------|------------------|---------|---------|
|              | kWh        | kW      | MCF     | kWh        | kW      | MCF     | Measure Life | kWh              | kW      | MCF     |
| RZC0011      | 101.9466   | 0.0726  | 4.0245  | 101.9466   | 0.0726  | 4.0245  | 18           | 112.1413         | 0.0799  | 4.4270  |
| RZC0018      | 126.2086   | 0.0563  | 8.7982  | 126.2086   | 0.0563  | 8.7982  | 13           | 138.8295         | 0.0619  | 9.6780  |
| RZC0019      | 185.7724   | 0.0867  | 13.1479 | 185.7724   | 0.0867  | 13.1479 | 13           | 204.3496         | 0.0954  | 14.4627 |
| RZC0020      | 307.5421   | 0.1710  | 21.3241 | 307.5421   | 0.1710  | 21.3241 | 13           | 338.2963         | 0.1881  | 23.4565 |
| RZC0022      | 118.9542   | 0.0560  | 7.6002  | 118.9542   | 0.0560  | 7.6002  | 20           | 130.8496         | 0.0616  | 8.3602  |
| RZC0023      | 89.5799    | 0.0270  | 5.8654  | 89.5799    | 0.0270  | 5.8654  | 20           | 98.5379          | 0.0297  | 6.4519  |
| RZC0024      | -28.0378   | -0.0357 | 10.6170 | -28.0378   | -0.0357 | 10.6170 | 20           | -30.8416         | -0.0393 | 11.6787 |
| RZC0055      | 76.8363    | 0.0222  | 5.3791  | 76.8363    | 0.0222  | 5.3791  | 20           | 84.5199          | 0.0244  | 5.9170  |
| RZC0060      | 1.4431     | 0.0011  | 0.0526  | 1.4431     | 0.0011  | 0.0526  | 20           | 1.5874           | 0.0012  | 0.0579  |
| RZC0061      | -351.5019  | 0.0000  | 41.5020 | -351.5019  | 0.0000  | 41.5020 | 20           | -386.6521        | 0.0000  | 45.6522 |
| RZC0062      | -362.6426  | 0.0000  | 50.9810 | -362.6426  | 0.0000  | 50.9810 | 20           | -398.9069        | 0.0000  | 56.0791 |
| RZC0063      | -423.7494  | 0.0000  | 63.3656 | -423.7494  | 0.0000  | 63.3656 | 20           | -466.1243        | 0.0000  | 69.7022 |
| RZE0007      | 45.2876    | -0.0255 | 0.0000  | 45.2876    | -0.0255 | 0.0000  | 20           | 49.8164          | -0.0281 | 0.0000  |
| RZE0008      | 2.7215     | -0.0230 | 0.0000  | 2.7215     | -0.0230 | 0.0000  | 20           | 2.9937           | -0.0253 | 0.0000  |
| RZE0009      | 30.5309    | 0.0180  | 0.0000  | 30.5309    | 0.0180  | 0.0000  | 20           | 33.5840          | 0.0198  | 0.0000  |
| RZE0010      | 36.4504    | 0.0204  | 0.0000  | 36.4504    | 0.0204  | 0.0000  | 18           | 40.0954          | 0.0224  | 0.0000  |
| RZE0011      | 115.4988   | 0.0655  | 0.0000  | 115.4988   | 0.0655  | 0.0000  | 18           | 127.0487         | 0.0721  | 0.0000  |
| RZE0012      | 21.6534    | -0.0254 | 0.0000  | 21.6534    | -0.0254 | 0.0000  | 20           | 23.8187          | -0.0279 | 0.0000  |
| RZE0018      | 134.1994   | 0.0413  | 0.0000  | 134.1994   | 0.0413  | 0.0000  | 13           | 147.6193         | 0.0454  | 0.0000  |
| RZE0019      | 205.7145   | 0.0648  | 0.0000  | 205.7145   | 0.0648  | 0.0000  | 13           | 226.2860         | 0.0713  | 0.0000  |
| RZE0020      | 354.2225   | 0.1238  | 0.0000  | 354.2225   | 0.1238  | 0.0000  | 13           | 389.6448         | 0.1362  | 0.0000  |
| RZE0021      | 100.4081   | 0.1459  | 0.0000  | 100.4081   | 0.1459  | 0.0000  | 5            | 100.4081         | 0.1459  | 0.0000  |
| RZE0022      | 121.7476   | 0.0429  | 0.0000  | 121.7476   | 0.0429  | 0.0000  | 20           | 133.9224         | 0.0472  | 0.0000  |
| RZE0023      | 115.1516   | 0.0334  | 0.0000  | 115.1516   | 0.0334  | 0.0000  | 20           | 126.6668         | 0.0367  | 0.0000  |
| RZE0050      | 37.1000    | 0.0044  | 0.0000  | 37.1000    | 0.0044  | 0.0000  | 9            | 37.1000          | 0.0044  | 0.0000  |
| RZE0051      | 166.0000   | 0.0189  | 0.0000  | 166.0000   | 0.0189  | 0.0000  | 12           | 182.6000         | 0.0208  | 0.0000  |
| RZE0052      | 690.0000   | 0.0584  | 0.0000  | 690.0000   | 0.0779  | 0.0000  | 12           | 759.0000         | 0.0857  | 0.0000  |
| RZE0055      | 84.0789    | 0.0249  | 0.0000  | 84.0789    | 0.0249  | 0.0000  | 20           | 92.4868          | 0.0274  | 0.0000  |
| RZE0056      | 968.5875   | 0.7463  | 0.0000  | 968.5875   | 0.7463  | 0.0000  | 15           | 1,065.4463       | 0.8209  | 0.0000  |
| RZE0058      | 612.8715   | 0.4475  | 0.0000  | 612.8715   | 0.4475  | 0.0000  | 15           | 674.1587         | 0.4923  | 0.0000  |
| RZE0059      | 1,457.2622 | 0.7043  | 0.0000  | 1,457.2622 | 0.7043  | 0.0000  | 15           | 1,602.9884       | 0.7747  | 0.0000  |
| RZE0060      | 403.1965   | 0.4535  | 0.0000  | 403.1965   | 0.4535  | 0.0000  | 15           | 443.5162         | 0.4989  | 0.0000  |
| RZE0062      | 153.0000   | 0.0174  | 0.0000  | 153.0000   | 0.0174  | 0.0000  | 6            | 153.0000         | 0.0174  | 0.0000  |
| RZE0063      | 1.4150     | 0.0008  | 0.0000  | 1.4150     | 0.0008  | 0.0000  | 20           | 1.5565           | 0.0009  | 0.0000  |
| RZE0064      | 730.0000   | 0.0657  | 0.0000  | 730.0000   | 0.0657  | 0.0000  | 15           | 803.0000         | 0.0723  | 0.0000  |
| RZE0109      | 37.1000    | 0.0044  | 0.0000  | 37.1000    | 0.0044  | 0.0000  | 9            | 37.1000          | 0.0044  | 0.0000  |
| RZE0110      | 166.0000   | 0.0189  | 0.0000  | 166.0000   | 0.0189  | 0.0000  | 12           | 182.6000         | 0.0208  | 0.0000  |
| RZE0111      | 690.0000   | 0.0584  | 0.0000  | 690.0000   | 0.0779  | 0.0000  | 12           | 759.0000         | 0.0857  | 0.0000  |
| RZE0112      | 153.0000   | 0.0174  | 0.0000  | 153.0000   | 0.0174  | 0.0000  | 6            | 153.0000         | 0.0174  | 0.0000  |

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| Measure Code | Reported  |        |         | Certified |        |         |              | Certified LLES |        |         |
|--------------|-----------|--------|---------|-----------|--------|---------|--------------|----------------|--------|---------|
|              | kWh       | kW     | MCF     | kWh       | kW     | MCF     | Measure Life | kWh            | kW     | MCF     |
| RZG0007      | 0.0000    | 0.0000 | 5.7053  | 0.0000    | 0.0000 | 5.7053  | 20           | 0.0000         | 0.0000 | 6.2758  |
| RZG0008      | 0.0000    | 0.0000 | 6.2975  | 0.0000    | 0.0000 | 6.2975  | 20           | 0.0000         | 0.0000 | 6.9273  |
| RZG0009      | 0.0000    | 0.0000 | 2.8436  | 0.0000    | 0.0000 | 2.8436  | 20           | 0.0000         | 0.0000 | 3.1280  |
| RZG0010      | 0.0000    | 0.0000 | 1.5341  | 0.0000    | 0.0000 | 1.5341  | 18           | 0.0000         | 0.0000 | 1.6875  |
| RZG0011      | 0.0000    | 0.0000 | 3.7315  | 0.0000    | 0.0000 | 3.7315  | 18           | 0.0000         | 0.0000 | 4.1047  |
| RZG0012      | 0.0000    | 0.0000 | 5.0327  | 0.0000    | 0.0000 | 5.0327  | 20           | 0.0000         | 0.0000 | 5.5360  |
| RZG0013      | 0.0000    | 0.0000 | 30.8233 | 0.0000    | 0.0000 | 30.8233 | 15           | 0.0000         | 0.0000 | 33.9056 |
| RZG0014      | 0.0000    | 0.0000 | 25.4802 | 0.0000    | 0.0000 | 25.4802 | 15           | 0.0000         | 0.0000 | 28.0282 |
| RZG0015      | 0.0000    | 0.0000 | 26.8399 | 0.0000    | 0.0000 | 26.8399 | 15           | 0.0000         | 0.0000 | 29.5239 |
| RZG0016      | 0.0000    | 0.0000 | 31.1926 | 0.0000    | 0.0000 | 31.1926 | 15           | 0.0000         | 0.0000 | 34.3119 |
| RZG0017      | 0.0000    | 0.0000 | 27.8667 | 0.0000    | 0.0000 | 27.8667 | 15           | 0.0000         | 0.0000 | 30.6534 |
| RZG0018      | 0.0000    | 0.0000 | 6.9446  | 0.0000    | 0.0000 | 6.9446  | 13           | 0.0000         | 0.0000 | 7.6391  |
| RZG0019      | 0.0000    | 0.0000 | 9.8709  | 0.0000    | 0.0000 | 9.8709  | 13           | 0.0000         | 0.0000 | 10.8580 |
| RZG0020      | 0.0000    | 0.0000 | 17.4857 | 0.0000    | 0.0000 | 17.4857 | 13           | 0.0000         | 0.0000 | 19.2343 |
| RZG0021      | 0.0000    | 0.0000 | 7.4840  | 0.0000    | 0.0000 | 7.4840  | 5            | 0.0000         | 0.0000 | 7.4840  |
| RZG0022      | 0.0000    | 0.0000 | 5.8825  | 0.0000    | 0.0000 | 5.8825  | 20           | 0.0000         | 0.0000 | 6.4708  |
| RZG0023      | 0.0000    | 0.0000 | 4.9360  | 0.0000    | 0.0000 | 4.9360  | 20           | 0.0000         | 0.0000 | 5.4296  |
| RZG0051      | 0.0000    | 0.0000 | 0.8262  | 0.0000    | 0.0000 | 0.8262  | 12           | 0.0000         | 0.0000 | 0.9088  |
| RZG0052      | 0.0000    | 0.0000 | 3.4992  | 0.0000    | 0.0000 | 3.4992  | 12           | 0.0000         | 0.0000 | 3.8491  |
| RZG0053      | -360.2840 | 0.0000 | 51.1722 | 0.0000    | 0.0000 | 51.1722 | 20           | 0.0000         | 0.0000 | 56.2894 |
| RZG0054      | 0.0000    | 0.0000 | 56.8611 | 0.0000    | 0.0000 | 56.8611 | 20           | 0.0000         | 0.0000 | 62.5472 |
| RZG0055      | 0.0000    | 0.0000 | 4.2846  | 0.0000    | 0.0000 | 4.2846  | 20           | 0.0000         | 0.0000 | 4.7131  |
| RZG0056      | 0.0000    | 0.0000 | 3.4992  | 0.0000    | 0.0000 | 3.4992  | 15           | 0.0000         | 0.0000 | 3.8491  |
| RZG0057      | 0.0000    | 0.0000 | 6.5124  | 0.0000    | 0.0000 | 6.5124  | 15           | 0.0000         | 0.0000 | 7.1636  |
| RZG0060      | 0.0000    | 0.0000 | 0.0497  | 0.0000    | 0.0000 | 0.0497  | 20           | 0.0000         | 0.0000 | 0.0547  |
| RZG0061      | 0.0000    | 0.0000 | 43.8940 | 0.0000    | 0.0000 | 43.8940 | 20           | 0.0000         | 0.0000 | 48.2834 |
| RZG0062      | 0.0000    | 0.0000 | 0.7582  | 0.0000    | 0.0000 | 0.7582  | 6            | 0.0000         | 0.0000 | 0.7582  |
| RZG0109      | 0.0000    | 0.0000 | 0.8262  | 0.0000    | 0.0000 | 0.8262  | 12           | 0.0000         | 0.0000 | 0.9088  |
| RZG0110      | 0.0000    | 0.0000 | 3.4992  | 0.0000    | 0.0000 | 3.4992  | 12           | 0.0000         | 0.0000 | 3.8491  |
| RZG0111      | 0.0000    | 0.0000 | 0.7582  | 0.0000    | 0.0000 | 0.7582  | 6            | 0.0000         | 0.0000 | 0.7582  |

**Major Findings by Fuel Type**

The tables below present certified program participation and energy savings by measure. Table 85 and Table 86 document kWh savings, Table 87 documents kW savings, and Table 88 and Table 89 document MCF savings.

**Table 85. Certified Home Performance with ENERGY STAR Program Participation and First-Year kWh Savings by Measure**

| Measure ID | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RZC0007    | 38                                | 38                                | 1,042.1880                          | 1,042.1880                          | 1.0000                                | 1,042.1880                                     | 0.9000                                    | 937.9692                                     |
| RZC0008    | 65                                | 65                                | -533.8905                           | -533.8905                           | 1.0000                                | -533.8905                                      | 0.9000                                    | -480.5015                                    |
| RZC0009    | 21                                | 21                                | 327.3060                            | 327.3060                            | 1.0000                                | 327.3060                                       | 0.9000                                    | 294.5754                                     |
| RZC0010    | 89                                | 89                                | 2,998.7660                          | 2,998.7660                          | 1.0000                                | 2,998.7660                                     | 0.9000                                    | 2,698.8894                                   |
| RZC0011    | 40                                | 40                                | 4,077.8640                          | 4,077.8640                          | 1.0000                                | 4,077.8640                                     | 0.9000                                    | 3,670.0776                                   |
| RZC0018    | 219                               | 219                               | 27,639.6834                         | 27,639.6834                         | 1.0000                                | 27,639.6834                                    | 0.9000                                    | 24,875.7151                                  |
| RZC0019    | 149                               | 149                               | 27,680.0876                         | 27,680.0876                         | 1.0000                                | 27,680.0876                                    | 0.9000                                    | 24,912.0788                                  |
| RZC0020    | 77                                | 77                                | 23,680.7417                         | 23,680.7417                         | 1.0000                                | 23,680.7417                                    | 0.9000                                    | 21,312.6675                                  |
| RZC0022    | 427                               | 427                               | 50,793.4434                         | 50,793.4434                         | 1.0000                                | 50,793.4434                                    | 0.9000                                    | 45,714.0991                                  |
| RZC0023    | 80                                | 80                                | 7,166.3920                          | 7,166.3920                          | 1.0000                                | 7,166.3920                                     | 0.9000                                    | 6,449.7528                                   |
| RZC0024    | 23                                | 23                                | -644.8694                           | -644.8694                           | 1.0000                                | -644.8694                                      | 0.9000                                    | -580.3825                                    |
| RZC0055    | 522                               | 522                               | 40,108.5486                         | 40,108.5486                         | 1.0000                                | 40,108.5486                                    | 0.9000                                    | 36,097.6937                                  |
| RZC0060    | 6,695                             | 6,695                             | 9,661.5545                          | 9,661.5545                          | 1.0000                                | 9,661.5545                                     | 0.9000                                    | 8,695.3991                                   |
| RZC0061    | 6                                 | 6                                 | -2,109.0114                         | -2,109.0114                         | 1.0000                                | -2,109.0114                                    | 0.9000                                    | -1,898.1103                                  |
| RZC0062    | 7                                 | 7                                 | -2,538.4982                         | -2,538.4982                         | 1.0000                                | -2,538.4982                                    | 0.9000                                    | -2,284.6484                                  |
| RZC0063    | 13                                | 13                                | -5,508.7422                         | -5,508.7422                         | 1.0000                                | -5,508.7422                                    | 0.9000                                    | -4,957.8680                                  |
| RZE0007    | 6                                 | 6                                 | 271.7256                            | 271.7256                            | 1.0000                                | 271.7256                                       | 0.9000                                    | 244.5530                                     |
| RZE0008    | 11                                | 11                                | 29.9365                             | 29.9365                             | 1.0000                                | 29.9365  | 0.9000                                    | 26.9429                                      |
| RZE0009    | 4                                 | 4                                 | 122.1236                            | 122.1236                            | 1.0000                                | 122.1236                                       | 0.9000                                    | 109.9112                                     |
| RZE0010    | 31                                | 31                                | 1,129.9624                          | 1,129.9624                          | 1.0000                                | 1,129.9624                                     | 0.9000                                    | 1,016.9662                                   |

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| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RZE0011      | 18                                | 18                                | 2,078.9784                          | 2,078.9784                          | 1.0000                                | 2,078.9784                                     | 0.9000                                    | 1,871.0806                                   |
| RZE0012      | 1                                 | 1                                 | 21.6534                             | 21.6534                             | 1.0000                                | 21.6534  | 0.9000                                    | 19.4881                                      |
| RZE0018      | 108                               | 108                               | 14,493.5352                         | 14,493.5352                         | 1.0000                                | 14,493.5352                                    | 0.9000                                    | 13,044.1817                                  |
| RZE0019      | 93                                | 93                                | 19,131.4485                         | 19,131.4485                         | 1.0000                                | 19,131.4485                                    | 0.9000                                    | 17,218.3037                                  |
| RZE0020      | 21                                | 21                                | 7,438.6725                          | 7,438.6725                          | 1.0000                                | 7,438.6725                                     | 0.9000                                    | 6,694.8053                                   |
| RZE0021      | 110                               | 110                               | 11,044.8910                         | 11,044.8910                         | 1.0000                                | 11,044.8910                                    | 0.9000                                    | 9,940.4019                                   |
| RZE0022      | 182                               | 182                               | 22,158.0632                         | 22,158.0632                         | 1.0000                                | 22,158.0632                                    | 0.9000                                    | 19,942.2569                                  |
| RZE0023      | 34                                | 34                                | 3,915.1544                          | 3,915.1544                          | 1.0000                                | 3,915.1544                                     | 0.9000                                    | 3,523.6390                                   |
| RZE0050      | 3,136                             | 3,136                             | 116,345.6000                        | 116,345.6000                        | 0.9520                                | 110,761.0112                                   | 0.9000                                    | 99,684.9101                                  |
| RZE0051      | 148                               | 148                               | 24,568.0000                         | 24,568.0000                         | 0.8080                                | 19,850.9440                                    | 0.9000                                    | 17,865.8496                                  |
| RZE0052      | 53                                | 53                                | 36,570.0000                         | 36,570.0000                         | 0.7590                                | 27,756.6300                                    | 0.9000                                    | 24,980.9670                                  |
| RZE0055      | 229                               | 229                               | 19,254.0681                         | 19,254.0681                         | 1.0000                                | 19,254.0681                                    | 0.9000                                    | 17,328.6613                                  |
| RZE0056      | 5                                 | 5                                 | 4,842.9375                          | 4,842.9375                          | 1.0000                                | 4,842.9375                                     | 0.9000                                    | 4,358.6438                                   |
| RZE0058      | 56                                | 56                                | 34,320.8040                         | 34,320.8040                         | 1.0000                                | 34,320.8040                                    | 0.9000                                    | 30,888.7236                                  |
| RZE0059      | 3                                 | 3                                 | 4,371.7866                          | 4,371.7866                          | 1.0000                                | 4,371.7866                                     | 0.9000                                    | 3,934.6079                                   |
| RZE0060      | 90                                | 90                                | 36,287.6850                         | 36,287.6850                         | 1.0000                                | 36,287.6850                                    | 0.9000                                    | 32,658.9165                                  |
| RZE0062      | 119                               | 119                               | 18,207.0000                         | 18,207.0000                         | 0.9180                                | 16,714.0260                                    | 0.9000                                    | 15,042.6234                                  |
| RZE0063      | 4,277                             | 4,277                             | 6,051.9550                          | 6,051.9550                          | 1.0000                                | 6,051.9550                                     | 0.9000                                    | 5,446.7595                                   |
| RZE0064      | 206                               | 206                               | 150,380.0000                        | 150,380.0000                        | 1.0000                                | 150,380.0000                                   | 0.9000                                    | 135,342.0000                                 |
| RZE0109      | 1,639                             | 1,639                             | 60,806.9000                         | 60,806.9000                         | 0.9520                                | 57,888.1688                                    | 0.9000                                    | 52,099.3519                                  |
| RZE0110      | 76                                | 76                                | 12,616.0000                         | 12,616.0000                         | 0.8080                                | 10,193.7280                                    | 0.9000                                    | 9,174.3552                                   |
| RZE0111      | 29                                | 29                                | 20,010.0000                         | 20,010.0000                         | 0.7590                                | 15,187.5900                                    | 0.9000                                    | 13,668.8310                                  |
| RZE0112      | 38                                | 38                                | 5,814.0000                          | 5,814.0000                          | 0.9180                                | 5,337.2520                                     | 0.9000                                    | 4,803.5268                                   |
| <b>Total</b> | <b>19,194</b>                     | <b>19,194</b>                     | <b>816,124.4444</b>                 | <b>816,124.4444</b>                 |                                       | <b>784,876.2944</b>                            | <b>0.9000</b>                             | <b>706,388.6650</b>                          |

Table 86. Certified Home Performance with ENERGY STAR Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID | 2013 Certified Net kWh Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net kWh LLESMS Savings<br>(H) = (F x 1.1)* | 2013 Realization Rate<br>(I) = (F/A) | Lifetime kWh Savings<br>(J) = (F x G) |
|------------|---|---------------------|---|--------------------------------------|---------------------------------------|
| RZC0007    | 937.9692  | 20                  | 1,031.7661  | 90.00%                               | 18,759.3840                           |
| RZC0008    | -480.5015                                       | 20                  | -528.5516   | 90.00%                               | -9,610.0290                           |
| RZC0009    | 294.5754  | 20                  | 324.0329  | 90.00%                               | 5,891.5080                            |
| RZC0010    | 2,698.8894                                      | 18                  | 2,968.7783  | 90.00%                               | 48,580.0092                           |
| RZC0011    | 3,670.0776                                      | 18                  | 4,037.0854  | 90.00%                               | 66,061.3968                           |
| RZC0018    | 24,875.7151                                     | 13                  | 27,363.2866   | 90.00%                               | 323,384.2958                          |
| RZC0019    | 24,912.0788                                     | 13                  | 27,403.2867   | 90.00%                               | 323,857.0249                          |
| RZC0020    | 21,312.6675                                     | 13                  | 23,443.9343   | 90.00%                               | 277,064.6779                          |
| RZC0022    | 45,714.0991                                     | 20                  | 50,285.5090   | 90.00%                               | 914,281.9812                          |
| RZC0023    | 6,449.7528                                      | 20                  | 7,094.7281  | 90.00%                               | 128,995.0560                          |
| RZC0024    | -580.3825                                       | 20                  | -638.4207   | 90.00%                               | -11,607.6492                          |
| RZC0055    | 36,097.6937                                     | 20                  | 39,707.4631   | 90.00%                               | 721,953.8748                          |
| RZC0060    | 8,695.3991                                      | 20                  | 9,564.9390  | 90.00%                               | 173,907.9810                          |
| RZC0061    | -1,898.1103                                     | 20                  | -2,087.9213   | 90.00%                               | -37,962.2052                          |
| RZC0062    | -2,284.6484                                     | 20                  | -2,513.1132   | 90.00%                               | -45,692.9676                          |
| RZC0063    | -4,957.8680                                     | 20                  | -5,453.6548   | 90.00%                               | -99,157.3596                          |
| RZE0007    | 244.5530  | 20                  | 269.0083  | 90.00%                               | 4,891.0608                            |
| RZE0008    | 26.9429   | 20                  | 29.6371   | 90.00%                               | 538.8570                              |
| RZE0009    | 109.9112  | 20                  | 120.9024  | 90.00%                               | 2,198.2248                            |
| RZE0010    | 1,016.9662                                      | 18                  | 1,118.6628  | 90.00%                               | 18,305.3909                           |
| RZE0011    | 1,871.0806                                      | 18                  | 2,058.1886  | 90.00%                               | 33,679.4501                           |
| RZE0012    | 19.4881   | 20                  | 21.4369   | 90.00%                               | 389.7612                              |
| RZE0018    | 13,044.1817                                     | 13                  | 14,348.5998   | 90.00%                               | 169,574.3618                          |
| RZE0019    | 17,218.3037                                     | 13                  | 18,940.1340   | 90.00%                               | 223,837.9475                          |
| RZE0020    | 6,694.8053                                      | 13                  | 7,364.2858  | 90.00%                               | 87,032.4683                           |



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| Measure ID   | 2013 Certified Net<br>kWh Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net<br>kWh LLESMS Savings<br>(H) = (F x 1.1)* | 2013 Realization<br>Rate<br>(I) = (F/A) | Lifetime kWh<br>Savings<br>(J) = (F x G) |
|--------------|--|---------------------|--|---|--|
| RZE0021      | 9,940.4019   | 5                   | 9,940.4019   | 90.00%                                  | 49,702.0095                              |
| RZE0022      | 19,942.2569  | 20                  | 21,936.4826  | 90.00%                                  | 398,845.1376                             |
| RZE0023      | 3,523.6390   | 20                  | 3,876.0029   | 90.00%                                  | 70,472.7792                              |
| RZE0050      | 99,684.9101  | 9                   | 99,684.9101  | 85.68%                                  | 897,164.1907                             |
| RZE0051      | 17,865.8496  | 12                  | 19,652.4346  | 72.72%                                  | 214,390.1952                             |
| RZE0052      | 24,980.9670  | 12                  | 27,479.0637  | 68.31%                                  | 299,771.6040                             |
| RZE0055      | 17,328.6613  | 20                  | 19,061.5274  | 90.00%                                  | 346,573.2258                             |
| RZE0056      | 4,358.6438   | 15                  | 4,794.5081   | 90.00%                                  | 65,379.6563                              |
| RZE0058      | 30,888.7236  | 15                  | 33,977.5960  | 90.00%                                  | 463,330.8540                             |
| RZE0059      | 3,934.6079   | 15                  | 4,328.0687   | 90.00%                                  | 59,019.1191                              |
| RZE0060      | 32,658.9165  | 15                  | 35,924.8082  | 90.00%                                  | 489,883.7475                             |
| RZE0062      | 15,042.6234  | 6                   | 15,042.6234  | 82.62%                                  | 90,255.7404                              |
| RZE0063      | 5,446.7595   | 20                  | 5,991.4355   | 90.00%                                  | 108,935.1900                             |
| RZE0064      | 135,342.0000                                       | 15                  | 148,876.2000   | 90.00%                                  | 2,030,130.0000                           |
| RZE0109      | 52,099.3519  | 9                   | 52,099.3519  | 85.68%                                  | 468,894.1673                             |
| RZE0110      | 9,174.3552   | 12                  | 10,091.7907  | 72.72%                                  | 110,092.2624                             |
| RZE0111      | 13,668.8310  | 12                  | 15,035.7141  | 68.31%                                  | 164,025.9720                             |
| RZE0112      | 4,803.5268   | 6                   | 4,803.5268   | 82.62%                                  | 28,821.1608                              |
| <b>Total</b> | <b>706,388.6650</b>                                |                     | <b>758,870.4500</b>  | <b>86.55%</b>                           | <b>9,694,841.5130</b>                    |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 87. Certified Home Performance with ENERGY STAR Program Participation and kW Savings by Measure

| Measure ID | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kW LLESM Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) |
|------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|--|-----------------------------------|
| RZC0007    | 38                                | 38                                | -1.2540                            | -1.2540                            | 1.0000                                | -1.2540                                       | 0.9000                                    | -1.1286                                     | 20               | -1.2415  | 90.00%                            |
| RZC0008    | 65                                | 65                                | -2.1450                            | -2.1450                            | 1.0000                                | -2.1450                                       | 0.9000                                    | -1.9305                                     | 20               | -2.1236  | 90.00%                            |
| RZC0009    | 21                                | 21                                | 0.4431                             | 0.4431                             | 1.0000                                | 0.4431  | 0.9000                                    | 0.3988                                      | 20               | 0.4387   | 90.00%                            |
| RZC0010    | 89                                | 89                                | 1.6287                             | 1.6287                             | 1.0000                                | 1.6287  | 0.9000                                    | 1.4658                                      | 18               | 1.6124   | 90.00%                            |
| RZC0011    | 40                                | 40                                | 2.9040                             | 2.9040                             | 1.0000                                | 2.9040  | 0.9000                                    | 2.6136                                      | 18               | 2.8750   | 90.00%                            |
| RZC0018    | 219                               | 219                               | 12.3297                            | 12.3297                            | 1.0000                                | 12.3297                                       | 0.9000                                    | 11.0967                                     | 13               | 12.2064  | 90.00%                            |
| RZC0019    | 149                               | 149                               | 12.9183                            | 12.9183                            | 1.0000                                | 12.9183                                       | 0.9000                                    | 11.6265                                     | 13               | 12.7891  | 90.00%                            |
| RZC0020    | 77                                | 77                                | 13.1670                            | 13.1670                            | 1.0000                                | 13.1670                                       | 0.9000                                    | 11.8503                                     | 13               | 13.0353  | 90.00%                            |
| RZC0022    | 427                               | 427                               | 23.9120                            | 23.9120                            | 1.0000                                | 23.9120                                       | 0.9000                                    | 21.5208                                     | 20               | 23.6729  | 90.00%                            |
| RZC0023    | 80                                | 80                                | 2.1600                             | 2.1600                             | 1.0000                                | 2.1600  | 0.9000                                    | 1.9440                                      | 20               | 2.1384   | 90.00%                            |
| RZC0024    | 23                                | 23                                | -0.8211                            | -0.8211                            | 1.0000                                | -0.8211                                       | 0.9000                                    | -0.7390                                     | 20               | -0.8129  | 90.00%                            |
| RZC0055    | 522                               | 522                               | 11.5884                            | 11.5884                            | 1.0000                                | 11.5884                                       | 0.9000                                    | 10.4296                                     | 20               | 11.4725  | 90.00%                            |
| RZC0060    | 6,695                             | 6,695                             | 7.3645                             | 7.3645                             | 1.0000                                | 7.3645  | 0.9000                                    | 6.6281                                      | 20               | 7.2909   | 90.00%                            |
| RZE0007    | 6                                 | 6                                 | -0.1530                            | -0.1530                            | 1.0000                                | -0.1530                                       | 0.9000                                    | -0.1377                                     | 20               | -0.1515  | 90.00%                            |
| RZE0008    | 11                                | 11                                | -0.2530                            | -0.2530                            | 1.0000                                | -0.2530                                       | 0.9000                                    | -0.2277                                     | 20               | -0.2505  | 90.00%                            |
| RZE0009    | 4                                 | 4                                 | 0.0720                             | 0.0720                             | 1.0000                                | 0.0720  | 0.9000                                    | 0.0648                                      | 20               | 0.0713   | 90.00%                            |
| RZE0010    | 31                                | 31                                | 0.6324                             | 0.6324                             | 1.0000                                | 0.6324  | 0.9000                                    | 0.5692                                      | 18               | 0.6261   | 90.00%                            |
| RZE0011    | 18                                | 18                                | 1.1790                             | 1.1790                             | 1.0000                                | 1.1790  | 0.9000                                    | 1.0611                                      | 18               | 1.1672   | 90.00%                            |
| RZE0012    | 1                                 | 1                                 | -0.0254                            | -0.0254                            | 1.0000                                | -0.0254                                       | 0.9000                                    | -0.0229                                     | 20               | -0.0251  | 90.00%                            |
| RZE0018    | 108                               | 108                               | 4.4604                             | 4.4604                             | 1.0000                                | 4.4604  | 0.9000                                    | 4.0144                                      | 13               | 4.4158   | 90.00%                            |
| RZE0019    | 93                                | 93                                | 6.0264                             | 6.0264                             | 1.0000                                | 6.0264  | 0.9000                                    | 5.4238                                      | 13               | 5.9661   | 90.00%                            |
| RZE0020    | 21                                | 21                                | 2.5998                             | 2.5998                             | 1.0000                                | 2.5998  | 0.9000                                    | 2.3398                                      | 13               | 2.5738   | 90.00%                            |

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kW LLESM Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|--|-----------------------------------|
| RZE0021      | 110                               | 110                               | 16.0490                            | 16.0490                            | 1.0000                                | 16.0490                                       | 0.9000                                    | 14.4441                                     | 5                | 14.4441  | 90.00%                            |
| RZE0022      | 182                               | 182                               | 7.8078                             | 7.8078                             | 1.0000                                | 7.8078  | 0.9000                                    | 7.0270                                      | 20               | 7.7297   | 90.00%                            |
| RZE0023      | 34                                | 34                                | 1.1356                             | 1.1356                             | 1.0000                                | 1.1356  | 0.9000                                    | 1.0220                                      | 20               | 1.1242   | 90.00%                            |
| RZE0050      | 3,136                             | 3,136                             | 13.7984                            | 13.7984                            | 0.9520                                | 13.1361                                       | 0.9000                                    | 11.8225                                     | 9                | 11.8225  | 85.68%                            |
| RZE0051      | 148                               | 148                               | 2.7972                             | 2.7972                             | 0.8080                                | 2.2601  | 0.9000                                    | 2.0341                                      | 12               | 2.2375   | 72.72%                            |
| RZE0052      | 53                                | 53                                | 3.0952                             | 4.1287                             | 0.7590                                | 3.1337  | 0.9000                                    | 2.8203                                      | 12               | 3.1023   | 91.12%                            |
| RZE0055      | 229                               | 229                               | 5.7021                             | 5.7021                             | 1.0000                                | 5.7021  | 0.9000                                    | 5.1319                                      | 20               | 5.6451   | 90.00%                            |
| RZE0056      | 5                                 | 5                                 | 3.7315                             | 3.7315                             | 1.0000                                | 3.7315  | 0.9000                                    | 3.3584                                      | 15               | 3.6942   | 90.00%                            |
| RZE0058      | 56                                | 56                                | 25.0600                            | 25.0600                            | 1.0000                                | 25.0600                                       | 0.9000                                    | 22.5540                                     | 15               | 24.8094  | 90.00%                            |
| RZE0059      | 3                                 | 3                                 | 2.1129                             | 2.1129                             | 1.0000                                | 2.1129  | 0.9000                                    | 1.9016                                      | 15               | 2.0918   | 90.00%                            |
| RZE0060      | 90                                | 90                                | 40.8150                            | 40.8150                            | 1.0000                                | 40.8150                                       | 0.9000                                    | 36.7335                                     | 15               | 40.4069  | 90.00%                            |
| RZE0062      | 119                               | 119                               | 2.0706                             | 2.0706                             | 0.9180                                | 1.9008  | 0.9000                                    | 1.7107                                      | 6                | 1.7107   | 82.62%                            |
| RZE0063      | 4,277                             | 4,277                             | 3.4216                             | 3.4216                             | 1.0000                                | 3.4216  | 0.9000                                    | 3.0794                                      | 20               | 3.3874   | 90.00%                            |
| RZE0064      | 206                               | 206                               | 13.5342                            | 13.5342                            | 1.0000                                | 13.5342                                       | 0.9000                                    | 12.1808                                     | 15               | 13.3989  | 90.00%                            |
| RZE0109      | 1,639                             | 1,639                             | 7.2116                             | 7.2116                             | 0.9520                                | 6.8654  | 0.9000                                    | 6.1789                                      | 9                | 6.1789   | 85.68%                            |
| RZE0110      | 76                                | 76                                | 1.4364                             | 1.4364                             | 0.8080                                | 1.1606  | 0.9000                                    | 1.0446                                      | 12               | 1.1490   | 72.72%                            |
| RZE0111      | 29                                | 29                                | 1.6936                             | 2.2591                             | 0.7590                                | 1.7147  | 0.9000                                    | 1.5432                                      | 12               | 1.6975   | 91.12%                            |
| RZE0112      | 38                                | 38                                | 0.6612                             | 0.6612                             | 0.9180                                | 0.6070  | 0.9000                                    | 0.5463                                      | 6                | 0.5463   | 82.62%                            |
| <b>Total</b> | <b>19,168</b>                     | <b>19,168</b>                     | <b>250.8681</b>                    | <b>252.4671</b>                    |                                       | <b>248.8823</b>                               | <b>0.9000</b>                             | <b>223.9941</b>                             |                  | <b>242.9232</b>                                      | <b>89.29%</b>                     |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 88. Certified Home Performance with ENERGY STAR Program Participation and First-Year MCF Savings by Measure

| Measure ID | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RZC0007    | 38                                | 38                                | 241.8586                            | 241.8586                            | 1.0000                                | 241.8586                                       | 0.9000                                    | 217.6727                                     |
| RZC0008    | 65                                | 65                                | 284.7780                            | 284.7780                            | 1.0000                                | 284.7780                                       | 0.9000                                    | 256.3002                                     |
| RZC0009    | 21                                | 21                                | 70.9611                             | 70.9611                             | 1.0000                                | 70.9611  | 0.9000                                    | 63.8650                                      |
| RZC0010    | 89                                | 89                                | 129.2725                            | 129.2725                            | 1.0000                                | 129.2725                                       | 0.9000                                    | 116.3453                                     |
| RZC0011    | 40                                | 40                                | 160.9800                            | 160.9800                            | 1.0000                                | 160.9800                                       | 0.9000                                    | 144.8820                                     |
| RZC0018    | 219                               | 219                               | 1,926.8058                          | 1,926.8058                          | 1.0000                                | 1,926.8058                                     | 0.9000                                    | 1,734.1252                                   |
| RZC0019    | 149                               | 149                               | 1,959.0371                          | 1,959.0371                          | 1.0000                                | 1,959.0371                                     | 0.9000                                    | 1,763.1334                                   |
| RZC0020    | 77                                | 77                                | 1,641.9557                          | 1,641.9557                          | 1.0000                                | 1,641.9557                                     | 0.9000                                    | 1,477.7601                                   |
| RZC0022    | 427                               | 427                               | 3,245.2854                          | 3,245.2854                          | 1.0000                                | 3,245.2854                                     | 0.9000                                    | 2,920.7569                                   |
| RZC0023    | 80                                | 80                                | 469.2320                            | 469.2320                            | 1.0000                                | 469.2320                                       | 0.9000                                    | 422.3088                                     |
| RZC0024    | 23                                | 23                                | 244.1910                            | 244.1910                            | 1.0000                                | 244.1910                                       | 0.9000                                    | 219.7719                                     |
| RZC0055    | 522                               | 522                               | 2,807.8902                          | 2,807.8902                          | 1.0000                                | 2,807.8902                                     | 0.9000                                    | 2,527.1012                                   |
| RZC0060    | 6,695                             | 6,695                             | 352.1570                            | 352.1570                            | 1.0000                                | 352.1570                                       | 0.9000                                    | 316.9413                                     |
| RZC0061    | 6                                 | 6                                 | 249.0120                            | 249.0120                            | 1.0000                                | 249.0120                                       | 0.9000                                    | 224.1108                                     |
| RZC0062    | 7                                 | 7                                 | 356.8670                            | 356.8670                            | 1.0000                                | 356.8670                                       | 0.9000                                    | 321.1803                                     |
| RZC0063    | 13                                | 13                                | 823.7528                            | 823.7528                            | 1.0000                                | 823.7528                                       | 0.9000                                    | 741.3775                                     |
| RZG0007    | 27                                | 27                                | 154.0431                            | 154.0431                            | 1.0000                                | 154.0431                                       | 0.9000                                    | 138.6388                                     |
| RZG0008    | 87                                | 87                                | 547.8825                            | 547.8825                            | 1.0000                                | 547.8825                                       | 0.9000                                    | 493.0943                                     |
| RZG0009    | 73                                | 73                                | 207.5828                            | 207.5828                            | 1.0000                                | 207.5828                                       | 0.9000                                    | 186.8245                                     |
| RZG0010    | 47                                | 47                                | 72.1027                             | 72.1027                             | 1.0000                                | 72.1027  | 0.9000                                    | 64.8924                                      |
| RZG0011    | 34                                | 34                                | 126.8710                            | 126.8710                            | 1.0000                                | 126.8710                                       | 0.9000                                    | 114.1839                                     |
| RZG0012    | 16                                | 16                                | 80.5232                             | 80.5232                             | 1.0000                                | 80.5232  | 0.9000                                    | 72.4709                                      |
| RZG0013    | 1                                 | 1                                 | 30.8233                             | 30.8233                             | 1.0000                                | 30.8233  | 0.9000                                    | 27.7410                                      |
| RZG0014    | 41                                | 41                                | 1,044.6882                          | 1,044.6882                          | 1.0000                                | 1,044.6882                                     | 0.9000                                    | 940.2194                                     |

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| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RZG0015      | 150                               | 150                               | 4,025.9850                          | 4,025.9850                          | 1.0000                                | 4,025.9850                                     | 0.9000                                    | 3,623.3865                                   |
| RZG0016      | 74                                | 74                                | 2,308.2524                          | 2,308.2524                          | 1.0000                                | 2,308.2524                                     | 0.9000                                    | 2,077.4272                                   |
| RZG0017      | 6                                 | 6                                 | 167.2002                            | 167.2002                            | 1.0000                                | 167.2002                                       | 0.9000                                    | 150.4802                                     |
| RZG0018      | 362                               | 362                               | 2,513.9452                          | 2,513.9452                          | 1.0000                                | 2,513.9452                                     | 0.9000                                    | 2,262.5507                                   |
| RZG0019      | 320                               | 320                               | 3,158.6880                          | 3,158.6880                          | 1.0000                                | 3,158.6880                                     | 0.9000                                    | 2,842.8192                                   |
| RZG0020      | 115                               | 115                               | 2,010.8555                          | 2,010.8555                          | 1.0000                                | 2,010.8555                                     | 0.9000                                    | 1,809.7700                                   |
| RZG0021      | 478                               | 478                               | 3,577.3520                          | 3,577.3520                          | 1.0000                                | 3,577.3520                                     | 0.9000                                    | 3,219.6168                                   |
| RZG0022      | 741                               | 741                               | 4,358.9325                          | 4,358.9325                          | 1.0000                                | 4,358.9325                                     | 0.9000                                    | 3,923.0393                                   |
| RZG0023      | 178                               | 178                               | 878.6080                            | 878.6080                            | 1.0000                                | 878.6080                                       | 0.9000                                    | 790.7472                                     |
| RZG0051      | 2,194                             | 2,194                             | 1,812.6828                          | 1,812.6828                          | 0.8080                                | 1,464.6477                                     | 0.9000                                    | 1,318.1829                                   |
| RZG0052      | 719                               | 719                               | 2,515.9248                          | 2,515.9248                          | 0.7590                                | 1,909.5869                                     | 0.9000                                    | 1,718.6282                                   |
| RZG0053      | 2                                 | 2                                 | 102.3444                            | 102.3444                            | 1.0000                                | 102.3444                                       | 0.9000                                    | 92.1100                                      |
| RZG0054      | 7                                 | 7                                 | 398.0277                            | 398.0277                            | 1.0000                                | 398.0277                                       | 0.9000                                    | 358.2249                                     |
| RZG0055      | 832                               | 832                               | 3,564.7872                          | 3,564.7872                          | 1.0000                                | 3,564.7872                                     | 0.9000                                    | 3,208.3085                                   |
| RZG0056      | 43                                | 43                                | 150.4656                            | 150.4656                            | 1.0000                                | 150.4656                                       | 0.9000                                    | 135.4190                                     |
| RZG0057      | 7                                 | 7                                 | 45.5868                             | 45.5868                             | 1.0000                                | 45.5868  | 0.9000                                    | 41.0281                                      |
| RZG0060      | 5,320                             | 5,320                             | 264.4040                            | 264.4040                            | 1.0000                                | 264.4040                                       | 0.9000                                    | 237.9636                                     |
| RZG0061      | 3                                 | 3                                 | 131.6820                            | 131.6820                            | 1.0000                                | 131.6820                                       | 0.9000                                    | 118.5138                                     |
| RZG0062      | 1,865                             | 1,865                             | 1,414.0430                          | 1,414.0430                          | 0.9180                                | 1,298.0915                                     | 0.9000                                    | 1,168.2823                                   |
| RZG0109      | 1,221                             | 1,221                             | 1,008.7902                          | 1,008.7902                          | 0.8080                                | 815.1025                                       | 0.9000                                    | 733.5922                                     |
| RZG0110      | 488                               | 488                               | 1,707.6096                          | 1,707.6096                          | 0.7590                                | 1,296.0757                                     | 0.9000                                    | 1,166.4681                                   |
| RZG0111      | 456                               | 456                               | 345.7392                            | 345.7392                            | 0.9180                                | 317.3886                                       | 0.9000                                    | 285.6497                                     |
| <b>Total</b> | <b>24,378</b>                     | <b>24,378</b>                     | <b>53,690.4591</b>                  | <b>53,690.4591</b>                  |                                       | <b>51,986.5624</b>                             | <b>0.9000</b>                             | <b>46,787.9061</b>                           |

Table 89. Certified Home Performance with ENERGY STAR Program Long-Life Equipment Savings Multiplier and Lifetime MCF Savings by Measure

| Measure ID | 2013 Certified Net MCF Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net MCF LLESM Savings<br>(H) = (F x 1.1) * | 2013 Realization Rate<br>(I) = (F/A) | Lifetime MCF Savings<br>(J) = (F x G) |
|------------|---|---------------------|---|--------------------------------------|---------------------------------------|
| RZC0007    | 217.6727  | 20                  | 239.4400  | 90.00%                               | 4,353.4548                            |
| RZC0008    | 256.3002  | 20                  | 281.9302  | 90.00%                               | 5,126.0040                            |
| RZC0009    | 63.8650   | 20                  | 70.2515   | 90.00%                               | 1,277.2998                            |
| RZC0010    | 116.3453  | 18                  | 127.9798  | 90.00%                               | 2,094.2145                            |
| RZC0011    | 144.8820  | 18                  | 159.3702  | 90.00%                               | 2,607.8760                            |
| RZC0018    | 1,734.1252                                      | 13                  | 1,907.5377  | 90.00%                               | 22,543.6279                           |
| RZC0019    | 1,763.1334                                      | 13                  | 1,939.4467  | 90.00%                               | 22,920.7341                           |
| RZC0020    | 1,477.7601                                      | 13                  | 1,625.5361  | 90.00%                               | 19,210.8817                           |
| RZC0022    | 2,920.7569                                      | 20                  | 3,212.8325  | 90.00%                               | 58,415.1372                           |
| RZC0023    | 422.3088  | 20                  | 464.5397  | 90.00%                               | 8,446.1760                            |
| RZC0024    | 219.7719  | 20                  | 241.7491  | 90.00%                               | 4,395.4380                            |
| RZC0055    | 2,527.1012                                      | 20                  | 2,779.8113  | 90.00%                               | 50,542.0236                           |
| RZC0060    | 316.9413  | 20                  | 348.6354  | 90.00%                               | 6,338.8260                            |
| RZC0061    | 224.1108  | 20                  | 246.5219  | 90.00%                               | 4,482.2160                            |
| RZC0062    | 321.1803  | 20                  | 353.2983  | 90.00%                               | 6,423.6060                            |
| RZC0063    | 741.3775  | 20                  | 815.5153  | 90.00%                               | 14,827.5504                           |
| RZG0007    | 138.6388  | 20                  | 152.5027  | 90.00%                               | 2,772.7758                            |
| RZG0008    | 493.0943  | 20                  | 542.4037  | 90.00%                               | 9,861.8850                            |
| RZG0009    | 186.8245  | 20                  | 205.5070  | 90.00%                               | 3,736.4904                            |
| RZG0010    | 64.8924   | 18                  | 71.3817   | 90.00%                               | 1,168.0637                            |
| RZG0011    | 114.1839  | 18                  | 125.6023  | 90.00%                               | 2,055.3102                            |
| RZG0012    | 72.4709   | 20                  | 79.7180   | 90.00%                               | 1,449.4176                            |
| RZG0013    | 27.7410   | 15                  | 30.5151   | 90.00%                               | 416.1146                              |
| RZG0014    | 940.2194  | 15                  | 1,034.2413  | 90.00%                               | 14,103.2907                           |
| RZG0015    | 3,623.3865                                      | 15                  | 3,985.7252  | 90.00%                               | 54,350.7975                           |

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| Measure ID   | 2013 Certified Net MCF Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net MCF LLESM Savings (H) = (F x 1.1) * | 2013 Realization Rate (I) = (F/A) | Lifetime MCF Savings (J) = (F x G) |
|--------------|--|------------------|--|-----------------------------------|------------------------------------|
| RZG0016      | 2,077.4272                                   | 15               | 2,285.1699   | 90.00%                            | 31,161.4074                        |
| RZG0017      | 150.4802                                     | 15               | 165.5282   | 90.00%                            | 2,257.2027                         |
| RZG0018      | 2,262.5507                                   | 13               | 2,488.8057   | 90.00%                            | 29,413.1588                        |
| RZG0019      | 2,842.8192                                   | 13               | 3,127.1011   | 90.00%                            | 36,956.6496                        |
| RZG0020      | 1,809.7700                                   | 13               | 1,990.7469   | 90.00%                            | 23,527.0094                        |
| RZG0021      | 3,219.6168                                   | 5                | 3,219.6168   | 90.00%                            | 16,098.0840                        |
| RZG0022      | 3,923.0393                                   | 20               | 4,315.3432   | 90.00%                            | 78,460.7850                        |
| RZG0023      | 790.7472                                     | 20               | 869.8219   | 90.00%                            | 15,814.9440                        |
| RZG0051      | 1,318.1829                                   | 12               | 1,450.0012   | 72.72%                            | 15,818.1952                        |
| RZG0052      | 1,718.6282                                   | 12               | 1,890.4911   | 68.31%                            | 20,623.5388                        |
| RZG0053      | 92.1100                                      | 20               | 101.3210   | 90.00%                            | 1,842.1992                         |
| RZG0054      | 358.2249                                     | 20               | 394.0474   | 90.00%                            | 7,164.4986                         |
| RZG0055      | 3,208.3085                                   | 20               | 3,529.1393   | 90.00%                            | 64,166.1696                        |
| RZG0056      | 135.4190                                     | 15               | 148.9609   | 90.00%                            | 2,031.2856                         |
| RZG0057      | 41.0281                                      | 15               | 45.1309  | 90.00%                            | 615.4218                           |
| RZG0060      | 237.9636                                     | 20               | 261.7600   | 90.00%                            | 4,759.2720                         |
| RZG0061      | 118.5138                                     | 20               | 130.3652   | 90.00%                            | 2,370.2760                         |
| RZG0062      | 1,168.2823                                   | 6                | 1,168.2823   | 82.62%                            | 7,009.6940                         |
| RZG0109      | 733.5922                                     | 12               | 806.9515   | 72.72%                            | 8,803.1068                         |
| RZG0110      | 1,166.4681                                   | 12               | 1,283.1149   | 68.31%                            | 13,997.6174                        |
| RZG0111      | 285.6497                                     | 6                | 285.6497   | 82.62%                            | 1,713.8984                         |
| <b>Total</b> | <b>46,787.9061</b>                           |                  | <b>50,999.3418</b>                                     | <b>87.14%</b>                     | <b>708,523.6256</b>                |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

## Appendix I: Home Energy Analysis Program

Table 90 presents reported gross and certified net energy savings for the Home Energy Analysis Program by fuel type. The realization rates reflect the adjustments Cadmus made based on our certification tasks and applying installation rate and NTG adjustments. The following sections discuss changes we made to reported gross energy savings.

**Table 90. Home Energy Analysis Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 299,311             | 3,858,172.1166    | 495.3412         | 127,919.0755      |
| Certified Net    | 299,311             | 3,354,479.3142    | 367.3659         | 116,929.1788      |
| Difference       | 0                   | -503,692.8024     | -127.9753        | -10,989.8967      |
| Realization Rate | 100.00%             | 86.94%            | 74.16%           | 91.41%            |

Table 91 presents reported and certified net energy savings with the long-life equipment savings multiplier for the Home Energy Analysis Program by fuel type.

**Table 91. Home Energy Analysis Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 299,311             | 3,414,979.0324    | 439.7723         | 117,972.9904      |
| Certified Net      | 299,311             | 3,434,594.2780    | 374.5671         | 123,693.1102      |
| Difference         | 0                   | 19,615.2456       | -65.2052         | 5,720.1198        |
| Certified/Reported | 100.00%             | 100.57%           | 85.17%           | 104.85%           |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

Cadmus reviewed program documents from a sample of 69 randomly selected account numbers. Table 92 documents reported and certified measure counts as well as reported and certified energy savings by fuel type.



**Table 92. Home Energy Analysis Program Sample Participation and Savings by End Use**

| Measure Code | Reported     |                    |               |                 | Certified    |                    |               |                 |
|--------------|--------------|--------------------|---------------|-----------------|--------------|--------------------|---------------|-----------------|
|              | n            | kWh                | kW            | MCF             | n            | kWh                | kW            | MCF             |
| RXE0002      | 197          | 7,308.7000         | 0.8668        | -               | 197          | 7,308.7000         | 0.8668        | -               |
| RXE0004      | 45           | 990.0000           | -             | -               | 45           | 990.0000           | -             | -               |
| RXE0005      | 18           | 918.0000           | 0.1044        | -               | 18           | 918.0000           | 0.1044        | -               |
| RXE0006      | 2            | 1,380.0000         | 0.1168        | -               | 2            | 1,380.0000         | 0.1168        | -               |
| RXE0007      | 1            | 166.0000           | 0.0189        | -               | 1            | 166.0000           | 0.0189        | -               |
| RXE0010      | 21           | 779.1000           | 0.0924        | -               | 21           | 779.1000           | 0.0924        | -               |
| RXE0011      | 19           | 704.9000           | 0.0836        | -               | 19           | 704.9000           | 0.0836        | -               |
| RXE0012      | 11           | 561.0000           | 0.0638        | -               | 11           | 561.0000           | 0.0638        | -               |
| RXE0013      | 1            | 690.0000           | 0.0584        | -               | 1            | 690.0000           | 0.0584        | -               |
| RXE0014      | 2            | 332.0000           | 0.0378        | -               | 2            | 332.0000           | 0.0378        | -               |
| RXE0015      | 1            | 166.0000           | 0.1890        | -               | 1            | 166.0000           | 0.1890        | -               |
| RXE0102      | 47           | 1,743.7000         | 0.2068        | -               | 47           | 1,743.7000         | 0.2068        | -               |
| RXE0104      | 1            | 22.0000            | -             | -               | 1            | 22.0000            | -             | -               |
| RXE0110      | 14           | 519.4000           | 0.0616        | -               | 14           | 519.4000           | 0.0616        | -               |
| RXE0111      | 2            | 74.2000            | 0.0088        | -               | 2            | 74.2000            | 0.0088        | -               |
| RXG0005      | 626          | -                  | -             | 158.1902        | 626          | -                  | -             | 158.1902        |
| RXG0006      | 37           | -                  | -             | 129.4704        | 37           | -                  | -             | 129.4704        |
| RXG0007      | 27           | -                  | -             | 14.4450         | 27           | -                  | -             | 14.4450         |
| RXG0009      | 9            | -                  | -             | 61.1154         | 9            | -                  | -             | 61.1154         |
| RXG0012      | 131          | -                  | -             | 33.1430         | 131          | -                  | -             | 33.1430         |
| RXG0013      | 44           | -                  | -             | 153.9648        | 44           | -                  | -             | 153.9648        |
| RXG0014      | 28           | -                  | -             | 14.9800         | 28           | -                  | -             | 14.9800         |
| RXG0015      | 62           | -                  | -             | 56.9160         | 62           | -                  | -             | 56.9160         |
| RXG0115      | 2            | -                  | -             | 8.3592          | 2            | -                  | -             | 8.3592          |
| <b>Total</b> | <b>1,348</b> | <b>16,355.0000</b> | <b>1.9091</b> | <b>630.5840</b> | <b>1,348</b> | <b>16,355.0000</b> | <b>1.9091</b> | <b>630.5840</b> |

The reported measure quantities for all database records matched their associated documentation. Table 93 provides the sample realization rates by fuel type and the t-test statistics Cadmus used to analyze errors in the sample.

**Table 93. Home Energy Analysis Program Sample Realization Rates and t-Statistic**

|                                     | kWh        | kW         | MCF        |
|-------------------------------------|------------|------------|------------|
| Sample Realization Rate             | 100.00%    | 100.00%    | 100.00%    |
| Standard Error                      | N/A        | N/A        | N/A        |
| t-Statistic                         | N/A        | N/A        | N/A        |
| p-Value                             | N/A        | N/A        | N/A        |
| <b>Apply to Program Population?</b> | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |

#### Task 4: Measure-Level Savings Analysis

Cadmus found discrepancies between the reported per-unit measure savings and values either maintained in the MEMD or calculated by Navigant for the program measures shown in Table 94.

**Table 94. Per-Unit Measure Discrepancies for the Home Energy Analysis Program**

| Measure Code and End Use                               | Reported Savings    | Verified Savings     |
|--|---------------------|----------------------|
| RXE0007 – Low-Flow Showerhead (1.5 GPM)                | 0.0584 kW           | 0.0779 kW            |
| RXE0015 – Low-Flow Bath Aerator (1 GPM)                | 0.189 kW<br>166 kWh | 0.0234 kW<br>207 kWh |
| RXG0007 – Low-Flow Bath Aerator (GPM not specified)    | 0.5350 MCF          | 0.6164 MCF           |
| RXG0014 – Low-Flow Kitchen Aerator (GPM not-specified) | 0.5350 MCF          | 1.0818 MCF           |
| RXG0015 – Low-Flow Bath Aerator (1 GPM)                | 0.9180 MCF          | 1.0567 MCF           |

Table 95 presents the reported and certified per-unit savings for all measures delivered through the 2013 Home Energy Analysis Program.

**Table 95. Home Energy Analysis Program Reported and Certified Per-Unit Measure Savings**

| Measure Code | Reported |        |        | Certified |        |        | Certified LLESMS |          |        |        |
|--------------|----------|--------|--------|-----------|--------|--------|------------------|----------|--------|--------|
|              | kWh      | kW     | MCF    | kWh       | kW     | MCF    | Measure Life     | kWh      | kW     | MCF    |
| RXC0001      | 128.2370 | 0.0000 | 6.9583 | 128.2370  | 0.0000 | 6.9583 | 9                | 128.2370 | 0.0000 | 6.9583 |
| RXC0101      | 140.6174 | 0.0000 | 7.2509 | 140.6174  | 0.0000 | 7.2509 | 9                | 140.6174 | 0.0000 | 7.2509 |
| RXE0002      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9                | 37.1000  | 0.0044 | 0.0000 |
| RXE0003      | 44.1000  | 0.0053 | 0.0000 | 44.1000   | 0.0053 | 0.0000 | 9                | 44.1000  | 0.0053 | 0.0000 |
| RXE0004      | 22.0000  | 0.0000 | 0.0000 | 22.0000   | 0.0000 | 0.0000 | 12               | 24.2000  | 0.0000 | 0.0000 |
| RXE0005      | 51.0000  | 0.0058 | 0.0000 | 51.0000   | 0.0058 | 0.0000 | 6                | 51.0000  | 0.0058 | 0.0000 |
| RXE0006      | 690.0000 | 0.0584 | 0.0000 | 690.0000  | 0.0779 | 0.0000 | 12               | 759.0000 | 0.0857 | 0.0000 |
| RXE0007      | 166.0000 | 0.0189 | 0.0000 | 166.0000  | 0.0189 | 0.0000 | 12               | 182.6000 | 0.0208 | 0.0000 |
| RXE0010      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9                | 37.1000  | 0.0044 | 0.0000 |
| RXE0011      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9                | 37.1000  | 0.0044 | 0.0000 |
| RXE0012      | 51.0000  | 0.0058 | 0.0000 | 51.0000   | 0.0058 | 0.0000 | 6                | 51.0000  | 0.0058 | 0.0000 |
| RXE0013      | 690.0000 | 0.0584 | 0.0000 | 690.0000  | 0.0779 | 0.0000 | 12               | 759.0000 | 0.0857 | 0.0000 |
| RXE0014      | 166.0000 | 0.0189 | 0.0000 | 166.0000  | 0.0189 | 0.0000 | 12               | 182.6000 | 0.0208 | 0.0000 |
| RXE0015      | 166.0000 | 0.1890 | 0.0000 | 207.0412  | 0.0234 | 0.0000 | 12               | 227.7453 | 0.0257 | 0.0000 |
| RXE0102      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9                | 37.1000  | 0.0044 | 0.0000 |
| RXE0103      | 44.1000  | 0.0053 | 0.0000 | 44.1000   | 0.0053 | 0.0000 | 9                | 44.1000  | 0.0053 | 0.0000 |
| RXE0104      | 22.0000  | 0.0000 | 0.0000 | 22.0000   | 0.0000 | 0.0000 | 12               | 24.2000  | 0.0000 | 0.0000 |
| RXE0110      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9                | 37.1000  | 0.0044 | 0.0000 |
| RXE0111      | 37.1000  | 0.0044 | 0.0000 | 37.1000   | 0.0044 | 0.0000 | 9                | 37.1000  | 0.0044 | 0.0000 |
| RXE0115      | 820.0000 | 0.0925 | 0.0000 | 820.0000  | 0.0925 | 0.0000 | 3                | 820.0000 | 0.0925 | 0.0000 |
| RXG0005      | 0.0000   | 0.0000 | 0.2527 | 0.0000    | 0.0000 | 0.2527 | 6                | 0.0000   | 0.0000 | 0.2527 |
| RXG0006      | 0.0000   | 0.0000 | 3.4992 | 0.0000    | 0.0000 | 3.4992 | 12               | 0.0000   | 0.0000 | 3.8491 |

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| Measure Code | Reported |        |        | Certified |        |        | Certified LLES |        |        |        |
|--------------|----------|--------|--------|-----------|--------|--------|----------------|--------|--------|--------|
|              | kWh      | kW     | MCF    | kWh       | kW     | MCF    | Measure Life   | kWh    | kW     | MCF    |
| RXG0007      | 0.0000   | 0.0000 | 0.5350 | 0.0000    | 0.0000 | 0.6164 | 12             | 0.0000 | 0.0000 | 0.6780 |
| RXG0009      | 0.0000   | 0.0000 | 6.7906 | 0.0000    | 0.0000 | 6.7906 | 9              | 0.0000 | 0.0000 | 6.7906 |
| RXG0012      | 0.0000   | 0.0000 | 0.2530 | 0.0000    | 0.0000 | 0.2530 | 6              | 0.0000 | 0.0000 | 0.2530 |
| RXG0013      | 0.0000   | 0.0000 | 3.4992 | 0.0000    | 0.0000 | 3.4992 | 12             | 0.0000 | 0.0000 | 3.8491 |
| RXG0014      | 0.0000   | 0.0000 | 0.5350 | 0.0000    | 0.0000 | 1.0818 | 12             | 0.0000 | 0.0000 | 1.1900 |
| RXG0015      | 0.0000   | 0.0000 | 0.9180 | 0.0000    | 0.0000 | 1.0567 | 12             | 0.0000 | 0.0000 | 1.1624 |
| RXG0109      | 0.0000   | 0.0000 | 6.7712 | 0.0000    | 0.0000 | 6.7712 | 9              | 0.0000 | 0.0000 | 6.7712 |
| RXG0115      | 0.0000   | 0.0000 | 4.1796 | 0.0000    | 0.0000 | 4.1796 | 3              | 0.0000 | 0.0000 | 4.1796 |

### Major Findings by Fuel Type

The tables below present certified program participation and energy savings by measure. Table 96 and Table 97 document kWh savings, Table 98 documents kW savings, and Table 99 and Table 100 document MCF savings.

Table 96. Certified Home Energy Analysis Program Participation and First-Year kWh Savings by Measure

| Measure ID | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RXC0001    | 431                               | 431                               | 55,270.1470                         | 55,270.1470                         | 1.0000                                | 55,270.1470                                    | 0.9000                                    | 49,743.1323                                  |
| RXC0101    | 4                                 | 4                                 | 562.4696                            | 562.4696                            | 1.0000                                | 562.4696                                       | 0.9000                                    | 506.2226                                     |
| RXE0002    | 39,536                            | 39,536                            | 1,466,785.6000                      | 1,466,785.6000                      | 0.9620                                | 1,411,047.7472                                 | 0.9000                                    | 1,269,942.9725                               |
| RXE0003    | 42                                | 42                                | 1,852.2000                          | 1,852.2000                          | 0.9620                                | 1,781.8164                                     | 0.9000                                    | 1,603.6348                                   |
| RXE0004    | 8,814                             | 8,814                             | 193,908.0000                        | 193,908.0000                        | 0.9260                                | 179,558.8080                                   | 0.9000                                    | 161,602.9272                                 |
| RXE0005    | 4,602                             | 4,602                             | 234,702.0000                        | 234,702.0000                        | 1.0000                                | 234,702.0000                                   | 0.9000                                    | 211,231.8000                                 |
| RXE0006    | 420                               | 420                               | 289,800.0000                        | 289,800.0000                        | 0.9110                                | 264,007.8000                                   | 0.9000                                    | 237,607.0200                                 |
| RXE0007    | 332                               | 332                               | 55,112.0000                         | 55,112.0000                         | 0.9320                                | 51,364.3840                                    | 0.9000                                    | 46,227.9456                                  |
| RXE0010    | 5,311                             | 5,311                             | 197,038.1000                        | 197,038.1000                        | 0.9620                                | 189,550.6522                                   | 0.9000                                    | 170,595.5870                                 |
| RXE0011    | 4,832                             | 4,832                             | 179,267.2000                        | 179,267.2000                        | 0.9620                                | 172,455.0464                                   | 0.9000                                    | 155,209.5418                                 |
| RXE0012    | 1,651                             | 1,651                             | 84,201.0000                         | 84,201.0000                         | 1.0000                                | 84,201.0000                                    | 0.9000                                    | 75,780.9000                                  |
| RXE0013    | 335                               | 335                               | 231,150.0000                        | 231,150.0000                        | 1.0000                                | 231,150.0000                                   | 0.9000                                    | 208,035.0000                                 |
| RXE0014    | 395                               | 395                               | 65,570.0000                         | 65,570.0000                         | 0.9330                                | 61,176.8100                                    | 0.9000                                    | 55,059.1290                                  |
| RXE0015    | 518                               | 518                               | 85,988.0000                         | 107,247.3416                        | 0.9320                                | 99,954.5224                                    | 0.9000                                    | 89,959.0701                                  |
| RXE0102    | 15,241                            | 15,241                            | 565,441.1000                        | 565,441.1000                        | 0.9620                                | 543,954.3382                                   | 0.9000                                    | 489,558.9044                                 |
| RXE0103    | 3                                 | 3                                 | 132.3000                            | 132.3000                            | 0.9620                                | 127.2726                                       | 0.9000                                    | 114.5453                                     |
| RXE0104    | 145                               | 145                               | 3,190.0000                          | 3,190.0000                          | 0.9260                                | 2,953.9400                                     | 0.9000                                    | 2,658.5460                                   |
| RXE0110    | 1,718                             | 1,718                             | 63,737.8000                         | 63,737.8000                         | 0.9620                                | 61,315.7636                                    | 0.9000                                    | 55,184.1872                                  |

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RXE0111      | 1,702                             | 1,702                             | 63,144.2000                         | 63,144.2000                         | 0.9620                                | 60,744.7204                                    | 0.9000                                    | 54,670.2484                                  |
| RXE0115      | 26                                | 26                                | 21,320.0000                         | 21,320.0000                         | 1.0000                                | 21,320.0000                                    | 0.9000                                    | 19,188.0000                                  |
| <b>Total</b> | <b>86,058</b>                     | <b>86,058</b>                     | <b>3,858,172.1166</b>               | <b>3,879,431.4582</b>               |                                       | <b>3,727,199.2380</b>                          | <b>0.9000</b>                             | <b>3,354,479.3142</b>                        |

Table 97. Certified Home Energy Analysis Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID | 2013 Certified Net kWh Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kWh LLESMS Savings (H) = (F x 1.1) * | 2013 Realization Rate (I) = (F/A) | Lifetime kWh Savings (J) = (F x G) |
|------------|--|------------------|---|-----------------------------------|------------------------------------|
| RXC0001    | 49,743.1323                                  | 9                | 49,743.1323   | 90.00%                            | 447,688.1907                       |
| RXC0101    | 506.2226                                     | 9                | 506.2226  | 90.00%                            | 4,556.0038                         |
| RXE0002    | 1,269,942.9725                               | 9                | 1,269,942.9725  | 86.58%                            | 11,429,486.7523                    |
| RXE0003    | 1,603.6348                                   | 9                | 1,603.6348  | 86.58%                            | 14,432.7128                        |
| RXE0004    | 161,602.9272                                 | 12               | 177,763.2199  | 83.34%                            | 1,939,235.1264                     |
| RXE0005    | 211,231.8000                                 | 6                | 211,231.8000  | 90.00%                            | 1,267,390.8000                     |
| RXE0006    | 237,607.0200                                 | 12               | 261,367.7220  | 81.99%                            | 2,851,284.2400                     |
| RXE0007    | 46,227.9456                                  | 12               | 50,850.7402   | 83.88%                            | 554,735.3472                       |
| RXE0010    | 170,595.5870                                 | 9                | 170,595.5870  | 86.58%                            | 1,535,360.2828                     |
| RXE0011    | 155,209.5418                                 | 9                | 155,209.5418  | 86.58%                            | 1,396,885.8758                     |
| RXE0012    | 75,780.9000                                  | 6                | 75,780.9000   | 90.00%                            | 454,685.4000                       |
| RXE0013    | 208,035.0000                                 | 12               | 228,838.5000  | 90.00%                            | 2,496,420.0000                     |
| RXE0014    | 55,059.1290                                  | 12               | 60,565.0419   | 83.97%                            | 660,709.5480                       |
| RXE0015    | 89,959.0701                                  | 12               | 98,954.9771   | 104.62%                           | 1,079,508.8416                     |
| RXE0102    | 489,558.9044                                 | 9                | 489,558.9044  | 86.58%                            | 4,406,030.1394                     |
| RXE0103    | 114.5453                                     | 9                | 114.5453  | 86.58%                            | 1,030.9081                         |

| Measure ID   | 2013 Certified Net<br>kWh Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net<br>kWh LLESMS Savings<br>(H) = (F x 1.1) * | 2013<br>Realization<br>Rate (I) = (F/A) | Lifetime kWh<br>Savings<br>(J) = (F x G) |
|--------------|--|---------------------|---|---|--|
| RXE0104      | 2,658.5460   | 12                  | 2,924.4006  | 83.34%                                  | 31,902.5520                              |
| RXE0110      | 55,184.1872  | 9                   | 55,184.1872   | 86.58%                                  | 496,657.6852                             |
| RXE0111      | 54,670.2484  | 9                   | 54,670.2484   | 86.58%                                  | 492,032.2352                             |
| RXE0115      | 19,188.0000  | 3                   | 19,188.0000   | 90.00%                                  | 57,564.0000                              |
| <b>Total</b> | <b>3,354,479.3142</b>                              |                     | <b>3,434,594.2780</b>   | <b>86.95%</b>                           | <b>31,617,596.6414</b>                   |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 98. Certified Home Energy Analysis Program Participation and kW Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kW LLESM Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|--|-----------------------------------|
| RXE0002      | 39,536                            | 39,536                            | 173.9584                           | 173.9584                           | 0.9620                                | 167.3480                                      | 0.9000                                    | 150.6132                                    | 9                | 150.6132   | 86.58%                            |
| RXE0003      | 42                                | 42                                | 0.2226                             | 0.2226                             | 0.9620                                | 0.2141  | 0.9000                                    | 0.1927                                      | 9                | 0.1927   | 86.58%                            |
| RXE0005      | 4,602                             | 4,602                             | 26.6916                            | 26.6916                            | 1.0000                                | 26.6916                                       | 0.9000                                    | 24.0224                                     | 6                | 24.0224  | 90.00%                            |
| RXE0006      | 420                               | 420                               | 24.5280                            | 32.7180                            | 0.9110                                | 29.8061                                       | 0.9000                                    | 26.8255                                     | 12               | 29.5080  | 109.37%                           |
| RXE0007      | 332                               | 332                               | 6.2748                             | 6.2748                             | 0.9320                                | 5.8481  | 0.9000                                    | 5.2633                                      | 12               | 5.7896   | 83.88%                            |
| RXE0010      | 5,311                             | 5,311                             | 23.3684                            | 23.3684                            | 0.9620                                | 22.4804                                       | 0.9000                                    | 20.2324                                     | 9                | 20.2324  | 86.58%                            |
| RXE0011      | 4,832                             | 4,832                             | 21.2608                            | 21.2608                            | 0.9620                                | 20.4529                                       | 0.9000                                    | 18.4076                                     | 9                | 18.4076  | 86.58%                            |
| RXE0012      | 1,651                             | 1,651                             | 9.5758                             | 9.5758                             | 1.0000                                | 9.5758  | 0.9000                                    | 8.6182                                      | 6                | 8.6182   | 90.00%                            |
| RXE0013      | 335                               | 335                               | 19.5640                            | 26.0965                            | 1.0000                                | 26.0965                                       | 0.9000                                    | 23.4869                                     | 12               | 25.8355  | 120.05%                           |
| RXE0014      | 395                               | 395                               | 7.4655                             | 7.4655                             | 0.9330                                | 6.9653  | 0.9000                                    | 6.2688                                      | 12               | 6.8957   | 83.97%                            |
| RXE0015      | 518                               | 518                               | 97.9020                            | 12.1212                            | 0.9320                                | 11.2970                                       | 0.9000                                    | 10.1673                                     | 12               | 11.1840  | 10.39%                            |
| RXE0102      | 15,241                            | 15,241                            | 67.0604                            | 67.0604                            | 0.9620                                | 64.5121                                       | 0.9000                                    | 58.0609                                     | 9                | 58.0609  | 86.58%                            |
| RXE0103      | 3                                 | 3                                 | 0.0159                             | 0.0159                             | 0.9620                                | 0.0153  | 0.9000                                    | 0.0138                                      | 9                | 0.0138   | 86.58%                            |
| RXE0110      | 1,718                             | 1,718                             | 7.5592                             | 7.5592                             | 0.9620                                | 7.2720  | 0.9000                                    | 6.5448                                      | 9                | 6.5448   | 86.58%                            |
| RXE0111      | 1,702                             | 1,702                             | 7.4888                             | 7.4888                             | 0.9620                                | 7.2042  | 0.9000                                    | 6.4838                                      | 9                | 6.4838   | 86.58%                            |
| RXE0115      | 26                                | 26                                | 2.4050                             | 2.4050                             | 1.0000                                | 2.4050  | 0.9000                                    | 2.1645                                      | 3                | 2.1645   | 90.00%                            |
| <b>Total</b> | <b>76,664</b>                     | <b>76,664</b>                     | <b>495.3412</b>                    | <b>424.2829</b>                    |                                       | <b>408.1844</b>                               | <b>0.9000</b>                             | <b>367.3659</b>                             |                  | <b>374.5671</b>                                      | <b>74.16%</b>                     |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 99. Certified Home Energy Analysis Program Participation and First-Year MCF Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RXC0001      | 431                               | 431                               | 2,999.0273                          | 2,999.0273                          | 1.0000                                | 2,999.0273                                     | 0.9000                                    | 2,699.1246                                   |
| RXC0101      | 4                                 | 4                                 | 29.0036                             | 29.0036                             | 1.0000                                | 29.0036  | 0.9000                                    | 26.1032                                      |
| RXG0005      | 142,188                           | 142,188                           | 35,930.9076                         | 35,930.9076                         | 1.0000                                | 35,930.9076                                    | 0.9000                                    | 32,337.8168                                  |
| RXG0006      | 7,863                             | 7,863                             | 27,514.2096                         | 27,514.2096                         | 0.9110                                | 25,065.4449                                    | 0.9000                                    | 22,558.9005                                  |
| RXG0007      | 9,589                             | 9,589                             | 5,130.1150                          | 5,910.6596                          | 0.9320                                | 5,508.7347                                     | 0.9000                                    | 4,957.8613                                   |
| RXG0009      | 1,140                             | 1,140                             | 7,741.2840                          | 7,741.2840                          | 1.0000                                | 7,741.2840                                     | 0.9000                                    | 6,967.1556                                   |
| RXG0012      | 26,047                            | 26,047                            | 6,589.8910                          | 6,589.8910                          | 1.0000                                | 6,589.8910                                     | 0.9000                                    | 5,930.9019                                   |
| RXG0013      | 7,450                             | 7,450                             | 26,069.0400                         | 26,069.0400                         | 1.0000                                | 26,069.0400                                    | 0.9000                                    | 23,462.1360                                  |
| RXG0014      | 6,939                             | 6,939                             | 3,712.3650                          | 7,506.6102                          | 0.9330                                | 7,003.6673                                     | 0.9000                                    | 6,303.3006                                   |
| RXG0015      | 11,685                            | 11,685                            | 10,726.8300                         | 12,347.5395                         | 0.9320                                | 11,507.9068                                    | 0.9000                                    | 10,357.1161                                  |
| RXG0109      | 2                                 | 2                                 | 13.5424                             | 13.5424                             | 1.0000                                | 13.5424  | 0.9000                                    | 12.1882                                      |
| RXG0115      | 350                               | 350                               | 1,462.8600                          | 1,462.8600                          | 1.0000                                | 1,462.8600                                     | 0.9000                                    | 1,316.5740                                   |
| <b>Total</b> | <b>213,688</b>                    | <b>213,688</b>                    | <b>127,919.0755</b>                 | <b>134,114.5748</b>                 |                                       | <b>129,921.3097</b>                            | <b>0.9000</b>                             | <b>116,929.1788</b>                          |



Table 100. Certified Home Energy Analysis Program Long-Life Equipment Savings Multiplier and Lifetime MCF Savings by Measure

| Measure ID   | 2013 Certified Net MCF Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net MCF LLESMSavings<br>(H) = (F x 1.1)* | 2013 Realization Rate<br>(I) = (F/A) | Lifetime MCF Savings<br>(J) = (F x G) |
|--------------|---|---------------------|---|--------------------------------------|---------------------------------------|
| RXC0001      | 2,699.1246                                      | 9                   | 2,699.1246  | 90.00%                               | 24,292.1211                           |
| RXC0101      | 26.1032   | 9                   | 26.1032   | 90.00%                               | 234.9292                              |
| RXG0005      | 32,337.8168                                     | 6                   | 32,337.8168   | 90.00%                               | 194,026.9010                          |
| RXG0006      | 22,558.9005                                     | 12                  | 24,814.7905   | 81.99%                               | 270,706.8054                          |
| RXG0007      | 4,957.8613                                      | 12                  | 5,453.6474  | 96.64%                               | 59,494.3353                           |
| RXG0009      | 6,967.1556                                      | 9                   | 6,967.1556  | 90.00%                               | 62,704.4004                           |
| RXG0012      | 5,930.9019                                      | 6                   | 5,930.9019  | 90.00%                               | 35,585.4114                           |
| RXG0013      | 23,462.1360                                     | 12                  | 25,808.3496   | 90.00%                               | 281,545.6320                          |
| RXG0014      | 6,303.3006                                      | 12                  | 6,933.6306  | 169.79%                              | 75,639.6070                           |
| RXG0015      | 10,357.1161                                     | 12                  | 11,392.8277   | 096.55%                              | 124,285.3936                          |
| RXG0109      | 12.1882   | 9                   | 12.1882   | 90.00%                               | 109.6934                              |
| RXG0115      | 1,316.5740                                      | 3                   | 1,316.5740  | 90.00%                               | 3,949.7220                            |
| <b>Total</b> | <b>116,929.1788</b>                             |                     | <b>123,693.1102</b>                                     | <b>91.41%</b>                        | <b>1,132,574.9519</b>                 |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

## Appendix J: Insulation and Windows Program

Table 101 presents reported gross and certified net energy savings for the Insulation and Windows Program by fuel type. The realization rates reflect the adjustments Cadmus made based on our certification tasks and applying installation rate and NTG adjustments. The changes we made to reported gross energy savings are discussed in the following sections.

**Table 101. Insulation and Windows Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 921,241.41          | 732,970.6083      | 401.5178         | 72,690.0034       |
| Certified Net    | 921,241.41          | 659,673.5475      | 361.3660         | 65,421.0030       |
| Difference       | 0                   | -73,297.0608      | -40.1518         | -7,269.0003       |
| Realization Rate | 100.00%             | 90.00%            | 90.00%           | 90.00%            |

Table 102 presents reported and certified net energy savings with the long-life equipment savings multiplier for the Insulation and Windows Program by fuel type.

**Table 102. Insulation and Windows Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 921,241.41          | 725,640.8689      | 397.5910         | 71,963.1110       |
| Certified Net      | 921,241.41          | 725,640.9022      | 397.5026         | 71,963.1033       |
| Difference         | 0                   | 0.0333            | -0.0884          | -0.0077           |
| Certified/Reported | 100.00%             | 100.00%           | 99.98%           | 100.00%           |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

Cadmus reviewed program documents from a sample of 69 randomly selected account numbers. Table 103 documents reported and certified measure counts as well as reported and certified energy savings by fuel type.

**Table 103. Insulation and Windows Program Sample Participation and Savings by End Use**

| Measure Code | Reported     |                   |               |                 | Certified    |                   |               |                 |
|--------------|--------------|-------------------|---------------|-----------------|--------------|-------------------|---------------|-----------------|
|              | n            | kWh               | kW            | MCF             | n            | kWh               | kW            | MCF             |
| RWC0001      | 7            | 699.7011          | 0.3108        | 45.7121         | 7            | 699.7011          | 0.3108        | 45.7121         |
| RWC0002      | 7            | 631.6002          | 0.1967        | 42.3633         | 7            | 631.6002          | 0.1967        | 42.3633         |
| RWC0004      | 1            | -1.2202           | -0.0350       | 4.4434          | 1            | -1.2202           | -0.0350       | 4.4434          |
| RWC0005      | 1,228        | 1,672.0448        | 1.2280        | 63.3648         | 1,228        | 1,672.0448        | 1.2280        | 63.3648         |
| RWC0006      | 4            | 259.3028          | 0.0768        | 18.7228         | 4            | 259.3028          | 0.0768        | 18.7228         |
| RWC0007      | 40           | 11.1520           | 0.0040        | 0.5840          | 40           | 11.1520           | 0.0040        | 0.5840          |
| RWE0001      | 1            | 121.0530          | 0.0422        | -               | 1            | 121.0530          | 0.0422        | -               |
| RWE0002      | 1            | 110.1718          | 0.0276        | -               | 1            | 110.1718          | 0.0276        | -               |
| RWE0005      | 1,290        | 1,819.2870        | 1.0320        | -               | 1,290        | 1,819.2870        | 1.0320        | -               |
| RWE0007      | 80           | 25.4160           | 0.0080        | -               | 80           | 25.4160           | 0.0080        | -               |
| RWG0001      | 17           | -                 | -             | 109.8166        | 17           | -                 | -             | 109.8166        |
| RWG0004      | 1            | -                 | -             | 3.0573          | 1            | -                 | -             | 3.0573          |
| RWG0005      | 2,836        | -                 | -             | 136.4116        | 2,836        | -                 | -             | 136.4116        |
| RWG0006      | 2            | -                 | -             | 9.0012          | 2            | -                 | -             | 9.0012          |
| RWG0007      | 373          | -                 | -             | 4.8117          | 373          | -                 | -             | 4.8117          |
| <b>Total</b> | <b>5,888</b> | <b>5,348.5085</b> | <b>2.8911</b> | <b>438.2888</b> | <b>5,888</b> | <b>5,348.5085</b> | <b>2.8911</b> | <b>438.2888</b> |

The reported measure quantities for all database records matched their associated documentation. Table 104 provides the sample realization rates by fuel type and the t-test statistics Cadmus used to analyze errors in the sample.

**Table 104. Insulation and Windows Program Sample Realization Rates and t-Statistic**

|                                     | kWh        | kW         | MCF        |
|-------------------------------------|------------|------------|------------|
| Sample Realization Rate             | 100.00%    | 100.00%    | 100.00%    |
| Standard Error                      | N/A        | N/A        | N/A        |
| t-Statistic                         | N/A        | N/A        | N/A        |
| p-Value                             | N/A        | N/A        | N/A        |
| <b>Apply to Program Population?</b> | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |

#### **Task 4: Measure-Level Savings Analysis**

Cadmus found zero discrepancies between the per-unit measure savings reported by Consumers Energy and values either maintained in the MEMD or calculated by Navigant.

Table 105 presents the reported and certified per-unit savings for all measures delivered through the 2013 Insulation and Windows Program.

**Table 105. Insulation and Windows Program Reported and Certified Per-Unit Measure Savings**

| Measure Code | Reported |         |        | Certified |         |        | Certified LLESIM |          |         |        |
|--------------|----------|---------|--------|-----------|---------|--------|------------------|----------|---------|--------|
|              | kWh      | kW      | MCF    | kWh       | kW      | MCF    | Measure Life     | kWh      | kW      | MCF    |
| RWC0001      | 99.9573  | 0.0444  | 6.5303 | 99.9573   | 0.0444  | 6.5303 | 20               | 109.9530 | 0.0488  | 7.1833 |
| RWC0002      | 90.2286  | 0.0281  | 6.0519 | 90.2286   | 0.0281  | 6.0519 | 20               | 99.2515  | 0.0309  | 6.6571 |
| RWC0003      | 25.2814  | -0.0265 | 5.3404 | 25.2814   | -0.0265 | 5.3404 | 20               | 27.8095  | -0.0292 | 5.8744 |
| RWC0004      | -1.2202  | -0.0350 | 4.4434 | -1.2202   | -0.0350 | 4.4434 | 20               | -1.3422  | -0.0385 | 4.8877 |
| RWC0005      | 1.3616   | 0.0010  | 0.0516 | 1.3616    | 0.0010  | 0.0516 | 20               | 1.4978   | 0.0011  | 0.0568 |
| RWC0006      | 64.8257  | 0.0192  | 4.6807 | 64.8257   | 0.0192  | 4.6807 | 20               | 71.3083  | 0.0211  | 5.1488 |
| RWC0007      | 0.2788   | 0.0001  | 0.0146 | 0.2788    | 0.0001  | 0.0146 | 20               | 0.3067   | 0.0001  | 0.0161 |
| RWE0001      | 121.0530 | 0.0422  | 0.0000 | 121.0530  | 0.0422  | 0.0000 | 20               | 133.1583 | 0.0464  | 0.0000 |
| RWE0002      | 110.1718 | 0.0276  | 0.0000 | 110.1718  | 0.0276  | 0.0000 | 20               | 121.1890 | 0.0304  | 0.0000 |
| RWE0003      | 39.2841  | -0.0205 | 0.0000 | 39.2841   | -0.0205 | 0.0000 | 20               | 43.2125  | -0.0226 | 0.0000 |
| RWE0004      | 7.7008   | -0.0236 | 0.0000 | 7.7008    | -0.0236 | 0.0000 | 20               | 8.4709   | -0.0260 | 0.0000 |
| RWE0005      | 1.4103   | 0.0008  | 0.0000 | 1.4103    | 0.0008  | 0.0000 | 20               | 1.5513   | 0.0009  | 0.0000 |
| RWE0006      | 80.7219  | 0.0212  | 0.0000 | 80.7219   | 0.0212  | 0.0000 | 20               | 88.7941  | 0.0233  | 0.0000 |
| RWE0007      | 0.3177   | 0.0001  | 0.0000 | 0.3177    | 0.0001  | 0.0000 | 20               | 0.3495   | 0.0001  | 0.0000 |
| RWG0001      | 0.0000   | 0.0000  | 6.4598 | 0.0000    | 0.0000  | 6.4598 | 20               | 0.0000   | 0.0000  | 7.1058 |
| RWG0002      | 0.0000   | 0.0000  | 5.4401 | 0.0000    | 0.0000  | 5.4401 | 20               | 0.0000   | 0.0000  | 5.9841 |
| RWG0003      | 0.0000   | 0.0000  | 4.3189 | 0.0000    | 0.0000  | 4.3189 | 20               | 0.0000   | 0.0000  | 4.7508 |
| RWG0004      | 0.0000   | 0.0000  | 3.0573 | 0.0000    | 0.0000  | 3.0573 | 20               | 0.0000   | 0.0000  | 3.3630 |
| RWG0005      | 0.0000   | 0.0000  | 0.0481 | 0.0000    | 0.0000  | 0.0481 | 20               | 0.0000   | 0.0000  | 0.0529 |
| RWG0006      | 0.0000   | 0.0000  | 4.5006 | 0.0000    | 0.0000  | 4.5006 | 20               | 0.0000   | 0.0000  | 4.9507 |
| RWG0007      | 0.0000   | 0.0000  | 0.0129 | 0.0000    | 0.0000  | 0.0129 | 20               | 0.0000   | 0.0000  | 0.0142 |

### Major Findings by Fuel Type

The tables below present certified program participation and energy savings by measure. Table 106 and Table 107 document kWh savings, Table 108 documents kW savings, and Table 109 and Table 110 document MCF savings.

Table 106. Certified Insulation and Windows Program Participation and First-Year kWh Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RWC0001      | 1,276                             | 1,276                             | 127,545.5148                        | 127,545.5148                        | 1.0000                                | 127,545.5148                                   | 0.9000                                    | 114,790.9633                                 |
| RWC0002      | 424                               | 424                               | 38,256.9264                         | 38,256.9264                         | 1.0000                                | 38,256.9264                                    | 0.9000                                    | 34,431.2338                                  |
| RWC0003      | 70                                | 70                                | 1,769.6980                          | 1,769.6980                          | 1.0000                                | 1,769.6980                                     | 0.9000                                    | 1,592.7282                                   |
| RWC0004      | 122                               | 122                               | -148.8644                           | -148.8644                           | 1.0000                                | -148.8644                                      | 0.9000                                    | -133.9780                                    |
| RWC0005      | 206,628                           | 206,628                           | 281,344.6848                        | 281,344.6848                        | 1.0000                                | 281,344.6848                                   | 0.9000                                    | 253,210.2163                                 |
| RWC0006      | 378                               | 378                               | 24,504.1146                         | 24,504.1146                         | 1.0000                                | 24,504.1146                                    | 0.9000                                    | 22,053.7031                                  |
| RWC0007      | 17,608                            | 17,608                            | 4,909.1104                          | 4,909.1104                          | 1.0000                                | 4,909.1104                                     | 0.9000                                    | 4,418.1994                                   |
| RWE0001      | 333                               | 333                               | 40,310.6490                         | 40,310.6490                         | 1.0000                                | 40,310.6490                                    | 0.9000                                    | 36,279.5841                                  |
| RWE0002      | 177                               | 177                               | 19,500.4086                         | 19,500.4086                         | 1.0000                                | 19,500.4086                                    | 0.9000                                    | 17,550.3677                                  |
| RWE0003      | 41                                | 41                                | 1,610.6481                          | 1,610.6481                          | 1.0000                                | 1,610.6481                                     | 0.9000                                    | 1,449.5833                                   |
| RWE0004      | 36                                | 36                                | 277.2288                            | 277.2288                            | 1.0000                                | 277.2288                                       | 0.9000                                    | 249.5059                                     |
| RWE0005      | 128,672                           | 128,672                           | 181,466.1216                        | 181,466.1216                        | 1.0000                                | 181,466.1216                                   | 0.9000                                    | 163,319.5094                                 |
| RWE0006      | 99                                | 99                                | 7,991.4681                          | 7,991.4681                          | 1.0000                                | 7,991.4681                                     | 0.9000                                    | 7,192.3213                                   |
| RWE0007      | 11,435                            | 11,435                            | 3,632.8995                          | 3,632.8995                          | 1.0000                                | 3,632.8995                                     | 0.9000                                    | 3,269.6096                                   |
| <b>Total</b> | <b>367,299</b>                    | <b>367,299</b>                    | <b>732,970.6083</b>                 | <b>732,970.6083</b>                 |                                       | <b>732,970.6083</b>                            | <b>0.9000</b>                             | <b>659,673.5475</b>                          |

Table 107. Certified Insulation and Windows Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID   | 2013 Certified<br>Net kWh Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net<br>kWh LLESMS Savings<br>(H) = (F x 1.1) * | 2013 Realization<br>Rate<br>(I) = (F/A) | Lifetime kWh Savings<br>(J) = (F x G) |
|--------------|--|---------------------|---|---|---------------------------------------|
| RWC0001      | 114,790.9633                                       | 20                  | 126,270.0597  | 90.00%                                  | 2,295,819.2664                        |
| RWC0002      | 34,431.2338  | 20                  | 37,874.3571   | 90.00%                                  | 688,624.6752                          |
| RWC0003      | 1,592.7282   | 20                  | 1,752.0010  | 90.00%                                  | 31,854.6752                           |
| RWC0004      | -133.9780  | 20                  | -147.3758   | 90.00%                                  | -2,679.5592                           |
| RWC0005      | 253,210.2163                                       | 20                  | 278,531.2380  | 90.00%                                  | 5,064,204.3264                        |
| RWC0006      | 22,053.7031  | 20                  | 24,259.0735   | 90.00%                                  | 441,074.0628                          |
| RWC0007      | 4,418.1994   | 20                  | 4,860.0193  | 90.00%                                  | 88,363.9872                           |
| RWE0001      | 36,279.5841  | 20                  | 39,907.5425   | 90.00%                                  | 725,591.6820                          |
| RWE0002      | 17,550.3677  | 20                  | 19,305.4045   | 90.00%                                  | 351,007.3548                          |
| RWE0003      | 1,449.5833   | 20                  | 1,594.5416  | 90.00%                                  | 28,991.6658                           |
| RWE0004      | 249.5059   | 20                  | 274.4565  | 90.00%                                  | 4,990.1184                            |
| RWE0005      | 163,319.5094                                       | 20                  | 179,651.4604  | 90.00%                                  | 3,266,390.1888                        |
| RWE0006      | 7,192.3213   | 20                  | 7,911.5534  | 90.00%                                  | 143,846.4258                          |
| RWE0007      | 3,269.6096   | 20                  | 3,596.5705  | 90.00%                                  | 65,392.1210                           |
| <b>Total</b> | <b>659,673.5475</b>                                |                     | <b>725,640.9022</b>   | <b>90.00%</b>                           | <b>13,193,470.9494</b>                |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 108. Certified Insulation and Windows Program Participation and kW Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kW LLESMSavings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|---|-----------------------------------|
| RWC0001      | 1,276                             | 1,276                             | 56.6544                            | 56.6544                            | 1.0000                                | 56.6544                                       | 0.9000                                    | 50.9890                                     | 20               | 56.0879   | 90.00%                            |
| RWC0002      | 424                               | 424                               | 11.9144                            | 11.9144                            | 1.0000                                | 11.9144                                       | 0.9000                                    | 10.7230                                     | 20               | 11.7953   | 90.00%                            |
| RWC0003      | 70                                | 70                                | -1.8550                            | -1.8550                            | 1.0000                                | -1.8550                                       | 0.9000                                    | -1.6695                                     | 20               | -1.8365   | 90.00%                            |
| RWC0004      | 122                               | 122                               | -4.2700                            | -4.2700                            | 1.0000                                | -4.2700                                       | 0.9000                                    | -3.8430                                     | 20               | -4.2273   | 90.00%                            |
| RWC0005      | 206,628                           | 206,628                           | 206.6280                           | 206.6280                           | 1.0000                                | 206.6280                                      | 0.9000                                    | 185.9652                                    | 20               | 204.5617  | 90.00%                            |
| RWC0006      | 378                               | 378                               | 7.2576                             | 7.2576                             | 1.0000                                | 7.2576  | 0.9000                                    | 6.5318                                      | 20               | 7.1850  | 90.00%                            |
| RWC0007      | 17,608                            | 17,608                            | 1.7608                             | 1.7608                             | 1.0000                                | 1.7608  | 0.9000                                    | 1.5847                                      | 20               | 1.7432  | 90.00%                            |
| RWE0001      | 333                               | 333                               | 14.0526                            | 14.0526                            | 1.0000                                | 14.0526                                       | 0.9000                                    | 12.6473                                     | 20               | 13.9121   | 90.00%                            |
| RWE0002      | 177                               | 177                               | 4.8852                             | 4.8852                             | 1.0000                                | 4.8852  | 0.9000                                    | 4.3967                                      | 20               | 4.8363  | 90.00%                            |
| RWE0003      | 41                                | 41                                | -0.8405                            | -0.8405                            | 1.0000                                | -0.8405                                       | 0.9000                                    | -0.7565                                     | 20               | -0.8321   | 90.00%                            |
| RWE0004      | 36                                | 36                                | -0.8496                            | -0.8496                            | 1.0000                                | -0.8496                                       | 0.9000                                    | -0.7646                                     | 20               | -0.8411   | 90.00%                            |
| RWE0005      | 128,672                           | 128,672                           | 102.9376                           | 102.9376                           | 1.0000                                | 102.9376                                      | 0.9000                                    | 92.6438                                     | 20               | 101.9082  | 90.00%                            |
| RWE0006      | 99                                | 99                                | 2.0988                             | 2.0988                             | 1.0000                                | 2.0988  | 0.9000                                    | 1.8889                                      | 20               | 2.0778  | 90.00%                            |
| RWE0007      | 11,435                            | 11,435                            | 1.1435                             | 1.1435                             | 1.0000                                | 1.1435  | 0.9000                                    | 1.0292                                      | 20               | 1.1321  | 90.00%                            |
| <b>Total</b> | <b>367,299</b>                    | <b>367,299</b>                    | <b>401.5178</b>                    | <b>401.5178</b>                    |                                       | <b>401.5178</b>                               | <b>0.9000</b>                             | <b>361.3660</b>                             |                  | <b>397.5026</b>                                     | <b>90.00%</b>                     |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 109. Certified Insulation and Windows Program Participation and First-Year MCF Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RWC0001      | 1,276                             | 1,276                             | 8,332.6628                          | 8,332.6628                          | 1.0000                                | 8,332.6628                                     | 0.9000                                    | 7,499.3965                                   |
| RWC0002      | 424                               | 424                               | 2,566.0056                          | 2,566.0056                          | 1.0000                                | 2,566.0056                                     | 0.9000                                    | 2,309.4050                                   |
| RWC0003      | 70                                | 70                                | 373.8280                            | 373.8280                            | 1.0000                                | 373.8280                                       | 0.9000                                    | 336.4452                                     |
| RWC0004      | 122                               | 122                               | 542.0948                            | 542.0948                            | 1.0000                                | 542.0948                                       | 0.9000                                    | 487.8853                                     |
| RWC0005      | 206,628                           | 206,628                           | 10,662.0048                         | 10,662.0048                         | 1.0000                                | 10,662.0048                                    | 0.9000                                    | 9,595.8043                                   |
| RWC0006      | 378                               | 378                               | 1,769.3046                          | 1,769.3046                          | 1.0000                                | 1,769.3046                                     | 0.9000                                    | 1,592.3741                                   |
| RWC0007      | 17,608                            | 17,608                            | 257.0768                            | 257.0768                            | 1.0000                                | 257.0768                                       | 0.9000                                    | 231.3691                                     |
| RWG0001      | 2,781                             | 2,781                             | 17,964.7038                         | 17,964.7038                         | 1.0000                                | 17,964.7038                                    | 0.9000                                    | 16,168.2334                                  |
| RWG0002      | 591                               | 591                               | 3,215.0991                          | 3,215.0991                          | 1.0000                                | 3,215.0991                                     | 0.9000                                    | 2,893.5892                                   |
| RWG0003      | 96                                | 96                                | 414.6144                            | 414.6144                            | 1.0000                                | 414.6144                                       | 0.9000                                    | 373.1530                                     |
| RWG0004      | 102                               | 102                               | 311.8446                            | 311.8446                            | 1.0000                                | 311.8446                                       | 0.9000                                    | 280.6601                                     |
| RWG0005      | 484,865.15                        | 484,865.15                        | 23,322.0137                         | 23,322.0137                         | 1.0000                                | 23,322.0137                                    | 0.9000                                    | 20,989.8123                                  |
| RWG0006      | 471                               | 471                               | 2,119.7826                          | 2,119.7826                          | 1.0000                                | 2,119.7826                                     | 0.9000                                    | 1,907.8043                                   |
| RWG0007      | 65,036.26                         | 65,036.26                         | 838.9678                            | 838.9678                            | 1.0000                                | 838.9678                                       | 0.9000                                    | 755.0710                                     |
| <b>Total</b> | <b>780,448.41</b>                 | <b>780,448.41</b>                 | <b>72,690.0034</b>                  | <b>72,690.0034</b>                  |                                       | <b>72,690.0034</b>                             | <b>0.9000</b>                             | <b>65,421.0030</b>                           |



Table 110. Certified Insulation and Windows Program Long-Life Equipment Savings Multiplier and Lifetime MCF Savings by Measure

| Measure ID   | 2013 Certified Net<br>MCF Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net<br>MCF LLESMS Savings<br>(H) = (F x 1.1)* | 2013 Realization<br>Rate<br>(I) = (F/A) | Lifetime MCF<br>Savings<br>(J) = (F x G) |
|--------------|--|---------------------|--|---|--|
| RWC0001      | 7,499.3965   | 20                  | 8,249.3362   | 90.00%                                  | 149,987.9304                             |
| RWC0002      | 2,309.4050   | 20                  | 2,540.3455   | 90.00%                                  | 46,188.1008                              |
| RWC0003      | 336.4452   | 20                  | 370.0897   | 90.00%                                  | 6,728.9040                               |
| RWC0004      | 487.8853   | 20                  | 536.6739   | 90.00%                                  | 9,757.7064                               |
| RWC0005      | 9,595.8043   | 20                  | 10,555.3848  | 90.00%                                  | 191,916.0864                             |
| RWC0006      | 1,592.3741   | 20                  | 1,751.6116   | 90.00%                                  | 31,847.4828                              |
| RWC0007      | 231.3691   | 20                  | 254.5060   | 90.00%                                  | 4,627.3824                               |
| RWG0001      | 16,168.2334  | 20                  | 17,785.0568  | 90.00%                                  | 323,364.6684                             |
| RWG0002      | 2,893.5892   | 20                  | 3,182.9481   | 90.00%                                  | 57,871.7838                              |
| RWG0003      | 373.1530   | 20                  | 410.4683   | 90.00%                                  | 7,463.0592                               |
| RWG0004      | 280.6601   | 20                  | 308.7262   | 90.00%                                  | 5,613.0868                               |
| RWG0005      | 20,989.8123  | 20                  | 23,088.7936  | 90.00%                                  | 419,796.2469                             |
| RWG0006      | 1,907.8043   | 20                  | 2,098.5848   | 90.00%                                  | 38,156.0868                              |
| RWG0007      | 755.0710   | 20                  | 830.5781   | 90.00%                                  | 15,101.4196                              |
| <b>Total</b> | <b>65,421.0030</b>                                 |                     | <b>71,963.1033</b>   | <b>90.00%</b>                           | <b>1,308,420.0606</b>                    |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

## Appendix K: New Home Construction Program

Table 111 presents reported gross and certified net energy savings for the New Home Construction Program by fuel type. The realization rates reflect the adjustments Cadmus made based on our certification tasks and applying installation rate and NTG adjustments. The following sections discuss the changes we made to reported gross energy savings.

**Table 111. New Home Construction Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 585                 | 168,680.1643      | 0.1760           | 14,428.6540       |
| Certified Net    | 585                 | 152,052.3393      | 0.1584           | 12,985.7886       |
| Difference       | 0                   | -16,627.8250      | -0.0176          | -1,442.8654       |
| Realization Rate | 100.00%             | 90.14%            | 90.00%           | 90.00%            |

Table 112 presents reported and certified net energy savings with the long-life equipment savings multiplier for the New Home Construction Program by fuel type.

**Table 112. New Home Construction Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 585                 | 165,835.1763      | 0.1584           | 14,276.5949       |
| Certified Net      | 585                 | 166,987.2093      | 0.1584           | 14,276.5931       |
| Difference         | 0                   | 1,152.0330        | 0.0000           | -0.0018           |
| Certified/Reported | 100.00%             | 100.69%           | 100.00%          | 100.00%           |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

Cadmus reviewed program documents from a sample of 55 randomly selected account numbers. Table 113 documents reported and certified measure counts as well as reported and certified energy savings by fuel type.

**Table 113. New Home Construction Program Sample Participation and Savings by End Use**

| Measure Code | Reported  |                    |          |                   | Certified |                    |          |                   |
|--------------|-----------|--------------------|----------|-------------------|-----------|--------------------|----------|-------------------|
|              | n         | kWh                | kW       | MCF               | n         | kWh                | kW       | MCF               |
| RNC0001      | 28        | 18,181.0000        | -        | 1,654.8000        | 28        | 18,181.0000        | -        | 1,654.8000        |
| RNE0001      | 11        | 3,096.0000         | -        | -                 | 11        | 3,096.0000         | -        | -                 |
| RNG0001      | 15        | -                  | -        | 352.8000          | 15        | -                  | -        | 352.8000          |
| RNG0008      | 1         | -                  | -        | 4.5464            | 1         | -                  | -        | 4.5464            |
| RNG0010      | 2         | -                  | -        | 1.9440            | 2         | -                  | -        | 1.9440            |
| RNG0012      | 2         | -                  | -        | 27.9006           | 2         | -                  | -        | 27.9006           |
| <b>Total</b> | <b>59</b> | <b>21,277.0000</b> | <b>-</b> | <b>2,041.9910</b> | <b>59</b> | <b>21,277.0000</b> | <b>-</b> | <b>2,041.9910</b> |

The reported measure quantities for all database records matched their associated documentation. Table 114 provides the sample realization rates by fuel type and the t-test statistics Cadmus used to analyze errors in the sample.

**Table 114. New Home Construction Program Sample Realization Rates and t-Statistic**

|                                     | kWh        | kW         | MCF        |
|-------------------------------------|------------|------------|------------|
| Sample Realization Rate             | 100.00%    | 100.00%    | 100.00%    |
| Standard Error                      | N/A        | N/A        | N/A        |
| t-Statistic                         | N/A        | N/A        | N/A        |
| p-Value                             | N/A        | N/A        | N/A        |
| <b>Apply to Program Population?</b> | <b>N/A</b> | <b>N/A</b> | <b>N/A</b> |

#### **Task 4: Measure-Level Savings Analysis**

Cadmus did not find any discrepancies between reported per-unit measure savings and values either maintained in the MEMD or calculated by Navigant. However, Cadmus found that a gas-only customer had received negative kWh savings from measure RNG0011–95% AFUE Boiler, and we removed the negative kWh savings for that customer.

Table 115 presents the reported and certified per-unit savings for all measures delivered through the 2013 New Home Construction Program.

**Table 115. New Home Construction Program Reported and Certified Per-Unit Measure Savings**

| Measure Code | Reported  |        |         | Certified |        |         | Certified LLESMS |           |        |         |
|--------------|-----------|--------|---------|-----------|--------|---------|------------------|-----------|--------|---------|
|              | kWh       | kW     | MCF     | kWh       | kW     | MCF     | Measure Life     | kWh       | kW     | MCF     |
| RNC0001      | Custom    | Custom | Custom  | Custom    | Custom | Custom  | 20               | Custom    | Custom | Custom  |
| RNE0001      | Custom    | Custom | Custom  | Custom    | Custom | Custom  | 20               | Custom    | Custom | Custom  |
| RNE0012      | 37.1000   | 0.0044 | 0.0000  | 37.1000   | 0.0044 | 0.0000  | 9                | 37.1000   | 0.0044 | 0.0000  |
| RNG0001      | Custom    | Custom | Custom  | Custom    | Custom | Custom  | 20               | Custom    | Custom | Custom  |
| RNG0002      | 0.0000    | 0.0000 | 6.5124  | 0.0000    | 0.0000 | 6.5124  | 15               | 0.0000    | 0.0000 | 7.1636  |
| RNG0003      | 0.0000    | 0.0000 | 3.4992  | 0.0000    | 0.0000 | 3.4992  | 15               | 0.0000    | 0.0000 | 3.8491  |
| RNG0004      | 0.0000    | 0.0000 | 24.3312 | 0.0000    | 0.0000 | 24.3312 | 15               | 0.0000    | 0.0000 | 26.7643 |
| RNG0008      | 80.0023   | 0.0000 | 4.5464  | 80.0023   | 0.0000 | 4.5464  | 9                | 80.0023   | 0.0000 | 4.5464  |
| RNG0010      | 0.0000    | 0.0000 | 0.9720  | 0.0000    | 0.0000 | 0.9720  | 15               | 0.0000    | 0.0000 | 1.0692  |
| RNG0011      | -266.8794 | 0.0000 | 41.9773 | -266.8794 | 0.0000 | 41.9773 | 15               | -293.5673 | 0.0000 | 46.1750 |
| RNG0012      | 0.0000    | 0.0000 | 13.9503 | 0.0000    | 0.0000 | 13.9503 | 15               | 0.0000    | 0.0000 | 15.3453 |

### ***Performance Incentive Metric***

In addition to verifying savings for the New Home Construction program, Cadmus verified the number of ENERGY STAR 3.0 homes built in 2013 compared to the number built in 2012 as a performance incentive metric. In 2013, 318 gas or combination new homes were constructed through the program compared to 194 in 2012, or a 63.92% increase. Of the 318 homes constructed in 2013, 202 were combination homes of which 185 were reported with the measure code RNC0001 – New Construction Combination Savings and 17 were reported using measure codes RNE0001 – New Construction Electric Savings and RNG0001 – New Construction Gas Savings. The remaining 116 of 318 homes were homes in which Consumers Energy provides only natural gas service. An additional 93 homes were constructed in areas where Consumers Energy provides only electric service resulting in a total of 411 ENERGY STAR 3.0 homes. Electric savings were reported for these homes, but they are not counted toward the performance incentive metric.

### Major Findings by Fuel Type

The tables below present certified program participation and energy savings by measure. Table 116 and Table 117 document kWh savings, Table 118 documents kW savings, and Table 119 and Table 120 document MCF savings.

Table 116. Certified New Home Construction Program Participation and First-Year kWh Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RNC0001      | 185                               | 185                               | 125,165.0000                        | 125,165.0000                        | 1.0000                                | 125,165.0000                                   | 0.9000                                    | 112,648.5000                                 |
| RNE0001      | 110                               | 110                               | 40,778.0000                         | 40,778.0000                         | 1.0000                                | 40,778.0000                                    | 0.9000                                    | 36,700.2000                                  |
| RNE0012      | 40                                | 40                                | 1,484.0000                          | 1,484.0000                          | 1.0000                                | 1,484.0000                                     | 0.9000                                    | 1,335.6000                                   |
| RNG0008      | 19                                | 19                                | 1,520.0437                          | 1,520.0437                          | 1.0000                                | 1,520.0437                                     | 0.9000                                    | 1,368.0393                                   |
| RNG0011      | 1                                 | 0                                 | -266.8794                           | 0.0000                              | 1.0000                                | 0.0000   | 0.9000                                    | 0.0000                                       |
| <b>Total</b> | <b>355</b>                        | <b>354</b>                        | <b>168,680.1643</b>                 | <b>168,947.0437</b>                 |                                       | <b>168,947.0437</b>                            | <b>0.9000</b>                             | <b>152,052.3393</b>                          |

Table 117. Certified New Home Construction Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID   | 2013 Certified Net kWh Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kWh LLESM Savings (H) = (F x 1.1) * | 2013 Realization Rate (I) = (F/A) | Lifetime kWh Savings (J) = (F x G) |
|--------------|--|------------------|--|-----------------------------------|------------------------------------|
| RNC0001      | 112,648.5000                                 | 20               | 123,913.3500   | 90.00%                            | 2,252,970.0000                     |
| RNE0001      | 36,700.2000                                  | 20               | 40,370.2200  | 90.00%                            | 734,004.0000                       |
| RNE0012      | 1,335.6000                                   | 9                | 1,335.6000   | 90.00%                            | 12,020.4000                        |
| RNG0008      | 1,368.0393                                   | 9                | 1,368.0393   | 90.00%                            | 12,312.3540                        |
| RNG0011      | 0.0000                                       | 15               | 0.0000   | 0.00%                             | 0.0000                             |
| <b>Total</b> | <b>152,052.3393</b>                          |                  | <b>166,987.2093</b>                                    | <b>90.14%</b>                     | <b>3,011,306.7540</b>              |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 118. Certified New Home Construction Program Participation and kW Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kW Savings (A) | 2013 Adjusted Gross kW Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kW Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kW Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kW LLESM Savings (H) = (F x 1.1) * | 2013 Realization Rate (I) = (F/A) |
|--------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|---|---|------------------|---|-----------------------------------|
| RNE0012      | 40                                | 40                                | 0.1760                             | 0.1760                             | 1.0000                                | 0.1760  | 0.9000                                    | 0.1584                                      | 9                | 0.1584  | 90.00%                            |
| <b>Total</b> | <b>40</b>                         | <b>40</b>                         | <b>0.1760</b>                      | <b>0.1760</b>                      |                                       | <b>0.1760</b>                                 | <b>0.9000</b>                             | <b>0.1584</b>                               |                  | <b>0.1584</b>   | <b>90.00%</b>                     |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 119. Certified New Home Construction Program Participation and First-Year MCF Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| RNC0001      | 185                               | 185                               | 8,765.9100                          | 8,765.9100                          | 1.0000                                | 8,765.9100                                     | 0.9000                                    | 7,889.3190                                   |
| RNG0001      | 133                               | 133                               | 4,726.3000                          | 4,726.3000                          | 1.0000                                | 4,726.3000                                     | 0.9000                                    | 4,253.6700                                   |
| RNG0002      | 1                                 | 1                                 | 6.5124                              | 6.5124                              | 1.0000                                | 6.5124   | 0.9000                                    | 5.8612                                       |
| RNG0003      | 5                                 | 5                                 | 17.4960                             | 17.4960                             | 1.0000                                | 17.4960  | 0.9000                                    | 15.7464                                      |
| RNG0004      | 7                                 | 7                                 | 170.3184                            | 170.3184                            | 1.0000                                | 170.3184                                       | 0.9000                                    | 153.2866                                     |
| RNG0008      | 19                                | 19                                | 86.3816                             | 86.3816                             | 1.0000                                | 86.3816  | 0.9000                                    | 77.7434                                      |
| RNG0010      | 43                                | 43                                | 41.7960                             | 41.7960                             | 1.0000                                | 41.7960  | 0.9000                                    | 37.6164                                      |
| RNG0011      | 1                                 | 1                                 | 41.9773                             | 41.9773                             | 1.0000                                | 41.9773  | 0.9000                                    | 37.7796                                      |
| RNG0012      | 41                                | 41                                | 571.9623                            | 571.9623                            | 1.0000                                | 571.9623                                       | 0.9000                                    | 514.7661                                     |
| <b>Total</b> | <b>435</b>                        | <b>435</b>                        | <b>14,428.6540</b>                  | <b>14,428.6540</b>                  |                                       | <b>14,428.6540</b>                             | <b>0.9000</b>                             | <b>12,985.7886</b>                           |

Table 120. Certified New Home Construction Program Long-Life Equipment Savings Multiplier and Lifetime MCF Savings by Measure

| Measure ID   | 2013 Certified<br>Net MCF Savings<br>(F) = (D x E) | Measure Life<br>(G) | 2013 Certified Net<br>MCF LLESMS Savings<br>(H) = (F x 1.1)* | 2013 Realization<br>Rate<br>(I) = (F/A) | Lifetime MCF<br>Savings<br>(J) = (F x G) |
|--------------|--|---------------------|--|---|--|
| RNC0001      | 7,889.3190   | 20                  | 8,678.2509   | 90.00%                                  | 157,786.3800                             |
| RNG0001      | 4,253.6700   | 20                  | 4,679.0370   | 90.00%                                  | 85,073.4000                              |
| RNG0002      | 5.8612   | 15                  | 6.4473   | 90.00%                                  | 87.9174                                  |
| RNG0003      | 15.7464  | 15                  | 17.3210  | 90.00%                                  | 236.1960                                 |
| RNG0004      | 153.2866   | 15                  | 168.6152   | 90.00%                                  | 2,299.2984                               |
| RNG0008      | 77.7434  | 9                   | 77.7434  | 90.00%                                  | 699.6910                                 |
| RNG0010      | 37.6164  | 15                  | 41.3780  | 90.00%                                  | 564.2460                                 |
| RNG0011      | 37.7796  | 15                  | 41.5575  | 90.00%                                  | 566.6936                                 |
| RNG0012      | 514.7661   | 15                  | 566.2427   | 90.00%                                  | 7,721.4911                               |
| <b>Total</b> | <b>12,985.7886</b>                                 |                     | <b>14,276.5931</b>   | <b>90.00%</b>                           | <b>255,035.3134</b>                      |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

## Appendix L: Home Energy Reports Program

Table 121 presents reported gross and certified net energy savings for the Home Energy Reports Program by fuel type. The realization rates reflect the adjustments Cadmus made based on our certification tasks and applying installation rate and NTG adjustments. The following section discuss the changes we made to reported gross energy savings.

**Table 121. Home Energy Reports Program Participation and Savings without Long-Life Equipment Savings Multiplier**

|                  | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|------------------|---------------------|-------------------|------------------|-------------------|
| Reported Gross   | 273,858             | 32,955,512.7929   | 0.0000           | 59,704.6063       |
| Certified Net    | 273,858             | 28,409,888.6773   | 0.0000           | 51,858.2914       |
| Difference       | 0                   | -4,545,624.1156   | 0.0000           | -7,846.3149       |
| Realization Rate | 100.00%             | 86.21%            | N/A              | 86.86%            |

Table 122 presents reported and certified net energy savings with the long-life equipment savings multiplier for the Home Energy Reports Program by fuel type.

**Table 122. Home Energy Reports Program Participation and Savings with Long-Life Equipment Savings Multiplier**

|                    | Participation Total | Total kWh Savings | Total kW Savings | Total MCF Savings |
|--------------------|---------------------|-------------------|------------------|-------------------|
| Reported Net       | 272,858             | 28,409,887.0904   | 0.0000           | 51,859.2817       |
| Certified Net      | 272,858             | 28,409,888.6773   | 0.0000           | 51,858.2914       |
| Difference         | 0                   | 1.5869            | 0.0000           | -0.9903           |
| Certified/Reported | 100.00%             | 100.00%           | N/A              | 100.00%           |

### Task 2: Database Review

The Consumers Energy and implementer databases matched across all areas of inquiry: (a) number of participants; (b) quantities of installed measures; and (c) appropriate application of savings according to customer type. Cadmus also verified that the measures were installed during the 2013 program year.

Gross reported savings are based on reported installation quantities; Cadmus used certified installation quantities when calculating net energy savings.

### Task 3: Documentation Review

The Home Energy Reports Program does not have customer-level program documents available for review; therefore, Cadmus did not conduct a documentation review of this program.

### Task 4: Measure-Level Savings Analysis

Cadmus found no discrepancies between per-unit measure savings reported by Consumers Energy and values either maintained in the MEMD or calculated by Navigant.



Table 123 presents the reported and certified per-unit savings for all measures delivered through the 2013 Home Energy Reports Program.

**Table 123. Home Energy Reports Program Reported and Certified Per-Unit Measure Savings**

| Measure Code | Reported |        |        | Certified |        |        | Certified LLESMS |          |        |        |
|--------------|----------|--------|--------|-----------|--------|--------|------------------|----------|--------|--------|
|              | kWh      | kW     | MCF    | kWh       | kW     | MCF    | Measure Life     | kWh      | kW     | MCF    |
| ROC0002      | 169.9878 | 0.0000 | 0.5858 | 169.9878  | 0.0000 | 0.5858 | 1                | 169.9878 | 0.0000 | 0.5858 |
| ROC0011      | 126.6491 | 0.0000 | 0.5777 | 126.6491  | 0.0000 | 0.5777 | 1                | 126.6491 | 0.0000 | 0.5777 |
| ROC0012      | 90.5706  | 0.0000 | 0.5832 | 90.5706   | 0.0000 | 0.5832 | 1                | 90.5706  | 0.0000 | 0.5832 |
| ROE0001      | 86.8679  | 0.0000 | 0.0000 | 86.8679   | 0.0000 | 0.0000 | 1                | 86.8679  | 0.0000 | 0.0000 |
| ROE0002      | 111.0317 | 0.0000 | 0.0000 | 111.0317  | 0.0000 | 0.0000 | 1                | 111.0317 | 0.0000 | 0.0000 |

### Major Findings by Fuel Type

The tables below present certified program participation and energy savings by measure. Table 124 and Table 125 document kWh savings and Table 126 and Table 127 document MCF savings. No kW savings were tracked for this program.

Table 124. Certified Home Energy Reports Program Participation and First-Year kWh Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross kWh Savings (A) | 2013 Adjusted Gross kWh Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross kWh Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net kWh Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| ROC0002      | 52,485                            | 52,485                            | 8,921,809.6830                      | 8,921,809.6830                      | 0.9690                                | 8,645,233.5828                                 | 0.9000                                    | 7,780,710.2245                               |
| ROC0011      | 42,821                            | 42,821                            | 5,423,241.1111                      | 5,423,241.1111                      | 0.9640                                | 5,228,004.4311                                 | 0.9000                                    | 4,705,203.9880                               |
| ROC0012      | 7,238                             | 7,238                             | 655,550.0028                        | 655,550.0028                        | 0.9430                                | 618,183.6526                                   | 0.9000                                    | 556,365.2874                                 |
| ROE0001      | 44,131                            | 44,131                            | 3,833,567.2949                      | 3,833,567.2949                      | 0.9510                                | 3,645,722.4974                                 | 0.9000                                    | 3,281,150.2477                               |
| ROE0002      | 127,183                           | 127,183                           | 14,121,344.7011                     | 14,121,344.7011                     | 0.9510                                | 13,429,398.8107                                | 0.9000                                    | 12,086,458.9297                              |
| <b>Total</b> | <b>273,858</b>                    | <b>273,858</b>                    | <b>32,955,512.7929</b>              | <b>32,955,512.7929</b>              |                                       | <b>31,566,542.9748</b>                         | <b>0.9000</b>                             | <b>28,409,888.6773</b>                       |

Table 125. Certified Home Energy Reports Program Long-Life Equipment Savings Multiplier and Lifetime kWh Savings by Measure

| Measure ID   | 2013 Certified Net kWh Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net kWh LLESMS Savings (H) = (F x 1.1) * | 2013 Realization Rate (I) = (F/A) | Lifetime kWh Savings (J) = (F x G) |
|--------------|--|------------------|---|-----------------------------------|------------------------------------|
| ROC0002      | 7,780,710.2245                               | 1                | 7,780,710.2245  | 87.21%                            | 7,780,710.2245                     |
| ROC0011      | 4,705,203.9880                               | 1                | 4,705,203.9880  | 6.76%                             | 4,705,203.9880                     |
| ROC0012      | 556,365.2874                                 | 1                | 556,365.2874  | 84.87%                            | 556,365.2874                       |
| ROE0001      | 3,281,150.2477                               | 1                | 3,281,150.2477  | 85.59%                            | 3,281,150.2477                     |
| ROE0002      | 12,086,458.9297                              | 1                | 12,086,458.9297   | 85.59%                            | 12,086,458.9297                    |
| <b>Total</b> | <b>28,409,888.6773</b>                       |                  | <b>28,409,888.6773</b>                                  | <b>86.21%</b>                     | <b>28,409,888.6773</b>             |

\* Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

Table 126. Certified Home Energy Reports Program Participation and First-Year MCF Savings by Measure

| Measure ID   | 2013 Reported Gross Participation | 2013 Adjusted Gross Participation | 2013 Reported Gross MCF Savings (A) | 2013 Adjusted Gross MCF Savings (B) | Certified Gross Adjustment Factor (C) | 2013 Certified Gross MCF Savings (D) = (B x C) | Deemed Net-to-Gross Adjustment Factor (E) | 2013 Certified Net MCF Savings (F) = (D x E) |
|--------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--|---|--|
| ROC0002      | 52,485                            | 52,485                            | 30,745.7130                         | 30,745.7130                         | 0.9690                                | 29,792.5959                                    | 0.9000                                    | 26,813.3363                                  |
| ROC0011      | 42,821                            | 42,821                            | 24,737.6917                         | 24,737.6917                         | 0.9640                                | 23,847.1348                                    | 0.9000                                    | 21,462.4213                                  |
| ROC0012      | 7,238                             | 7,238                             | 4,221.2016                          | 4,221.2016                          | 0.9430                                | 3,980.5931                                     | 0.9000                                    | 3,582.5338                                   |
| <b>Total</b> | <b>102,544</b>                    | <b>102,544</b>                    | <b>59,704.6063</b>                  | <b>59,704.6063</b>                  |                                       | <b>57,620.3238</b>                             | <b>0.9000</b>                             | <b>51,858.2914</b>                           |

Table 127. Certified Home Energy Reports Program Long-Life Equipment Savings Multiplier and Lifetime MCF Savings by Measure

| Measure ID   | 2013 Certified Net MCF Savings (F) = (D x E) | Measure Life (G) | 2013 Certified Net MCF LLESMS Savings (H) = (F x 1.1)* | 2013 Realization Rate (I) = (F/A) | Lifetime MCF Savings (J) = (F x G) |
|--------------|--|------------------|--|-----------------------------------|------------------------------------|
| ROC0002      | 26,813.3363                                  | 1                | 26,813.3363  | 87.21%                            | 26,813.3363                        |
| ROC0011      | 21,462.4213                                  | 1                | 21,462.4213  | 86.76%                            | 21,462.4213                        |
| ROC0012      | 3,582.5338                                   | 1                | 3,582.5338   | 84.87%                            | 3,582.5338                         |
| <b>Total</b> | <b>51,858.2914</b>                           |                  | <b>51,858.2914</b>                                     | <b>86.86%</b>                     | <b>51,858.2914</b>                 |

\*Long-life equipment savings multiplier of 1.1 is only applied where the measure life (G) is 10 years or greater.

## Appendix M: Measure Descriptions by Program

Table 128 presents measure descriptions for all measure codes used in this report.

**Table 128. Program Measure Descriptions**

| Measure Code                                      | Measure Description  |
|---|--|
| <b>Appendix A: ENERGY STAR Lighting Program</b>   |  |
| RBE0002   | CFL Bulbs Regular (buydown)  |
| RBE0003   | CFL Bulbs Specialty (buydown) – Weighted Average                               |
| RBE0005   | LED Holiday Lights (buydown)   |
| RLE0009   | LED Bulb Replacing A-Line 60 Watt  |
| RLE0010   | LED Bulb Replacing A-Line 75 Watt  |
| RLE0012   | LED Flood PAR  |
| <b>Appendix B: ENERGY STAR Appliances Program</b> |  |
| RAC0100   | Setback Thermostat – Moderate Setback – Combination Fuel Customers             |
| RAE0002   | ENERGY STAR Dehumidifier   |
| RAE0003   | ENERGY STAR Room Air Conditioner   |
| RAE0005   | Setback Thermostat – Moderate Setback – Electric Customers                     |
| RAE0006   | Clothes Washer CEE Tier2, Electric DHW, Electric Dryer – Electric Customers    |
| RAE0007   | Clothes Washer CEE Tier2, Electric DHW, Gas Dryer – Electric Customers         |
| RAE0008   | Clothes Washer CEE Tier2, Gas DHW, Electric Dryer – Electric Customers         |
| RAE0009   | Clothes Washer CEE Tier2, Gas DHW, Gas Dryer – Electric Customers              |
| RAE0010   | Clothes Washer CEE Tier3, Electric DHW, Electric Dryer – Electric Customers    |
| RAE0011   | Clothes Washer CEE Tier3, Electric DHW, Gas Dryer – Electric Customers         |
| RAE0012   | Clothes Washer CEE Tier3, Gas DHW, Electric Dryer – Electric Customers         |
| RAE0013   | Clothes Washer CEE Tier3, Gas DHW, Gas Dryer – Electric Customers              |
| RAE9001   | CFL Bulbs Regular – Energy Efficiency Kit                                      |
| RAE9006   | Clothes Washer CEE Tier2, Electric DHW, Electric Dryer – Combination Customers |
| RAE9007   | Clothes Washer CEE Tier2, Electric DHW, Gas Dryer – Combination Customers      |
| RAE9010   | Clothes Washer CEE Tier3, Electric DHW, Electric Dryer – Combination Customers |
| RAE9011   | Clothes Washer CEE Tier3, Electric DHW, Gas Dryer – Combination Customers      |
| RAE9018   | LED Nightlight – Energy Efficiency Kit   |
| RAG0004   | Low-Flow Showerheads – 1.75 GPM – Gas Customers                                |
| RAG0005   | Setback Thermostat – Moderate Setback – Gas Customers                          |
| RAG0007   | Clothes Washer CEE Tier2, Electric DHW, Gas Dryer – Gas Customers              |
| RAG0008   | Clothes Washer CEE Tier2, Gas DHW, Electric Dryer – Gas Customers              |
| RAG0009   | Clothes Washer CEE Tier2, Gas DHW, Gas Dryer – Gas Customers                   |
| RAG0011   | Clothes Washer CEE Tier3, Electric DHW, Gas Dryer – Gas Customers              |
| RAG0012   | Clothes Washer CEE Tier3, Gas DHW, Electric Dryer – Gas Customers              |
| RAG0013   | Clothes Washer CEE Tier3, Gas DHW, Gas Dryer – Gas Customers                   |
| RAG9002   | Low-Flow Bath Faucet Aerators – Gas Energy Efficiency Kit                      |
| RAG9003   | Low-Flow Kitchen Faucet Aerators- Gas EE Energy Efficiency Kit                 |
| RAG9008   | Clothes Washer CEE Tier2, Gas DHW, Electric Dryer – Combination Customers      |

| Measure Code                                      | Measure Description   |
|---|---|
| RAG9009   | Clothes Washer CEE Tier2, Gas DHW, Gas Dryer – Combination Customers                            |
| RAG9012   | Clothes Washer CEE Tier3, Gas DHW, Electric Dryer – Combination Customers                       |
| RAG9013   | Clothes Washer CEE Tier3, Gas DHW, Gas Dryer – Combination Customers                            |
| RAG9020   | Low-Flow Showerhead – 2.0 GPM – Energy Efficiency Kit – Gas Customers                           |
| <b>Appendix C: HVAC and Water Heating Program</b> |   |
| RHC0100   | Setback Thermostat – Moderate Setback – Combination Customers                                   |
| RHE0001   | ECM Blower – Intermittent – Electric Customer   |
| RHE0004   | Setback Thermostat – Moderate Setback -- Electric Customers                                     |
| RHE0006   | Split System Central Air Conditioner – SEER > 15  |
| RHE0007   | Split System Central Air Conditioner – SEER > 16  |
| RHE0008   | Tier 1 Ground-Source Heat Pump – EER > 17   |
| RHE0009   | Tier 2 Ground-Source Heat Pump – EER > 19   |
| RHE0011   | Tier 2 Air-Source Heat Pump – EER > 15  |
| RHE0012   | Tier 3 Air-Source Heat Pump – EER > 16  |
| RHE0016   | Operations and Maintenance HVAC Tune Up – Electric Customers                                    |
| RHG0002   | Tankless Gas Water Heater – EF > 0.82   |
| RHG0004   | Setback Thermostat – Moderate Setback -- Gas or Combination Customers                           |
| RHG0006   | Natural Gas Boiler – AFUE > 87%   |
| RHG0007   | Natural Gas Furnace – AFUE 94%  |
| RHG0008   | Super High-Efficiency Gas Water Heater – EF ≥ 0.67  |
| RHG0010   | Natural Gas Furnace – AFUE 95%  |
| RHG0011   | Natural Gas Furnace – AFUE 96%  |
| RHG0012   | Natural Gas Furnace – AFUE 97%  |
| RHG0013   | Natural Gas Furnace – AFUE > 98%  |
| RHG0015   | Natural Gas Boiler – AFUE > 92%   |
| RHG0016   | Natural Gas Boiler – AFUE > 95%   |
| RHG0017   | Operations and Maintenance HVAC Tune Up – Gas Customers   |
| RHG0018   | Natural Gas Boiler – AFUE > 90%   |
| <b>Appendix D: Income Qualified Program</b>       |   |
| RCE0002   | Residential Income Qualified Custom (non-CAA) – Electric Customers                              |
| RCG0002   | Residential Income Qualified Custom (measure life < 10 years) – Gas Customers                   |
| RCG0002   | Residential Income Qualified Custom – (measure life ≥ 10 years) – Gas Customers                 |
| RIE0001   | CFL Bulbs – Regular (CAA)   |
| RIE0002   | Agency Refrigerator Replacement – ENERGY STAR (CAA)   |
| RIE0012   | Low-Flow Bath Faucet Aerators – 1.5 GPM (non-CAA) – Electric Customers                          |
| RIE0013   | Pipe Wrap (non-CAA) – Electric Customers  |
| RIE0016   | CFL Bulbs – Direct Install (non-CAA)  |
| RIE0018   | ECM Blower – Intermittent (CAA) – Electric and Combination Customers                            |
| RIE0030   | Low-Flow Showerheads – Energy-Efficiency Measures – 1.75 GPM (CAA) – Electric Customers         |
| RIE0032   | Low-Flow Bath Faucet Aerators – Energy-Efficiency Measures – 1.5 GPM (CAA) – Electric Customers |
| RIE0035   | Low-Flow Showerhead – 1.5 GPM (non-CAA)   |

| Measure Code | Measure Description  |
|--------------|--|
| RIE0036      | Low-Flow Showerhead – 1.5 GPM Handheld (non-CAA)   |
| RIE0037      | ECM Blower Community Homeworks (non-CAA)   |
| RIE0038      | CFL Bulbs – Energy-Efficiency Measures – (CAA)   |
| RIE0039      | Low-Flow Kitchen Faucet Aerator – 1.5 GPM (non-CAA) – Electric Customers                   |
| RIE0048      | Low-Flow Bath Faucet Aerators – 1.0 GPM (non-CAA) – Electric Customers                     |
| RIE0049      | Low-Flow Bath Faucet Aerators – 1.0 GPM (CAA) – Electric Customers                         |
| RIE0050      | Pipe Wrap – (non-CAA) – Electric Customers   |
| RIG0004      | Setback Thermostat – 5/2 (CAA)   |
| RIG0006      | High-Efficiency Gas Furnace – AFUE $\geq .92$ (CAA)  |
| RIG0008      | Low-Flow Showerheads – 1.75 GPM (non-CAA) – Gas Customers                                  |
| RIG0009      | Low-Flow Bath Faucet Aerators – 1.5 GPM (non-CAA) – Gas Customers                          |
| RIG0010      | Pipe Wrap (non-CAA) – Gas Customers  |
| RIG0011      | Setback Thermostat – Full Setback (non-CAA) – Gas and Combination Customers                |
| RIG0016      | Setback Thermostat – 5/2 (non-CAA) – Multifamily Customers                                 |
| RIG0017      | Ceiling Insulation – Minimum of 10% Reduction (CAA)  |
| RIG0018      | Mobile Home Belly Insulation – Floor Insulation (CAA)                                      |
| RIG0019      | Wall Insulation – Four Walls – No Partial (CAA)  |
| RIG0020      | Band Joint Insulation – Rim Joist (CAA)  |
| RIG0021      | Air Sealing – Minimum 10% Reduction (CAA)  |
| RIG0023      | Operations and Maintenance Tune-Up – Furnace Only (CAA)                                    |
| RIG0027      | Low-Flow Handheld Showerhead – 1.75 GPM (non-CAA) – Gas Customers                          |
| RIG0029      | Natural Gas Furnace – AFUE 95% (CAA)   |
| RIG0030      | Natural Gas Furnace – AFUE 96% (CAA)   |
| RIG0033      | Air Infiltration Reduction 15% (CAA) – Gas Customers                                       |
| RIG0034      | Air Infiltration Reduction 20% (CAA) – Gas Customers                                       |
| RIG0035      | Air Infiltration Reduction 30% (CAA) – Gas Customers                                       |
| RIG0036      | Air Infiltration Reduction 50% (CAA) – Gas Customers                                       |
| RIG0038      | Operations and Maintenance Tune-Up – Furnace Only – Direct Install (non-CAA)               |
| RIG0039      | Low-Flow Handheld Showerhead – Pre-Weatherization 1.75 GPM (CAA) – Gas Customers           |
| RIG0041      | Low-Flow Showerheads – Pre-Weatherization – 1.75 GPM (CAA) – Gas Customers                 |
| RIG0042      | Low-Flow Showerheads – Energy-Efficiency Measures – 1.75 GPM (CAA) – Gas Customers         |
| RIG0043      | Low-Flow Bath Faucet Aerators – Pre-Weatherization – 1.5 GPM (CAA) – Gas Customers         |
| RIG0044      | Low-Flow Bath Faucet Aerators – Energy-Efficiency Measures – 1.5 GPM (CAA) – Gas Customers |
| RIG0046      | Pipe Wrap Energy-Efficiency Measures (CAA) – Gas Customers                                 |
| RIG0047      | Operations and Maintenance Tune-Up Furnace (non-CAA) – Multifamily Customers               |
| RIG0048      | Setback Thermostat – Energy-Efficiency Measures (CAA)                                      |
| RIG0049      | Low-Flow Showerhead – 1.5 GPM (non-CAA)  |
| RIG0050      | Low-Flow Showerhead – Handheld – 1.5 GPM (non-CAA)   |
| RIG0051      | Natural Gas Furnace – AFUE 95% (community homeworks) (non-CAA)                             |
| RIG0052      | Operations and Maintenance Tune-Up Furnace Only – Direct Install (non-CAA)                 |
| RIG0053      | Low-Flow Kitchen Faucet Aerator – 1.5 GPM (non-CAA) – Gas Customers                        |
| RIG0060      | Air Infiltration Reduction 10% (MI Neighborhood Weatherization) – Gas Customers            |

| Measure Code                                   | Measure Description  |
|--|--|
| RIG0061  | Air Infiltration Reduction 15% (MI Neighborhood Weatherization) – Gas Customers    |
| RIG0062  | Air Infiltration Reduction 20% (MI Neighborhood Weatherization) – Gas Customers    |
| RIG0063  | Air Infiltration Reduction 30% (MI Neighborhood Weatherization) – Gas Customers    |
| RIG0064  | Air Infiltration Reduction 50% (MI Neighborhood Weatherization) – Gas Customers    |
| RIG0066  | Attic Insulation (MI Neighborhood Weatherization)                                  |
| RIG0067  | Wall Insulation – R-13 (MI Neighborhood Weatherization)                            |
| RIG0068  | Band Joist – Insulate (MI Neighborhood Weatherization)                             |
| RIG0070  | High-Efficiency Furnace Replacement – AFUE 92% (MI Neighborhood Weatherization)    |
| RIG0071  | High-Efficiency Furnace Replacement – AFUE 95% (MI Neighborhood Weatherization)    |
| RIG0073  | Boiler Replacement – AFUE 92% (MI Neighborhood Weatherization)                     |
| RIG0086  | Air Infiltration Reduction 10% (non-CAA) – Gas Customers                           |
| RIG0087  | Air Infiltration Reduction 15% (non-CAA) – Gas Customers                           |
| RIG0088  | Air Infiltration Reduction 20% (non-CAA) – Gas Customers                           |
| RIG0089  | Air Infiltration Reduction 30% (non-CAA) – Gas Customers                           |
| RIG0090  | Air Infiltration Reduction 50% (non-CAA) – Gas Customers                           |
| RIG0092  | Band Joist Insulation – Rim Joist (non-CAA)  |
| RIG0093  | Low-Flow Bath Faucet Aerators 1.0 GOM (non-CAA) – Gas Customers                    |
| RIG0095  | Door Weatherstripping (non-CAA) – Single-Family Customers                          |
| RIG0096  | Attic Insulation Measure (non-CAA)   |
| RIG0097  | Pipe Wrap (non-CAA) – Gas Customers  |
| RIG0100  | Operations and Maintenance Tune-Up Boiler Only (non-CAA) – Single-Family Customers |
| <b>Appendix E: Appliance Recycling Program</b> |  |
| RTE0001  | Refrigerator Recycling   |
| RTE0009  | Refrigerator Recycling – Retailer  |
| RTE0002  | Freezer Recycling  |
| RTE0010  | Freezer Recycling – Retailer   |
| RTE0007  | Dehumidifier Recycling   |
| RTE0008  | Room Unit Air Conditioner Recycling  |
| <b>Appendix F: Multifamily Program</b>         |  |
| RCE0001  | Residential Multifamily Custom – Measure Life < 10 years – Electric Customers      |
| RCE0001  | Residential Multifamily Custom – Measure Life ≥ 10 years) – Electric Customers     |
| RCG0001  | Residential Multifamily Custom Measure Life < 10 years – Gas Customers             |
| RCG0001  | Residential Multifamily Custom (Measure Life ≥ 10 years) – Gas Customers           |
| RME0004  | Low-Flow Bath Faucet Aerators – Direct Install – Electric Customers                |
| RME0019  | Low-Flow Kitchen Faucet Aerators- Direct Install – Electric Customers              |
| RME0023  | CFL Bulbs – 13 Watt  |
| RME0027  | CFL Screw-In Bulbs – Prescriptive  |
| RME0029  | CFL Fixtures – Prescriptive  |
| RME0031  | Occupancy Sensors – Under 500 Watts  |
| RME0035  | LED/Induction (Night Only) < 175 Watts   |
| RME0036  | LED/Induction (Night Only) – 175-250 Watts   |
| RME0038  | LED/Induction (Night Only) – 250-400 Watts   |



| Measure Code | Measure Description  |
|--------------|--|
| RME0039      | LED/Induction (24x7) < 175 Watts   |
| RME0046      | CFL Specialty – In-Unit – Direct Install   |
| RME0050      | Low-Flow Showerhead – 1.5 GPM – Direct Install                                       |
| RME0051      | Low-Flow Showerhead – 1.5 GPM Handheld – Direct Install                              |
| RME0104      | Low-Flow Bath Faucet Aerators – Prescriptive – Electric Customers                    |
| RME0105      | Low-Flow Showerheads – 1.75 GPM – Electric Customers                                 |
| RME0119      | Low-Flow Kitchen Faucet Aerators – Prescriptive – Electric Customers                 |
| RME0121      | Low-Flow Showerhead – 1.5 GPM – Electric Customers                                   |
| RME0123      | CFL – Common Area – Direct Install   |
| RME0133      | 2L RW HPT8 Replacing T12 – Common – 24/7   |
| RME0142      | Air Conditioner – < 63.3 Tons – 10 SEER  |
| RME0147      | CFL Lamp – Specialty – In Unit   |
| RME0150      | CFL Candelabra Lamp – 5-13 Watts – Direct Install                                    |
| RME0159      | HPT8 Replacing T12 – Per Lamp – Common   |
| RME0167      | LED Lamp – 50-80 Watt Replacement – Common   |
| RME0175      | Room Air Conditioner (CEE Tier 2)  |
| RME0178      | Low-Flow Bath Faucet Aerators – 1.0 GPM –Direct Install – Electric Customers         |
| RME0180      | LED Candelabra Lamp – 3-5 Watts – In-Unit – Direct Install                           |
| RME0181      | CFL Candelabra Lamp – 5-13 Watts – In-Unit – Direct Install                          |
| RME0184      | LED Exit Signs – Direct Install  |
| RME0194      | LED Lamp – 60 Watt Replacement – In Unit – Direct Install                            |
| RMG0004      | Low-Flow Bath Faucet Aerators – Gas Customers  |
| RMG0007      | Pipe Wrap – DHW – In-Unit – Direct Install – Gas Customers                           |
| RMG0009      | Boiler Controls  |
| RMG0011      | Boiler Tune-Up   |
| RMG0012      | High-Efficiency Boiler – AFUE > 90%  |
| RMG0014      | Low-Flow Kitchen Faucet Aerators – Gas Customers                                     |
| RMG0016      | Pipe Wrap – Hydronic   |
| RMG0018      | Super High-Efficiency Gas Water Heater – AFUE ≥ 0.88%                                |
| RMG0020      | Furnace Tune-Up – 40,000 – 80,000 BTU  |
| RMG0030      | ENERGY STAR Doors  |
| RMG0031      | Door Weather Stripping   |
| RMG0034      | Airtight Can Light   |
| RMG0035      | ENERGY STAR Windows  |
| RMG0050      | Low-Flow Showerhead – 1.5 GPM  |
| RMG0051      | Low-Flow Showerhead – Handheld – 1.5 GPM   |
| RMG0108      | Setback Thermostat – Moderate Setback – Prescriptive – Gas and Combination Customers |
| RMG0115      | Furnace Tune-Up – 40,000 – 80,000 BTU – Direct Install                               |
| RMG0116      | Furnace Tune-Up 0 80,001 – 120,000 BTU – Direct Install                              |
| RMG0118      | Pipe Wrap – DHW (common)   |
| RMG0119      | Low-Flow Kitchen Aerator – Gas Customers   |
| RMG0120      | Low-Flow Bath Aerator – Gas Customers  |



| Measure Code   | Measure Description  |
|--|--|
| RMG0121  | Furnace Replacement – AFUE 92% – In Unit                                 |
| RMG0122  | Pipe Wrap – Space – Common – Direct Install – Gas Customers              |
| RMG0123  | Pipe Wrap – DHW – Common – Direct Install – Gas Customers                |
| RMG0131  | DHW Boiler Tune-Up   |
| RMG0132  | Furnace Tune-up – 40-80 MBH (>2,000 units) – Direct Install              |
| RMG0133  | Furnace Tune-up – 80-120 MBH (>2,000 units) – Direct Install             |
| RMG0136  | Furnace Replacement – AFUE 95% – Common                                  |
| RMG0137  | Furnace Replacement – AFUE 95% – In Unit                                 |
| RMG0143  | High-Efficiency Boiler Replacement AFUE > 92%                            |
| RMG0144  | High-Efficiency Boiler Replacement AFUE > 95%                            |
| RMG0145  | Indirect Water Heater – AFUE 90%   |
| RMG0146  | Indirect Water Heater – AFUE 84-90%                                      |
| RMG0149  | Low-Flow Showerhead – 1.5 GPM – Prescriptive                             |
| RMG0152  | Roof Insulation  |
| RMG0154  | Low-Flow Bath Faucet Aerators – 1.0 GPM – Direct Install – Gas Customers |
| RMG0157  | Shower Start Showerhead – Direct Install – Gas Customers                 |
| RMG0163  | Boiler Tune-Up   |
| <b>Appendix G: THINK! Energy Program</b>                     |  |
| REE0001  | CFL Bulbs – Regular  |
| REE0005  | LED Night Light  |
| REG0003  | Low-Flow Showerheads – Gas Customers                                     |
| REG0004  | Low-Flow Bath Faucet Aerators – Gas Customers                            |
| REG0005  | Low-Flow Kitchen Faucet Aerators – Gas Customers                         |
| <b>Appendix H: Home Performance with ENERGY STAR Program</b> |  |
| RZC0007  | Basement Wall Insulation – Combination Customers                         |
| RZC0008  | Crawlspace Insulation – Combination Customers                            |
| RZC0009  | Duct Insulation and/or Replacement – Combination Customers               |
| RZC0010  | Duct Sealing 15% Reduction – Combination Customers                       |
| RZC0011  | Duct Sealing 30% Reduction – Combination Customers                       |
| RZC0018  | Infiltration Reduction of 20% – Combination Customers                    |
| RZC0019  | Infiltration Reduction of 30% – Combination Customers                    |
| RZC0020  | Infiltration Reduction of 50% – Combination Customers                    |
| RZC0022  | Roof Insulation (attic) – Combination Customers                          |
| RZC0023  | Wall Insulation – Combination Customers                                  |
| RZC0024  | Floor Insulation – Combination Customers                                 |
| RZC0055  | Rim Joist Insulation – Combination Customers                             |
| RZC0060  | Window Replacement – Combination Customers                               |
| RZC0061  | Natural Gas Boiler – AFUE 90% – Combination Customers                    |
| RZC0062  | Natural Gas Boiler – AFUE 92% – Combination Customers                    |
| RZC0063  | Natural Gas Boiler – AFUE 95% – Combination Customers                    |
| RZE0007  | Basement Wall Insulation – Electric Customers                            |
| RZE0008  | Crawlspace Insulation – Electric Customers                               |

| Measure Code | Measure Description  |
|--------------|--|
| RZE0009      | Duct Insulation and/or Replacement – Electric Customers                          |
| RZE0010      | Duct Sealing 15% Reduction – Electric Customers                                  |
| RZE0011      | Duct Sealing 30% Reduction – Electric Customers                                  |
| RZE0012      | Floor Insulation – Electric Customers  |
| RZE0018      | Infiltration Reduction of 20% – Electric Customers                               |
| RZE0019      | Infiltration Reduction of 30% – Electric Customers                               |
| RZE0020      | Infiltration Reduction of 50% – Electric Customers                               |
| RZE0021      | Operations and Maintenance HVAC Tune Up – Electric Customers                     |
| RZE0022      | Roof Insulation (attic) – Electric Customers                                     |
| RZE0023      | Wall Insulation – Electric Customers   |
| RZE0050      | ENERGY STAR CFL Bulbs – Regular  |
| RZE0051      | Low-Flow Faucet Aerators – Electric Customers                                    |
| RZE0052      | Low-Flow Showerheads – Electric Customers  |
| RZE0055      | Rim Joist Insulation – Electric Customers  |
| RZE0056      | Tier 1 Air-Source Heat Pump – Electric and Combination Customers                 |
| RZE0058      | Tier 1 Split System Central Air Conditioner – Electric and Combination Customers |
| RZE0059      | Tier 2 Air-Source Heat Pump – Electric and Combination Customers                 |
| RZE0060      | Tier 2 Split System Central Air Conditioner – Electric and Combination Customers |
| RZE0062      | Pipe Wrap – Electric Customers   |
| RZE0063      | Window Replacement – Electric Customers  |
| RZE0064      | ECM Motor  |
| RZE0109      | ENERGY STAR CFL Bulbs – Regular – Left with Customer                             |
| RZE0110      | Low Flow Faucet Aerators – Electric – Left with Customer                         |
| RZE0111      | Low Flow Showerheads – Electric – Left with Customer                             |
| RZE0112      | Pipe Wrap – Left with Customer – Electric Customers                              |
| RZG0007      | Basement Wall Insulation – Gas Customers   |
| RZG0008      | Crawlspace Insulation – Gas Customers  |
| RZG0009      | Duct Insulation and/or Replacement – Gas Customers                               |
| RZG0010      | Duct Sealing 15% Reduction – Gas Customers                                       |
| RZG0011      | Duct Sealing 30% Reduction – Gas Customers                                       |
| RZG0012      | Floor Insulation – Gas and Combination Customers                                 |
| RZG0013      | Gas Furnace – AFUE 94%   |
| RZG0014      | Gas Furnace – AFUE 95%   |
| RZG0015      | Gas Furnace – AFUE 96%   |
| RZG0016      | Gas Furnace – AFUE 97%   |
| RZG0017      | Gas Furnace – AFUE 98%   |
| RZG0018      | Infiltration Reduction of 20% – Gas Customers                                    |
| RZG0019      | Infiltration Reduction of 30% – Gas Customers                                    |
| RZG0020      | Infiltration Reduction of 50% – Gas Customers                                    |
| RZG0021      | Operations and Maintenance HVAC Tune-Up – Gas Customers                          |
| RZG0022      | Roof Insulation (attic) – Gas Customers  |
| RZG0023      | Wall Insulation – Gas Customers  |

| Measure Code                                    | Measure Description  |
|---|--|
| RZG0051   | Low-Flow Faucet Aerators – Gas and Combination Customers                           |
| RZG0052   | Low-Flow Showerheads – Gas and Combination Customers                               |
| RZG0053   | Natural Gas Boiler – AFUE 92%- Gas Customers                                       |
| RZG0054   | Natural Gas Boiler – AFUE 95% – Gas Customers                                      |
| RZG0055   | Rim Joist Insulation – Gas Customers   |
| RZG0056   | Super High-Efficiency Gas Water Heater – Gas and Combination Customers             |
| RZG0057   | Tankless Water Heater – Gas and Combination Customers                              |
| RZG0060   | Window Replacement – Gas Customers   |
| RZG0061   | Natural Gas Boiler – AFUE 90% – Gas Customers                                      |
| RZG0062   | Pipe Wrap – Gas Customers  |
| RZG0109   | Low-Flow Faucet Aerators – Left with Customer – Gas and Combination Customers      |
| RZG0110   | Low-Flow Showerheads – Left with Customer – Gas and Combination Customers          |
| RZG0111   | Pipe Wrap – Left with Customer – Gas Customers                                     |
| <b>Appendix I: Home Energy Analysis Program</b> |  |
| RXC0001   | Setback Thermostat – Moderate Setback – Combination Customers                      |
| RXC0101   | Setback Thermostat – Moderate Setback – Left with Customer – Combination Customers |
| RXE0002   | CFL Bulbs Regular – 13 Watts   |
| RXE0003   | CFL Bulbs Specialty  |
| RXE0004   | LED Nightlight   |
| RXE0005   | Pipe Wrap 3/4-inch – Electric Water Heater   |
| RXE0006   | Low-Flow Showerheads – Electric Water Heater                                       |
| RXE0007   | Low-Flow Bath Aerators – Electric Water Heater                                     |
| RXE0010   | CFL Bulbs Regular – 18 Watts   |
| RXE0011   | CFL Bulbs Regular – 23 Watts   |
| RXE0012   | Pipe Wrap 1/2-inch – Electric Water Heater   |
| RXE0013   | Handheld Showerheads – Electric Water Heater                                       |
| RXE0014   | Low-Flow Kitchen Faucet Aerators – Electric Water Heater                           |
| RXE0015   | Low-Flow Bath Faucet Aerators – 1 GPM – Electric Water Heater                      |
| RXE0102   | CFL Bulbs Regular – 13 Watts – Left with Customer                                  |
| RXE0103   | CFL Bulbs Specialty – Left with Customer   |
| RXE0104   | LED Nightlight – Left with Customer  |
| RXE0110   | CFL bulbs regular – 18 Watts – Left with Customer                                  |
| RXE0111   | CFL bulbs regular – 23 Watts – Left with Customer                                  |
| RXE0115   | Low-Flow Showerheads and Shower Start – Electric Water Heater                      |
| RXG0005   | Pipe Wrap 3/4-inch – Gas Water Heater  |
| RXG0006   | Low-Flow Showerheads – Gas Water Heater  |
| RXG0007   | Low-Flow Bath Aerators – Gas Water Heater  |
| RXG0009   | Setback Thermostat – Moderate Setback – Gas Customers                              |
| RXG0012   | Pipe Wrap 1/2-inch – Gas Water Heater  |
| RXG0013   | Handheld Showerheads – Gas Water Heater  |
| RXG0014   | Low-Flow Kitchen Faucet Aerators – Gas Water Heater                                |
| RXG0015   | Low-Flow Bath Faucet Aerators – 1 GPM – Gas Water Heater                           |

| Measure Code                                      | Measure Description  |
|---|--|
| RXG0109   | Setback Thermostat – Moderate Setback – Left with Customer – Gas Customers   |
| RXG0115   | Low-Flow Showerheads and Shower Start – Gas Water Heater                     |
| <b>Appendix J: Insulation and Windows Program</b> |  |
| RWC0001   | Roof Insulation (attic) – Combination Customers                              |
| RWC0002   | Wall Insulation – Combination Customers                                      |
| RWC0003   | Basement Wall Insulation – Combination Customers                             |
| RWC0004   | Crawlspace Insulation – Combination Customers                                |
| RWC0005   | Window Replacement – Combination Customers                                   |
| RWC0006   | Rim Joist Insulation – Combination Customers                                 |
| RWC0007   | Door Replacement – Combination Customers                                     |
| RWE0001   | Roof Insulation (attic) – Electric Customers                                 |
| RWE0002   | Wall Insulation – Electric Customers   |
| RWE0003   | Basement Wall Insulation – Electric Customers                                |
| RWE0004   | Crawlspace Insulation – Electric Customers                                   |
| RWE0005   | Window Replacement – Electric Customers                                      |
| RWE0006   | Rim Joist Insulation – Electric Customers                                    |
| RWE0007   | Door Replacement – Electric Customers  |
| RWG0001   | Roof Insulation (attic) – Gas Customers                                      |
| RWG0002   | Wall Insulation – Gas Customers  |
| RWG0003   | Basement Wall Insulation – Gas Customers                                     |
| RWG0004   | Crawlspace Insulation – Gas Customers  |
| RWG0005   | Window Replacement – Gas Customers   |
| RWG0006   | Rim Joist Insulation – Gas Customers   |
| RWG0007   | Door Replacement – Gas Customers   |
| <b>Appendix K: New Home Construction Program</b>  |  |
| RNC0001   | New Construction Combination Savings   |
| RNE0001   | New Construction Electric Savings  |
| RNE0012   | \$2.00 CFL Bonus Measure – CFL Bulbs Regular                                 |
| RNG0001   | New Construction Gas Savings   |
| RNG0002   | Tankless Gas Water Heater – EF > 0.80  |
| RNG0003   | Super High-Efficiency Gas Water Heater – EF ≥ 0.67                           |
| RNG0004   | Tier 1 Natural Gas Furnace – AFUE ≥ 95% AFUE                                 |
| RNG0008   | Setback Thermostat – 5/2 – Gas Customers                                     |
| RNG0010   | High-Efficiency Gas Water Heater – EF ≥ 0.62                                 |
| RNG0011   | High-Efficiency Boiler Tier I – AFUE ≥ 95%, AHRI Rated                       |
| RNG0012   | High-Efficiency Furnace Tier 2 – AFUE 92% to 94.9%, AHRI Rated               |
| <b>Appendix L: Home Energy Reports Program</b>    |  |
| ROC0002   | Track #4: New Dual Fuel Program (high electric usage)                        |
| ROC0011   | Track #1a: Dual-Fuel Program – Former Pilot (high electric usage)            |
| ROC0012   | Track #1b: Dual-Fuel Program – Refill (average electric usage)               |
| ROE0001   | Track #2: Electric Program – Muskegon (average electric usage)               |
| ROE0002   | Track #3: New Electric Program – Grand Rapids, Zeeland (high electric usage) |

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**DIRECT TESTIMONY**

**OF**

**RICHARD A. MORGAN**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

RICHARD A. MORGAN  
DIRECT TESTIMONY

1 Q. Please state your name and business address.

2 A. My name is Richard A. Morgan. I am President of Morgan Marketing Partners, LLC  
3 (“MMP”). My business address is 6205 Davenport Drive, Madison, Wisconsin 53711-  
4 2447.

5 Q. Can you describe MMP?

6 A. MMP is a professional services firm formed in 1995 that partners with utility and  
7 governmental clients to provide energy efficiency consulting services including program  
8 design and development, cost-effectiveness modeling, strategic marketing consulting,  
9 implementation and operations assistance, new product and service development,  
10 management assistance, and evaluation and assessments. MMP has worked with clients  
11 including, but not limited to, DTE Energy, Duke Energy, California Public Utility  
12 Commission, Energy Trust of Oregon, Missouri River Energy Services, Kansas City  
13 Power & Light, Jacksonville Electric Authority, Rochester Public Utilities, MidAmerican  
14 Energy, Hawaii Electric, Northwest Energy Efficiency Alliance, the State of Indiana, and  
15 Wisconsin Focus on Energy administered by Wisconsin Energy Conservation  
16 Corporation. One of MMP’s largest clients is Duke Energy. Since MMP was formed, I  
17 have worked with Duke Energy on program planning and design. One of these programs  
18 was recognized by The American Council for an Energy Efficient Economy (“ACEEE”) as an  
19 award-winning program for low-income customers. From 2001 to 2011, MMP  
20 served as planner and advisor to Wisconsin Energy Conservation Corp. and the State of  
21 Wisconsin on the statewide residential and business public benefits efficiency program,  
22 *Wisconsin Focus on Energy*. MMP has also developed comprehensive energy efficiency  
23 program portfolios for Kansas City Power & Light, NIPSCO, and Missouri River Energy  
24 Services. I served as one of two principal auditors to complete a management audit for  
25 the Energy Trust of Oregon to review all aspects of the Trust including organizational

RICHARD A. MORGAN  
DIRECT TESTIMONY

1 structure, program design/delivery, support systems, public involvement, and overall  
2 management. The California Public Utility Commission retained MMP to participate on  
3 an independent review team to provide advice regarding the portfolio of utility energy  
4 efficiency programs developed for 2006-2008. In 2012, I also completed a portfolio  
5 program assessment with a team of evaluators to assess all the energy efficiency  
6 programs offered by the California utilities.

7 Q. Can you summarize your educational background and professional qualifications?

8 A. I earned a Bachelor of Science degree in Resource Management from Ohio State  
9 University, School of Natural Resources in 1976. I am the Past President of the  
10 American Marketing Association, Madison Chapter, and a past Board Member and Vice  
11 President, Business Development for the Association of Energy Services Professionals  
12 ("AESP"). I am currently on the board of the Midwest Energy Efficiency Alliance. I  
13 have had numerous papers and research published at AESP, ACEEE as well as general  
14 articles in energy literature and marketing articles in *The Capital Times* newspaper in  
15 Madison. I am also the winner of the 2002 AESP B.H. Prasad Outstanding Contributor  
16 of the Year.

17 Q. Can you describe your professional background and experience?

18 A. I have over 35 years of management, planning, program design, implementation,  
19 low-income program, and marketing experience in the energy field. Prior to starting  
20 MMP in 1995, I spent four years as a manager and consultant with A&C Enercom, a  
21 leading energy services and consulting company. I was also marketing manager for EWI  
22 Engineering, a 100-person engineering consulting firm. Before joining EWI  
23 Engineering, I spent over 11 years with Wisconsin Power & Light Company, a combined  
24 gas and electric company now a part of Alliant Energy, in its marketing and energy  
25 efficiency department. I held numerous positions managing many different services

RICHARD A. MORGAN  
DIRECT TESTIMONY

1 including low-income programs, residential services, commercial and industrial gas  
2 services, demand-side management programs, and marketing/sales initiatives. Within my  
3 various positions my responsibilities included program planning, evaluation oversight,  
4 new product/service development, program design, market research,  
5 advertising/promotion planning, implementation and operations management, evaluation,  
6 budgeting, tracking, training, government interface, sales, field customer service support,  
7 quality control, and business center operations. Prior to joining Wisconsin Power &  
8 Light, I worked for the Oregon Department of Energy and the Western SUN, a federally  
9 funded regional solar center.

10 Q. Have you previously provided testimony before the Michigan Public Service  
11 Commission (“MPSC” or the “Commission”)?

12 A. Yes, I testified on behalf of Consumers Energy Company (“Consumers Energy” or the  
13 “Company”) for its 2011 Energy Optimization (“EO”) Reconciliation, Case No.  
14 U-16736, for its 2012 EO Reconciliation, Case No. U-17281, and for its 2015 EO  
15 Biennial Plan Filing, Case No. U-17351. In addition, I have testified in Detroit Edison’s  
16 EO Plan approved by the Commission in its June 2, 2009 Order in MPSC Case No.  
17 U-15806 (approved EO Plan) and in Case No. U-15890 on behalf of MichCon. I also  
18 filed testimony in support of Detroit Edison’s and MichCon’s 2010 amended Plan to  
19 expand that program under that same case.

20 Q. What is the purpose of your testimony in this proceeding?

21 A. The purpose of my testimony is to (1) describe how MMP helped Consumers Energy  
22 model for cost-effectiveness Consumers Energy’s EO programs; (2) describe the  
23 cost-effectiveness modeling for the EO programs; and (3) provide the results  
24 demonstrating that the EO portfolio is cost-effective using the Utility System Resource  
25 Cost Test (“UCT”) (excluding the low-income customers).



RICHARD A. MORGAN  
DIRECT TESTIMONY

1 Q. Are you sponsoring any exhibits?

2 A. No.

3 Q. Will you describe the services your firm has provided for Consumers Energy?

4 A. MMP provided cost effectiveness modeling services utilizing the DSMore modeling tool.  
5 In addition, MMP has also provided the Michigan Energy Measures Database for use by  
6 all Michigan utilities in their cost-effectiveness modeling.

7 Q. How was cost-effectiveness of these programs determined?

8 A. The DSMore cost analysis tool was used to calculate and report cost-effectiveness for the  
9 programs using the UCT as defined by Public Act ("PA 295") and the Commission's  
10 December 4, 2008, Order in Case No. U-15800. As ordered, Consumers Energy's  
11 programs must be cost-effective utilizing the UCT, but several other cost-effectiveness  
12 tests were performed, and their results along with the UCT are tabulated in Exhibit A-11  
13 (BMR-1).

14 Q. Can you describe the DSMore modeling tool?

15 A. The DSMore tool is award-winning modeling software that is nationally recognized and  
16 used in many states across the country to determine cost-effectiveness. Developed and  
17 licensed by Integral Analytics based in Cincinnati Ohio, the DSMore cost-effectiveness  
18 modeling tool takes hourly prices and hourly energy savings from the specific  
19 measures/technologies being considered for the EO program, and then correlates both to  
20 weather. This tool looks at over 30 years of historic weather variability to get the full  
21 weather variances appropriately modeled. In turn, this allows the model to capture the  
22 low-probability, but high-consequence weather events and apply appropriate value to  
23 them. Thus, a more accurate view of the value of the efficiency measure can be captured  
24 in comparison to other alternative supply options.

RICHARD A. MORGAN  
DIRECT TESTIMONY

1 Q. Can you please describe the various tests run in your DSMore modeling?

2 A. Exhibit A-11 (BMR-1) shows the cost-effectiveness test results for the Consumers  
3 Energy gas and electric EO programs in total, by residential and business classes, and for  
4 each program. The various test results shown are for the following tests:

5 • UCT: Defined as the ratio of the net benefits of the programs to the program costs  
6 incurred by the utility for the programs. For a program to be cost-effective, this ratio  
7 needs to be greater than one.

8 • Total Resource Cost Test ("TRC"): Defined as the total avoided cost divided by the  
9 program costs plus the participant's costs. Incentives paid to the customer are in both  
10 the cost and benefit sides of the equation, so they cancel each other out.

11 • Rate Impact Measure ("RIM"): Defined as the avoided cost benefits divided by the  
12 program costs and lost revenues.

13 • Participant Test: Defined as the participant's benefits in energy savings from their  
14 bill plus their incentives divided by their costs to participate.

15 Q. What type of EO program information is used for model inputs?

16 A. Inputs into the model include participation rates, incentives paid, energy savings of the  
17 measure, life of the measure, implementation costs, administrative costs, and incremental  
18 costs to the participant of the high efficiency measure.

19 Q. What program costs and savings were used for the cost-effectiveness calculation?

20 A. Certified energy savings and participation amounts were provided by measure from the  
21 third-party independent evaluators, The Cadmus Group, Inc. and Energy Market  
22 Innovations, Inc., as described in witnesses M. Sami Khawaja's and Robert D. Bordner's  
23 testimony, respectively. Participation results multiplied by the certified savings number  
24 over the life of the measure yields the lifetime savings results used in the DSMore model.  
25 Program costs and incentives paid were based on actual payments for the year 2013  
26 program year. Additional information such as measure life and incremental cost was  
27 taken from the 2013 Michigan Energy Measures Database ("MEMD").

RICHARD A. MORGAN  
DIRECT TESTIMONY

1 Q. What type of utility information is used in DSMore?

2 A. For utility information, DSMore utilizes utility rates; escalation rates; discount rates for  
3 the utility, society and the participant; and avoided costs.

4 Q. What is the source of the utility information used for Consumers Energy's DSMore  
5 inputs?

6 A. Utility inputs were provided to me by Consumers Energy.

7 Q. Will you describe the cost-effectiveness results for the Consumers Energy's EO  
8 programs?

9 A. All Consumers Energy programs are cost-effective with the gas program portfolio UCT  
10 score of 2.13 and the electric program portfolio UCT score of 2.70. The combined fuel  
11 portfolio UCT score is 2.50. This means that the savings benefits are 113% greater than  
12 the program cost for gas, 170% greater than the program cost for electric, and 150%  
13 greater than the program cost for the combined fuel portfolio.

14 Q. Based on the results of your work, do the Consumers Energy EO programs meet the  
15 cost-effectiveness requirements of the state legislation and MPSC Order?

16 A. Yes. Based on the analysis I performed using DSMore, the Consumers Energy  
17 reconciled results of the 2013 program passes the cost-effectiveness test in accordance to  
18 the guidelines outlined by the MPSC, and the legislative requirements of PA 295. This  
19 analysis was done in accordance to MPSC guidelines and did not include low-income  
20 programs. The results of my analysis are provided in Exhibit A-11 (BMR-1), Tables 4.7  
21 and 4.8.

22 Q. Does this complete your testimony?

23 A. Yes, it does.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**DIRECT TESTIMONY**

**OF**

**BENJAMIN M. RUHL**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

BENJAMIN M. RUHL  
DIRECT TESTIMONY

1 Q. Please state your name and business address.

2 A. My name is Benjamin M. Ruhl. My business address is One Energy Plaza, Jackson,  
3 Michigan.

4 Q. By whom are you employed?

5 A. I am employed by Consumers Energy Company ("Consumers Energy" or the  
6 "Company").

7 Q. What is your position with Consumers Energy?

8 A. I am a Senior Energy Optimization Support Analyst in the Energy Efficient Solutions  
9 Group, managing the Group's Regulatory and Planning functions.

10 Q. Please state your educational background.

11 A. I graduated from Purdue University in May 1981 with a Bachelor of Science Degree in  
12 Construction Technology.

13 Q. Please summarize your professional experience.

14 A. In June 1981, I joined the Company as a Cost Engineer in the Plant Modifications and  
15 Miscellaneous Projects Department. My primary responsibilities included documenting  
16 costs of power plant modification projects and tracking potential impacts of costs on  
17 authorized project budgets. These responsibilities included the development of monthly  
18 cost reports and their transmittal to management and the Corporate Treasury Department.

19 In January 1984, I transferred to the Midland Project to serve as a Budget Analyst.  
20 I was responsible for developing monthly cost reports, assisting in quarterly budget  
21 variance reviews, and preparing project budget forecasts. In July 1984, I joined the Legal  
22 Department as a Litigation Support Specialist to assist legal counsel with numerous tasks  
23 in preparation for the Midland Project litigation. I also assisted in the preparation of the

BENJAMIN M. RUHL  
DIRECT TESTIMONY

1 Midland Options Study and subsequent tasks involved in the formation of the Midland  
2 Cogeneration Venture.

3 In March 1987, I joined the Market Research and Pricing Department (now the  
4 Rates and Regulation Department) as a Rate Analyst. I was promoted to the position of  
5 General Rate Analyst in December 1989 and to Senior Rate Analyst in April of 2004  
6 undertaking responsibilities including rate design, research and development of studies  
7 for Senior Management regarding electric industry restructuring and customer-specific  
8 rate analyses. I have served on several corporate task forces regarding deregulation,  
9 wheeling, transmission system utilization, and customer metering. I was involved as a  
10 Consumers Energy representative on the Tariff Working Group subcommittee of the  
11 Alliance Regional Transmission Organization ("Alliance RTO"). On April 16 of 2012 I  
12 accepted a promotional transfer to my current position in the Energy Efficient Solutions  
13 Group.

14 Q. During your tenure with Consumers Energy, have you provided testimony before the  
15 Michigan Public Service Commission ("MPSC" or the "Commission")?

16 A. Yes, I provided testimony on behalf of the Company in the following cases:

- 17 • Case No. U-12781 regarding transmission capability pursuant to Section 10v of  
18 2000 Public Act 141 ("PA 141").
- 19 • Case No. U-14347 supporting recovery of the Company's revenue requirement,  
20 transmission expense recovery, and for the elimination of rate skewing.
- 21 • Case Nos. U-15805 and U-15889 regarding cost recovery of the Company's  
22 Energy Optimization ("EO") program expenditures.
- 23 • Case No. U-16302 concerning the Company's 2009 EO Reconciliation.
- 24 • Case No. U-16303 concerning the Company's 2010 EO Reconciliation.

BENJAMIN M. RUHL  
DIRECT TESTIMONY

- Case No. U-16412 regarding cost recovery of the Company's EO Amended Plan program expenditures.
- Case No. U-16670 regarding cost recovery of the Company's EO Amended Plan program expenditures.
- Case No. U-16794, supporting recovery of the Company's electric revenue requirement.
- Case No. U-17082 regarding reconciliation of gas revenues pursuant to the Pilot Revenue Decoupling Mechanism.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is as follows:

1. To demonstrate that Consumers Energy has reasonably and prudently administered its 2013 EO Plan in compliance with 2008 PA 295 ("PA 295").
2. To demonstrate that the Company has met (exceeded), as independently certified, its 2013 electric and gas statutory energy savings targets as required by PA 295 within the spending cap established by that Act.
3. To demonstrate that the Company's 2013 electric and gas EO program portfolios each achieved (exceeded) a benefit/cost ratio of greater than 1.0, as independently certified, using the utility system resource cost test as required by PA 295.
4. To demonstrate that the Company's 2013 EO Plan performance met the performance incentive requirements set forth per the amended methodology established by the MPSC in its January 31, 2013 Order in Case No. U-17138.

Q. Are you sponsoring any exhibits with your direct testimony?

A. Yes, I am sponsoring the following exhibits.

- Exhibit A-11 (BMR-1) – Consumers Energy: 2013 Energy Optimization Annual Report. This exhibit is a comprehensive Report that reviews the Company's 2013 EO performance. It details customer participation levels, investment, energy savings, and cost-effectiveness results for each program.
- Exhibit A-12 (BMR-2) – Calculation of 2013 Electric and Natural Gas Savings Targets. This exhibit provides updates of each of these targets as compared to those contained in the original Plan approved by the Commission in MPSC Case No. U-16670. These updates are due to the replacement of 2012 *estimated* sales, used in the calculations in the original Plan, with 2012 *actual* sales, now that actual sales information is available.

BENJAMIN M. RUHL  
DIRECT TESTIMONY

• Exhibit A-13 (BMR-3) – 2013 Electric Program Portfolio Savings and Investment Summary. This exhibit summarizes the information in Exhibit A-11 (BMR-1), *supra*, including the energy savings generated through implementation of the Company’s 2013 electric EO Plan, the investments made to achieve those savings, and metrics demonstrating the cost-effectiveness of those investments.

• Exhibit A-14 (BMR-4) – 2013 Gas Program Portfolio Savings and Investment Summary. This exhibit summarizes the information in Exhibit A-11 (BMR-1), *supra*, relating to the energy savings generated through implementation of the Company’s 2013 gas EO Plan, the investments made to achieve those savings, and metrics demonstrating the cost-effectiveness of those investments.

• Exhibit A-15 (BMR-5) – Electric and Gas Incentive Justification. This exhibit illustrates the Company’s justification of the amount of electric and gas incentive payments it has earned for the performance of its 2013 EO Plan.

Q. Have these exhibits been prepared by you or under your supervision?

A. Yes.

Q. What other Company witnesses are presenting testimony in this proceeding?

A. The following Company witnesses will be presenting testimony in this proceeding:

• Company witness Theodore A. Ykimoff will be presenting testimony regarding the 2013 Plan performance of the residential portfolio.

• Company witness Alfred A. Alatalo will be presenting testimony regarding the 2013 Plan performance of the business portfolio.

• Company witness James P. Schwanitz is presenting testimony and exhibits that detail the Company’s 2013 EO Plan year costs, including adjusting out 2012 Plan year costs recorded in 2013, as well as adjusting in 2013 Plan year costs recorded in 2014.

• Company witness Katherine L. Allen is presenting testimony regarding the Company’s actual booked costs per the general ledger for the 2013 Plan year, as well as for the actual recovery of the performance incentive earned for the 2010 Plan year versus the planned recovery. Witness Allen also addresses the Generally Accepted Accounting Principle (“GAAP”) rules associated with revenue recognition for alternative revenue programs, as relating to the recovery period for the earned performance incentive.

• Company witness Laura M. Collins is presenting testimony and exhibits providing 1) a comparison of the EO surcharge revenue collected during 2013 to the Company’s Commission-approved EO Plan and 2) the Company’s proposed



BENJAMIN M. RUHL  
DIRECT TESTIMONY

mechanism for collecting incentive payments it has earned for its 2013 EO Plan performance, including reconciliation of the 2010 performance incentive.

- Company witness Richard A. Morgan is presenting testimony regarding the EO program cost-effectiveness modeling he performed for the Company.
- Company witness M. Sami Khawaja will be presenting testimony and exhibits on behalf of The Cadmus Group, Inc. (“Cadmus”), the Company’s independent third-party evaluator of the residential programs, presenting certification of the results for the Company’s 2013 residential program performance.
- Company witness Robert D. Bordner will be presenting testimony and exhibits on behalf of Energy Market Innovations, Inc. (“EMI”), the Company’s independent third-party evaluator of the business programs, presenting certification of the results for the Company’s 2013 business program performance.

Q. Has the Company produced an annual report for its 2013 EO performance as required by PA 295?

A. Yes. Exhibit A-11 (BMR-1), Consumers Energy: 2013 Energy Optimization Annual Report is a comprehensive Report that reviews the Company’s 2013 EO performance on 12-residential programs, nine-residential pilots, three-business programs, and eight-business pilots. The Report details customer participation levels, investment, energy savings, and cost-effectiveness results for each program.

Q. How is this Report organized?

A. The Company used the same basic template for the 2013 Report as was employed for the 2012 Energy Optimization Annual Report. The annual report submitted in this case shows actual 2013 performance compared to the 2013 program year approved by the Commission in the April 17, 2012 Order in MPSC Case No. U-16670 covering the period 2012-2015.

Q. Did the Company meet its 2013 electric energy savings target as prescribed by PA 295?

A. Yes, the Company met its 2013 electric energy savings target. The statutory requirement was 335,498 MWh as shown in Exhibit A-12 (BMR-2), page 1 on line 7, column (e).

BENJAMIN M. RUHL  
DIRECT TESTIMONY

1 With the Long-Life Equipment Savings (“LLES”) Multiplier, the Company achieved  
2 473,045 MWh of savings as shown in Exhibit A-13 (BMR-3) on line 24, column (d), or  
3 141% of the statutory requirement.

4 Q. Did the Company meet its 2013 gas energy savings target as prescribed by PA 295?

5 A. Yes, the Company also met its 2013 gas savings target. The statutory requirement was  
6 1,765,915 Mcf as shown in Exhibit A-12 (BMR-2), page 2 on line 8, column (e). With  
7 the LLES Multiplier, the Company achieved 2,173,124 Mcf of savings as shown in  
8 Exhibit A-14 (BMR-4) on line 23, column (d), or 123% of the statutory requirement.

9 Q. Did the Company make any adjustments to its 2013 gas energy savings target as  
10 prescribed by PA 295?

11 A. Yes, the Company adjusted the 2013 gas transportation targets pursuant to the  
12 Commission’s December 2, 2010 Order in MPSC Case No. U-16412. In that Order, the  
13 Commission granted the Company authorization to adjust the sales target downward.

14 Q. Has the Company certified these electric and gas energy savings?

15 A. Yes. The Company engaged two independent consultants to perform this certification.  
16 Cadmus certified the residential energy savings and a team led by EMI certified the  
17 nonresidential energy savings. Energy savings for pilot programs as well as savings  
18 attributed to education and awareness are detailed in Exhibit A-11 (BMR-1) on page 14.

19 Q. What are Cadmus’ qualifications for certifying the residential energy savings?

20 A. In its more than two decades of working in the energy industry, Cadmus has conducted  
21 several hundred process and impact program evaluations. Much of this work has  
22 involved multi-year, multi-program (portfolio) projects, many of which were residential  
23 evaluations. Cadmus team members have contributed to some of the most widely used

BENJAMIN M. RUHL  
DIRECT TESTIMONY

1 evaluation protocols, including the International Performance Measurement and  
2 Verification Protocols (“IPMVP”), the National Action Plan for Energy Efficiency  
3 Evaluation (“NAPEEE”) Guidelines, and the California Evaluation Protocols. Cadmus  
4 staff has testified before several State regulatory agencies and legislatures on issues of  
5 energy efficiency program design, implementation, and evaluation.

6 Q. What were Cadmus’ conclusions regarding the amount of electric and gas savings for the  
7 2013 residential programs?

8 A. Cadmus’ conclusions regarding the amount of electric and gas savings for the  
9 2013 residential programs are presented in the testimony and exhibits of Company  
10 witness Khawaja.

11 Q. What are EMI’s qualifications for certifying the nonresidential energy savings?

12 A. The commercial and industrial (“C&I”) evaluation team led by EMI includes several of  
13 the most reputable evaluation, research, and engineering firms in the energy industry. All  
14 the firms on the evaluation team have conducted independent impact, process, and  
15 engineering analyses for utilities and regulatory commissions throughout the United  
16 States for well over ten years. Evaluation team members have specific experience in  
17 evaluating the unique needs of the C&I energy efficiency programs.

18 Q. What were EMI’s conclusions regarding the amount of 2013 nonresidential electric and  
19 gas savings?

20 A. EMI’s conclusions regarding the amount of 2013 nonresidential electric and gas savings  
21 are presented in the testimony and exhibits of Company witness Bordner.

BENJAMIN M. RUHL  
DIRECT TESTIMONY

1 Q. Did the Company achieve its 2013 electric savings target within the Commission-  
2 approved 2013 spending level set by the Commission in MPSC Case No. U-16670?

3 A. Yes. The Commission approved the 2013 electric spending level in Case No. U-16670 to  
4 be \$69.2M. The Company actually spent \$69.1M as shown on Exhibit A-13 (BMR-3),  
5 line 24, column (e).

6 Q. Did the Company achieve its 2013 gas savings target within the Commission-approved  
7 2013 spending level set by the Commission in Case No. U-16670?

8 A. Yes. The Commission approved the Company's 2013 gas spending level in Case No.  
9 U-16670 to be \$47.9M. The Company actually spent \$47.8M as shown on Exhibit A-14  
10 (BMR-4), line 23, column (e).

11 Q. Why do the actual electric and gas spending levels vary from the planned spending  
12 levels?

13 A. Due to the large number of programs and timing of program expenses it is not practically  
14 possible to exactly match planned spending with actual spending. It should be noted that  
15 the variance between planned spending and actual spending is a de minimus amount when  
16 compared to the total spending.

17 Q. Was the cost-effectiveness of the Company's EO programs measured per the industry-  
18 accepted standard practice tests?

19 A. Yes, benefit-cost ratios were calculated for the Utility Cost Test, Total Resource Cost  
20 Test, Rate Impact Measure, and Participant Cost Test.

BENJAMIN M. RUHL  
DIRECT TESTIMONY

1 Q. Who performed the calculations of the benefit-cost ratios for these standard practice  
2 tests?

3 A. Those calculations were performed by Mr. Morgan, President of Morgan Marketing  
4 Partners, LLC, utilizing DSMore, a software tool that is nationally recognized as one of  
5 the leading tools for performing such calculations. Mr. Morgan is sponsoring testimony  
6 in this case in support of these test results, as he did in Case No. U-17281, the Company's  
7 2012 EO Reconciliation filing.

8 Q. Did the Company's portfolios of electric and gas EO programs each achieve the statutory  
9 requirement of a benefit/cost ratio of greater than 1.0 as calculated by the utility system  
10 resource cost test ("UCT")?

11 A. Yes, they did. The UCT score for the electric program portfolio was 2.70, as shown on  
12 Exhibit A-11 (BMR-1) in Table 4.7 Summary of Electric Programs Benefit-Cost Test  
13 Results. The UCT score for the gas program portfolio was 2.13, as shown on Exhibit  
14 A-11 (BMR-1) in Table 4.8 Summary of Natural Gas Programs Benefit-Cost Test  
15 Results.

16 Q. Is the Company requesting performance incentive payments for its 2013 EO program  
17 achievements?

18 A. Yes. The Company will demonstrate that it has earned performance incentives for both  
19 its electric and gas 2013 EO program achievements.

20 Q. Would you please summarize the adjustments made to the requirements for earning a  
21 performance incentive?

22 A. The performance incentive metrics prior to 2013 Plan year application for both the  
23 electric and gas portfolios required that the statutory savings target be exceeded by 15%

BENJAMIN M. RUHL  
DIRECT TESTIMONY

1 and that the UCT test score be 1.25 or greater. If these tests were met, the Company  
2 would be awarded an incentive equal to 15% of the EO program spend for the portfolio.  
3 Changes were made to the metrics of the performance incentive in the settlement of Case  
4 No. U-17138. In order to achieve the maximum performance incentive for 2013  
5 performance, the UCT test scores still need to be 1.25 or greater. The 15% of spend  
6 award was divided into two components, an energy savings component worth a  
7 maximum of 12% for exceeding statutory savings by 15%, and a “deep-dive” component,  
8 comprised of a menu of initiatives from which to choose to fulfill the remainder of the  
9 allowable maximum incentive amount equal to 15% of program spend. The menus and  
10 metrics for these “deep-dive” components are contained in the Settlement Agreement of  
11 Case No. U-17138.

12 Q. Was the Company successful in achieving the necessary metrics to earn the maximum  
13 performance incentives for both its electric and gas EO programs?

14 A. Yes. The Company earned 12% of the program investment for its electric portfolio by  
15 achieving 141% of its statutory electric savings target with a UCT score of 2.70. The  
16 remaining 3% of the maximum performance incentive for electric was met by exceeding  
17 the maximum incentive metrics for Low-Income Programs and Multi-Measure C&I. The  
18 Company earned 12% of the program investment for its gas portfolio by achieving 123%  
19 of its statutory gas savings target with a UCT score of 2.13. The remaining 3% of the  
20 maximum performance incentive for gas was met by exceeding the maximum incentive  
21 metrics for Low-Income Programs and New Construction Residential. The certifications  
22 of these non-energy performance incentive metrics are included in the Cadmus and EMI  
23 certification reports included in this filing.

BENJAMIN M. RUHL  
DIRECT TESTIMONY

1 Q. What is the amount of performance incentive the Company has earned for its 2013 EO  
2 Plan performance?

3 A. Exhibit A-15 (BMR-5) illustrates the Company's performance incentives earned for its  
4 2013 electric EO program portfolio to be \$10.36M, and the performance incentive for its  
5 2013 gas EO program portfolio to be \$7.17M.

6 Q. How does the Company propose to collect these incentive payments?

7 A. The Company's proposed mechanism for collecting these payments is described in the  
8 testimony of Company witness Collins.

9 Q. Does that conclude your testimony?

10 A. Yes.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_ )

Case No. U-17601

**EXHIBITS**

**OF**

**BENJAMIN M. RUHL**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014





# **CONSUMERS ENERGY 2013 ENERGY OPTIMIZATION ANNUAL REPORT**

**Submitted To:**  
Michigan Public Service Commission  
Case No. U-17601

**May 30, 2014**



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## FOREWORD

Consumers Energy Company (“Consumers Energy” or “Company”), the primary subsidiary of CMS Energy, is Michigan’s largest utility and provides electric and natural gas service to a mix of residential, commercial, and diversified industrial customers in Michigan’s Lower Peninsula. Consumers Energy works hard to keep its rates competitive, ensure high levels of customer satisfaction, and provide reliable utility service to its customers, which include 6.5 million of Michigan’s 10 million residents.

In accordance with 2008 Public Act 295, the Company is pleased to present this Energy Optimization Annual Report for calendar year 2013. The report provides an account of the operational, cost-effectiveness, and financial performance of the Company’s energy optimization portfolio.

The programs in the portfolio provided a wide range of opportunities for customers in all classes to reduce their energy consumption and save money on their utility bills. Building on the momentum established with initial program implementation efforts in July 2009, customer participation continued to flourish in 2013; more than 30,000 students participated in the energy education program; more than 28,000 second refrigerators/freezers were recycled; more than 78,000 rebates were provided; more than 100,000 homes and businesses received services; more than 3.1 million energy efficient light bulbs were purchased or provided. As a result, the Company once again cost-effectively exceeded its statutory energy savings goals, and provided significant value to our customers.

## EXECUTIVE SUMMARY

### Continuing the Challenge

In accordance with 2008 PA 295 and the Temporary Order of the Michigan Public Service Commission (“MPSC” or “Commission”) in Case No. U-15800, Consumers Energy filed its 2009-2014 Energy Optimization Plan (Case Nos. U-15805/U-15889) on February 17, 2009. After a contested case hearing, the Commission issued an Order on May 26, 2009, approving the Company’s plan.

With less than a year to achieve its 2009 statutory energy savings targets, the Company began preparation for implementation of the plan even as its case was being litigated. As a result of significant upfront planning and effort, the Company launched its programs in July, which left less than six months to achieve its 2009 statutory electric and natural gas savings targets. Fortunately, the 2009 targets were modest in comparison with those of future years and the Company succeeded in exceeding those targets.

In 2010, the Company had a full year’s opportunity to be in-market with its robust portfolio of programs. Compared to the 2009 energy savings targets, the 2010 electric target increased 63% and natural gas target increased 218%. In total, the Company delivered 143% of the electric statutory target and 144% of the natural gas statutory target.

In 2011, the electric target increased 45% and natural gas target increased 95% compared to 2010 targets. The Company delivered 138% of the electric statutory target and 161% of the natural gas statutory target.

Beginning in 2012, we reached a full run rate of 1% electric annual savings and .75% natural gas savings. Compared to the 2011 energy savings targets, the 2012 electric target increased 31% and natural gas target increased 46%. The Company delivered 123% of the electric statutory target and 129% of the natural gas statutory target.

The Company once again was well prepared to face the continued energy savings challenge as it was equipped with a strong foundation of best practice programs, seasoned implementation contractors, energetic and engaged trade ally networks, and a Michigan market receptive to energy efficient solutions. The success experienced with each of those key business drivers positioned the Company to exceed the energy savings challenges in 2013, delivering 141% of the electric statutory target and 123% of the natural gas statutory target.

### Exceeding the Challenge – Helping Michigan Save Energy

Trade ally and customer reaction continued to be very positive, as evidenced by high program participation levels and electric and gas energy savings that exceeded the statutory targets. The total first-year energy savings delivered in 2013 represented enough to supply electricity to over 56,000 residential homes and natural gas to over 22,000 residential homes for a year. These energy savings were achieved cost-effectively and within the allowable statutory collection limits. As a result, the Company is eligible to receive an incentive payment based on the formula approved by the Commission in Case No. U-15806 on September 29, 2009, as modified in Case No. U-17138 on January 31, 2013.

As shown in Table ES-1 the Company achieved 141% of its statutory electric savings target within the planned investment and a Utility Cost Test (UCT) score of 2.70. Achieving 115% or more of the energy savings target with a UCT score of 1.25 or greater qualified the Company to earn a performance incentive worth 12% of its program investment. Another 3% was earned by achieving the “deep dive” metrics for low-income programs and multi-measure commercial and industrial. As a result, the Company earned a \$10.4 million (15% of \$69.1 million) incentive payment for its electric portfolio performance in 2013.

**Table ES-1. 2013 Electric Results**

| <b>Savings</b>                   | <b>Actual</b> | <b>Target</b> |
|----------------------------------|---------------|---------------|
| MWh                              | 473,045       | 335,498       |
| % of Statutory Target            | 141%          | 100%          |
| <b>Investment</b>                |               |               |
| \$ Millions                      | \$69.10       | \$69.22       |
| % of Statutory Spending Cap      | 92.8%         | 92.9%         |
| <b>Benefit-Cost Test Results</b> |               |               |
| UCT Score                        | 2.70          |               |

As shown in Table ES-2 the Company achieved 123% of its statutory natural gas savings target within the planned investment and a UCT score of 2.13. Achieving 115% or more of the energy savings target with a UCT score of 1.25 or greater qualified the Company to earn a performance incentive worth 12% of its program investment. Another 3% was earned by achieving the “deep dive” metrics for low-income programs and new construction for residential. Thus, in 2013, the Company earned a \$7.17 million (15% of \$47.78 million) incentive payment for its natural gas portfolio performance.

**Table ES-2. 2013 Natural Gas Results**

| <b>Savings</b>                   | <b>Actual</b> | <b>Target</b> |
|----------------------------------|---------------|---------------|
| Mcf                              | 2,173,124     | 1,765,915     |
| % of Statutory Target            | 123%          | 100%          |
| <b>Investment</b>                |               |               |
| \$ Millions                      | \$47.78       | \$47.94       |
| % of Statutory Spending Cap      | 102.8%        | 103.1%        |
| <b>Benefit-Cost Test Results</b> |               |               |
| UCT Score                        | 2.13          |               |



# 1 ANNUAL REPORT ORGANIZATION

The remainder of the Annual Report is divided into the following sections:

*Section 2 - Portfolio Development:* Provides an overview of the statewide energy savings database and the risk mitigation strategies the Company employed in developing and implementing its portfolio of Energy Optimization (EO) programs.

*Section 3 - Program Portfolio Summary:* Provides a high-level overview of each of the Company's EO programs.

*Section 4 - Portfolio Summary Results:* Details the summary results of the energy savings, investment levels, and benefit-cost results achieved by the Company's electric and natural gas EO program portfolios.

*Section 5 - Residential Programs:* Presents detailed program results for each of the Company's residential programs.

*Section 6 - Business Programs:* Presents detailed program results for each of the Company's business programs.

*Section 7 - Portfolio Management:* Presents an overview of the Company's approach to delivering its EO programs through a combination of in-house staff resources and third-party implementation contractors. Also provides an overview of management approach, results tracking, and coordination with other entities.

*Section 8 - Evaluation, Measurement and Verification (EM&V):* Provides an overview of the various EM&V activities the Company carried out to ensure programs achieved intended goals. Discussions of evaluation activities for individual programs are contained in each individual program write-up in Sections 5 and 6.

*Section 9 - Energy Optimization Future Investment:* Details the company's planned investment in its EO programs each year 2014-2017.

*Appendix A -* Contains a glossary of terms used in this report.

## 2 PORTFOLIO DEVELOPMENT

The majority of programs contained in Consumers Energy's 2013 portfolio were a continuation of programs launched in 2009. The development of these programs was based on a national review of leading energy efficiency programs, and they achieved significant and immediate energy savings, while also building on established trade ally and retailer partnerships. The programs targeted all major sectors and customer classes, including low-income and small business customers. Programs were designed to capture both electric and natural gas savings. For those Consumers Energy customers with only electric or only natural gas service, efforts were made to coordinate and align with other utilities so that customers could easily take advantage of efficiency program offerings across both fuel types, thereby producing an overall benefit for Michigan's energy efficiency goals.

The Company offered a diverse portfolio of "tried and true" major programs across the residential, commercial and industrial (C&I) sectors. Additionally, the Company planned and/or implemented several residential and business pilots targeting experimental opportunities.

### 2.1 Deemed Savings

To assess energy savings for electric and natural gas measures, Consumers Energy used the Michigan Energy Measures Database ("MEMD") which was developed in conjunction with the MPSC and other energy utilities specifically for the Michigan market. In the MEMD, non-weather sensitive measure savings estimates are standardized throughout the state. For weather-sensitive measures, a weighting calculation tool allowed weighting of the energy savings from measures based on the mix of weather station locations throughout the Company's service territory. Except for custom business projects, this report relied on the 2013 MEMD for savings calculations, measure lifetimes, and incremental cost estimates.

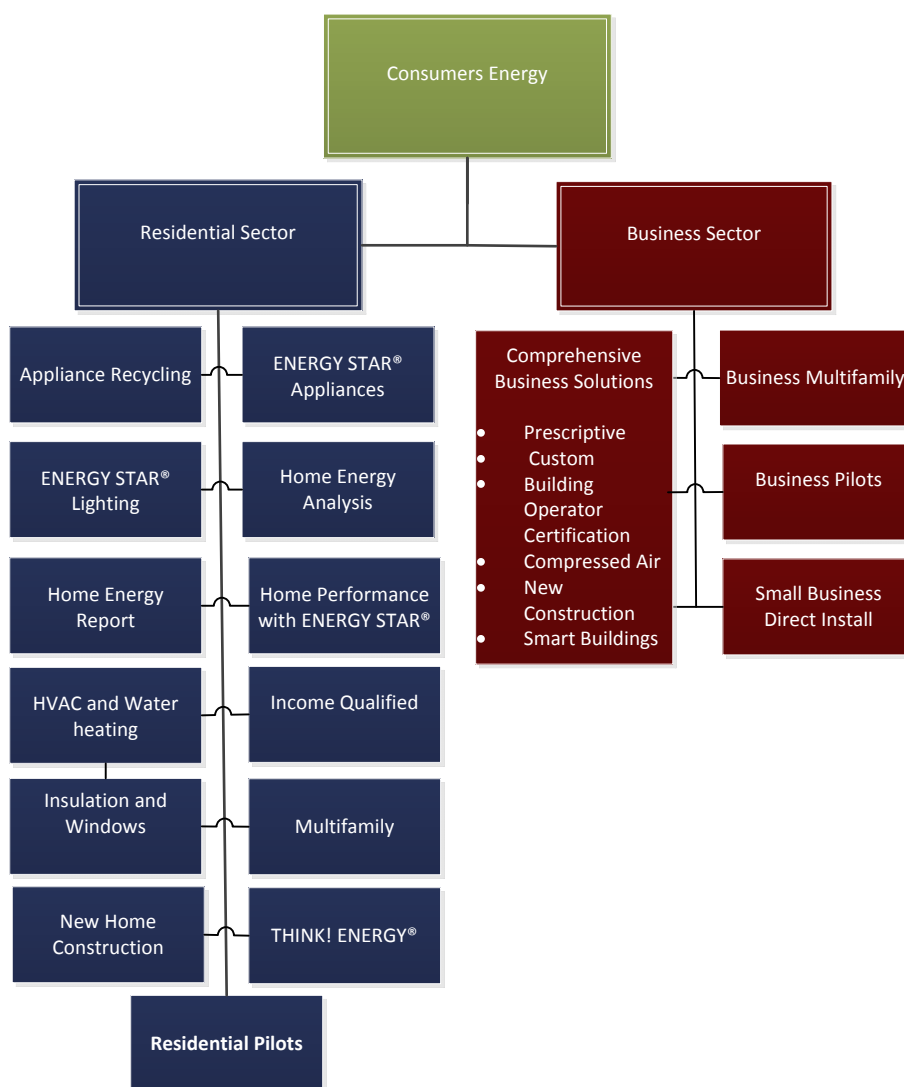
### 2.2 Portfolio Risk Management

Despite the challenges faced by Michigan in 2013 as it moved toward economic recovery, the Company still was able to exceed its statutory electric and natural gas energy savings targets. The risks from these challenges were mitigated by employing five key strategies that were essentially a continuation from 2009 through 2012: (1) implementation of a broad portfolio of programs; (2) implementation of a portfolio of programs that had previously proven successful; (3) use of existing program implementation contractors; (4) use of the MEMD as the basis for estimating program savings; and (5) use of program evaluation results to fine-tune programs.

### 3 PROGRAM PORTFOLIO SUMMARY

Figure 3-1 below represents the Company's 2013 portfolio of EO programs and pilots. By design, the programs are not divided by energy; rather, they are presented as a comprehensive program portfolio that seeks to capture all cost-effective electric and/or natural gas savings. In total, the Company had available 12 residential programs, nine residential pilots, three business programs, and eight business pilots. Customer participation, investment levels, and energy savings by fuel type are included in Sections 5 and 6 of this report.

Figure 3-1. 2013 Consumers Energy Portfolio of Programs



## 3.1 Summary of Residential Programs

### Residential Sector

#### Appliance Recycling Program

Many refrigerators and freezers being replaced by the Company's customers are still functioning, and often end up as energy-guzzling back-up appliances in basements and garages or are sold in the used appliance market. The Appliance Recycling Program targeted "second" refrigerators and freezers, and provided the dual benefit of cutting energy consumption while keeping the appliances out of the used resale market. The program offered an environmentally responsible turnkey pick-up and recycling service.

#### ENERGY STAR® Appliances

The ENERGY STAR® Appliances Program employed a web-based and in-store promotional strategy to influence the purchase of high-efficiency appliances. Since appliance standards, as well as the market share of high-efficiency appliances, are gradually increasing, the program was specific in its list of qualifying models, as well as marketing emphasis. To increase the opportunity for customer participation, low-flow showerheads and programmable thermostats were included as eligible measures.

#### ENERGY STAR® Lighting

In 2013, the Residential Lighting Program provided incentives and marketing support through major retailers at over 404 locations to promote sales and use of ENERGY STAR® lighting products. General advertising, in-store signage, sales associate training, and instant customer incentives through price markdowns drove participation.

#### Home Energy Analysis(HEA)

The Home Energy Analysis Program was launched in January 2012 after a six-month pilot. Participating customers received direct installation of energy saving measures, a walk through energy inspection of their homes that culminated in a customized summary report with energy saving tips and recommendations. The low-cost measures installed included compact fluorescent light bulbs (CFLs) and low-flow water devices that were installed free of charge to residential customers. While the program was promoted as having a \$25 customer fee, this was waived in all circumstances by the customer simply using a promotional code. This provided an effective method of tracking customer response by promotional channel. Other utility energy efficiency programs were cross-promoted, and customers were encouraged to take the next step in their energy efficiency journey by participating in the Home Performance with ENERGY STAR® Program.

#### Home Performance with ENERGY STAR® (HPwES)

The Home Performance with ENERGY STAR® Program generated interest and activity by offering several incentive options to customers who took a whole house approach when installing energy efficient measures. HPwES enrolled and trained over 100 contractors to conduct comprehensive audits that identified areas of opportunity. Customers received incentives to help offset the incremental cost of purchasing and installing the energy efficiency measures.

#### Home Energy Report (HER)

The HER Program provided residential customers with energy information through personalized reports delivered by mail, email or an integrated Web portal to empower them to make better energy usage decisions. Behavioral science research has demonstrated that peer-based comparisons are highly motivating ways to present information. The HER Program created a comparison group for each participating residence comprised of other similarly sized and located households. This behavioral science based approach complemented other residential energy efficiency programs, and was a driving force behind consistent and reliable behavior-based energy efficiency.

### **HVAC and Water Heating**

The high-efficiency HVAC and Water Heating Program increased demand using a market push and pull strategy. The strategy focused on educating customers about the economic benefits of high-efficiency heating, cooling and water heating equipment and also enlisted contractor participation to promote the program and ensure equipment purchased was sized and correctly installed. Financial incentives paid to customers helped reduce the incremental cost of purchasing qualifying high-efficiency models.

### **Income Qualified Energy Assistance**

The Income Qualified Energy Assistance Program identified specific opportunities for low-income customers to lower their energy bills through installation of energy efficiency measures, provided financial assistance to cover the full cost of installation, and educated customers with limited income about how to reduce their energy use and manage their utility costs. The program coordinated low-income services with local weatherization providers to offer comprehensive assistance at lower administrative costs.

### **Insulation and Windows**

The Insulation and Windows Program provided incentive rebates to customers to encourage them to install qualified energy savings windows and home insulation. The program was unique in that customers could use the services of a contractor or perform the improvements and apply for rebates themselves. This was particularly appealing for do-it-yourself customers.

### **Multifamily Program**

The Multifamily Program produced immediate electric and natural gas energy savings in multifamily buildings through the direct installation of energy-saving measures in individual living units. Since this is traditionally a hard-to-reach market, the Company's implementation contractor dispatched a crew of installers to targeted buildings to install low-cost measures, such as lighting and low-flow water devices free of charge to the property owner and tenants. The common areas of these complexes were also an area of focus to engage in energy efficient opportunities through the Prescriptive and Custom Program offerings.

### **New Construction**

The New Construction Program produced long-term electric and natural gas savings by encouraging the construction of single-family homes and duplexes that met the ENERGY STAR® Version 3.0 standard or included a high-efficiency package. Builders who participated were provided incentives that covered approximately 40% of the cost to upgrade and certify each home to meet program standards. The program also employed a training component for builders on building practices and ways to sell the value of energy efficiency to their customers.

### **THINK! ENERGY® Program Grades 4-6**

The THINK! ENERGY® Program influenced students and their families to take actions to reduce their home energy use and increase efficiency. The program targeted students in grades 4-6, providing education and a "take-home" kit that raised awareness about how individual actions and low-cost measures can provide reductions in consumption of electricity, natural gas, and water. The program is endorsed by the Michigan Department of Education.

### **Residential Pilots**

The objective of the Residential Pilots was to help homeowners learn more about new energy efficient opportunities to capture additional electric and natural gas energy savings. The nine pilots included Multi-measure Engagement (Energy Advisor), Smart (Learning) Thermostats, Smart Energy Challenge, Virtual Smart Energy Challenge, Demonstration Project (MEEp), Made in Michigan, Agriculture, Habitat for Humanity – Phase Two and Secondary Education (Youth Energy Advisory). Details for each pilot are included in Section 5.

# Summary of Business Programs

## Business Sector

### Comprehensive Business Solutions Program

#### **Prescriptive**

The Comprehensive Business Solutions Programs generated energy savings for C&I customers through the promotion of high-efficiency electric and natural gas equipment. Cash-back mail-in incentives typically ranged from 20% to 70% of the incremental cost to purchase high-efficiency models.

#### **Custom**

The Custom Business Solutions Program assisted larger commercial and industrial customers with the analysis and selection of high-efficiency equipment or processes not covered under the Comprehensive Business Solutions Program. The program approach identified more complex energy saving projects, provided economic analysis, and aided in the completion of the incentive application. Incentives for energy savings were based on per kWh and/or per Mcf for installed measures.

#### **Specialty - New Construction**

This program captures energy efficiency opportunities through comprehensive efforts to influence building design and construction practices. The program worked with design professionals and construction contractors to influence prospective building owners and developers to construct high-performance buildings that provided improved energy efficiency, systems performance and comfort.

#### **Specialty - Builder Operator Certification (BOC)**

BOC is a competency-based training and certification program for operations and maintenance staff working in commercial, institutional, or industrial buildings. BOC achieves energy savings by training individuals directly responsible for the maintenance of energy-using building equipment and day-to-day building operations.

#### **Specialty - Compressed Air**

This program was to implement compressed air system audits at a number of facilities in order to determine the potential savings that would result from the implementation of the measures identified in the audits.

#### **Specialty - Smart Buildings (EBCx)**

The Smart Building Program offers a retro-commissioning audit and consulting service to customers with energy management systems in need of improvement. The program structure allows the Comprehensive Business Solutions Program a method to achieve energy savings related to low-cost/no-cost building system optimization measures previously not available to be incentivized as capital measures.

### Small Business Direct Install Program

The Small Business Direct Install Program targeted small business customers who otherwise would not participate in energy efficiency program offerings. The program offered highly discounted services for direct installation of efficient lighting and other low-cost energy saving measures.

### Business Multifamily Program

The Multifamily Program produced immediate electric and natural gas energy savings in multifamily buildings through the direct installation of energy-saving measures in individual living units. Since this has been a traditionally hard-to-reach market, the Company's implementation contractor dispatched a crew of installers and targeted buildings to install low-cost measures such as lighting and low-flow water devices free of charge to the property owner and tenants. The common areas of these complexes were

also an area of focus to engage in energy efficient opportunities. In addition incentives were offered for Prescriptive, Custom and Comprehensive energy efficiency projects.

### **Business Pilots**

The Business Pilot Programs focused on eight areas: (1) Multi-Measure Bonus with incentives to customers who completed comprehensive “deep dive” projects; (2) Buy Michigan Bonus with incentives to customers who bought energy efficient products manufactured in Michigan; (3) Agriculture with incentives for audits and projects specific to the agriculture industry; (4) Building Performance with ENERGY STAR® for K-12 Schools to help identify opportunities to make schools more energy efficient; (5) Refrigeration, provided detailed analysis of energy saving opportunities for customers with heavy-duty refrigeration systems; (6) Industrial Continuous Improvement which worked closely with industrial customers in a long-term relationship to improve their overall management of energy; (7) Energy Check which provided benchmarking information and recommendations for saving energy through periodic reports and a data portal; and (8) HVAC Quality Maintenance to promote more effective tune ups of rooftop air conditioning units.

## 4 PORTFOLIO SUMMARY RESULTS

### 4.1 Portfolio Framework & Summary

Consumers Energy invested a total of \$116.9 million in energy efficiency programs during calendar year 2013. That investment included \$56.7 million for residential programs, \$44.5 million for commercial and industrial programs, and \$15.7 million for associated program support services.

The plan sought to maximize the amount of program investment that went directly to customers through rebates and incentives, training and technical assistance, and customer education. Investment was made to adequately plan, develop, deliver, and evaluate quality programs. Additional investment was made to build customer awareness of the Company's program offerings and provide enhancements to a comprehensive data tracking system.

Table 4-1 details the statutory percentages that were used to calculate the energy savings goals and investment caps.

**Table 4-1. Statutory Savings Goals and Investment Levels**

| Electricity                                  | 2013  |
|--|-------|
| Electric Savings Goal as % of Total Sales    | 1.00% |
| Investment as % of Electric Revenue          | 2.00% |
| Natural Gas                                  | 2013  |
| Natural Gas Savings Goal as % of Total Sales | 0.75% |
| Investment as % of Natural Gas Revenue       | 2.00% |

As shown in Table 4-2, the Company achieved 141% of its statutory electric savings target within the investment target and a UCT score of 2.70. Achieving 115% or more of the energy savings target with a UCT score of 1.25 or greater qualified the Company to earn a performance incentive worth 12% of its program investment. Another 3% was earned by achieving the "deep dive" metrics for low-income programs and multi-measure commercial and industrial. As a result, the Company earned a \$10.36 million (15% of \$69.10 million) incentive payment for its electric portfolio performance in 2013.



**Table 4-2. 2013 Electric Results**

| <b>Savings</b>                   | <b>Actual</b> | <b>Target</b> |
|----------------------------------|---------------|---------------|
| MWh                              | 473,045       | 335,498       |
| % of Statutory Target            | 141%          | 100%          |
| <b>Investment</b>                |               |               |
| \$ Millions                      | \$69.10       | \$69.22       |
| % of Statutory Spending Cap      | 92.8%         | 92.9%         |
| <b>Benefit-Cost Test Results</b> |               |               |
| UCT Score                        | 2.70          |               |

As shown in Table 4-3, the Company achieved 123% of its statutory natural gas savings target within the planned investment and a UCT score of 2.13. Achievement of 115% or more of the energy savings target with a UCT score of 1.25 or greater qualifies the Company to earn a performance incentive worth 12% of its program investment. Another 3% was earned by achieving the gas “deep dive” metrics for low-income programs and residential new construction. As a result, the Company earned a \$7.17 million (15% of \$47.78 million) incentive payment for its natural gas portfolio performance in 2013.

**Table 4-3. 2013 Natural Gas Results**

| <b>Savings</b>                   | <b>Actual</b> | <b>Target</b> |
|----------------------------------|---------------|---------------|
| Mcf                              | 2,173,124     | 1,765,915     |
| % of Statutory Target            | 123%          | 100%          |
| <b>Investment</b>                |               |               |
| \$ Millions                      | \$47.78       | \$47.94       |
| % of Statutory Spending Cap      | 102.8%        | 103.1%        |
| <b>Benefit-Cost Test Results</b> |               |               |
| UCT Score                        | 2.13          |               |

A summary of 2013 overall utility cost test results and investment by program is provided in Table 4-4 on the following page. Table 4-5 shows first-year annualized energy savings for 2013, as well as Long-Life Equipment Savings (LLES) Multiplier (refer to 2/28/2013 order of Case No. U-17138 for details) and lifetime savings. The LLES Multiplier was instituted to incent Consumers to implement measures having measure lives of 10 years or more. Energy savings associated with such measures receive an additional 10% first year savings incentive. Energy savings over the useful lifetimes of the measures implemented in 2013 equate to 3,972,554 MWh and 23,200,831 Mcf, which will represent approximately \$600 million of future customer utility bill savings. Additionally, demand reduction for programs delivered in 2013 was 19.3 MW for residential programs and 40.5 MW for business programs for a total of 60 MW saved. Please note that the overall portfolio UCT score of 2.91 in this table does not include (per statute) the costs and energy savings of the Income Qualified Program, nor does it include the costs of the incentive payments the Company has earned for the performance of its electric and natural gas EO portfolios.

**Table 4-4. 2013 Portfolio Investment**

|   | Utility System Resource Cost Test | Lifetime CCE /kWh | Lifetime CCE /Mcf | Investment          |                        | Total Investment |
|---|-----------------------------------|-------------------|-------------------|---------------------|------------------------|------------------|
|   |                                   |                   |                   | Electric Investment | Natural Gas Investment |                  |
| RESIDENTIAL PROGRAMS                      |                                   |                   |                   |                     |                        |                  |
| Appliance Recycling                       | 3.34                              | \$0.017           | -                 | \$4,521,572         | -                      | \$4,521,572      |
| ENERGY STAR® Appliances                   | 2.14                              | \$0.018           | \$2.53            | \$85,598            | \$228,162              | \$313,760        |
| ENERGY STAR® Lighting                     | 7.99                              | \$0.006           | -                 | \$6,418,208         | -                      | \$6,418,208      |
| Home Energy Analysis                      | 1.52                              | \$0.050           | \$2.53            | \$1,730,680         | \$2,861,933            | \$4,592,613      |
| Home Energy Report                        | 0.78                              | \$0.068           | \$10.18           | \$2,111,089         | \$527,772              | \$2,638,861      |
| Home Performance with ENERGY STAR®        | 1.04                              | \$0.081           | \$3.51            | \$855,858           | \$2,490,192            | \$3,346,049      |
| HVAC and Water Heating                    | 3.05                              | \$0.024           | \$1.27            | \$2,033,870         | \$7,252,346            | \$9,286,216      |
| Income Qualified Energy Assistance        | 0.40                              | \$0.077           | \$12.40           | \$1,553,208         | \$9,892,713            | \$11,445,921     |
| Insulation and Windows Program            | 1.83                              | \$0.047           | \$1.78            | \$678,638           | \$2,325,038            | \$3,003,677      |
| Residential Multifamily                   | 2.41                              | \$0.045           | \$0.87            | \$3,679,529         | \$2,093,274            | \$5,772,803      |
| New Home Construction                     | 1.56                              | \$0.064           | \$2.02            | \$208,928           | \$515,788              | \$724,716        |
| THINK! ENERGY®                            | 2.98                              | \$0.022           | \$1.25            | \$601,997           | \$973,912              | \$1,575,909      |
| Residential Pilot Programs                | -                                 | -                 | -                 | \$1,398,767         | \$1,642,140            | \$3,040,908      |
| Residential Subtotal                      | 2.18                              | \$0.020           | \$2.36            | \$25,877,944        | \$30,803,270           | \$56,681,215     |
| BUSINESS PROGRAMS                         |                                   |                   |                   |                     |                        |                  |
| Comprehensive & Custom Business Solutions | 4.29                              | \$0.010           | \$1.01            | \$21,534,553        | \$8,630,429            | \$30,164,982     |
| Small Business Direct Install             | 2.94                              | \$0.018           | \$0.82            | \$10,068,877        | \$981,572              | \$11,050,450     |
| Business Multifamily Direct Install       | 4.92                              | \$0.010           | \$0.77            | \$391,573           | \$295,176              | \$686,749        |
| Business Pilots                           | -                                 | -                 | -                 | \$1,952,000         | \$623,198              | \$2,575,197      |
| Self-Direct                               | -                                 | -                 | -                 | -                   | -                      | \$0              |
| Business Subtotal                         | 2.84                              | \$0.016           | \$1.39            | \$33,947,003        | \$10,530,375           | \$44,477,378     |
|   |                                   |                   |                   |                     |                        |                  |
| Utility Oversight                         | -                                 | -                 | -                 | \$3,690,106         | \$2,564,311            | \$6,254,417      |
| Tracking System                           | -                                 | -                 | -                 | \$723,339           | \$502,659              | \$1,225,998      |
| Education & Awareness                     | -                                 | -                 | -                 | \$1,929,702         | \$1,340,975            | \$3,270,677      |
| EM&V                                      | -                                 | -                 | -                 | \$2,928,945         | \$2,035,368            | \$4,964,313      |
| Support Services Subtotal                 | -                                 | -                 | -                 | \$9,272,092         | \$6,443,313            | \$15,715,405     |
| TOTAL                                     | 2.5                               | \$0.018           | \$1.94            | \$69,097,040        | \$47,776,959           | \$116,873,998    |

**Table 4-5. 2013 Portfolio Savings**

|   | First Year Net MWh Savings | First Year MWh Savings w/ LLES Multiplier | MWh Lifetime Savings | First Year Net MWh Savings | First Year MW Savings w/ LLES Multiplier | First Year Net MWh Savings | First Year MWh Savings w/ LLES Multiplier | First Year Net MWh Savings | First Year Mcf Savings w/ LLES Multiplier | Mcf Lifetime Savings |
|---|----------------------------|---|----------------------|----------------------------|--|----------------------------|---|----------------------------|---|----------------------|
| <b>RESIDENTIAL PROGRAMS</b>               |                            |   |                      |                            |  |                            |   |                            |   |                      |
| Appliance Recycling                       | 31,357                     | 31,357                                    | 250,859              | 3.7                        | 3.7                                      | -                          | -   | -                          | -   | -                    |
| ENERGY STAR® Appliances                   | 421                        | 446                                       | 4,329                | 0.1                        | 0.1                                      | 8,491                      | 9,038                                     | 9,038                      | 90,039                                    | 90,039               |
| ENERGY STAR® Lighting                     | 101,878                    | 101,918                                   | 921,349              | 12.1                       | 12.1                                     | -                          | -   | -                          | -   | -                    |
| Home Energy Analysis                      | 3,354                      | 3,435                                     | 31,618               | 0.4                        | 0.4                                      | 116,929                    | 123,693                                   | 123,693                    | 1,132,575                                 | 1,132,575            |
| Home Energy Report                        | 28,410                     | 28,410                                    | 28,410               | -                          | -  | 51,858                     | 51,858                                    | 51,858                     | 51,858                                    | 51,858               |
| Home Performance with ENERGY STAR®        | 706                        | 759                                       | 9,695                | 0.2                        | 0.2                                      | 46,788                     | 50,999                                    | 50,999                     | 708,524                                   | 708,524              |
| HVAC and Water Heating                    | 5,502                      | 6,002                                     | 79,108               | 1.1                        | 1.2                                      | 410,922                    | 444,641                                   | 444,641                    | 5,704,408                                 | 5,704,408            |
| Income Qualified Energy Assistance        | 2,033                      | 2,075                                     | 18,598               | 0.2                        | 0.2                                      | 84,676                     | 89,201                                    | 89,201                     | 773,895                                   | 773,895              |
| Insulation and Windows Program            | 660                        | 726                                       | 13,193               | 0.4                        | 0.4                                      | 65,421                     | 71,963                                    | 71,963                     | 1,308,420                                 | 1,308,420            |
| Residential Multifamily                   | 7,626                      | 7,955                                     | 75,725               | 0.9                        | 1.0                                      | 184,682                    | 199,006                                   | 199,006                    | 2,414,800                                 | 2,414,800            |
| New Home Construction                     | 152                        | 167                                       | 3,011                | 0.0                        | 0.0                                      | 12,986                     | 14,277                                    | 14,277                     | 255,035                                   | 255,035              |
| THINK! ENERGY®                            | 2,641                      | 2,685                                     | 25,106               | 0.3                        | 0.3                                      | 64,948                     | 71,443                                    | 71,443                     | 779,380                                   | 779,380              |
| Residential Pilot Programs                | 6,792                      | 6,792                                     | -                    | -                          | -  | 60,696                     | 60,696                                    | 60,696                     | -   | -                    |
| <b>Residential Subtotal</b>               | <b>191,532</b>             | <b>192,728</b>                            | <b>1,461,002</b>     | <b>19.3</b>                | <b>19.5</b>                              | <b>1,108,398</b>           | <b>1,186,815</b>                          | <b>1,186,815</b>           | <b>13,218,933</b>                         | <b>13,218,933</b>    |
| <b>BUSINESS PROGRAMS</b>                  |                            |   |                      |                            |  |                            |   |                            |   |                      |
| Comprehensive & Custom Business Solutions | 154,270                    | 166,774                                   | 1,932,456            | 23.9                       | 25.6                                     | 702,517                    | 750,276                                   | 750,276                    | 8,396,337                                 | 8,396,337            |
| Small Business Direct Install             | 81,964                     | 84,184                                    | 536,499              | 16.2                       | 16.5                                     | 131,420                    | 132,612                                   | 132,612                    | 1,194,696                                 | 1,194,696            |
| Business Multifamily Direct Install       | 4,317                      | 4,576                                     | 42,596               | 0.4                        | 0.4                                      | 28,218                     | 30,823                                    | 30,823                     | 390,865                                   | 390,865              |
| Business Pilots                           | 9,478                      | 9,478                                     | -                    | -                          | -  | 23,034                     | 23,034                                    | 23,034                     | -   | -                    |
| Self-Direct                               | 5,936                      | 5,936                                     | -                    | -                          | -  | -                          | -   | -                          | -   | -                    |
| <b>Business Subtotal</b>                  | <b>255,965</b>             | <b>270,948</b>                            | <b>2,511,552</b>     | <b>40.5</b>                | <b>42.5</b>                              | <b>885,189</b>             | <b>936,745</b>                            | <b>936,745</b>             | <b>9,981,898</b>                          | <b>9,981,898</b>     |
| <b>UTILITY PROGRAMS</b>                   |                            |   |                      |                            |  |                            |   |                            |   |                      |
| Utility Oversight                         | -                          | -   | -                    | -                          | -  | -                          | -   | -                          | -   | -                    |
| Tracking System                           | -                          | -   | -                    | -                          | -  | -                          | -   | -                          | -   | -                    |
| Education & Awareness                     | 9,370                      | 9,370                                     | -                    | -                          | -  | 49,565                     | 49,565                                    | 49,565                     | -   | -                    |
| EM&V                                      | -                          | -   | -                    | -                          | -  | -                          | -   | -                          | -   | -                    |
| <b>Support Services Subtotal</b>          | <b>9,370</b>               | <b>9,370</b>                              | <b>-</b>             | <b>-</b>                   | <b>-</b>                                 | <b>49,565</b>              | <b>49,565</b>                             | <b>49,565</b>              | <b>-</b>                                  | <b>-</b>             |
| <b>TOTAL</b>                              | <b>456,867</b>             | <b>473,045</b>                            | <b>3,972,554</b>     | <b>59.8</b>                | <b>62.1</b>                              | <b>2,043,152</b>           | <b>2,173,124</b>                          | <b>2,173,124</b>           | <b>23,200,831</b>                         | <b>23,200,831</b>    |

## 4.2 Energy Savings for Pilot and Education and Awareness

Because pilot and education programs have uncertain outcomes in terms of energy savings, utilities may be reluctant to invest much funding in them; instead choosing to direct investment toward proven programs. However, such lack of investment may result in missed opportunities for promising new programs and increased customer awareness leading to greater participation. Recognizing this challenge, the Commission put forth in Case No. U-15800 a methodology for calculating deemed energy savings for pilot and education programs.

### Pilots

In Section 3(c) of Attachment E, the Order indicates “Utilities may designate up to five percent of the energy optimization budget for pilot programs, future energy optimization program development or to assess emerging technologies.” Further in that section, the Order states that “These budget funds will be deemed to generate a proportional amount up to five percent of the required energy savings for the program year during which the money is spent.”

In 2013, the Company invested 4.85% (\$3.35 million divided by \$69.10 million) of the total electric budget for pilot programs, and the required electric energy savings per statute was 335,498 MWh. As a result, pilot programs were deemed to have generated 16,270 MWh (4.85% of 335,498 MWh) of electric savings. The Company invested 4.74% (\$2.27 million divided by \$47.78 million) of the total natural gas budget for pilot programs. The required natural gas energy savings per statute in 2013 were 1,765,915 Mcf. As a result, pilot programs were deemed to have generated 83,731 Mcf (4.74% of 1,765,915 Mcf) of natural gas savings.

### Education & Awareness

In Section 3(d) of Attachment E, the Order states that “Up to three percent of the energy optimization budget may be used for the cost of energy optimization education programs.” Further in that section, the Order states that “These budget funds will be deemed to generate a proportional amount up to three percent of the required energy savings for the program year during which the money is spent.”

In 2013, the Company invested 2.79% (\$1.93 million divided by \$69.10 million) of the total electric budget for education programs, and the required electric energy savings per statute was 335,498 MWh. As a result, education programs were deemed to have generated 9,370 MWh (2.79% of 335,498 MWh) of electric savings. The Company invested 2.81% (\$1.34 million divided by \$47.78 million) of the total natural gas budget for education programs, and the required natural gas energy savings per statute were 1,765,915 Mcf. As a result, education programs were deemed to have generated 49,565 Mcf (2.81% of 1,765,915 Mcf) of natural gas savings.

## 4.3 Energy Optimization Credits

As shown on Table 4-5, Consumers Energy delivered 456,867 MWh of electric savings in 2013. Since each MWh saved equates to one energy optimization (EO) credit, the Company earned 456,867 electric EO credits. Also as shown on Table 4-5, Consumers Energy delivered 2,043,152 Mcf of natural gas savings in 2013. As each Mcf saved equates to one EO credit, the Company earned 2,043,152 natural gas EO credits.

All 2013 electric and natural gas EO credits necessary to maximize achievement of utility incentive payments will be used for that purpose and any remaining electric credits are expected to be applied toward renewable energy credits.

## 4.4 Benefit-Cost Background

There are five standard practice benefit-cost tests commonly utilized in the energy efficiency industry, each of which addresses different perspectives as shown in Table 4-6 below.

**Table 4-6. Comparative Benefit-Cost Tests**

|   | UTILITY SYSTEM<br>RESOURCE COST<br>TEST (UCT) | TOTAL<br>RESOURCE<br>COST TEST | PARTICIPANT<br>COST TEST | RATE IMPACT<br>MEASURE TEST | SOCIETAL TEST |
|---|---|--------------------------------|--------------------------|-----------------------------|---------------|
| <b>BENEFITS</b>                                       |   |                                |                          |                             |               |
| Reduction in<br>Customer's Utility Bill               |   |                                | X                        |                             |               |
| Incentive Paid by<br>Utility/Program<br>Administrator |   |                                | X                        |                             |               |
| Any Tax Credit<br>Received                            |   | X                              | X                        |                             |               |
| Avoided Supply Costs                                  | X   | X                              |                          | X                           | X             |
| Avoided Participant<br>Costs                          |   | X                              | X                        |                             | X             |
| Participant Payment to<br>Utility (if any)            | X   |                                |                          | X                           |               |
| External Benefits                                     |   |                                |                          |                             | X             |
| <b>COSTS</b>  |   |                                |                          |                             |               |
| Utility Admin Costs                                   | X   | X                              |                          | X                           | X             |
| Participant Costs                                     |   | X                              | X                        |                             | X             |
| Incentive Costs                                       | X   |                                |                          |                             |               |
| External Costs  |   |                                |                          |                             | X             |
| Lost Revenues   |   |                                |                          | X                           |               |

The [Utility System Resource Cost Test](#) measures the net benefits of a demand-side management (DSM) program as a resource option based on the costs and benefits incurred by the utility (including incentive costs) and excluding any net costs incurred by the customer participating in the efficiency program. The benefits are the avoided supply costs of energy and demand, the reduction in transmission, distribution, generation and capacity valued at marginal costs for the periods when there is a load reduction. The costs are the program costs incurred by the utility, the incentives paid to the customers, and the increased supply costs for the periods in which load is increased.

The [Total Resource Cost Test](#) is a test that measures the total net resource expenditures of a DSM program from the point of view of the utility and its ratepayers. Resource costs include changes in supply and participant costs. A DSM program which passes this test (i.e., a ratio greater than 1.0) is viewed as beneficial to the utility and its customers because the savings outweigh the DSM costs incurred by the utility and its customers.

The [Participant Cost Test](#) illustrates the relative magnitude of net benefits that go to participants compared to net benefits achieved from other perspectives. While called a “participant” perspective, it is not necessarily a perspective indicating whether customers participate. The implied discount rate can vary substantially among customers. More importantly, many customers do not even know what a

present-value benefit-cost analysis is let alone feel confident in making decisions based on it. Consequently, a simple payback (years) net of rebate has been shown to provide further guidance on customer participation. The benefits derived from this test reflect reductions in a customer's bill and energy costs plus any incentives received from the utility or third parties and any tax credit. Savings are based on gross revenues. Costs are based on out-of-pocket expenses from participating in a program, plus any increases in the customer's utility bill(s).

The [Rate Impact Measure \(RIM\) Test](#) measures the change in utility energy rates resulting from changes in revenues and operating costs. The higher the RIM test, the less impact on increasing energy rates. While the RIM results provide a guide as to which technology has more impact on rates, generally it is not considered a pass/fail test. Instead, the amount of rate impact is usually considered at a policy level. The policy level decision is whether the entire portfolio's impact on rates is so detrimental that some net benefits have to be forgone.

The [Societal Cost Test](#) is similar to the Total Resource Cost test. However, it also accounts for the effects of externalities, such as reductions in carbon dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and sulfur dioxide (SO<sub>2</sub>).

### **Statutory Standard**

2008 PA 295 established the Utility System Resource Cost Test (UCT) as the official one by which the cost-effectiveness of utility EO program portfolios will be judged. In addition to calculating the benefit-cost ratios for this test, the Company performed similar calculations for three others, the results of which are shown on pages 18 and 19. The Company did not calculate benefit-cost ratios for the Societal Test because of the uncertainty of values associated with environmental externalities.

## 4.5 Benefit-Cost Test Results

### Electric Programs

As shown in Table 4-7 below, the Company's 2013 overall portfolio of electric programs passed the utility cost test with a score of 2.70 with the inclusion of the \$10.36 million electric performance incentive the Company has earned.

**Table 4-7. Summary of Electric Programs Benefit-Cost Test Results**

| <b>RESIDENTIAL PROGRAMS</b>               | <b>Utility Cost Test</b> | <b>Total Resource Cost Test</b> | <b>Participant Measure</b> | <b>Rate Impact Measure</b> |
|---|--------------------------|---------------------------------|----------------------------|----------------------------|
| Appliance Recycling                       | 3.34                     | 2.78                            | 15.00                      | 0.42                       |
| ENERGY STAR® Appliances                   | 3.03                     | 0.39                            | 0.93                       | 0.43                       |
| ENERGY STAR® Lighting                     | 7.99                     | 3.88                            | 11.44                      | 0.43                       |
| Home Energy Analysis                      | 1.01                     | 0.94                            | 17.25                      | 0.31                       |
| Home Energy Report                        | 0.81                     | 0.81                            | -                          | 0.26                       |
| Home Performance with ENERGY STAR®        | 0.89                     | 0.73                            | 2.85                       | 0.40                       |
| HVAC and Water Heating                    | 2.47                     | 2.19                            | 7.23                       | 0.47                       |
| Income Qualified Energy Assistance        | 0.68                     | 0.68                            | -                          | 0.27                       |
| Insulation and Windows Program            | 1.51                     | 0.45                            | 0.84                       | 0.53                       |
| Residential Multifamily                   | 1.15                     | 1.15                            | -                          | 0.33                       |
| New Home Construction                     | 1.21                     | 0.55                            | 1.12                       | 0.51                       |
| THINK! ENERGY®                            | 2.08                     | 2.08                            | 12.33                      | 0.34                       |
| Residential Pilot Programs                | -                        | -                               | -                          | -                          |
| <b>Residential Portfolio Average*</b>     | <b>2.60</b>              | <b>1.97</b>                     | <b>11.21</b>               | <b>0.40</b>                |
|   |                          |                                 |                            |                            |
| <b>BUSINESS PROGRAMS</b>                  |                          |                                 |                            |                            |
| Comprehensive & Custom Business Solutions | 4.39                     | 1.48                            | 3.83                       | 0.45                       |
| Small Business Direct Install             | 2.64                     | 2.64                            | -                          | 0.41                       |
| Business Multifamily Direct Install       | 4.67                     | 4.67                            | -                          | 0.42                       |
| Business Pilots                           | -                        | -                               | -                          | -                          |
| <b>Business Portfolio Average</b>         | <b>2.78</b>              | <b>1.42</b>                     | <b>5.02</b>                | <b>0.42</b>                |
|   |                          |                                 |                            |                            |
| <b>Total Portfolio without Incentive*</b> | <b>3.12</b>              | <b>1.74</b>                     | <b>6.55</b>                | <b>0.42</b>                |
|   |                          |                                 |                            |                            |
| <b>Total Portfolio with Incentive*</b>    | <b>2.70</b>              | <b>1.61</b>                     | <b>6.55</b>                | <b>0.41</b>                |

\*Does not include Residential Income Qualified Program



## Natural Gas Programs

As shown in Table 4-8 below, the Company's 2013 overall portfolio of natural gas programs passed the utility cost test with a score of 2.13 with the inclusion of the \$7.17 million natural gas performance incentive the Company has earned.

**Table 4-8. Summary of Natural Gas Programs Benefit-Cost Test Results**

| <b>RESIDENTIAL PROGRAMS</b>               | <b>Utility<br/>Cost Test</b> | <b>Total<br/>Resource<br/>Cost Test</b> | <b>Participant<br/>Measure</b> | <b>Rate<br/>Impact<br/>Measure</b> |
|---|------------------------------|---|--------------------------------|------------------------------------|
| Appliance Recycling                       | -                            | -                                       | -                              | -                                  |
| ENERGY STAR® Appliances                   | 1.80                         | 0.31                                    | 0.54                           | 0.52                               |
| ENERGY STAR® Lighting                     | -                            | -                                       | -                              | -                                  |
| Home Energy Analysis                      | 1.83                         | 1.72                                    | 22.15                          | 0.52                               |
| Home Energy Report                        | 0.65                         | 0.65                                    | -                              | 0.35                               |
| Home Performance with ENERGY STAR®        | 1.09                         | 0.80                                    | 2.12                           | 0.43                               |
| HVAC and Water Heating                    | 3.21                         | 1.33                                    | 2.35                           | 0.58                               |
| Income Qualified Energy Assistance        | 0.36                         | 0.36                                    | -                              | 0.24                               |
| Insulation and Windows Program            | 1.92                         | 0.35                                    | 0.65                           | 0.51                               |
| Residential Multifamily                   | 4.62                         | 4.62                                    | -                              | 0.61                               |
| New Home Construction                     | 1.70                         | 1.63                                    | 3.87                           | 0.49                               |
| THINK! ENERGY®                            | 3.54                         | 3.54                                    | 11.81                          | 0.60                               |
| Residential Pilot Programs                | -                            | -                                       | -                              | -                                  |
| <b>Residential Portfolio Average*</b>     | <b>1.73</b>                  | <b>0.99</b>                             | <b>2.55</b>                    | <b>0.50</b>                        |
|   |                              |   |                                |                                    |
| <b>BUSINESS PROGRAMS</b>                  |                              |   |                                |                                    |
| Comprehensive & Custom Business Solutions | 4.05                         | 1.73                                    | 2.95                           | 0.62                               |
| Small Business Direct Install             | 5.96                         | 5.96                                    | -                              | 0.68                               |
| Business Multifamily Direct Install       | 5.26                         | 5.26                                    | -                              | 0.64                               |
| Business Pilots                           | -                            | -                                       | -                              | -                                  |
| <b>Business Portfolio Average</b>         | <b>3.02</b>                  | <b>1.66</b>                             | <b>3.51</b>                    | <b>0.60</b>                        |
|   |                              |   |                                |                                    |
| <b>Total Portfolio without Incentive*</b> | <b>2.54</b>                  | <b>1.32</b>                             | <b>2.89</b>                    | <b>0.56</b>                        |
|   |                              |   |                                |                                    |
| <b>Total Portfolio with Incentive*</b>    | <b>2.13</b>                  | <b>1.21</b>                             | <b>2.89</b>                    | <b>0.54</b>                        |

\*Does not include Residential Income Qualified Program



## 4.6 Benefit-Cost Methodology

For the 2013 analysis of program benefits, a software program called DSMore™ was utilized, which applies avoided cost savings generated by each measure or program across the entire portfolio.

DSMore™ was selected because it reflects the variation of savings and avoided costs over more than 30 years of weather data. The correlation and covariance between savings and price (or cost) of avoided energy is incorporated into the analysis rather than using a static typical year. Simply, weather variations concurrently cause savings and energy prices to increase or decrease. Simple averages are not as accurate because price variations are not symmetrical. Thus, DSMore™ improves the valuation of measures with weather-sensitive savings more accurately than using typical year or average savings.

DSMore™ also uses load-shape and price-shape input files. These files are tailored to the specific group of customers for which a program is designed. A full enumeration of hourly load and price distributions for over 30 years is modeled. The files statistically measure price and load covariance. DSMore™ calculates a full distribution of load shapes and reports the mean load shape for each month, both weekend and weekday, along with the standard deviation of these shapes at the hourly level.

### Discount Rate

There is a time value of money because money spent in the future does not have the same value as money spent today. This time value is represented by a discount rate (analogous to an interest rate). Economic equations use the discount rate to convert all costs and benefits to a “present value” for comparing alternative costs and benefits. Consumers Energy used a uniform discount rate of 8.70% for electric and 8.63% for gas energy efficiency programs and supply-side resources.

### Pricing Scenario

The DSMore™ price simulation file allows modeling of a range of energy cost (price) scenarios. Consumers Energy’s avoided energy cost served as the basis for selecting a DSMore™ pricing scenario which statistically modeled energy prices (costs) for 8,760 hours per year over 30-plus years of weather statistics. Subsequent years used Consumers Energy’s projected escalation factors to model avoided costs. The base assumptions were the same as those used to model the Company’s 2012-2015 Amended Energy Optimization Plan in Case No. U-16670 that received Commission approval April 17, 2012.

### Avoided Capacity and Energy Benefits

DSMore™ avoided cost benefits fall into two categories: avoided capacity benefits and avoided energy benefits. Avoided capacity benefits are the benefits derived from deferring the need to build new generating plants in the future. Avoided capacity values were based on Consumers Energy’s projections of future power plant costs considering expected levels of capacity available over future years and the costs of that capacity.

Avoided energy benefits are estimated by DSMore™ using the annual hourly patterns of equipment use and input values supplied by Consumers Energy that incorporate the varying costs to generate electricity at different times of the day and year.

### Avoided Transmission and Distribution Benefits

The transmission and distribution system line losses can be avoided, thus producing benefits when customers save energy. Losses are incurred from electrical resistance in lines and from transformation of voltage from high voltage to the voltage level used by the customer. The Consumers Energy line loss study was used to value losses at the secondary, primary and transmission voltage levels (9.7%, 6.0% and 3.8% respectively). While the cost of building transmission and distribution systems – by either building with less capacity or avoiding building completely – theoretically might be avoided, Consumers Energy’s current transmission and

distribution systems are typically adequate to meet customers' needs. The current situation, relative to numbers of customers and demand, would need to substantially change before costs of building transmission and distribution systems could be avoided.

#### Administration, Implementation and Direct Costs

Administration, implementation and direct costs were included as technology inputs of DSMore™ to allow aggregation into total program cost-effectiveness. Consumers Energy support services that are not specific to individual programs are added as costs at the portfolio level for all programs.

## 5 RESIDENTIAL PROGRAMS

### 5.1 Appliance Recycling Program

| Program  | Appliance Recycling   |                |                 |  |  |
|--|---|----------------|-----------------|--|--|
| Objective  | Produce long-term electric energy savings in the residential sector by permanently removing operable second refrigerators and freezers from the power grid and recycling them in an environmentally safe manner.  |                |                 |  |  |
| Target Market  | Residential electric customers who are currently operating second refrigerators and/or freezers.  |                |                 |  |  |
| Program Duration   | The Appliance Recycling Program began in 2009 and is an ongoing element of the program portfolio.   |                |                 |  |  |
| Program Description  | The average household replaces a refrigerator every 10 years. However, many of the refrigerators and freezers being replaced still functioned and often end up as energy-guzzling back-up appliances in basements and garages or are sold in a used appliance market. The Appliance Recycling Program targeted second refrigerators and freezers, providing the dual benefit of cutting energy consumption and keeping the appliances out of the used market. An appliance recycling contractor provides turnkey implementation services that include verification of customer eligibility, scheduling of pick-up appointments, appliance pick-up, rebate processing, and recycling services. |                |                 |  |  |
| Program Logic  | <p>Following are the primary barriers in this market and the program elements that addressed them:</p> <table> <tr> <th>Market Barrier</th><th>Program Element</th></tr> <tr> <td> <ul style="list-style-type: none"> <li>Lack of awareness about operating costs for “second” refrigerators and freezers, as well as for older units</li> <li>Inconvenience of removing older units</li> <li>Cost of disposal</li> </ul> </td><td> <ul style="list-style-type: none"> <li>Marketing materials with operating cost estimates</li> <li>Free pickup/removal from customer site plus incentive</li> <li>Free disposal and proper recycling</li> </ul> </td></tr> </table>                        | Market Barrier | Program Element | <ul style="list-style-type: none"> <li>Lack of awareness about operating costs for “second” refrigerators and freezers, as well as for older units</li> <li>Inconvenience of removing older units</li> <li>Cost of disposal</li> </ul> | <ul style="list-style-type: none"> <li>Marketing materials with operating cost estimates</li> <li>Free pickup/removal from customer site plus incentive</li> <li>Free disposal and proper recycling</li> </ul> |
| Market Barrier   | Program Element   |                |                 |  |  |
| <ul style="list-style-type: none"> <li>Lack of awareness about operating costs for “second” refrigerators and freezers, as well as for older units</li> <li>Inconvenience of removing older units</li> <li>Cost of disposal</li> </ul> | <ul style="list-style-type: none"> <li>Marketing materials with operating cost estimates</li> <li>Free pickup/removal from customer site plus incentive</li> <li>Free disposal and proper recycling</li> </ul>  |                |                 |  |  |
| Incentive Strategy   | <p>During 2013, customers were offered a \$50 rebate and free pickup and recycling of their old operable second refrigerators and freezers. Typically, a customer would have to pay a municipal fee of about \$35 for appropriate disposal of the unit, so the free pick-up service provided additional value.</p> <p>To provide additional customer value, customers also were offered free pickup and recycling of their old operable window air conditioners and dehumidifiers during a home pickup of a refrigerator or freezer. This offering began in July and customers were offered \$15 for each small unit.</p>   |                |                 |  |  |

## Eligible Measures, Efficiency Requirements & Incentives

Deemed savings values are based on documented values from the Michigan Energy Measures Database.

| Measure                       | Eligibility   | Incentive per Unit |
|-------------------------------|---------------|--------------------|
| Recycled Refrigerator         | Operable Unit | \$50               |
| Recycled Freezer              | Operable Unit | \$50               |
| Recycled Room Air Conditioner | Operable Unit | \$15               |
| Recycled Dehumidifier         | Operable Unit | \$15               |

## Implementation Strategy

Key elements of the implementation strategy included:

- ***Turnkey appliance pickup/recycling.*** Consumers Energy continued work with its implementation contractor to provide comprehensive turnkey implementation services, from eligibility verification and scheduling of pickups to proper disposal and recycling of turned-in appliances.
- ***Incentive coordination and processing.*** The implementation contractor coordinated prompt processing of incentive payments. As prompt incentive payment is essential to retailer/customer satisfaction, the implementation contractor established protocols and service level requirements that expedited payments.

To minimize free ridership, the program used marketing messages targeted at customers with second refrigerators/freezers. Mass marketing that emphasized the cost of operating second refrigerators/freezers also had the potential to increase spillover impacts.

The implementation contractor handled implementation-related administrative requirements, including the following:

- Management of the scheduling, pickup, and appliance recycling processes
- Marketing strategy and messaging
- Incentive processing
- Data tracking and reporting
- Investment tracking and reporting
- Call Center services
- Managing public relations
- Customer satisfaction/Problem resolution

## Marketing Strategy

All marketing materials carried a strong consumer education message emphasizing the cost of operating second refrigerators and freezers and older, inefficient appliances, and the importance of proper disposal and recycling of older units. Key elements of the marketing strategy included:

- Customer marketing through Consumers Energy's website, social media, bill inserts, newsletters and email blasts.
- A referral campaign was piloted for three months through the Company's Call Center where customer service representatives promoted the program.
- Press releases.
- Mass media advertising including print, radio and television.

## Milestones

| Major Milestone  | Date       |
|--|------------|
| Picked up small appliances during home collections of large appliances | 7/13       |
| Achieved 75,000th large appliance pickup                               | 9/13       |
| Received 2013 MDEQ Neighborhood Environmental Partnership Award        | 9/13       |
| Implemented a three-month internal referral program                    | 9/13-11/13 |

In July, Consumers Energy began picking up window air conditioners and dehumidifiers during home collections of large appliances (refrigerators and/or freezers). This customer value offering resulted in an additional 907 small appliances being recycled.

In September, Consumers Energy achieved a milestone of recycling 75,000 refrigerators and freezers. This achievement was recognized in the media, which showcased the environmental impacts and the Company's award to its 75,000<sup>th</sup> customer.

Also in September, the Michigan Department of Environmental Quality (MDEQ) honored Consumers Energy with the Neighborhood Environmental Partnership Award for participation in community-based recycling events in collaboration with Holland Board of Public Works. At these one-day drop-off collection events, room air conditioners and dehumidifiers were collected along with second refrigerators and freezers for recycling.

During the months of September through November, Consumers Energy implemented a Customer Service Representative (CSR) referral pilot. This pilot resulted in 537 successful referrals during the three-month pilot, 165 CSRs (over 55%) participated by providing at least one successful referral. The pilot demonstrated the internal referral option was successful and also raised employee awareness of the program and other energy efficiency programs in the portfolio. The overall employee referral rate increased from .06% outside of the pilot campaign to 6.3% during the pilot.

Recycling drop-off events were conducted with Holland Board of Public Works, Lowell Light & Power, city of South Haven, city of Sturgis and Traverse City Light

|   | <p>and Power where customers were provided with an opportunity to drop off eligible appliances on a weekend day without setting up an appointment for pickup. The events promoted collaboration and goodwill with municipal utility partners and offered customers a convenient opportunity to recycle other items such as electronics and noneligible appliances through nonrelated participating vendors.</p> <p>The Appliance Recycling Program also has made considerable impacts on the environment. Over 95% of the materials in old refrigerators are transformed into new products when recycled, and hazardous oils, toxins and chlorofluorocarbon gases are safely disposed of. Since inception of the program in 2009, 82,894 units have been responsibly recycled. This equates to:</p> <ul style="list-style-type: none"> <li>• Properly recycling over 124 tons of aluminum, 6,217 tons of metal, 124 tons of glass and 1,036 tons of plastic</li> <li>• Keeping over 414 tons of foam insulation containing toxins and chlorofluorocarbon gases out of landfills</li> <li>• Avoiding CO<sub>2</sub> emissions equal to 165,788 cars per year</li> </ul> |         |                |                        |        |                   |       |                           |     |                        |     |       |        |
|---|--|---------|----------------|------------------------|--------|-------------------|-------|---------------------------|-----|------------------------|-----|-------|--------|
| <b>EM&amp;V Strategy</b>                            | <p>The following evaluation activities were performed for the 2013 Appliance Recycling Program.</p> <p><b>Participant Online Surveys:</b> Surveys with 2013 participants in the Appliance Recycling Program were conducted throughout the year. The participant surveys assessed satisfaction with key program elements including application process, scheduling, collection process, rebate levels, and the program overall. Over 3,700 surveys were completed.</p>  |         |                |                        |        |                   |       |                           |     |                        |     |       |        |
| <b>Consumers Energy Administrative Requirements</b> | <p>Consumers Energy staff were responsible for general administrative oversight of the program portfolio and addressed the following:</p> <ul style="list-style-type: none"> <li>• Management of the implementation contractor</li> <li>• Coordination of marketing strategy/public relations</li> <li>• Development and placement of marketing materials and advertising</li> <li>• Data warehousing</li> <li>• Customer satisfaction</li> <li>• Management of key performance metrics and reporting</li> <li>• Goal achievement within investment</li> </ul>   |         |                |                        |        |                   |       |                           |     |                        |     |       |        |
| <b>Participation</b>                                | <table border="1"> <thead> <tr> <th>Measure</th><th>Units Recycled</th></tr> </thead> <tbody> <tr> <td>Refrigerator Recycling</td><td>22,780</td></tr> <tr> <td>Freezer Recycling</td><td>5,400</td></tr> <tr> <td>Air Conditioner Recycling</td><td>368</td></tr> <tr> <td>Dehumidifier Recycling</td><td>539</td></tr> <tr> <td>Total</td><td>29,087</td></tr> </tbody> </table>   | Measure | Units Recycled | Refrigerator Recycling | 22,780 | Freezer Recycling | 5,400 | Air Conditioner Recycling | 368 | Dehumidifier Recycling | 539 | Total | 29,087 |
| Measure   | Units Recycled   |         |                |                        |        |                   |       |                           |     |                        |     |       |        |
| Refrigerator Recycling                              | 22,780   |         |                |                        |        |                   |       |                           |     |                        |     |       |        |
| Freezer Recycling                                   | 5,400  |         |                |                        |        |                   |       |                           |     |                        |     |       |        |
| Air Conditioner Recycling                           | 368  |         |                |                        |        |                   |       |                           |     |                        |     |       |        |
| Dehumidifier Recycling                              | 539  |         |                |                        |        |                   |       |                           |     |                        |     |       |        |
| Total   | 29,087   |         |                |                        |        |                   |       |                           |     |                        |     |       |        |

## Investment

|          | 2013 Actual | 2013 Plan   |
|----------|-------------|-------------|
| Electric | \$4,521,572 | \$3,961,125 |
| Gas      | -           | \$46,125    |
| Total    | \$4,521,572 | \$4,007,250 |

## Energy Savings

|     | 2013 Actual | 2013 Actual<br>w/ LLES<br>Multiplier | 2013 Plan |
|-----|-------------|--------------------------------------|-----------|
| MWh | 31,357      | 31,357                               | 43,840    |
| MW  | 3.7         | 3.7                                  | 4.9       |
| Mcf | -           | -                                    | 17,321    |

## Benefit-Cost Test Results

| Benefit-Cost Test        | B/C Ratio |
|--------------------------|-----------|
| Utility Cost Test        | 3.34      |
| Total Resource Cost Test | 2.78      |
| Participant Test         | 15.00     |
| Rate Impact Measure      | 0.42      |

## 5.2 ENERGY STAR® Appliances Program

| Program                          | ENERGY STAR® Appliances   |                |                 |                       |                       |                        |           |                                  |                             |
|----------------------------------|---|----------------|-----------------|-----------------------|-----------------------|------------------------|-----------|----------------------------------|-----------------------------|
| Objective                        | Produce long-term energy savings in the residential sector by promoting high-efficiency home appliances through the retail channel.   |                |                 |                       |                       |                        |           |                                  |                             |
| Target Market                    | The program targeted residential customers in the market for new clothes washers, low-flow showerheads, room air conditioners, dehumidifiers, and programmable thermostats. Residential rental property owners also were eligible to participate.   |                |                 |                       |                       |                        |           |                                  |                             |
| Program Duration                 | The ENERGY STAR® Appliance Program is an ongoing element of the portfolio.  |                |                 |                       |                       |                        |           |                                  |                             |
| Program Description              | <p>Since appliance standards as well as the market share of high-efficiency appliances are gradually increasing, the program was very specific regarding qualifying models as well as marketing emphasis.</p> <p>The program provided incentives to customers to encourage them to purchase high-efficiency clothes washers meeting Consortium for Energy Efficiency (CEE) standards. In addition, customer incentives were available for low-flow showerheads, programmable thermostats, dehumidifiers and room air conditioners.</p>  |                |                 |                       |                       |                        |           |                                  |                             |
| Program Logic                    | <p>Although consumer awareness of high-efficiency clothes washers has significantly increased, a first cost barrier still exists when promoting the highest efficiency units.</p> <p>Following is a list of the primary barriers in this market and the program elements addressing them:</p> <table> <tr> <th>Market Barrier</th><th>Program Element</th></tr> <tr> <td>• First-cost concerns</td><td>• Customer incentives</td></tr> <tr> <td>• Consumer information</td><td>• Website</td></tr> <tr> <td>• Retail sales force information</td><td>• Field work with retailers</td></tr> </table>   | Market Barrier | Program Element | • First-cost concerns | • Customer incentives | • Consumer information | • Website | • Retail sales force information | • Field work with retailers |
| Market Barrier                   | Program Element   |                |                 |                       |                       |                        |           |                                  |                             |
| • First-cost concerns            | • Customer incentives   |                |                 |                       |                       |                        |           |                                  |                             |
| • Consumer information           | • Website   |                |                 |                       |                       |                        |           |                                  |                             |
| • Retail sales force information | • Field work with retailers   |                |                 |                       |                       |                        |           |                                  |                             |
| Incentive Strategy               | <p>The following incentive strategy was employed to address current market barriers:</p> <p><b><i>Mail-in rebates for high-efficiency clothes washers.</i></b> Customers and retailers could download a rebate application from Consumers Energy's website. The rebate application also listed rebates on eligible low-flow showerheads, programmable thermostats, ENERGY STAR® room air conditioners and ENERGY STAR® dehumidifiers.</p> <p>Electric-only or gas-only customers received a \$25 rebate for the purchase of a qualifying clothes washer. Combination customers who purchased qualifying clothes washers received a \$50 rebate.</p> |                |                 |                       |                       |                        |           |                                  |                             |



## Eligible Measures, Efficiency Requirements & Incentives

| Measure                      | Eligibility  | Incentive per Unit |
|------------------------------|--------------|--------------------|
| Clothes Washer<br>CEE Tier 2 | ENERGY STAR® | \$25 or \$50       |
| Clothes Washer<br>CEE Tier 3 | ENERGY STAR® | \$25 or \$50       |
| Room Air Conditioner         | ENERGY STAR® | \$20               |
| Dehumidifier                 | ENERGY STAR® | \$20               |
| Thermostat                   | Programmable | \$10               |
| Low-Flow Showerhead          | <1.75 GPM    | \$10               |

## Implementation Strategy

Key elements of the implementation strategy included:

- **Retailer education and outreach.** Consumers Energy's implementation contractor utilized field representatives to facilitate the education of participating retailers. The field representatives maintained regular contact with participating retailers to ensure the following:
  - (1) Retail sales staff were informed about the program offerings, rebate application process, and benefits of ENERGY STAR® qualifying products
  - (2) Retailers' concerns and issues were addressed promptly
- **Incentive coordination and processing.** The implementation contractor processed all incentive requests and managed prompt processing of incentive payments.

Strategies to limit free ridership and promote spillover included:

- Clothes washer incentives for only the highest efficiency levels
- Program promotion primarily on Consumers Energy's Website

The implementation contractor was responsible for handling implementation-related administrative requirements, including the following:

- Retailer education
- Marketing strategy and messaging
- Field services
- Rebate processing
- Data tracking and reporting
- Investment tracking and reporting
- Call Center services
- Managing public relations
- Customer satisfaction/Problem resolution

## Marketing Strategy

Key elements of the marketing strategy included:

- Customer marketing through Consumers Energy's Website
- Television, radio, and print media encouraging customers to visit Consumers Energy's website to find out more about ways to save energy and money

The website carried a strong consumer education message emphasizing the benefits of high-efficiency appliances and early replacement with ENERGY STAR® qualified models (lifetime dollar savings, energy-savings, water savings, and lower noise levels).

ENERGY STAR® Appliances, Appliance Recycling, CFL Recycling Program and Home Energy Analyzer) was included in the kit.

## Milestones

| Major Milestone  | Date |
|--|------|
| Partnered with Kent District Library to provide 37 Kill-a-Watt energy meters for check-out with library card | 4/13 |

## EM&V Strategy

The following evaluation activities were performed for the 2013 ENERGY STAR® Appliance Program.

**Participant Online Surveys:** Surveys with 2013 participants in the ENERGY STAR® Appliance Program were conducted while the program was active. The participant surveys assessed satisfaction with key program elements including rebate levels, the energy efficient equipment purchased, interaction with retailers, and the program overall. Nearly 200 surveys were completed by program participants.

## Consumers Energy Administrative Requirements

Consumers Energy staff were responsible for general administrative oversight of the program portfolio and addressed the following:

- Overall program administration
- Management of the implementation contractor
- Coordination of marketing strategy/public relations among programs and market sectors
- Development and placement of marketing materials with input from the implementation contractor
- Coordination of all educational services
- Customer satisfaction
- Data warehousing
- Management of key performance metrics and reporting
- Goal achievement within investment

## Participation

| Measure             | Number of Rebates |
|---------------------|-------------------|
| Clothes Washer      | 3,367             |
| Setback Thermostat  | 614               |
| Low-Flow Showerhead | 45                |

|  |                        |       |
|--|------------------------|-------|
|  | Room Air Conditioner   | 15    |
|  | Dehumidifier           | 49    |
|  | Total                  | 4,090 |
|  |                        |       |
|  | Energy Efficiency Kits | 1,525 |

|                   |          |                    |                  |
|-------------------|----------|--------------------|------------------|
| <b>Investment</b> |          | <b>2013 Actual</b> | <b>2013 Plan</b> |
|                   | Electric | \$85,598           | \$413,987        |
|                   | Gas      | \$228,162          | \$197,524        |
|                   | Total    | \$313,760          | \$611,510        |

|                       |     |                    |   |                  |
|-----------------------|-----|--------------------|---|------------------|
| <b>Energy Savings</b> |     |                    | <b>2013 Actual<br/>w/ LLES<br/>Multiplier</b> |                  |
|                       |     | <b>2013 Actual</b> |   | <b>2013 Plan</b> |
|                       | MWh | 421                | 446   | 877              |
|                       | MW  | 0.1                | 0.1   | 0.2              |
|                       | Mcf | 8,491              | 9,038   | 95,933           |

|                                  |                          |                  |
|----------------------------------|--------------------------|------------------|
| <b>Benefit-Cost Test Results</b> | <b>Benefit-Cost Test</b> | <b>B/C Ratio</b> |
|                                  | Utility Cost Test        | 2.14             |
|                                  | Total Resource Cost Test | 0.33             |
|                                  | Participant Test         | 0.67             |
|                                  | Rate Impact Measure      | 0.48             |

## 5.3 ENERGY STAR® Lighting Program

| Program   | ENERGY STAR® Lighting  |                |                 |   |   |
|---|--|----------------|-----------------|---|---|
| Objective   | Produce long-term electric energy savings in the residential sector by increasing the market share of high-efficiency lighting products sold through retail sales channels.  |                |                 |   |   |
| Target Market   | All residential customers purchasing light bulbs and fixtures through retail sales channels. Residential rental property owners and customers living in rental properties also were eligible.  |                |                 |   |   |
| Program Duration  | The ENERGY STAR® Lighting Program began in 2009 and is an ongoing element of the portfolio.  |                |                 |   |   |
| Program Description   | The program provided incentives and marketing support through retailers to build market share and usage of ENERGY STAR® lighting products: CFLs, LEDs and holiday LED light strings. It targeted the purchase of lighting products through in-store promotion as well as special sales events. Customer incentives, in the form of instant savings, facilitated the increased purchase of high-efficiency products, while in-store signage, sales associate training, and support made provider participation easier.  |                |                 |   |   |
| Program Logic   | <p>The retail channel approach leveraged the normal retail sales channels for lighting products, creating opportunities for cooperative promotions, increasing the demand and, therefore, the stocking of qualifying products, and supporting long-term market transformation.</p> <p>Following is a list of the primary barriers in this market and the program elements that addressed those barriers:</p> <table> <tr> <th>Market Barrier</th><th>Program Element</th></tr> <tr> <td> <ul style="list-style-type: none"> <li>First cost concerns</li> <li>Consumer information</li> <li>Limited product availability</li> <li>Retail sales force information</li> </ul> </td><td> <ul style="list-style-type: none"> <li>Customer incentives</li> <li>Point-of-sale displays</li> <li>Field work with retailers</li> <li>Field work with retailers</li> </ul> </td></tr> </table> | Market Barrier | Program Element | <ul style="list-style-type: none"> <li>First cost concerns</li> <li>Consumer information</li> <li>Limited product availability</li> <li>Retail sales force information</li> </ul> | <ul style="list-style-type: none"> <li>Customer incentives</li> <li>Point-of-sale displays</li> <li>Field work with retailers</li> <li>Field work with retailers</li> </ul> |
| Market Barrier  | Program Element  |                |                 |   |   |
| <ul style="list-style-type: none"> <li>First cost concerns</li> <li>Consumer information</li> <li>Limited product availability</li> <li>Retail sales force information</li> </ul> | <ul style="list-style-type: none"> <li>Customer incentives</li> <li>Point-of-sale displays</li> <li>Field work with retailers</li> <li>Field work with retailers</li> </ul>  |                |                 |   |   |
| Incentive Strategy  | <p>Although several incentive strategies were re-examined to address current market conditions, it was decided to continue with the approach launched in July 2009 due to its ease of customer participation and the successful results delivered.</p> <p><b>CFL and LED markdowns.</b> The markdown approach was the primary driver of volume within the program. Consumers Energy agreed to reimburse select retailers for discounting the cost of CFLs, LEDs and holiday light strings by a specified dollar amount per unit, during special limited-term promotions. Qualifying products were listed at a lower retail price on store shelves, and point-of-purchase materials helped direct customers to the program's specially-priced lighting products. At the end of every month, the retailer provided a point-of-sale report and was reimbursed for the</p>               |                |                 |   |   |

## Eligible Measures, Efficiency Requirements & Incentives

discount provided on each unit sold. This strategy eliminated costs associated with mail-in rebate fulfillment, claim form printing, and store location setup. Volume was controlled by allocating a specific number of bulbs that each retailer could sell in advance of the promotion, and discounts were offered on a “while supplies last” basis.

Note that the incentive amounts listed below are an average. Incentive amounts offered in conjunction with markdown promotions varied based on specific agreements negotiated with retailers.

| Measure                      | Eligibility  | Average Incentive per Unit |
|------------------------------|--------------|----------------------------|
| CFL Standard                 | ENERGY STAR® | \$1.20                     |
| CFL Specialty                | ENERGY STAR® | \$1.73                     |
| LED Bulb 60W Replacement     | ENERGY STAR® | \$4.28                     |
| LED Flood Par                | ENERGY STAR® | \$10.00                    |
| LED Holiday Lighting Strings | ENERGY STAR® | \$2.00                     |

## Implementation Strategy

Key elements of the implementation strategy included:

- **Retailer/manufacturer recruitment for markdown component.** Consumers Energy’s implementation contractor continued working with its subcontractor to help manage the lighting program. The contractors were very experienced in launching similar lighting programs throughout the United States and were able to leverage their existing relationships with several “big box” retailers to maintain seamless program participation in 2013. Building on the momentum of past years, marketing activities focused on leveraging the program’s historic success. To that end, Consumers Energy added new partnerships with lighting retailers in 2013 that increased store count by 53% compared to 2012.
- Participating retailers included Ace, ACO Hardware, Big Lots, Costco, Dollar General, Dollar Tree, Home Depot, Lowe’s, Meijer, Menards, Sam’s Club, True Value, Walgreens and Wal-Mart. In total, these retailers represented 404 participating locations throughout Consumers Energy’s service territory.
- The agreement with each participating retailer specified program requirements such as product specifications, performance criteria, product stocking objectives and data sharing requirements.
- **Retailer recruitment, education and outreach.** The implementation contractors utilized six field representatives to maintain regular contact with participating retailers to ensure the following:
  - Retail sales staff were informed about the program offering and benefits of qualifying products
  - Point-of-purchase displays were visible and qualifying products were stocked in accordance with retailer commitments
  - Retailers’ concerns and issues were addressed promptly
  - Retailers were informed well in advance of planned promotional activities
  - Retail sales staff and customers were educated on high-efficiency lighting options and Energy Independence and Security Act (EISA) regulations

- Retail sales staff and customers were briefed on other energy efficiency programs offered by Consumers Energy
- **Incentive processing.** The implementation contractor managed the processing of retailer incentive payments. A prompt incentive payment was essential to ensuring manufacturer and retailer satisfaction, and they established protocols that expedited payments.
- **Collaboration with other Michigan utilities.** Consumers Energy worked with other Michigan utilities to ensure coordination with lighting manufacturers and “big-box” retailers on CFL incentive strategies. These efforts included collaboration to identify stores in western Michigan to assist Wisconsin Energy Conservation Corporation (WECC) in achieving electric energy savings for the Efficiency United cooperative utilities they represent.

The implementation contractor handled implementation-related administrative requirements, including the following:

- Retailer/manufacturer recruitment, negotiation, and support
- Field services
- Marketing strategy
- Content recommendations for marketing materials and advertising
- Invoice and rebate processing
- Data tracking and reporting
- Investment tracking and reporting
- Call Center services
- Customer satisfaction/problem resolution
- Measurement and verification

## Marketing Strategy

Key elements of the marketing strategy included:

- Point-of-purchase displays
- Cooperative advertising with retailers
- Customer marketing through Consumers Energy’s website and newsletter
- Mass-market advertising through bill inserts, radio, newspaper, and television
- Leveraging the program as an entry point to other Consumers Energy Savings Solutions Programs
- LED light bulbs and holiday LED light campaign promotion

The program was marketed in stores through point-of-purchase displays, signage, and other materials that were developed in cooperation with participating retailers. Materials employed a strong consumer education component emphasizing the benefits of high-efficiency lighting products (e.g., lifetime dollar savings, energy savings, longer product life, safety, appropriate light quality). The marketing materials leveraged the ENERGY STAR® brand, which enjoys a high level of consumer recognition and acceptance.

In 2013, LED light bulb offerings were expanded. Over 7,500 LED light bulbs were sold, nearly a 313% increase from 2012 levels. Overall, retailers welcomed the program and requested to participate in future promotions.

Consumers Energy continued a partnership with the Feeding America West Michigan Food Bank and with it came the announcement of 100,000 CFLs being provided to

the Food Bank to help struggling families save energy and money. The distribution events were held in February and October.

On the Consumers Energy website, comprehensive information about energy efficient bulbs was posted with links provided to the ENERGY STAR® website. Additionally, the Consumers Energy site contained a listing of participating store locations where customers could purchase specially priced bulbs.

Bill inserts and mass media advertising (radio, print, and television) were developed and placed by Consumers Energy to support the markdown campaign. The primary objective was to increase customer awareness of Consumers Energy's energy efficiency programs and drive customers to its website for more information.

## Milestones

| Major Milestone   | Date  |
|---|-------|
| 3 million CFL bulbs sold in 2013  | 11/13 |
| Surpassed 11 million CFL bulbs sold since program launch in 2009                | 12/13 |
| Performed 8,137 program retailer site visits and 276 special promotional events | 12/13 |

## EM&V Strategy

The following evaluation activities were performed for the ENERGY STAR® Lighting Program in 2013 to assess program effectiveness, customer awareness, and the influence of the program on the adoption of energy efficient lighting. The Michigan Public Service Commission directed Consumers Energy to determine the appropriate net-to-gross ratio for standard CFLs promoted through upstream lighting programs.

**Customer Telephone Surveys:** Surveys were conducted with nearly 500 customers who recently purchased light bulbs. The surveys explored familiarity with the phase-out of incandescents, lumen levels, the Lighting Facts label, and Consumers Energy's efforts to promote energy efficient lighting products. The surveys asked about customer purchase patterns, including CFL selections, storage, replacement, and recycling. Customer purchases were characterized by bulb type and store. Survey respondents also were recruited for in-home audits of lighting use.

**Lighting Saturation Studies:** Site visits were conducted in 103 homes to capture home lighting composition, determine changes in lighting usage since the study was conducted in 2010, and gather information to determine program attribution.

**Price Response Modeling:** This approach involves using point-of-sale data to estimate the effect of price changes on the number of bulbs sold. Price response modeling uses variation in bulb prices over time to estimate the price elasticity of customer demand or the change in demand quantity due to a change in price. This analysis provided estimates of free ridership to determine a net-to-gross ratio (NTGR) for standard CFLs.

**Advisory Panel:** Conducted in coordination with DTE Energy, the evaluation teams convened an advisory panel to review the range of NTGR results associated with the research conducted up to that point, and to bring the expert panelists' own market knowledge to bear in establishing a single estimate of NTGR for use by both companies for 2014-2015.



## Consumers Energy Administrative Requirements

Consumers Energy staff were responsible for general administrative oversight of the program portfolio including:

- Program administration
- Management of the implementation contractor
- Coordination of marketing strategy/public relations among programs and market sectors
- Data warehousing
- Customer satisfaction
- Management of key performance metrics and reporting
- Goal achievement within investment

## Participation

| Bulb Type          | 2013 Actual Sales |
|--------------------|-------------------|
| CFL                |                   |
| • Standard         | 2,804,318         |
| • Specialty        | 322,707           |
| LED Bulbs          | 7,646             |
| LED Holiday Lights | 13,019            |
| Total              | 3,147,690         |

## Investment

|          | 2013 Actual | 2013 Plan   |
|----------|-------------|-------------|
| Electric | \$6,418,208 | \$4,888,497 |
| Gas      | -           | -           |
| Total    | \$6,418,208 | \$4,888,497 |

## Energy Savings

|     | 2013 Actual | 2013 Actual w/ LLES Multiplier | 2013 Plan |
|-----|-------------|--------------------------------|-----------|
| MWh | 101,878     | 101,918                        | 59,439    |
| MW  | 12.1        | 12.1                           | 5.4       |
| Mcf | -           | -                              | -         |

## Benefit-Cost Test Results

| Benefit-Cost Test        | B/C Ratio |
|--------------------------|-----------|
| Utility Cost Test        | 7.99      |
| Total Resource Cost Test | 3.88      |
| Participant Test         | 11.44     |
| Rate Impact Measure      | 0.43      |



## 5.4 Home Energy Analysis Program

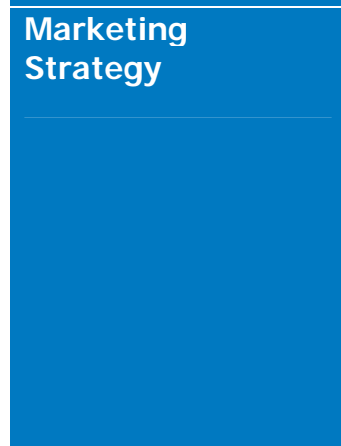
| Program             | Home Energy Analysis  |
|---------------------|---|
| Objective           | Initiate a conversation about energy efficiency with customers that increased awareness of the portfolio of programs and satisfaction levels for participants, while capturing both short- and long-term energy savings.  |
| Target Market       | Residential customers in single-family homes and duplexes who had interest in learning about ways to improve the energy efficiency of their home.   |
| Program Duration    | The program was piloted the last two quarters of 2011 and launched in January 2012.   |
| Program Description | <p>The program provided an in-home assessment performed by a trained analyst. The assessment included a visual inspection of the home, installation of energy efficiency measures, and a customized summary report with energy-saving tips and recommendations.</p> <p><b>Introduction:</b> A trained analyst introduced him/herself, described what the assessment consisted of and how they would help identify areas where energy saving opportunities could be present.</p> <p><b>Visual Inspection:</b> The analyst walked the perimeter of the home with the customer, checked the mechanicals, rim joist and attic insulation levels while looking for other common areas where obvious signs of potential energy inefficiencies existed.</p> <p><b>Direct Install:</b> Energy saving measures were installed throughout the home during the assessment that included: compact fluorescent light bulbs, LED night lights, energy efficient shower heads, energy efficient kitchen and bathroom faucet aerators, water heater pipe insulation and programmable thermostats.</p> <p>On average, a customer participating in the Home Energy Analysis program received \$50 worth of energy-saving measures which would provide an estimated annual savings up to \$150.</p> <p><b>Customizable Report:</b> As the analyst walked through the home performing the visual inspection, findings were entered into a web-based intake tool to create a personalized report for each customer. The analyst discussed the report with the customer during the last step of the Home Energy Analysis. The discussion focused on educating the homeowner and was based on the findings during the inspection.</p> <p>The report included usage data, measures installed during the assessment and their estimated annual and lifetime savings. It also included additional notes and tips, suggestions for next steps and additional energy-saving programs in the residential portfolio. Details regarding infiltration, insulation and current efficiency of mechanical systems were not attainable during a Home Energy Analysis.</p> |

|   |  |
|---|--|
|   | <p>Therefore, analysts briefly explained the benefits of a more comprehensive energy audit and how it could potentially improve the comfort and efficiency of their home.</p> <p>At the homeowner's request, the report was either printed or emailed after the analysis was completed.</p>  |
| Program Logic   | <p>The program was designed to overcome one of the key barriers in the residential existing homes market – lack of information about how the home uses energy and actions that will save the most energy and money. The program provided an educational resource to consumers to make it as easy as possible for them to take action.</p> <p>The educational component of the program was achieved by having a team of trained analysts identify simple and low-cost ways to immediately improve a home's efficiency, and answer customer questions about all other residential programs in the portfolio.</p> <p>In addition to the educational aspect, the Home Energy Analysis program included an energy efficiency direct install component, completed during the same visit.</p>   |
| Incentive Strategy                                      | <p>The Home Energy Analysis included a \$25 fee, which was waived by entering a promotional code at time of scheduling the appointment. The fee represented the value of the service to customers and helped reduce appointment cancellations. Promotional codes were made available to customers via a variety of marketing outlets. Marketing messaging included expiration dates for the promotional codes as a call to action for customers.</p> <p>In terms of cross promoting other programs in the portfolio and encouraging customers to take the next step in the energy efficiency journey, Home Energy Analysis (CHA) field staff also promoted the Home Performance with ENERGY STAR® program through offering coupons good toward \$100 off a comprehensive home assessment. In 2013, 207 coupons were redeemed by contractors who performed a CHA for a customer and 36% of those customers had several recommended measures installed as a result of the CHA.</p> |
| Eligible Measures, Efficiency Requirements & Incentives | <p>The Home Energy Analysis program was not designed to provide additional incentives for customers to participate, nor does it offer incentives for energy efficiency measures installed by customers</p>   |
| Implementation Strategy                                 | <p>Key elements of the implementation strategy included:</p> <p><b>Recruiting and training of field staff:</b> The staff hired to perform field work were experts in delivering home energy efficiency, several were Building Performance Institute (BPI) certified and/or RESNET certified analysts. This level of expertise proved essential in delivering accurate and credible energy saving information and ensured customer satisfaction and safety.</p> <p><b>Web based intake tool:</b> The online intake tool enabled the field staff to capture data as it pertained to a customer's home and its current level of efficiency. This tool proved very important in delivering a high level of customer satisfaction by providing service in a timely fashion and delivering a personalized on-site report.</p>  |



The following implementation-related administrative requirements were handled by the implementation contractor:

- Dedicated Web page and online intake tool
- GIS-enabled scheduling system
- Call Center services
- Recruiting and training of field team staff
- On-premise direct installation services
- Walk-through analysis report
- Quality assurance verification
- Post-service follow-up
- Inventory management
- Segment-targeted marketing strategy and materials
- Data tracking and reporting
- Investment tracking and reporting
- Customer satisfaction/problem resolution



## Marketing Strategy

Key elements of the marketing strategy included:

- Direct mail campaigns targeted a specific geographic area
- Utility newsletter bill inserts and messages
- Program website
- Press releases in targeted communities
- Email messaging
- Outreach events held in different areas throughout the state

The program primarily utilized direct mail and email media advertising to promote and direct customers to contact the call center or visit the program's website for program information and scheduling opportunities.



## Milestones

| Major Milestone  | Date  |
|--|-------|
| Over 14,000 Home Energy Analysis completed                                   | 12/13 |
| Over 30,000 Home Energy Analysis completed since program launched in 2012    | 12/13 |
| Over 600,000 energy-saving measures installed since program launched in 2012 | 12/13 |



## EM&V Strategy

The following evaluation activities were performed for the Home Energy Analysis (HEA) program in 2013.

**Focus Groups:** Focus group discussions were held in two locations with HEA participants. The group discussions were structured to assess the level of program awareness and understanding, explore motivations and perceived barriers to participation, including follow through of HEA recommendations, and gauge program satisfaction,

**Field Observation:** The evaluation team accompanied program analysts to observe: the HEA processes and adherence to protocols; the measure installation processes; and interaction with participants including identification of energy savings opportunities and delivery of the HEA report. The field observations

provided additional understanding of the participation process including customers' experiences with HEA analyst, direct install measures, and audit reports; their understanding of HEA recommendations; and their knowledge of additional program offerings.

**Analyst Interviews:** In-person interviews were conducted to gather analysts' insights on program experiences, including training, implementation challenges, and best practices for introducing customers to other Consumers Energy programs.

**Participant Online Surveys:** Surveys with 2013 participants in the Home Energy Analysis program were conducted throughout the year. The participant surveys assessed satisfaction with key program elements including scheduling of the home analysis, energy savings equipment installed, the interaction with the analyst, and , the program overall. Over 2,000 surveys were completed.

## Consumers Energy Administrative Requirements

Consumers Energy was responsible for general administrative oversight of the program portfolio. Key oversight functions included:

- Overall program administration
- Recruitment, selection, and management of the Implementation Contractor
- Coordination of marketing strategy/public relations among programs and market sectors
- Coordination of all educational services
- Customer satisfaction
- Data warehousing
- Management of key performance metrics and reporting
- Goal achievement within investment

## Participation

| Measure Description                            | Number of Measures Installed |
|--|------------------------------|
| Compact Fluorescent Light Bulbs                | 68,385                       |
| LED Night Lights                               | 8,959                        |
| Pipe Wrap Insulation (linear feet)             | 174,488                      |
| Energy Efficient Showerheads                   | 16,068                       |
| Energy Efficient Showerheads with Shower Start | 376                          |
| Bathroom Faucet Aerators                       | 22,124                       |
| Kitchen Faucet Aerators                        | 7,334                        |
| Programmable Thermostats                       | 1,577                        |

## Investment

|          | 2013 Actual | 2013 Plan |
|----------|-------------|-----------|
| Electric | \$1,730,680 | N/A       |
| Gas      | \$2,861,933 | N/A       |
| Total    | \$4,592,613 | N/A       |

## Energy Savings

|     | 2013 Actual | 2013 Actual<br>w/ LLES<br>Multiplier | 2013 Plan |
|-----|-------------|--------------------------------------|-----------|
| MWh | 3,354       | 3,435                                | N/A       |
| MW  | 0.4         | 0.4                                  | N/A       |
| Mcf | 116,929     | 123,693                              | N/A       |

## Benefit- Cost Test Results

| Benefit-Cost Test        | B/C Ratio |
|--------------------------|-----------|
| Utility Cost Test        | 1.52      |
| Total Resource Cost Test | 1.42      |
| Participant Test         | 20.10     |
| Rate Impact Measure      | 0.44      |

## 5.5 Home Energy Report Program

| Program                    | Home Energy Report   |
|----------------------------|--|
| <b>Objective</b>           | <p>The Home Energy Report (HER) program provided customers with personalized information on their energy use and customized energy-saving advice, thereby motivating them to measurably and verifiably use less energy and save money on their monthly bills. The HER Program also helped to increase customer participation in other EO programs, thereby leveraging the effectiveness of the reports.</p>  |
| <b>Target Market</b>       | <p>Residential customer segments were served by the HER program. The program was automatically delivered on an opt-out basis to 260,000 households and targeted a variety of customer segments. Participants also were provided access to a Web portal. All participants were given the opportunity to opt-out at any time through the duration of the program.</p>  |
| <b>Program Duration</b>    | <p>The program officially launched in 2013 and is an ongoing element of the portfolio.</p>   |
| <b>Program Description</b> | <p>The HER Program is a proven energy efficiency program that leverages large-scale consumer engagement to drive measureable and sustainable energy savings.</p> <p>The 2013 HER Program provided residential customers with better energy information through personalized reports delivered by mail, email and an integrated Web portal to help them put their energy usage in context and make better energy-usage decisions. Behavioral science research has demonstrated that peer-based comparisons are highly motivating ways to present information. The HER Program leveraged a comparison group for each residence and compared it to other similarly sized and located households. This behavioral science complemented other residential energy efficiency approaches, and was a driving force behind consistent and reliable behavior-based energy efficiency.</p> <p>The HER Program presented customers with the most relevant suggestions to deliver the greatest savings.</p> |
| <b>Program Logic</b>       | <p>The HER Program was organized around two concepts. First, motivate consumers to change their behavior by putting their usage in context. Second, provide them with salient, personalized advice to capitalize on this motivation to use less energy and save money. Customers received individually targeted savings tips based on their energy usage patterns, housing characteristics, and demographics.</p> <p>In addition, the HER program was designed to enrich the effectiveness of the overall EO portfolio by increasing participation in other programs.</p>  |
| <b>Incentive Strategy</b>  | <p>The HER program relied on low- to no-cost behavioral adaptations.</p>   |

|   |   |
|---|---|
| Eligible Measures, Efficiency Requirements and Incentives | <p>Residential customers were provided a personalized energy report delivered by mail, email and an integrated Web portal to help them put their energy usage in context and make better energy usage decisions.</p> <p>Deemed savings values were based on documented values from the Michigan Energy Measures Database (MEMD).</p>  |
| Implementation Strategy                                   | <p>Consumers Energy initially launched the HER Program as a pilot in April 2011 with 50,000 test customers. After demonstrating success, the program was expanded in subsequent years to reach 260,000 customers.</p> <p>Key elements of the implementation strategy included:</p> <ul style="list-style-type: none"> <li>• Delivery of reports: Targeted households automatically received four to six home energy reports annually depending on program design. These reports provided periodic updates on the energy usage behavior of a given household, and offered tips for saving energy.</li> <li>• Delivery of Web portal: All program participants had access to a Web portal. This site enabled participants to create a profile, perform an online audit, access energy savings tips, monitor usage over time, and compare usage to neighbors for benchmarking purposes.</li> <li>• Ability to opt-out: All participants had a clear method for opting out of the program if they no longer wanted to receive the information. The opt-out rate for the HER Program was less than 1%.</li> </ul> <p>The implementation contractor handled implementation-related administrative requirements, including the following:</p> <ul style="list-style-type: none"> <li>• Data tracking and reporting</li> <li>• Segmentation/list strategies</li> <li>• Report creation and fulfillment</li> <li>• Call Center services</li> <li>• Customer satisfaction/Problem resolution</li> </ul> |
| Marketing Strategy  | <p>The 2013 HER Program was automatically delivered on an opt-out basis to 260,000 gas and electric customers.</p>  |
| EM&V Strategy   | <p>The following evaluation activities were performed for the Home Energy Reports in 2013:</p> <ul style="list-style-type: none"> <li>• <b>Review of Deemed Savings Values:</b> The evaluation team assessed the application of deemed savings values, including determination of the control group consumption, program attrition and per unit savings calculations for various program tracks.</li> <li>• <b>Database Review:</b> The evaluation team reviewed the program tracking database to ensure accurate and comprehensive data collection.</li> </ul>   |
| Consumers Energy Administrative Requirements              | <p>Consumers Energy staff were responsible for general administrative oversight of the program portfolio, including the following:</p> <ul style="list-style-type: none"> <li>• Program administration</li> <li>• Recruitment, selection, and management of the Implementation Contractors</li> <li>• Coordination of marketing strategy/public relations among programs and</li> </ul>   |

market sectors

- Development and placement of marketing materials and advertising
- Coordination of all educational services
- Customer satisfaction
- Data warehousing
- Management of key performance metrics and reporting
- Goal achievement within investment

## Participation

| Customer Type                | Number of Participants |
|------------------------------|------------------------|
| Electric Only                | 171,314                |
| Gas Only                     | 0                      |
| Combination (electric & gas) | 102,544                |
| Total                        | 273,858                |

The Cadmus Certification Report shows program participation at 355,026, which includes 81,168 customers who were part of the control group.

## Investment

|          | 2013 Actual | 2013 Plan |
|----------|-------------|-----------|
| Electric | \$2,111,089 | N/A       |
| Gas      | \$527,772   | N/A       |
| Total    | \$2,638,861 | N/A       |

## Energy Savings

|     | 2013 Actual | 2013 Actual w/ LLES Multiplier | 2013 Plan |
|-----|-------------|--------------------------------|-----------|
| MWh | 28,410      | 28,410                         | N/A       |
| MW  | -           | -                              | N/A       |
| Mcf | 51,858      | 51,858                         | N/A       |

## Benefit- Cost Test Results

| Benefit-Cost Test        | B/C Ratio |
|--------------------------|-----------|
| Utility Cost Test        | 0.78      |
| Total Resource Cost Test | 0.78      |
| Participant Test         | -         |
| Rate Impact Measure      | 0.27      |



## 5.6 Home Performance with ENERGY STAR® Program

| Program             | Home Performance with ENERGY STAR®  |
|---------------------|---|
| Objective           | Produce long-term electric and natural gas energy savings in the residential sector by helping customers analyze their energy use and recommending the installation of appropriate weatherization measures, heating and cooling systems, and other high-efficient equipment.  |
| Target Market       | To help promote deep energy savings and increase the percentage of customers who implement improvements, the program targeted residential customers in single-family homes and duplexes with above average consumption and household income.  |
| Program Duration    | The program was previously titled Existing Home Retrofit Program and was launched in the first quarter of 2011.   |
| Program Description | <p>The program offered two options to capture savings in the single-family existing homes market.</p> <p><b>Option 1: Home Performance Survey.</b> A pre-approved participating contractor provided customers with a one-hour visual walk-through analysis of their home, and a report detailing opportunities to improve their energy efficiency. The walk-through analysis also provided a low-cost approach for the participating contractor to determine if the customer's home was a good candidate to receive a full comprehensive home assessment. To help improve the customer's experience, this option was phased out of the program in June and replaced by the Home Energy Analysis program.</p> <p><b>Option 2: Home Performance with ENERGY STAR®.</b> The program used a network of participating contractors, trained in building science and certified with the Building Performance Institute (BPI), to deliver a comprehensive home assessment and assess the effectiveness of installing measures under the Home Performance with ENERGY STAR® model. Customers paid a market-based fee to the contractor for the assessment, which was a pre-requisite to qualify for rebates. The assessment included diagnostic testing for combustion safety, duct leakage, and air infiltration. Both a "test in" and "test out" were required to assure the efficacy of installed measures. After the inspection and "test-in" were completed, the results were entered into energy modeling software to create the final report. This report informed the customer of the energy savings, cost, and payback for the suggested improvements.</p> <p>Financial incentives for building shell improvements and energy efficient heating and cooling equipment were available to homeowners. To qualify for financial incentives, the contractor administered all required paperwork on behalf of the homeowner, once improvements were completed and the "test-out" was performed. Financial incentives were paid to the customer in the form of a check, and mailed within six to eight weeks upon approval of an application.</p> |

## Program Logic

The program was designed to overcome one of the key barriers in the residential existing homes market – lack of information about how homes use energy and actions that will save the most energy and money. The program provided an educational resource to consumers and made it as easy as possible for them to take action.

Option 1 provided simple tools and direct installation of measures that were available immediately to the mass market, tapping the current public interest in sustainability to capture immediate energy savings.

Option 2 developed a sustainable market-based infrastructure of experienced energy professionals who could assist with the major renovation work necessary to capture long-term savings in the existing homes market.

### Market Barrier

- Lacked information about home energy use and which energy-saving actions to take first
- First cost concerns for customers
- Lack of experienced home energy analysts to address more complex home performance issues
- Hassle finding contractors and arranging work

### Program Element

- A variety of energy analysis tools that helped prioritize recommendations
- Financial incentives and information on lifecycle savings
- Trained and mentored providers
- Provided a list of qualified contractors that meet program standards

## Incentive Strategy

Under option 1, that was phased out, the Home Performance Survey included a \$50 customer fee. The fee represented the value of the service to customers and helped screen those who would be unlikely to implement improvements. The comprehensive home performance assessment used a market-based fee structure and was reimbursed based on recommended measures installed.

In terms of cross-promotions within the portfolio, Home Energy Analysis field representatives provided customers with a \$100 off coupon good toward a comprehensive home assessment under the HPwES program.

Participants who met the guidelines for the Home Performance with ENERGY STAR® Program received financial incentives for measures that are listed in the next section.

## Eligible Measures, Efficiency Requirements and Incentives

| Eligible Measure and Efficiency Requirements | Incentive Range per Unit |               |
|--|--------------------------|---------------|
|  | Combination & Gas Only   | Electric Only |
| Multiple Measure Installation                | \$200 - \$700            | \$100 - \$400 |

|  |   |                   |             |
|--|---|-------------------|-------------|
|  | Bonus   |                   |             |
|  | Air Sealing<br>(20% to 50% reduction)             | \$100 - \$400     | \$40 - \$80 |
|  | Duct Sealing<br>(15% to 30% reduction)            | \$50 - \$100      | \$15 - \$35 |
|  | Duct Insulation and/or Replacement                | \$50 - \$100      | \$15        |
|  | Roof (Attic) Insulation                           | \$250 - \$300     | \$70        |
|  | Above Grade Wall Insulation                       | \$200             | \$50        |
|  | Basement Wall Insulation                          | \$100 - \$300     | \$70        |
|  | Crawlspace Insulation                             | \$100 - \$150     | \$20        |
|  | Floor Insulation                                  | \$100 - \$200     | \$20        |
|  | Rim Joist Insulation                              | \$75 - \$100      | \$20        |
|  | Natural Gas Furnace 94% or Higher AFUE            | \$400 - \$500     | N/A         |
|  | Operations and Maintenance Furnace Tune-Up        | \$50              | \$50        |
|  | ECM Motor   | N/A               | \$100       |
|  | Natural Gas Boiler 90% or Higher AFUE             | \$1,250 - \$2,000 | N/A         |
|  | Split System Central A/C 15.0 SEER or Higher      | N/A               | \$300       |
|  | Air Source Heat Pump 15.0 SEER or Higher          | N/A               | \$300       |
|  | Ground Source Heat Pump 17.0 SEER or Higher       | N/A               | \$500       |
|  | Tankless Water Heater .82 EF or Higher            | \$200             | N/A         |
|  | High-Efficiency Gas Water Heater .67 EF or Higher | \$120             | N/A         |

|  |  |  |
|--|--|--|
| Window Replacement Minimum .30 U-factor & .35 SHGC | \$2 per square foot of window area up to \$500 | \$2 per square foot of window area up to \$500 |
|--|--|--|

## Implementation Strategy

Key elements of the implementation strategy included:

- **Application processing.** The implementation contractor coordinated processing of all incentive applications, verification of eligibility, and prompt delivery of rebate checks to contractors/customers.
- **Trade Ally recruitment, education and outreach.** The implementation contractor utilized account managers to facilitate the recruitment of trade allies to participate in the program. The account managers maintained regular contact with participating trade allies to ensure that:
  - Trade allies were informed about the program offering and incentive application process.
  - Trade allies maintained an adequate supply of program marketing materials and application forms.
  - Qualifying equipment was installed.
  - Concerns and issues were addressed promptly.
  - Trade allies provided exceptional customer service.
  - Trade allies were trained on how to sell and market the whole house approach using building science to properly diagnose a home for energy efficient improvements.

Strategies to limit free ridership and promote spillover included:

- Charged a fee for Home Performance Surveys to represent the value of the service and targeted customers who wanted to take action but needed more information before they acted.
- Offered incentives at a sufficient level to motivate customers who would not otherwise implement improvements due to the first-cost barrier.
- Utilized Consumers Energy's customer billing information to identify high-use customers who were most likely to benefit from the program.

The following implementation-related administrative requirements were handled by our implementation contractor:

- Trade ally recruitment and training
- Walk-through analysis report
- Marketing strategy and materials
- Field services
- Trade ally education, training and outreach
- Rebate processing
- Assisting with developing network of Home Performance providers
- Data tracking and reporting
- Investment tracking and reporting
- Call Center services
- Public relations

## Marketing Strategy

## Milestones

## EM&V Strategy

## Consumers Energy Administrative

- Customer satisfaction/Problem resolution

Key elements of the marketing strategy included:

- Utility newsletter bill inserts
- Program website
- Press releases in targeted communities
- Mass media advertising
- Assisting participating contractors with marketing strategies
- Promoting comprehensive assessments by offering \$100 coupons primarily through the Home Energy Analysis Program

The program primarily utilized mass media advertising to promote general awareness of the program and directed customers to contact the Call Center or visit the website for program information. Mass media advertising included print and online advertisements in nine newspapers located in areas with a high concentration of participating contractors. The program website and online bill analysis system also promoted the availability of the program to interested customers.

| Major Milestone                                      | Date  |
|--|-------|
| Phased out Option 1 Home Performance Survey Delivery | 6/13  |
| Over 2,100 HPwES jobs performed                      | 12/13 |

The following evaluation activities were performed for the Home Performance with ENERGY STAR® program in 2013.

**Materials Review:** The evaluation team conducted a comprehensive review of program materials to ensure that all elements of program documentation necessary to support successful implementation of the program were present.

**Contractor Interview:** In depth interviews were conducted with the contractors who were most active in the program (those completing over 100 projects). These interviews covered a broad range of topics including: how contractors first learned about the program and became involved; program delivery methods by contractors; understanding program requirements and impact of program changes; and most effective methods for encouraging customers to complete comprehensive upgrades. The interviews also explored the level of support contractors received through the program, contractor satisfaction and levels, and willingness to continue participation.

**Participant Online Surveys:** Surveys with 2013 participants in the Home Performance Program were conducted. The participant surveys assessed satisfaction with key program elements including the comprehensive home assessment, services provided by the Home Performance contractor, and the energy efficiency improvements installed.

Consumers Energy was responsible for general administrative oversight of the program portfolio. Key oversight functions included:

- Overall program administration

## Requirements

- Recruitment, selection, and management of the implementation contractor
- Coordination of marketing strategy/public relations among programs and market sectors
- Coordination of all educational services
- Data warehousing
- Management of key performance metrics and reporting
- Goal achievement within investment

## Participation

| Measure                                | Number of Rebates |
|--|-------------------|
| Home Performance Survey                | 1,632             |
| Comprehensive Home Assessment          | 1,027             |
| Duct Insulation and/or Replacement     | 98                |
| Duct Sealing - 15% to 30% Reduction    | 259               |
| Infiltration Reduction - 20% to 50%    | 1,464             |
| Air Source Heat Pump (Tier 1 & 2)      | 8                 |
| Split System Central A/C (Tier 1 & 2)  | 146               |
| Natural Gas Boiler - 95%               | 38                |
| Gas Furnace - 94% to 98% AFUE          | 272               |
| Operations & Maintenance HVAC Tune-Up  | 588               |
| ECM Motor                              | 206               |
| Super High-Efficiency Gas Water Heater | 43                |
| Tankless Water Heater                  | 7                 |
| Roof (attic) Insulation                | 1,350             |
| Wall Insulation (Above grade)          | 292               |
| Basement Wall Insulation               | 71                |
| Floor Insulation                       | 40                |
| Crawlspace Insulation                  | 163               |
| Rim Joist Insulation                   | 1,583             |
| Window Replacement (Square feet)       | 16,292            |
| ENERGY STAR® CFL bulb – Regular        | 4,775             |
| Low-Flow Faucet Aerators               | 3,639             |
| Low-Flow Showerheads                   | 1,289             |
| Pipe Wrap (Linear feet)                | 2,478             |
| Direct Install Kits                    | 1,615             |

## Investment

|          | 2013 Actual | 2013 Plan    |
|----------|-------------|--------------|
| Electric | \$855,858   | \$5,446,437  |
| Gas      | \$2,490,192 | \$6,008,366  |
| Total    | \$3,346,049 | \$11,454,803 |

## Energy Savings

|     | 2013 Actual | 2013 Actual<br>w/ LLES<br>Multiplier | 2013 Plan |
|-----|-------------|--------------------------------------|-----------|
| MWh | 706         | 759                                  | 21,251    |
| MW  | 0.2         | 0.2                                  | 2.6       |
| Mcf | 46,788      | 50,999                               | 274,488   |

## Benefit-Cost Test Results

| Benefit-Cost Test        | B/C Ratio |
|--------------------------|-----------|
| Utility Cost Test        | 1.04      |
| Total Resource Cost Test | 0.78      |
| Participant Test         | 2.23      |
| Rate Impact Measure      | 0.42      |

## 5.7 HVAC and Water Heating Program

| <b>Program</b>  | <b>HVAC and Water Heating</b>   |                       |                        |   |   |   |  |
|---|---|-----------------------|------------------------|---|---|---|--|
| <b>Objective</b>  | Produce long-term electric and natural gas energy savings in the residential sector by promoting the purchase and installation of high-efficiency heating and cooling equipment as well as high-efficiency water heating equipment.   |                       |                        |   |   |   |  |
| <b>Target Market</b>  | Residential customers installing new central air conditioning units, heat pumps, natural gas furnaces and boilers, and/or water heating equipment. Products installed in single-family homes, including condominiums and townhouses, were individually owned and metered for natural gas and/or electric service.   |                       |                        |   |   |   |  |
| <b>Program Duration</b>   | The HVAC and Water Heating Program was an ongoing element of the portfolio.   |                       |                        |   |   |   |  |
| <b>Program Description</b>  | <p>The HVAC and Water Heating Program affected the purchase and installation of high-efficiency heating, cooling, and water heating technologies through a combination of market push and pull strategies that stimulated demand while simultaneously increasing market provider investment in stocking and promoting high-efficiency products.</p> <p>The program promoted high-efficiency ENERGY STAR® central air-conditioning (SEER 15 and greater), high-efficiency natural gas furnaces (95% AFUE and higher) and boilers (87% AFUE and higher), premium efficiency furnaces and heat pumps with high-efficiency motors (electrically commutated motors – ECMs), high-efficiency storage gas water heaters (0.67 EF or greater), tankless (instantaneous) natural gas water heaters (0.82 EF or greater), programmable thermostats, and diagnostic tune-ups.</p>  |                       |                        |   |   |   |  |
| <b>Program Logic</b>  | <p>The program stimulated demand by educating customers about the energy and money-saving benefits associated with efficient products and providing financial incentives to overcome the first cost barrier. The program stimulated market provider investment in stocking and promoting efficient products by offering HVAC contractors several effective services including training, educational materials, and marketing collateral. Further, the existence of rebates elevated efficiency to a competitive issue that naturally motivated market providers to stock and promote targeted products.</p> <table> <tr> <th><b>Market Barrier</b></th><th><b>Program Element</b></th></tr> <tr> <td> <ul style="list-style-type: none"> <li>First cost concerns for customers</li> <li>Consumer information</li> </ul> </td><td> <ul style="list-style-type: none"> <li>Financial incentives and information on lifecycle savings</li> <li>Education materials featuring energy and nonenergy benefits of premium high-efficiency equipment</li> </ul> </td></tr> <tr> <td> <ul style="list-style-type: none"> <li>Competing motivations for contractors (additional profit on</li> </ul> </td><td> <ul style="list-style-type: none"> <li>Provided contractor training on value of program participation and value to customers from</li> </ul> </td></tr> </table> | <b>Market Barrier</b> | <b>Program Element</b> | <ul style="list-style-type: none"> <li>First cost concerns for customers</li> <li>Consumer information</li> </ul> | <ul style="list-style-type: none"> <li>Financial incentives and information on lifecycle savings</li> <li>Education materials featuring energy and nonenergy benefits of premium high-efficiency equipment</li> </ul> | <ul style="list-style-type: none"> <li>Competing motivations for contractors (additional profit on</li> </ul> | <ul style="list-style-type: none"> <li>Provided contractor training on value of program participation and value to customers from</li> </ul> |
| <b>Market Barrier</b>   | <b>Program Element</b>  |                       |                        |   |   |   |  |
| <ul style="list-style-type: none"> <li>First cost concerns for customers</li> <li>Consumer information</li> </ul> | <ul style="list-style-type: none"> <li>Financial incentives and information on lifecycle savings</li> <li>Education materials featuring energy and nonenergy benefits of premium high-efficiency equipment</li> </ul>   |                       |                        |   |   |   |  |
| <ul style="list-style-type: none"> <li>Competing motivations for contractors (additional profit on</li> </ul>     | <ul style="list-style-type: none"> <li>Provided contractor training on value of program participation and value to customers from</li> </ul>  |                       |                        |   |   |   |  |



premium products but concerns about being low-cost bidder)

- Urgency of replacement decision when equipment fails

purchasing high-efficiency products. Collateral materials, including sales brochures, were provided to participating contractors.

- Provided contractors with training to better inform consumers of choices and that high-efficiency technologies are stocked and available.

## Incentive Strategy

Furnace, central air-conditioning, and heat pump incentives were tiered to encourage installation of higher efficiencies.

Incentives were offered for the installation of equipment that utilized an ECM blower motor, including high-efficiency natural gas furnaces.

## Eligible Measures, Efficiency Requirements & Incentives

| Eligible Measure and Efficiency Requirements     | Incentive per Qualifying Unit                   |
|--|---|
| Split System Central AC > SEER 15.0 – 15.99      | \$150   |
| Split System Central AC > SEER 16.0 or Higher    | \$250   |
| Tier 1: Ground Source Heat Pump > 17 – 18.99 EER | \$200   |
| Tier 2: Ground Source Heat Pump > 19+ EER        | \$300   |
| Tier 1: Air Source Heat Pump > 15 – 15.99 SEER   | \$150   |
| Tier 2: Air Source Heat Pump > 16 SEER           | \$250   |
| Natural Gas Furnace 95%-95.99% AFUE              | \$400 Jan-Mar<br>\$250 Apr-Aug<br>\$200 Sep-Dec |
| Natural Gas Furnace 96%-96.99% AFUE              | \$400 Jan-Mar<br>\$300 Apr-Aug<br>\$250 Sep-Dec |
| Natural Gas Furnace 97%-97.99% AFUE              | \$400 Jan-Mar<br>\$325 Apr-Aug<br>\$300 Sep-Dec |
| Natural Gas Furnace 98% AFUE                     | \$400 Jan-Mar<br>\$325 Apr-Aug<br>\$300 Sep-Dec |
| ECM Blower Motor                                 | \$100 Jan-Mar<br>\$75 Apr-Aug<br>\$150 Sep-Dec  |
| Furnace/Boiler/Central AC Tune-Up                | \$50  |
| Natural Gas Boiler= >90%AFUE                     | \$1000 Jan-Mar                                  |
| Natural Gas Boiler= 87%-91.99% AFUE              | \$750 Apr-Dec                                   |
| Natural Gas Boiler =92%-94.99% AFUE              | \$900 Apr-Dec                                   |
| Natural Gas Boiler =>95% AFUE                    | \$1000 Apr-Dec                                  |

|                                |   |       |
|--------------------------------|---|-------|
|                                | Natural Gas Water Heater =>0.67 EF  | \$75  |
|                                | Tankless Gas Water Heater EF =>0.82   | \$100 |
| <b>Implementation Strategy</b> | <p>Key elements of the implementation strategy included:</p> <ul style="list-style-type: none"> <li>• <b><i>Contractor recruitment, education and outreach.</i></b> The implementation contractor utilized field staff to facilitate the recruitment and training of HVAC contractors to participate in the program. The field staff maintained regular contact with participating contractors to ensure that: <ul style="list-style-type: none"> <li>• Contractors were kept informed about the program offering and incentive application process</li> <li>• Contractors had an adequate supply of program marketing materials</li> <li>• Qualifying equipment was readily stocked</li> <li>• Contractors' concerns and issues were addressed promptly</li> </ul> </li> <li>• <b><i>Application processing.</i></b> The implementation contractor coordinated processing of all rebate applications, verification of eligibility, and delivery of rebate checks to customers.</li> </ul> <p>Strategies to limit free ridership and promote spillover included:</p> <ul style="list-style-type: none"> <li>• Incentives limited to high-efficiency equipment</li> <li>• Incentive levels tiered to encourage purchase of high-efficiency equipment that would not have happened without the rebate</li> <li>• Incentive claims had to be submitted within 30 days of purchase</li> </ul> <p>The following implementation-related administrative requirements were handled by our implementation contractor:</p> <ul style="list-style-type: none"> <li>• Coordination with other utilities for combined gas/electric savings</li> <li>• Contractor recruitment</li> <li>• Marketing strategy and messaging</li> <li>• Field services</li> <li>• Rebate processing</li> <li>• Data tracking and reporting</li> <li>• Investment tracking and reporting</li> <li>• Call Center services</li> <li>• Public relations</li> <li>• Customer satisfaction/Problem resolution</li> </ul> |       |
| <b>Marketing Strategy</b>      | <p>Key elements of the marketing strategy included:</p> <ul style="list-style-type: none"> <li>• HVAC meetings to discuss the program and solicit contractor involvement</li> <li>• Availability of forms, including incentive forms and other collateral materials to HVAC contractors</li> <li>• Online accessibility of rebate applications and program information</li> <li>• Listing of participating contractors on Consumers Energy's website</li> <li>• Mass-media advertising</li> </ul> <p>As the program has matured and the contractor network has grown, the HVAC and Water Heating Program was primarily marketed through these HVAC contractors, the most direct influencers of customer HVAC purchase</p>   |       |

decisions. Contractors received educational materials to share with their customers through training meetings and in-person visits. This strategy proved successful in 2013 as over 350 participants took part in various training sessions, performed at locations that included: distributor sites, offsite locations, and contractor offices throughout the state.

The website contained all necessary information about the program, including incentives and downloadable rebate forms.

Mass media advertising that included print, radio, and television promoted general awareness of Consumers Energy's programs and directed customers to visit the website for more program information.

## Milestones

| Major Milestone  | Date  |
|--|-------|
| Implemented a newly improved field verification process  | 7/13  |
| Over 350 HVAC contractors attended various program trainings                                   | 12/13 |
| Rebate application flaw rates were reduced to less than 15% of the total applications received | 12/13 |
| Year-end overall rebate cycle time was 25 days   | 12/13 |

A newly improved field verification process was developed and implemented in July 2013. From July to December, 140 home site visits were conducted and the field verifications resulted with a 100% pass rate.

In 2013, over 350 contractors participated in various training sessions both in person and via webinar access. Since inception of the program in 2009, a total of 1,450 sessions have been conducted. The 2013 training sessions included new contractor education, tune-up quality education and program orientation for new trade ally employees. An additional purpose of these sessions was to assist trade allies by arming them with information that will help to facilitate a great customer experience.

Through continuous process evaluation and improvements, the number of total flawed applications received decreased from 55% in 2009 to less than 15% in 2013. The notable benefit achieved from this reduction in program flaw rate led to the reduced rebate cycle time from more than 35 days to less than 25 days in 2013.

## EM&V Strategy

The following evaluation activities were performed for the 2013 HVAC and Water Heating program.

**Participant Online Surveys:** Surveys with 2013 participants in the HVAC and Water Heating Program were conducted throughout the year. The participant surveys assessed satisfaction with key program elements including rebate levels, the energy efficient equipment installed, the quality of work performed by contractors, and the program overall. Nearly 1,200 surveys were completed by program participants.

## Consumers Energy Administrative Requirements

Consumers Energy staff were responsible for general administrative oversight of the program portfolio. Key oversight functions included:

- Overall program administration
- Management of the implementation contractor
- Coordination of marketing strategy/public relations among programs and market sectors
- Development and placement of marketing materials and advertising
- Coordination of all educational services
- Data warehousing
- Customer satisfaction
- Management of key performance metrics and reporting
- Goal achievement within investment

## Participation

| Measure Description                            | Number of Rebates |
|--|-------------------|
| Split System Central AC > SEER 15.0            | 599               |
| Split System Central AC > SEER 16.0            | 1,305             |
| Tier 1: Ground source heat pump > 17 EER*      | 4                 |
| Tier 2: Ground source heat pump > 19 EER*      | 72                |
| Tier 2: Air source heat pump > 15 SEER*        | 16                |
| Tier 3: Air source heat pump > 16 SEER*        | 45                |
| ECM blower motor                               | 6,315             |
| Natural gas boiler $\geq$ 87% AFUE             | 11                |
| Natural gas boiler >90% AFUE                   | 116               |
| Natural gas boiler >92% AFUE                   | 10                |
| Natural gas boiler >95% AFUE                   | 107               |
| Natural gas furnace 94% AFUE                   | 2                 |
| Natural gas furnace 95% AFUE                   | 6,173             |
| Natural gas furnace 96% AFUE                   | 8,407             |
| Natural gas furnace 97% AFUE                   | 1,728             |
| Natural gas furnace 98% AFUE                   | 140               |
| Natural gas water heater $\geq$ 0.67 EF        | 124               |
| Tankless gas water heater EF $\geq$ 0.82       | 136               |
| Natural gas furnace/boiler diagnostic tune-ups | 2,734             |
| Air conditioning tune-up                       | 674               |

|                           |                          |             |                                |           |
|---------------------------|--------------------------|-------------|--------------------------------|-----------|
|                           | Setback Thermostat       | 9,887       |                                |           |
|                           | Total                    | 38,605      |                                |           |
| *Replacement Only         |                          |             |                                |           |
| Investment                |                          | 2013 Actual | 2013 Plan                      |           |
|                           | Electric                 | \$2,033,870 | \$3,334,469                    |           |
|                           | Gas                      | \$7,252,346 | \$9,507,787                    |           |
|                           | Total                    | \$9,286,216 | \$12,842,256                   |           |
| Energy Savings            |                          | 2013 Actual | 2013 Actual w/ LLES Multiplier | 2013 Plan |
|                           | MWh                      | 5,502       | 6,002                          | 4842      |
|                           | MW                       | 1.1         | 1.2                            | 1.2       |
|                           | Mcf                      | 410,922     | 444,641                        | 423,405   |
| Benefit-Cost Test Results | Benefit-Cost Test        |             | B/C Ratio                      |           |
|                           | Utility Cost Test        |             | 3.05                           |           |
|                           | Total Resource Cost Test |             | 1.43                           |           |
|                           | Participant Test         |             | 2.73                           |           |
|                           | Rate Impact Measure      |             | 0.56                           |           |

## 5.8 Income Qualified Energy Assistance Program

| Program             | Income Qualified Energy Assistance   |
|---------------------|--|
| Objective           | Provide installation of energy efficiency measures and energy education at no cost to income qualified residential customers to assist in decreasing energy usage resulting in a reduction of utility costs. The program is offered to both single-family and multifamily customers within Consumers Energy's service territory. The program also coordinates and collaborates with local community action agencies (CAA's) and other nonprofit agencies to leverage existing state and federal funding for income qualified residents.  |
| Target Market       | Residential customers with a household income that is at or below 200% of the federal poverty level.   |
| Program Duration    | The Income Qualified (IQ) Energy Assistance Program is an ongoing element of the energy efficiency portfolio.  |
| Program Description | The Income Qualified Energy Assistance Program is comprised of several initiatives that deliver energy-efficiency products, services, and education at no cost to customers at or below 200% of the federal poverty level. The initiatives included outreach to both single- and multifamily customers with installations of energy efficient measures and energy education. In addition, program staff worked closely with Community Action Agencies (CAAs) and other nonprofit agencies to leverage existing state and federal funding to provide comprehensive weatherization assistance. The program's collaborative approach of engaging and cooperating with local agencies fostered greater public awareness toward adopting energy efficiency practices. |

| <b>Program Logic</b>   | <table> <tr> <th data-bbox="560 153 748 184"><i><b>Market Barrier</b></i></th><th data-bbox="1024 153 1240 184"><i><b>Program Element</b></i></th></tr> <tr> <td data-bbox="560 186 998 688"> <ul style="list-style-type: none"> <li>Limited state and federal funding to leverage comprehensive weatherization services</li> <li>Lack of energy efficiency awareness</li> <li>Ability to reach IQ target market customers and validate eligibility</li> </ul> </td><td data-bbox="1024 186 1489 989"> <ul style="list-style-type: none"> <li>Continued coordination with local CAAs and many non-profit agencies to maximize the number of homes that can be weatherized.</li> <li>Utilized advertising opportunities in targeted communities. Provided marketing collateral and education to customers through the various program initiatives to reinforce behavioral changes.</li> <li>Worked with existing nonprofit agency contact/client lists and utilized Consumers Energy database that included income qualified customers for targeted outreach opportunities. Additional outreach efforts included community events in specific geographical locations while working with local media to develop awareness through advertising channels.</li> </ul> </td></tr> </table> | <i><b>Market Barrier</b></i> | <i><b>Program Element</b></i> | <ul style="list-style-type: none"> <li>Limited state and federal funding to leverage comprehensive weatherization services</li> <li>Lack of energy efficiency awareness</li> <li>Ability to reach IQ target market customers and validate eligibility</li> </ul> | <ul style="list-style-type: none"> <li>Continued coordination with local CAAs and many non-profit agencies to maximize the number of homes that can be weatherized.</li> <li>Utilized advertising opportunities in targeted communities. Provided marketing collateral and education to customers through the various program initiatives to reinforce behavioral changes.</li> <li>Worked with existing nonprofit agency contact/client lists and utilized Consumers Energy database that included income qualified customers for targeted outreach opportunities. Additional outreach efforts included community events in specific geographical locations while working with local media to develop awareness through advertising channels.</li> </ul> |
|--|--|------------------------------|-------------------------------|--|---|
| <i><b>Market Barrier</b></i>   | <i><b>Program Element</b></i>  |                              |                               |  |   |
| <ul style="list-style-type: none"> <li>Limited state and federal funding to leverage comprehensive weatherization services</li> <li>Lack of energy efficiency awareness</li> <li>Ability to reach IQ target market customers and validate eligibility</li> </ul> | <ul style="list-style-type: none"> <li>Continued coordination with local CAAs and many non-profit agencies to maximize the number of homes that can be weatherized.</li> <li>Utilized advertising opportunities in targeted communities. Provided marketing collateral and education to customers through the various program initiatives to reinforce behavioral changes.</li> <li>Worked with existing nonprofit agency contact/client lists and utilized Consumers Energy database that included income qualified customers for targeted outreach opportunities. Additional outreach efforts included community events in specific geographical locations while working with local media to develop awareness through advertising channels.</li> </ul>  |                              |                               |  |   |
| <b>Incentive Strategy</b>  | <p>Equipment and installation costs for all eligible measures are provided at no cost to eligible customers. These installations were provided by field technicians employed by the implementation contractor, in addition to coordinated effort with local CAAs and other nonprofit agencies that provide comprehensive weatherization services.</p>  |                              |                               |  |   |
| <b>Eligible Measures, Efficiency Requirements &amp; Incentives</b>   | <p>Eligible measures include but are not limited to the following:</p> <ul style="list-style-type: none"> <li>Insulation (attic, wall, band joist)</li> <li>Blower door testing, pre- and post-test</li> <li>Air sealing</li> <li>Appliance/equipment replacements with high-efficiency (water heaters, refrigerators)</li> <li>Lighting (CFLs and LEDs)</li> <li>Setback thermostats</li> <li>Water-saving measures (low-flow showerheads, aerators, pipe wrap, etc.)</li> <li>Furnace/boiler replacements</li> <li>ECM motor replacements</li> <li>Furnace tune-ups</li> </ul>   |                              |                               |  |   |
| <b>Implementation Strategy</b>   | <p>Key elements of the implementation strategy included:</p> <ul style="list-style-type: none"> <li><b>Coordination</b> with CAAs and other nonprofit agencies including community-based organizations. <ul style="list-style-type: none"> <li>Summary – The exhaustion of American Reinvestment Recovery Act (ARRA) funds in 2012 deeply impacted CAA program participation due to funding reductions and respective staffing cuts, therefore, the program began outreach to other non-profit agencies to enlist further</li> </ul> </li> </ul>   |                              |                               |  |   |

leveraging opportunities. Leveraged work was completed in 2013, but was very small in comparison to previous years.

- **Recruitment and hiring of private-sector contractors.** Subcontractors were used in 2013 for the IQ program.
  - Summary – Two firms were hired to provide services for the installation of energy efficiency measures.
- **Targeting** income qualified single-family residents and owners of multi-family properties with low-income residents to provide turnkey direct-install services for individual residential living units.
  - Summary – Several methods were used, such as apartment owner listings, CAA supplied information, subcontractor leads, and events which allowed specific targeting of owners of income qualified multifamily properties.
- **New Programs.** The Helping Neighbors initiative launched in 2011 as an innovative community-focused energy efficiency program. This concept continued in 2013 and was delivered by the IC's in-house field services team for single-family homes. In 2013, this initiative became a hybrid approach ranging from direct installation of low-cost measures to deeper savings with insulation installations and air-infiltration measures along with energy education.
  - Summary - In 2013, this initiative reached 8,918 homes.
- **Training.** Program management continued meeting with CAAs and local nonprofit agencies to encourage participation and provide education on how the program could benefit their organization and the customer. In addition, separate training was developed for recipients of energy measures in the form of a web-based tool known as Every Day Actions Save Energy (EASE).
  - Summary – Training was an ongoing part of the IQ Program for 2013. Program management provided Community Empowered Energy Efficiency (CE3) seminars to various participating multi-family properties and EASE training for single-family residents.

This program addressed a hard-to-reach sector, challenged by limited income and lack of funding available for investment in energy efficiency. Therefore, free ridership was not a concern.

The IC handled administrative requirements, including the following:

- Administrative coordination with local agencies
- Competitive bid process to engage additional local contractors
- Marketing strategy and materials
- Payment processing
- Data tracking and reporting
- Investment tracking and reporting
- Call Center services
- Managing public relations
- Customer satisfaction/Problem resolution

## Marketing Strategy

In 2013, marketing efforts focused on several collaboratives to reach the income qualified customer segment. Key methods included:

- Collaboration with Saginaw Habitat for Humanity



- Participation with Saginaw Housing Commission summer event
- Attendance at Saginaw Council meetings
- Participation in Saginaw's Light Up the Night event
- Cooperative work with Bay City Electric Light & Power IQ Program
- Attendance at several church summer events

Marketing and outreach efforts also attempted to engage customers during their daily routines, such as providing marketing materials on public transportation, in Consumers Energy bill payment centers, and participating in neighborhood events. The program used the following marketing pieces to engage customers and reinforce energy-saving messages:

- Informational brochures
- Bill inserts
- Posters
- Educational brochures
- Yard signs
- Press releases
- Door hangers
- Information for newsletters and articles
- Thank you postcard
- Advertising on city buses
- Local media coverage of installation work

## Milestones

| Major Milestone  | Date  |
|--|-------|
| Over 5,120 single family homes and 3,798 multifamily homes received assistance through the program | 12/13 |

## EM&V Strategy

The 2013 evaluation of the Income Qualified portfolio included an assessment of the various program elements and the interaction of the various elements of the program including agency-coordinated activities and program elements delivered directly to customers.

**Participant Surveys:** Surveys were conducted with approximately 150 participants in the Helping Neighbors Program. The purpose of this study was to understand: how customers learned of the Income Qualified Energy Assistance Program's Helping Neighbors Single Family Initiative; how they typically learn about ways to reduce energy costs; their recall of any tips to save energy provided by the energy technician; what efforts the energy technician made to cross-promote other Consumers Energy programs and what affect that had on participants; and their overall satisfaction with Consumers Energy. In addition, the survey verified the installation of energy-saving measures by the program technician or installation of equipment that was left behind during the site visit.

**Stakeholder Interviews:** Interviews were conducted with program staff, including Consumers Energy program manager and implementation contractor staff. Interviews also were conducted with CAA staff that partner with Consumers Energy to deliver services to the income qualified population. The interviews were tailored to address topics specific to the stakeholder involvement in the programs (goals, barriers to delivery, program changes, tracking/ reporting issues, etc.).

**Consumers Energy Administrative Requirements**

**Participation**

**Investment**

**Logic Model Development:** The logic model documented key program objectives, inventoried program activities, and mapped the activities to the program objectives they supported.

Consumers Energy staff were responsible for general administrative oversight of the program, including the following:

- Overall program administration
- Management of the implementation contractor
- Coordination of marketing strategy/public relations among programs and market sectors
- Coordination among participating CAAs and other nonprofit agencies
- Coordination of all educational services
- Data warehousing
- Customer satisfaction
- Management of the evaluation contractor
- Management of key performance metrics and reporting
- Goal achievement with investment

| Measure                                | Number of Installed Measures |
|--|------------------------------|
| Lighting (CFL bulbs)                   | 41,408                       |
| Faucet Aerator                         | 13,216                       |
| Low-Flow Showerhead                    | 6,700                        |
| Setback Thermostat                     | 1,550                        |
| Refrigerator Replacement               | 263                          |
| Band Joist Insulation                  | 26,318 sq. ft.               |
| Wall Insulation                        | 178,926 sq. ft.              |
| Attic Insulation                       | 1,367,147 sq. ft.            |
| Air Sealing                            | 908,737 sq. ft.              |
| HVAC & ECM Motor (Furnace Replacement) | 375                          |
| Furnace Tune-Up                        | 3,029                        |
| Pipe Wrap                              | 19,239 ft.                   |

|          | 2013 Actual  | 2013 Plan    |
|----------|--------------|--------------|
| Electric | \$1,553,208  | \$1,554,158  |
| Gas      | \$9,892,713  | \$9,895,367  |
| Total    | \$11,445,921 | \$11,449,525 |

## Energy Savings

|     | 2013 Actual | 2013 Actual<br>w/ LLES<br>Multiplier | 2013 Plan |
|-----|-------------|--------------------------------------|-----------|
| MWh | 2,033       | 2,075                                | 1,540     |
| MW  | 0.2         | 0.2                                  | 0.2       |
| Mcf | 84,676      | 89,201                               | 64,366    |

## Benefit-Cost Test Results

| Benefit-Cost Test        | B/C Ratio |
|--------------------------|-----------|
| Utility Cost Test        | 0.40      |
| Total Resource Cost Test | 0.40      |
| Participant Test         | -         |
| Rate Impact Measure      | 0.25      |

## 5.9 Insulation and Windows Program

| Program  | Insulation and Windows Program   |  |                |                 |  |   |
|--|--|--|----------------|-----------------|--|---|
| Objective  | Produce long-term electric and natural gas energy savings in the residential sector by promoting the purchase and installation of high-efficiency windows and doors as well as upgrades to home insulation.  |  |                |                 |  |   |
| Target Market  | Residential customers in single-family homes and duplexes in Consumers Energy’s electric, gas and combination territories.   |  |                |                 |  |   |
| Program Duration   | The Insulation and Windows Program was launched in July 2011 as part of the Home Performance with ENERGY STAR® Program. Beginning in 2013, the program became a stand-alone program due in large part to customer interest and strong participation results.   |  |                |                 |  |   |
| Program Description  | <p>The Insulation and Windows Program offers rebates for two types of improvements. The program is unique in that it offers Consumers Energy customers the ability to use the services of a contractor or to perform the improvements themselves. This was particularly appealing for the do-it-yourself (DIY) target audience. Customers were able to purchase and install energy efficiency improvements and apply for their rebate, all in one day. In addition, the program was available to all Consumers Energy customer types: gas-only, electric-only, and combination (gas and electric) customers.</p> <p>The program also appeals to a new target audience of insulation and windows contractors and installers, most of whom do not provide the full range of services required to be a participating contractor in either the HPwES or HVAC programs. Michigan-based insulation and window manufacturers also have been strong supporters and trade allies of the program and offered additional rebates to their employees.</p>  |  |                |                 |  |   |
| Program Logic  | <p>The program educated customers on the comfort and savings benefits of increasing the levels of insulation in their homes, installing energy efficient windows, and provided financial incentives for meeting minimum installation requirements. The program also provided information, training, and marketing support to contractors and other providers of insulation and window products, encouraging them to leverage these resources in their sales efforts.</p> <table><tr><th>Market Barrier</th><th>Program Element</th></tr><tr><td><ul style="list-style-type: none"><li>• Lack of information about home energy use and which energy-saving actions to take first</li><li>• First-cost concerns for customers</li><li>• Consumer information</li></ul></td><td><ul style="list-style-type: none"><li>• A variety of energy analysis tools that provided prioritized recommendations</li><li>• Financial incentives and information on lifecycle savings</li><li>• Education materials featuring the energy and nonenergy benefits of premium</li></ul></td></tr></table> |  | Market Barrier | Program Element | <ul style="list-style-type: none"><li>• Lack of information about home energy use and which energy-saving actions to take first</li><li>• First-cost concerns for customers</li><li>• Consumer information</li></ul> | <ul style="list-style-type: none"><li>• A variety of energy analysis tools that provided prioritized recommendations</li><li>• Financial incentives and information on lifecycle savings</li><li>• Education materials featuring the energy and nonenergy benefits of premium</li></ul> |
| Market Barrier   | Program Element  |  |                |                 |  |   |
| <ul style="list-style-type: none"><li>• Lack of information about home energy use and which energy-saving actions to take first</li><li>• First-cost concerns for customers</li><li>• Consumer information</li></ul> | <ul style="list-style-type: none"><li>• A variety of energy analysis tools that provided prioritized recommendations</li><li>• Financial incentives and information on lifecycle savings</li><li>• Education materials featuring the energy and nonenergy benefits of premium</li></ul>  |  |                |                 |  |   |

- Finding contractors and arranging work

- installations
- Training and mentoring for providers
  - Provided contractor training on value of program participation and value to customers from purchasing high-efficiency products, collateral materials including sales brochures were provided to participating contractors

## Incentive Strategy

Customers participating in the Insulation and Windows Program received financial incentives for implementing insulation and window measures that met program eligibility requirements. Beginning in the second quarter of the year, insulation incentive levels were reduced to help provide continuity of the program for the remainder of the year.

## Eligible Measures, Efficiency Requirements & Incentives

| Eligible Measure and Efficiency Requirement   | Customer Type: Combination              | Customer Type: Gas – Only       | Customer Type: Electric – Only |
|---|---|---------------------------------|--------------------------------|
| Roof (Attic) Insulation - minimum 500 sq. ft. installed   | Jan-Mar \$200<br>Apr-Dec \$125          | Jan- Mar \$200<br>Apr-Dec \$125 | Jan-Dec \$50                   |
| Above Grade Wall Insulation - minimum 500 sq. ft. installed                                     | Jan-Mar \$150<br>Apr-Dec \$125          | Jan-Mar \$150<br>Apr-Dec \$125  | Jan-Dec \$50                   |
| Basement Wall Insulation - minimum 500 sq. ft. installed  | Jan-Mar \$200<br>Apr-Dec \$50           | Jan-Mar \$200<br>Apr-Dec \$50   | Jan-Dec \$50                   |
| Crawlspace Insulation - minimum 200 sq. ft. installed   | Jan-Mar \$100<br>Apr-Dec \$50           | Jan-Mar \$100<br>Apr-Dec \$50   | Jan-Dec \$10                   |
| Rim Joist – must insulate all accessible rim joist areas  | Jan-Dec \$50                            | Jan-Dec \$50                    | Jan-Dec \$20                   |
| Window Replacement – U-factor must be $\leq 0.30$ or rated as ENERGY STAR® for Northern climate | \$15 per opening or \$1 per square foot |                                 |                                |
| Patio Door Replacement – U-factor must be $\leq 0.30$ or rated as ENERGY STAR®                  | \$40 per opening or \$1 per square foot |                                 |                                |

## Implementation Strategy

Key elements of the implementation strategy included:

- **Application processing.** The implementation contractor coordinated processing of all incentive applications, verification of eligibility, and prompt delivery of rebate checks to customers.
- **Contractor participation, education and outreach.** The implementation contractor utilized account managers to facilitate the participation of contractors in the program. The account managers maintained regular contact with participating trade allies to ensure that:
  - Trade allies were informed about the program offering and incentive application process.
  - Trade allies maintained an adequate supply of program marketing materials and application forms.
  - Qualifying equipment was installed.
  - Concerns and issues were addressed promptly.

Strategies to limit free ridership and promote spillover included:

- Incentives limited to high-efficiency measures
- Offering incentives at a sufficient level to motivate customers who would not otherwise implement improvements due to the first-cost barrier
- Incentive claims had to be submitted within 30 days of purchase

The following implementation-related administrative requirements were handled by the implementation contractor:

- Contractor participation and training
- Marketing strategy and materials
- Field services
- Outreach
- Rebate processing
- Data tracking and reporting
- Investment tracking and reporting
- Call Center services
- Public relations
- Customer satisfaction/problem resolution
- Quality Assurance

## Marketing Strategy

Key elements of the marketing strategy included:

- Utility newsletter bill inserts
- Program website
- Web banner/ads
- Assisting participating contractors and retailers with marketing strategies

**Engage Contractors.** Outreach and training were offered to contractors and retailers to motivate them to promote the program incentives to their customers. They were equipped with marketing and promotional materials (e.g., product sheets, rebate forms) and training on program terms and conditions. Outreach

activities included:

- Mailing program materials
- Followup telephone calls
- Orientation meetings
- In-person and in-store visits by account managers
- Email newsletters

**Provide Complete Website Presence.** The program was outlined in detail on the Consumers Energy website. Customers and contractors were able to review qualifying measures and download incentive applications and important program documents

## Milestones

| Major Milestone  | Date  |
|--|-------|
| A total of 743 contractors submitted at least one rebate application and of these, 327 (44%) submitted more than 5 applications. | 12/13 |

## EM&V Strategy

The following evaluation activities were performed for the Insulation and Windows (INWIN) Program in 2013.

**Focus Groups:** Focus group discussions were held in two locations (Lansing and Troy) with INWIN participants. The group discussions were structured to: assess the level of program awareness and understanding; explore motivations and perceived barriers to participation; consider how the path of participation was determined; and gauge program satisfaction.

**Participant Telephone Surveys:** A total of 144 telephone surveys with program participants were conducted. The objectives of the survey were to:

- Assess the level of customer awareness of the INWIN rebates and program participation options
- Explore customers' motivations and perceived barriers to participation, including reasons for choosing the contractor-install or do-it-yourself (DIY) option
- Evaluate the participation process, including the ease of the application process and satisfaction with program rebates
- Assess customers' experiences with contractors and the effectiveness of contractors promoting the program
- Recruit households for site visits

**Site Visits:** Site visits were conducted to verify installed amounts of insulation and windows measures, and R-values of INWIN Program insulation measures and determine appropriate installation rates for reporting savings. Site visits were conducted in a total of 28 homes, including 23 homes with insulation measures, 15 homes with windows installations, and two homes with both insulation and window measures. The evaluation team technicians visually inspected and physically measured installations of attics, rim joists, and crawlspace insulation and windows. For wall and basement wall insulation, which precluded direct access to the insulation, field technicians used infrared imaging to verify insulation installations.

|  | <p><b>Flawed Application Review:</b> The evaluation team conducted a review of submitted applications that were incomplete or contained errors that delayed processing. Missing or erroneous information was categorized to determine areas of primary reasons for application rejection or delays in processing and to identify mechanisms to reduce flaw rates.</p> <p><b>Participant Online Surveys:</b> Surveys with 2013 participants in the Home Energy Analysis Program were conducted throughout the year. The participant surveys assessed satisfaction with key program elements including ease of application, rebate level, energy-savings improvements made, interaction with the contractors, and the program overall. Over 1,000 surveys were completed.</p> |                                |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
|--|---|--------------------------------|-------------------|--------------------------------|-----------|-----------------------------|-------|--------------------------|-------------|-----------------------|-------|-------------|-----|--------------------|--------|------------------------|-------|
| Consumers Energy Administrative Requirements | <p>Consumers Energy was responsible for general administrative oversight of the program portfolio. Key oversight functions included:</p> <ul style="list-style-type: none"><li>• Overall program administration</li><li>• Recruitment, selection, and management of the implementation contractor</li><li>• Coordination of marketing strategy/public relations among programs and market sectors</li><li>• Coordination of all educational services</li><li>• Customer satisfaction</li><li>• Data warehousing</li><li>• Management of key performance metrics and reporting</li><li>• Goal achievement within investment</li></ul>  |                                |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Participation                                | <table><tr><th>Measure</th><th>Number of Rebates</th></tr><tr><td>Roof (Attic) Insulation</td><td>4,389</td></tr><tr><td>Above Grade Wall Insulation</td><td>1,192</td></tr><tr><td>Basement Wall Insulation</td><td>207</td></tr><tr><td>Crawlspace Insulation</td><td>260</td></tr><tr><td>Rim Joist</td><td>948</td></tr><tr><td>Window Replacement</td><td>5,563</td></tr><tr><td>Patio Door Replacement</td><td>1,706</td></tr></table>  | Measure                        | Number of Rebates | Roof (Attic) Insulation        | 4,389     | Above Grade Wall Insulation | 1,192 | Basement Wall Insulation | 207         | Crawlspace Insulation | 260   | Rim Joist   | 948 | Window Replacement | 5,563  | Patio Door Replacement | 1,706 |
| Measure                                      | Number of Rebates   |                                |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Roof (Attic) Insulation                      | 4,389   |                                |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Above Grade Wall Insulation                  | 1,192   |                                |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Basement Wall Insulation                     | 207   |                                |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Crawlspace Insulation                        | 260   |                                |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Rim Joist                                    | 948   |                                |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Window Replacement                           | 5,563   |                                |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Patio Door Replacement                       | 1,706   |                                |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Investment                                   | <table><tr><th></th><th>2013 Actual</th><th>2013 Plan</th></tr><tr><td>Electric</td><td>\$678,638</td><td>N/A</td></tr><tr><td>Gas</td><td>\$2,325,038</td><td>N/A</td></tr><tr><td>Total</td><td>\$3,003,677</td><td>N/A</td></tr></table>   |                                | 2013 Actual       | 2013 Plan                      | Electric  | \$678,638                   | N/A   | Gas                      | \$2,325,038 | N/A                   | Total | \$3,003,677 | N/A |                    |        |                        |       |
|  | 2013 Actual   | 2013 Plan                      |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Electric                                     | \$678,638   | N/A                            |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Gas  | \$2,325,038   | N/A                            |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Total  | \$3,003,677   | N/A                            |                   |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Energy Savings                               | <table><tr><th></th><th>2013 Actual</th><th>2013 Actual w/ LLES Multiplier</th><th>2013 Plan</th></tr><tr><td>MWh</td><td>660</td><td>726</td><td>N/A</td></tr><tr><td>MW</td><td>0.4</td><td>0.4</td><td>N/A</td></tr><tr><td>Mcf</td><td>65,421</td><td>71,963</td><td>N/A</td></tr></table>  |                                | 2013 Actual       | 2013 Actual w/ LLES Multiplier | 2013 Plan | MWh                         | 660   | 726                      | N/A         | MW                    | 0.4   | 0.4         | N/A | Mcf                | 65,421 | 71,963                 | N/A   |
|  | 2013 Actual   | 2013 Actual w/ LLES Multiplier | 2013 Plan         |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| MWh  | 660   | 726                            | N/A               |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| MW   | 0.4   | 0.4                            | N/A               |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |
| Mcf  | 65,421  | 71,963                         | N/A               |                                |           |                             |       |                          |             |                       |       |             |     |                    |        |                        |       |



## Benefit-Cost Test Results

| Benefit-Cost Test        | B/C Ratio |
|--------------------------|-----------|
| Utility Cost Test        | 1.83      |
| Total Resource Cost Test | 0.36      |
| Participant Test         | 0.67      |
| Rate Impact Measure      | 0.51      |

## 5.10 Residential Multifamily Program

|                            |   |
|----------------------------|---|
| <b>Program</b>             | <b>Residential Multifamily</b>  |
| <b>Objective</b>           | The primary goal of this program was to produce immediate electric and natural gas energy savings in multifamily buildings through the direct installation of energy-saving measures in individual living units and common areas. A second program objective was to achieve additional energy savings through the promotion of high-efficiency equipment for prescriptive, custom, and comprehensive retrofit projects.   |
| <b>Target Market</b>       | All property owners of multifamily buildings, including apartments, condominiums, dorms, and assisted living, were eligible to participate. In 2013, the Multifamily Program offered direct installation and prescriptive, custom, and comprehensive measures to both residential and commercial customers. Targeted, proactive outreach efforts were utilized to influence the multifamily market sector.  |
| <b>Program Duration</b>    | This program has been an ongoing element of the Company's portfolio since 2009.   |
| <b>Program Description</b> | <p>The Multifamily Program was designed to offer property owners a turnkey service to help residents reduce energy use in their living units through the direct installation of various energy saving devices. The direct install service was provided at no cost to property owners and tenants. In addition to the products installed, educational materials were left behind in the individual units that explained the energy and money-saving benefits associated with the installed energy efficient measures.</p> <p>The program also informed property owners of the benefits of upgrading and maintaining the operational efficiency of existing HVAC equipment. Furnace tune-ups, completed by a certified HVAC technician, were offered to properties at no cost to the owners or tenants. Program field staff proactively trained and equipped a network of trade allies to perform the work and communicate the benefits of equipment maintenance to the customer. The trade allies served as the primary means of delivering the message and benefits of furnace tune-ups to the end-use customer. A total of 7,307 furnace tune-ups were completed in 2013 as a result of the residential Multifamily Program.</p> <p>The Residential Multifamily Program also was designed to also offer incentives to property owners who purchased specific high-efficiency measures to retrofit individual units and common areas within the property. In 2013, 197 prescriptive and custom rebate applications were submitted by customers and trade allies for projects they completed in a building that had a Consumers Energy residential electric and/or gas rate code.</p> <p>For properties that were interested in reducing a significant portion of their energy</p> |

## Program Logic

use, the Multifamily Program offered the Comprehensive Building Initiative. This pilot was targeted at properties that were undergoing multiple retrofits which saved at least 10% of their annual energy use.

The Multifamily Program encounters market barriers from two groups; the property owner and the tenant. The following common barriers are described below, along with program strategies that were employed to address them:

### Market Barrier

### Program Element

#### For residents:

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Hassle of researching how to reduce their energy bills</li> <li>• Hesitancy to invest in products that may stay with the unit when they leave</li> <li>• Lack of information about potential energy savings</li> <li>• Concern regarding installation technicians entering the apartment</li> </ul> | <ul style="list-style-type: none"> <li>• Turnkey service; work was performed for them</li> <li>• Materials and installation were provided free to the resident</li> <li>• Leave-behind educational materials for residents</li> <li>• A member of the apartment community staff was present at all times to escort the installation technicians</li> </ul> |
|--|--|

#### For property owners:

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Hassle of making arrangements to install measures</li> <li>• Lack of awareness regarding energy and nonenergy benefits</li> <li>• Emphasis on first-cost rather than lifecycle cost</li> <li>• Hesitancy to invest in products that are unfamiliar</li> </ul> | <ul style="list-style-type: none"> <li>• Simple turnkey service</li> <li>• Marketing materials, case studies, website, and “good will” benefit of offering free measures to their residents</li> <li>• Financial incentives, lifecycle/payback information, and proactive outreach meetings with decision makers for budget expenditures</li> <li>• Products left behind for the owner to install and test</li> </ul> |
|--|---|

## Incentive Strategy

**Direct Install of In-Unit Measures.** Property owners were offered a free direct install service for reducing in-unit energy use.

**Prescriptive and Custom Measures.** Common energy-saving measures for multifamily complexes were added to an application with the incentive amounts based on deemed energy savings from the Michigan Energy Measures Database (MEMD). This portion of the Multifamily Program was added to address deeper energy-saving opportunities than were possible through direct install measures.

**Comprehensive Whole Building Initiative.** Properties were given extra incentives when their overall energy use was reduced by at least 10%. The program team used energy modeling to predict energy reduction based on measures installed. By working closely with property managers, the Multifamily

**Eligible Measures, Efficiency Requirements & Incentives**

Program staff created an energy model of the building. Based on the energy savings information provided by the model, the customer then created a plan to remodel their building. The predicted energy savings from the retrofits determined the level at which the measure incentives would be increased. The table below illustrates the tiered incentive amounts at various energy-saving levels.

| <b>Comprehensive Program Incentive Structure</b> |                         |                         |
|--|-------------------------|-------------------------|
| Energy Savings Tier                              | Incentive per kWh Saved | Incentive per Mcf Saved |
| Tier 1 – 10% +                                   | \$0.09                  | \$9.00                  |
| Tier 2 – 20% +                                   | \$0.12                  | \$10.00                 |
| Tier 3 – 30% +                                   | \$0.14                  | \$11.00                 |

Deemed savings values were based on the MEMD

The Multifamily Program offered the following measures as part of the Direct Install portion of the program. The products were installed at no cost to the property owner or residents.

| <b>Direct Install Measure</b> | <b>Efficiency Requirements</b> |
|-------------------------------|--------------------------------|
| CFL Lamp                      | ENERGY STAR®                   |
| LED Lamp                      | 9.5 watt                       |
| CFL Candelabra                | 9 watt                         |
| LED Candelabra                | 3 watt                         |
| LED Exit Sign                 | 1.2 watt                       |
| Low-Flow Showerhead           | 1.5 gpm                        |
| Bathroom Faucet Aerator       | 1.0 gpm                        |
| Kitchen Faucet Aerators       | 1.5 gpm                        |
| DHW Pipe Wrap                 | R-4                            |

The Multifamily Program offered the following measures as part of the Prescriptive portion of the program. Property owners and managers were eligible to receive incentives for the retrofit improvements listed below.

| <b>Multifamily Prescriptive Measures</b>   |                                      |         |
|--|--------------------------------------|---------|
| <b>Prescriptive Measures – Common Area</b> | <b>Prescriptive Incentive Amount</b> |         |
| CFL ≤115W or Specialty                     | \$1–\$8                              | Lamp    |
| Compact Fluorescent Fixture                | \$25                                 | Fixture |
| LED Lamp Replacing 50W - 100W              | \$20-\$25                            | Lamp    |

|  |  |            |              |
|--|--|------------|--------------|
|  | Incandescent   |            |              |
|  | LED PAR Flood Lamp                                   | \$20       | Lamp         |
|  | LED MR16 Lamp  | \$5        | Lamp         |
|  | LED Candelabra Lamp 3W-5W                            | \$10-\$15  | Lamp         |
|  | CFL Candelabra Lamp 5W-13W                           | \$8-\$10   | Lamp         |
|  | LED Fixture Replacing Incandescent                   | \$25       | Lamp         |
|  | HP T8 Lamp Replacing T12                             | \$3        | Lamp         |
|  | HP T8 Lamp Replacing T12HO                           | \$10       | Lamp         |
|  | 1-4 Lamp HP T8 Replacing T12                         | \$15-\$40  | Lamp         |
|  | 1-4 Lamp RW HP T8 Replacing T12                      | \$20-\$50  | Lamp         |
|  | 4 ft. Lamp Removal w/ HP/RW T8 Retrofit              | \$5        | Lamp         |
|  | 8 ft. Lamp Removal w/ HP or RW T8 Retrofit           | \$10       | Lamp         |
|  | LED, T-1, or Electroluminescent Exit Signs           | \$12.50    | Fixture      |
|  | Exterior HID to CFL $\leq 400W$ \$45/Fixture         | \$45-\$120 | Fixture      |
|  | Exterior HID to T5/T8 Linear Fluorescent             | \$0.50     | Watt Reduced |
|  | Exterior HID to LED/Induction $<400W$                | \$45-\$180 | Fixture      |
|  | Vending Equipment Controller                         | \$50       | Unit         |
|  | Occupancy Sensor for Interior Lights                 | \$40-\$100 | Fixture      |
|  | Occupancy Sensor for Exterior Fixtures               | \$0.20     | Watt         |
|  | Space Heating Boiler Tune-Up                         | \$0.25     | MBH          |
|  | DHW Boiler Tune-Up                                   | \$0.25     | MBH          |
|  | Furnace Tune-Up 40 MBH - 120 MBH                     | \$40-\$60  | Tune-Up      |
|  | Furnace Tune-Up $>120$ MBH                           | \$0.50     | MBH          |
|  | Chiller Tune-Up                                      | \$15       | Ton          |
|  | High-Efficiency Space Heating Boiler $\geq 90\%$     | \$3-\$5    | MBH          |
|  | Furnace Replacement $\geq 92\%$                      | \$80-\$150 | Furnace      |
|  | Infrared Heater Replacing Standard Unit Heater       | \$6        | MBH          |
|  | Boiler Water Reset Control                           | \$0.35     | MBH          |
|  | Indirect Water Heater with Efficiency of $\geq 84\%$ | \$1-\$2.50 | MBH          |
|  | Instant Hot Water Heater $\geq 82\%$                 | \$175      | MBH          |
|  | Tank Style Water Heater $EF \geq 0.80$               | \$200      | MBH          |
|  | Variable Frequency Drive on HVAC Fans                | \$60       | HP           |
|  | Variable Frequency Drive on HVAC Pumping             | \$100      | HP           |

|  |  |                                      |               |
|--|--|--------------------------------------|---------------|
|  | Pipe Wrap  | \$1.50-\$6.00                        | Foot          |
|  | Leaking Steam Trap Repair or Replacement         | \$100                                | Trap          |
|  | Programmable Thermostat                          | \$10                                 | Unit          |
|  | Air Conditioner - <5.4 Tons, 1 ph - 14 SEER      | \$6                                  | Ton           |
|  | Air Conditioner - <5.4 Tons, 3 ph - 11.6 SEER    | \$6                                  | Ton           |
|  | Air Conditioner - <20 Tons - 11 SEER             | \$8-\$15                             | Ton           |
|  | Air Conditioner - <63.3 Tons - 10 SEER           | \$15                                 | Ton           |
|  | Pool Water Heater $\geq 84\%$                    | \$2                                  | MBH           |
|  | Pool Cover                                       | \$0.50                               | Sq. Ft.       |
|  | <b>Prescriptive Measures – In Unit</b>           | <b>Prescriptive Incentive Amount</b> |               |
|  | CFL $\leq 115W$ or Specialty                     | \$1-\$4                              | Lamp          |
|  | Compact Fluorescent Fixture                      | \$10                                 | Fixture       |
|  | LED Fixture                                      | \$10                                 | Fixture       |
|  | LED Replacing 40W - 100W Incandescent            | \$4-\$8                              | Lamp          |
|  | LED PAR Flood Lamp                               | \$10                                 | Lamp          |
|  | Low-Flow Bath Aerator $\leq 1.75GPM$             | \$2                                  | Aerator       |
|  | Low-Flow Kitchen Sprayer Aerator $\leq 1.75GPM$  | \$3                                  | Aerator       |
|  | Low-Flow Showerhead $\leq 1.75 GPM$              | \$15-\$30                            | Showerhead    |
|  | Tankless Gas Water Heater                        | \$50                                 | Unit          |
|  | Pipe Wrap - Gas Domestic Hot Water               | \$0.75                               | Foot          |
|  | Space Heating Furnace Replacement $\geq 92\%$    | \$80                                 | Furnace       |
|  | Furnace Replacement $\geq 95\%$                  | \$125-\$150                          | Furnace       |
|  | Furnace Tune-Up $\geq 40$ MBH                    | \$40-\$80                            | Tune-Up       |
|  | Package Terminal Heat Pump - 9.1 EER             | \$50                                 | Unit          |
|  | Room Air Conditioner CEE Tier 2                  | \$20                                 | Unit          |
|  | Programmable Thermostat                          | \$10                                 | Unit          |
|  | <b>Prescriptive Measures – Building Envelope</b> | <b>Prescriptive Incentive Amount</b> |               |
|  | ENERGY STAR® Door                                | \$10                                 | Door          |
|  | Door Weather Stripping                           | \$1.75                               | Door          |
|  | ENERGY STAR® Window                              | \$100                                | 100 Sq. Ft.   |
|  | Airtight Can Light                               | \$5                                  | Fixture       |
|  | Duct Sealing                                     | \$6                                  | 1,000 Sq. Ft. |

## Implementation Strategy

|                                |          |               |
|--------------------------------|----------|---------------|
| Duct Insulation                | \$10     | 1,000 Sq. Ft. |
| Wall Insulation                | \$40     | 1,000 Sq. Ft. |
| Roof Insulation                | \$20     | 1,000 Sq. Ft. |
| Reduce Air Infiltration by 30% | \$5-\$25 | 1,000 Sq. Ft. |

Key elements of the implementation strategy included:

- **Targeted Outreach to Property Owners.** Program representatives concentrated on building relationships with property management companies, owners, associations and their members to recruit participation in the program. The program team assisted customers as necessary to coordinate direct installations and complete rebate application requirements. In addition, property owners were reached through direct mail, participation in association events, one-on-one meetings with program staff, and other channels. On several occasions, the Multifamily Program outreach team utilized Resident Education events to reach the individual residents before installation occurred. The outreach team provided dinner and educated the residents on the benefits of the direct install products. The residents were shown samples of the showerheads, aerators, and light bulbs to get a preview of what would be installed in their apartment units. These education events helped the direct install technicians achieve a higher installation rate because the residents were educated on the program and more receptive to the installed measures.
- **Targeted Outreach to HVAC Trade Allies.** Program representatives informed and recruited participation from trade allies for the Furnace Tune-Up Program. This program was offered at no cost to the owner or tenant. Outreach included orientation meetings and training of trade allies to perform and communicate HVAC tune-up benefits. Program representatives also worked directly with property owners to schedule and coordinate the furnace tune-up and other direct installation measures for individual living units. Due to the incentives available for this measure, several trade allies were able to hire additional staff to support the furnace tune-up portion of their business.
- **Direct Installs.**
  - **Standard Direct Install:** Program representatives identified interested property owners and scheduled appointments for the free installation of energy-saving devices in the individual living units and common areas. In 2013, three new direct install offerings were added to the Multifamily Program: LED 60-watt equivalent replacement bulbs, LED/CFL candelabra bulbs, and LED exit signs. The installation crews were trained on the technical and educational benefits of all of the energy-saving devices installed. In addition, educational materials describing the work performed and energy-saving benefits of the installed items were left in each of the living units. The Multifamily Program contributed to market transformation by installing 28,680 screw-in LED bulbs in 2013.
  - **Pipe Wrap:** Property owners also were offered pipe wrap insulation on unwrapped domestic hot water piping in both common areas and in-unit areas. The insulating pipe wrap prevented heat loss through the piping in unconditioned spaces.
  - **Furnace Tune-Ups:** Additionally, the Multifamily Program incorporated furnace tune-ups into the Direct Install Program

offering. Trade allies were given the opportunity to offer free furnace tune-ups to qualifying properties and received an incentive amount of \$50 per tune-up completed. The Multifamily Program incentivized over 7,500 furnace tune-ups in 2013.

- ***Prescriptive and Custom Programs.*** Going beyond the direct installation of low-cost measures and to help building owners continue to reduce their energy use and costs, program representatives conducted site assessments to help target common high-efficiency retrofit opportunities. Opportunities for energy efficiency improvements would then be presented to the building owner in an effort to encourage participation in the prescriptive and custom portion of the program. In 2013, more than 197 projects received incentives totaling more than \$502,000.
- ***Comprehensive Whole Building Program.*** The Comprehensive Program was developed to encourage and address large improvement projects that reduced a significant percentage of the property's overall energy use. Qualifying projects needed to include measures from at least two energy-saving measure categories and show a reduction in the overall energy use of the building of at least 10%. The Multifamily Program team used building energy modeling to provide a customized estimate of the yearly energy savings expected after the recommended retrofits were complete. Incentives were then awarded based on the level and potential of energy savings. Higher incentives were provided based on energy-saving tiers of 10-19%, 19-29%, and 30%+.
- ***Collaboration Efforts.*** Beginning in September 2011, Consumers Energy and DTE began coordinating multifamily direct install projects in single-fuel service territories. This collaborative effort continued in 2013 and resulted in a total of 11,772 direct install units at 113 properties that had both Consumers Energy and DTE as their utility provider.
- ***Program Operations.*** The following implementation-related administrative requirement were handled by the implementation contractor:
  - Marketing and educational materials
  - Field services including direct install of products and QA/QC inspections
  - Product ordering and inventory
  - Data tracking and reporting
  - Investment tracking and reporting
  - Prescriptive and custom application processing
  - Call Center services
  - Trade ally and customer outreach/training
  - Customer satisfaction/Problem resolution
  - Engineering support and energy modeling

## Marketing Strategy

A highly targeted marketing strategy was employed in 2013. Recruitment efforts targeted property management companies in an effort to secure agreements to address multiple properties through a single point of contact before targeting owners and managers of individual properties.

A targeted marketing strategy with property owners and management companies increased awareness of the Consumers Energy Multifamily Program offerings. The targeted marketing approach focused on specific measures and specific target markets. Based on these targets, direct mail campaigns were created, program



collateral was designed, and recognition of program participants was generated.

Marketing and outreach strategies included:

- In-person visits by program representatives
- Walk-through energy assessments of properties to encourage participation in the direct install, prescriptive and custom measures
- Targeted advertising in trade organization and association publications
- Outreach to property management associations to recruit assistance in distributing information about the program through existing channels
- Direct mailings promoting the program offerings and benefits
- Utilizing our trade ally network to promote and distribute information about the program
- Trade ally recognition awards
- Redesigned Multifamily Program Catalog

As market penetration of direct install measures increases, program staff has identified additional energy-saving opportunities to meet program goals. In 2013, there was a greater focus on prescriptive and custom measures, going beyond direct install and introducing a more targeted marketing approach.

The 2013 Program Catalog was expanded to create a more complete overview of all the program offerings. Included in the 2013 catalog were descriptions of all direct install product offerings, prescriptive and custom measures, efficiency requirements, and all of the necessary forms and worksheets necessary to submit rebate applications.

## Milestones

| Major Milestone  | Date |
|--|------|
| Launched redesigned Multifamily Program catalog  | 3/13 |
| Increased market transformation by switching from direct install CFLs in individual units to direct install LEDs | 3/13 |
| Launched direct install furnace tune-ups initiative  | 4/13 |

## EM&V Strategy

The following evaluation activities were performed for the Multifamily Direct Install Program in 2013.

**Evaluability Assessment:** As the program focused on increased common area savings opportunities, including comprehensive, multi-measure efficiency upgrades and the utilization of a building energy simulation model, an evaluability assessment was conducted. The assessment included a review of: data collection protocols; development of model inputs; model algorithms; calibration approaches; and assumption sensitivity. Guidelines for evaluable and accurate modeling were developed.

**Benchmarking and Best Practices Study:** The Multifamily program was benchmarked against 16 other utility programs that were of similar size or geography; identified as exemplary programs (e.g., designated by the American

|  | <p>Council for an Energy Efficient Economy); offered similar measures (including both direct install measures and common area measures). The benchmarking sought to compare programs in terms of the magnitude of savings, the comprehensiveness and diversity of measures offered through the program, and cost-effectiveness. In addition, the analysis identified best practices for effectively addressing barriers faced by this hard-to-reach market segment in order to achieve comprehensive energy savings.</p>   |                              |  |                                |                              |      |         |      |        |                      |        |                 |        |                             |         |                         |        |
|--|--|------------------------------|--|--------------------------------|------------------------------|------|---------|------|--------|----------------------|--------|-----------------|--------|-----------------------------|---------|-------------------------|--------|
| <p><b>Consumers Energy Administrative Requirements</b></p> | <p>Consumers Energy staff were responsible for general administrative oversight of the program portfolio including:</p> <ul style="list-style-type: none"> <li>• Management of the implementation contractor</li> <li>• Coordination of marketing strategy/public relations among programs and market sectors</li> <li>• Coordination of all educational services</li> <li>• Customer satisfaction</li> <li>• Data warehousing</li> <li>• Management of the evaluation contractor</li> <li>• Management of key performance metrics and reporting</li> <li>• Goal achievement within investment</li> </ul>  |                              |  |                                |                              |      |         |      |        |                      |        |                 |        |                             |         |                         |        |
| <p><b>Participation</b></p>                                | <p>Due to a greater focus on LED lighting and Pipe Wrap, Consumers Energy experienced excellent participation in the direct install portion of the program in 2013. Below are the total quantities of products installed by the Multifamily Program technicians in 2013.</p> <table border="1"> <thead> <tr> <th colspan="2">Direct Install Product Count</th></tr> <tr> <th>In-Unit Direct Install Measure</th><th>Number of Installed Measures</th></tr> </thead> <tbody> <tr> <td>CFLs</td><td>134,207</td></tr> <tr> <td>LEDs</td><td>28,679</td></tr> <tr> <td>Low-Flow Showerheads</td><td>14,859</td></tr> <tr> <td>Faucet Aerators</td><td>28,573</td></tr> <tr> <td>Pipe Wrap (ft.) Common Area</td><td>164,222</td></tr> <tr> <td>Pipe Wrap (ft.) In-Unit</td><td>39,866</td></tr> </tbody> </table> <ul style="list-style-type: none"> <li>• Prescriptive and Custom Projects: 197 projects received incentives through the multifamily prescriptive and custom application.</li> <li>• Furnace Tune-Up: Completed 7,307 tune-ups.</li> <li>• Comprehensive Retrofits: Five comprehensive projects were completed.</li> </ul> | Direct Install Product Count |  | In-Unit Direct Install Measure | Number of Installed Measures | CFLs | 134,207 | LEDs | 28,679 | Low-Flow Showerheads | 14,859 | Faucet Aerators | 28,573 | Pipe Wrap (ft.) Common Area | 164,222 | Pipe Wrap (ft.) In-Unit | 39,866 |
| Direct Install Product Count                               |  |                              |  |                                |                              |      |         |      |        |                      |        |                 |        |                             |         |                         |        |
| In-Unit Direct Install Measure                             | Number of Installed Measures   |                              |  |                                |                              |      |         |      |        |                      |        |                 |        |                             |         |                         |        |
| CFLs   | 134,207  |                              |  |                                |                              |      |         |      |        |                      |        |                 |        |                             |         |                         |        |
| LEDs   | 28,679   |                              |  |                                |                              |      |         |      |        |                      |        |                 |        |                             |         |                         |        |
| Low-Flow Showerheads                                       | 14,859   |                              |  |                                |                              |      |         |      |        |                      |        |                 |        |                             |         |                         |        |
| Faucet Aerators  | 28,573   |                              |  |                                |                              |      |         |      |        |                      |        |                 |        |                             |         |                         |        |
| Pipe Wrap (ft.) Common Area                                | 164,222  |                              |  |                                |                              |      |         |      |        |                      |        |                 |        |                             |         |                         |        |
| Pipe Wrap (ft.) In-Unit                                    | 39,866   |                              |  |                                |                              |      |         |      |        |                      |        |                 |        |                             |         |                         |        |

## Investment

|          | 2013 Actual | 2013 Plan   |
|----------|-------------|-------------|
| Electric | \$3,679,529 | \$3,858,598 |
| Gas      | \$2,093,274 | \$2,250,111 |
| Total    | \$5,772,803 | \$6,108,708 |

## Energy Savings

|     | 2013 Actual | 2013 Actual<br>w/ LLES<br>Multiplier | 2013 Plan |
|-----|-------------|--------------------------------------|-----------|
| MWh | 7,626       | 7,955                                | 5,758     |
| MW  | 0.9         | 1.0                                  | 0.5       |
| Mcf | 184,682     | 199,006                              | 272,215   |

## Benefit-Cost Test Results

| Benefit-Cost Test        | B/C Ratio |
|--------------------------|-----------|
| Utility Cost Test        | 2.41      |
| Total Resource Cost Test | 2.41      |
| Participant Test         | -         |
| Rate Impact Measure      | 0.49      |

## 5.11 New Home Construction Program

| Program             | New Home Construction  |
|---------------------|--|
| Objective           | Produce long-term electric and natural gas energy savings in the residential sector by transforming the construction of single-family homes and duplexes that meet the ENERGY STAR® Version 3.0 standards.   |
| Target Market       | The 2013 Residential New Home Construction Program focused on home builders and used various methods to encourage adoption of the ENERGY STAR® 3.0 standards.  |
| Program Duration    | The New Home Construction Program was launched January 1, 2012, and is an ongoing element of the energy efficiency programs portfolio.   |
| Program Description | <p>The New Home Construction Program produced long-term electric and natural gas savings by encouraging the construction of single-family homes and duplexes that are certified as meeting ENERGY STAR® Version 3.0 standards.</p> <p>The program identified and recruited builders to build homes to exceed baseline building codes for energy efficiency. The goal was to have builders construct a home to ENERGY STAR® 3.0 requirements and achieve certification by an independent Home Energy Rating System (HERS). The ENERGY STAR® 3.0 certification is a whole-house envelope approach versus only installing high-efficiency HVAC equipment options.</p> <p>Builders participating in the program gained access to cash-back incentives that covered approximately 40% of the cost to upgrade and certify each home (percentage based on builder-supplied information with the related rebated amount). The amount of the specific incentive was based on the type of energy service provided by Consumers Energy.</p> <p>Participating builders received education on building practices designed to achieve the ENERGY STAR® standards. Builders were also educated on how to sell the value of energy efficient homes to their customers.</p> |

## Program Logic

The primary barriers to increased market penetration of ENERGY STAR® homes in the new construction market included:

### Market Barrier

- Higher initial cost to meet the ENERGY STAR® 3.0 standards.
- Lack of awareness among homeowners regarding both the energy and nonenergy benefits and rebates provided by Consumers Energy
- Lack of awareness among builders/HVAC/homeowners regarding the technology and building practices that result in a more efficient home

### Program Element

- Financial incentives, information on lifecycle savings and tax incentives
- Educational material and builder training was provided including follow-up letter and appreciation gift with acknowledgement of Consumers Energy's program
- Educational materials and builder training, including requirement of the HVAC installer certification to meet ENERGY STAR® 3.0 standard

## Incentive Strategy

The program offered financial incentives that varied based on Consumers Energy service area classification and the achievement of the ENERGY STAR® 3.0 certification.

## Eligible Measures, Efficiency Requirements & Incentives

### ENERGY STAR® 3.0 Incentives

| Energy Type                  | Heating Type                                      | Cooling Type   | Rebate Amount |
|------------------------------|---|----------------|---------------|
| Combination Gas and Electric | Gas Furnace or Boiler                             | Central A/C    | \$1,500       |
| Combination Gas and Electric | Gas Furnace or Boiler                             | No Central A/C | \$1,350       |
| Gas Only                     | Gas Furnace or Boiler                             | N/A            | \$1,200       |
| Electric Only                | Air Source Heat Pump or Ground Source Heat Pump   | Central A/C    | \$1,500       |
| Electric Only                | Non-Electric Heating (i.e. Gas Furnace or Boiler) | Central A/C    | \$300         |

## Implementation Strategy

Key elements of the implementation strategy included:

- **Recruitment/training team of Home Energy® Raters.** Identified existing resources with appropriate training and experience.
- **Outreach to targeted builders.** Utilized experienced field representatives to meet with builders, promote the benefits of ENERGY STAR® homes, and generate interest in the program. Builders were recruited through

various channels including builder associations, realtors, trades, raters and direct outreach to targeted home builders

- **Conducted builder training on marketing ENERGY STAR® homes.** Participating builder training efforts were focused first on the benefits associated with ENERGY STAR® from the customers' perspective including improved efficiency, comfort, safety, and durability. Builders were also educated regarding the opportunity to improve their business by differentiating themselves using the nationally recognized ENERGY STAR® brand.
- **Conducted builder training on the ENERGY STAR® performance standard.** The second phase of the training process focused on the ENERGY STAR® 3.0 standard and building practices needed to meet the requirements.
- **Coached and mentored participating builders and raters.** Once the initial training was completed, the program provided technical assistance and market recognition to participating builders, their trade partners, and raters on an ongoing basis.

Strategies to limit free ridership and promote spillover included:

- To minimize free ridership, the program continued to target builders not currently meeting the ENERGY STAR® 3.0 standard. Many builders were meeting the previous level of ENERGY STAR® 2.5 standard. However, they moved away from ENERGY STAR® when the 3.0 standard replaced 2.5 due to higher requirements. These were the builders the outreach team first focused on to bring back to the ENERGY STAR® program. Secondary targets included builders who currently met the ENERGY STAR® standard, but only on a small percentage of homes.

Implementation-related administrative requirements included the following:

- Management of subcontractors
- Investment tracking
- Call Center services
- Administer customer service standards
- Data tracking systems
- On-site verification of incentive claims
- Public relations
- Customer satisfaction/Problem resolution
- Supporting evaluation activities

## Marketing Strategy

The program was marketed to select builders primarily through direct business-to-business contacts via program field staff. Opportunities were identified to present the program at builder, realtor, rater and other trade association meetings and place information in association newsletters. Customers were marketed via home shows, parades of homes, and other events focused on new home building.

## EM&V Strategy

The following evaluation activities were conducted to assess the implementation of the New Home Construction Program in 2013:

**Program Manager Telephone Interviews:** As part of a benchmarking effort, interviews were conducted with managers of other residential new construction programs. The programs were selected based on success, maturity, and

innovation. The interviews gathered information on program design, operation, and market engagement. Insights from the interviews were identified best practice approaches currently employed by the program and opportunities for program enhancement.

**Home Energy Rating Reviews:** Home Energy Raters (HERS) use REM/Rate software (a residential energy analysis software that is commonly used to model the performance of residential buildings) to determine if homes meet the ENERGY STAR® 3.0 standards. A sample of 35 REM/Rate files were reviewed to ensure consistency of modeling practices among the HERS raters and to verify modeled energy savings.

## Consumers Energy Administrative Requirement

Consumers Energy staff was responsible for general administrative oversight of the program portfolio, including the following:

- Program administration
- Recruitment, selection, and management of the implementation contractor
- Coordination of marketing strategy/public relations among programs and market sectors
- Development and placement of marketing materials and advertising
- Coordination of all educational services
- Customer satisfaction
- Data warehousing
- Management of key performance metrics and reporting
- Goal achievement within investment

## Participation

| Customer Service Type/Program Track | Number of Completed Applications |
|-------------------------------------|----------------------------------|
| Electric-only/ENERGY STAR® 3.0      | 97                               |
| Gas-only/ENERGY STAR® 3.0           | 120                              |
| Combination/ENERGY STAR® 3.0        | 198                              |
| Total                               | 415                              |

## Investment

|          | 2013 Actual | 2013 Plan |
|----------|-------------|-----------|
| Electric | \$208,928   | \$246,904 |
| Gas      | \$515,788   | \$249,094 |
| Total    | \$724,716   | \$492,188 |

## Energy Savings

|     | <b>2013 Actual</b> | <b>2013 Actual<br/>w/ LLES<br/>Multiplier</b> | <b>2013 Plan</b> |
|-----|--------------------|---|------------------|
| MWh | 152                | 167   | 101              |
| MW  | 0.0                | 0.0   | 1.2              |
| Mcf | 12,986             | 14,277  | 6,375            |

## Benefit-Cost Test Results

| <b>Benefit-Cost Test</b> | <b>B/C Ratio</b> |
|--------------------------|------------------|
| Utility Cost Test        | 1.56             |
| Total Resource Cost Test | 1.13             |
| Participant Test         | 2.63             |
| Rate Impact Measure      | 0.50             |



## 5.12 THINK! ENERGY® Program

|                            |  |
|----------------------------|--|
| <b>Program</b>             | <b>THINK! ENERGY®</b>  |
| <b>Objective</b>           | The THINK! ENERGY® program was designed to influence students and their families to take actions that would reduce their home energy use and increase efficiency.  |
| <b>Target Market</b>       | Grade levels 4-6 in elementary schools throughout the Consumers Energy service area were targeted by the THINK! ENERGY® Take Action programs in combination and single-fuel service territories. The base program was run in the combination service territory and a collaborative program with DTE Energy was conducted in the spring. A second collaboration with the Lansing Board of Water & Light was conducted in fall. In addition, two new initiatives were launched. The first, titled, Innovation targeted 900 students in grades 9-12 in the fall of 2013. The other, was called Community in Action, targeted adults, such as school faculty and parents.  |
| <b>Program Duration</b>    | THINK! ENERGY® Take Action was launched in 2010 and is an ongoing element of the program portfolio. The Innovation and Community Action components of the program were launched in 2013.   |
| <b>Program Description</b> | <p>Providing energy education to students was a good way to influence families' energy behaviors. The program targeted students in grades 4-6, providing education and a take-home kit that raised awareness about how individual actions and low-cost measures can provide reductions in electricity, natural gas, and water consumption.</p> <p>The Take Action kit included:</p> <ul style="list-style-type: none"> <li>• Three CFLs</li> <li>• Low-flow showerhead</li> <li>• Kitchen aerator</li> <li>• Bathroom aerator</li> <li>• Shower timer</li> <li>• Flow test bag</li> <li>• Light switch stickers</li> <li>• LED night light</li> <li>• Student Guide</li> </ul> <p>The Innovation program worked in a similar manner to Take Action, providing an introductory presentation and take-home kit, but also included a social media component. The program targeted high school students.</p> <p>The Innovation kit included:</p> <ul style="list-style-type: none"> <li>• Three CFLs</li> <li>• Low-flow showerhead</li> <li>• Bathroom aerator</li> <li>• Shower timer</li> <li>• Flow test bag</li> <li>• Smart power strip</li> </ul> |

|   | The implementation contractor presented the program concept to the Michigan Department of Education, and again secured their enthusiastic endorsement for the program and utility collaborative efforts.   |                    |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
|---|--|--------------------|--|----------------|-----------------|---|---|--------------|--------|-----------------|--|--------|---------------------|------------------------|--------|------------------------------|------------------------|--------|---------------------------------|------------------------|--------|
| Program Logic   | The following strategies were employed to address current market barriers:<br><br><table><tr><th>Market Barrier</th><th>Program Element</th></tr><tr><td><ul style="list-style-type: none"><li>Low levels of energy efficiency literacy in the schools</li><li>Families too busy to learn about and/or undertake simple low-cost efficiency measures in the home</li></ul></td><td><ul style="list-style-type: none"><li>Energy education materials provided by the implementation contractor</li><li>Free energy-saving kits and motivated students to help families install the measures</li></ul></td></tr></table> |                    |  | Market Barrier | Program Element | <ul style="list-style-type: none"><li>Low levels of energy efficiency literacy in the schools</li><li>Families too busy to learn about and/or undertake simple low-cost efficiency measures in the home</li></ul> | <ul style="list-style-type: none"><li>Energy education materials provided by the implementation contractor</li><li>Free energy-saving kits and motivated students to help families install the measures</li></ul> |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| Market Barrier  | Program Element  |                    |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| <ul style="list-style-type: none"><li>Low levels of energy efficiency literacy in the schools</li><li>Families too busy to learn about and/or undertake simple low-cost efficiency measures in the home</li></ul> | <ul style="list-style-type: none"><li>Energy education materials provided by the implementation contractor</li><li>Free energy-saving kits and motivated students to help families install the measures</li></ul>  |                    |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| Incentive Strategy  | All educational materials and take-home efficiency kits were offered free of charge to the schools and their students. Teachers were provided a mini-grant of \$25 to \$100 for returning program data. Teachers in the base program who returned data in program years 2011-2013 were given a TrickleStar energy meter as a thank you gift and incentive to sign up again in 2014.  |                    |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| Eligible Measures, Efficiency Requirements & Incentives   | <table><tr><th>Measure</th><th>Eligibility</th><th>Incentive per Unit</th></tr><tr><td>CFLs (3 per kit)</td><td>ENERGY STAR®</td><td>\$2.60</td></tr><tr><td>LED Night Light</td><td></td><td>\$3.50</td></tr><tr><td>Low-Flow Showerhead</td><td>1.5 gallons per minute</td><td>\$5.50</td></tr><tr><td>Low-Flow Bath Faucet Aerator</td><td>1.5 gallons per minute</td><td>\$1.90</td></tr><tr><td>Low-Flow Kitchen Faucet Aerator</td><td>1.5 gallons per minute</td><td>\$3.20</td></tr></table>   |                    |  | Measure        | Eligibility     | Incentive per Unit  | CFLs (3 per kit)  | ENERGY STAR® | \$2.60 | LED Night Light |  | \$3.50 | Low-Flow Showerhead | 1.5 gallons per minute | \$5.50 | Low-Flow Bath Faucet Aerator | 1.5 gallons per minute | \$1.90 | Low-Flow Kitchen Faucet Aerator | 1.5 gallons per minute | \$3.20 |
| Measure   | Eligibility  | Incentive per Unit |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| CFLs (3 per kit)  | ENERGY STAR®   | \$2.60             |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| LED Night Light   |  | \$3.50             |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| Low-Flow Showerhead   | 1.5 gallons per minute   | \$5.50             |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| Low-Flow Bath Faucet Aerator  | 1.5 gallons per minute   | \$1.90             |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| Low-Flow Kitchen Faucet Aerator   | 1.5 gallons per minute   | \$3.20             |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| Implementation Strategy   | Consumers Energy managed implementation-related administrative requirements, including the following: <ul style="list-style-type: none"><li>Program administration</li><li>School recruitment</li><li>The work of the energy education contractor</li><li>Data tracking and reporting</li><li>Investment tracking and reporting</li><li>Public relations</li><li>Customer satisfaction/Problem resolution</li></ul>  |                    |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |
| Marketing Strategy  | The program was marketed through direct mail letters and emails sent to school districts within the Company’s service territory.<br><br>A \$100 classroom mini-grant was offered to participating schools for each classroom that turned in 80% of the home reports included in students’ take-home kits. Lesser   |                    |  |                |                 |   |   |              |        |                 |  |        |                     |                        |        |                              |                        |        |                                 |                        |        |

|   | awards of \$50 or \$25 were provided to teachers who returned less than 80% of the home reports.  |                 |      |   |      |                             |      |                    |       |                                  |       |
|---|---|-----------------|------|---|------|-----------------------------|------|--------------------|-------|----------------------------------|-------|
| <b>Milestones</b>                                   | <table> <tr> <th>Major Milestone</th><th>Date</th></tr> <tr> <td>Conducted Collaboration Program with DTE Energy</td><td>3/13</td></tr> <tr> <td>Community in Action Program</td><td>3/13</td></tr> <tr> <td>Innovation Program</td><td>11/13</td></tr> <tr> <td>Implemented teacher loyalty gift</td><td>12/13</td></tr> </table>  | Major Milestone | Date | Conducted Collaboration Program with DTE Energy | 3/13 | Community in Action Program | 3/13 | Innovation Program | 11/13 | Implemented teacher loyalty gift | 12/13 |
| Major Milestone                                     | Date  |                 |      |   |      |                             |      |                    |       |                                  |       |
| Conducted Collaboration Program with DTE Energy     | 3/13  |                 |      |   |      |                             |      |                    |       |                                  |       |
| Community in Action Program                         | 3/13  |                 |      |   |      |                             |      |                    |       |                                  |       |
| Innovation Program                                  | 11/13   |                 |      |   |      |                             |      |                    |       |                                  |       |
| Implemented teacher loyalty gift                    | 12/13   |                 |      |   |      |                             |      |                    |       |                                  |       |
| <b>EM&amp;V Strategy</b>                            | <p>The following evaluation activities were performed for the THINK! ENERGY® Program in 2013.</p> <p><b>Classroom Observation:</b> Energy education presentations were observed by the evaluation team and reviewed to assess effectiveness of the presentation of materials, student engagement, and alignment with Michigan educational content requirements.</p> <p><b>Pre-/Post-Survey and Household Report Card Result Analysis:</b> The implementation contractor provided the evaluation team with the raw data collected from the Household Report Cards issued to THINK! ENERGY® participants. This data provided installation indicators, as well as valuable process evaluation findings.</p> <p><b>Participating Teacher Surveys:</b> The evaluation team administered web-based surveys to 205 teachers of the participating classes in Consumers Energy’s dual-fuel service area and 37 teachers in areas where Consumers Energy delivered a co-branded program with Lansing Board of Water &amp; Light and DTE Energy. The surveys provided broad perspective on the program effectiveness, coordination with classroom curriculum, and ideas for program enhancements. The surveys with teachers in the co-branded area provided additional insight on teacher perceptions of the value of the utility partnering.</p> <p><b>Participating Household Surveys:</b> The 760 (612 from Consumers Energy dual-fuel area and 148 in co-branded areas) respondents surveyed provided key information on installation of measures provided and the influence of the program on behavior practices for participating households. The household survey was conducted approximately two months after the school presentations.</p> <p><b>Persistence Surveys:</b> The evaluation team recruited households that completed the household survey between 2011 and 2013 to participate in a persistence survey, administered to 91 households, several months after the program was administered in the classroom. The purpose of this survey was to determine the persistence of measures and the longer-term behavioral effects the program had on participants.</p> |                 |      |   |      |                             |      |                    |       |                                  |       |
| <b>Consumers Energy Administrative Requirements</b> | <p>Consumers Energy staff were responsible for general administrative oversight of the program, including the following:</p> <ul style="list-style-type: none"> <li>• Program management</li> <li>• Coordination of marketing strategy/public relations among programs and market sectors</li> <li>• Coordination of all educational services</li> <li>• Customer satisfaction</li> <li>• Data warehousing</li> </ul>   |                 |      |   |      |                             |      |                    |       |                                  |       |

## Participation

- Management of key performance metrics and reporting
- Goal achievement within investment

The collaboration with the Lansing Board of Water & Light included 1,334 students and 57 teachers. The collaboration with DTE Energy included 6,576 students and 306 teachers. The totals listed below include all participants in both the base and collaborative THINK! ENERGY® Take Action programs.

| <b>Group</b>             | <b>Kits Distributed with Electric Measures</b> | <b>Kits Distributed with Gas Measures</b> |
|--------------------------|--|---|
| Base Program             | 19,875   | 19,875                                    |
| LBWL Collaboration       | 0  | 1,391                                     |
| DTE Energy Collaboration | 3,397  | 3,485                                     |
| Total                    | 23,272   | 24,752                                    |

## Investment

|          | <b>2013 Actual</b> | <b>2013 Plan</b> |
|----------|--------------------|------------------|
| Electric | \$601,997          | \$601,484        |
| Gas      | \$973,912          | \$974,425        |
| Total    | \$1,575,909        | \$1,575,909      |

## Energy Savings

|     | <b>2013 Actual</b> | <b>2013 Actual w/ LLES Multiplier</b> | <b>2013 Plan</b> |
|-----|--------------------|---------------------------------------|------------------|
| MWh | 2,641              | 2,685                                 | 1,846            |
| MW  | 0.3                | 0.3                                   | 0.2              |
| Mcf | 64,948             | 71,443                                | 31,762           |

## Benefit-Cost Test Results

| <b>Benefit-Cost Test</b> | <b>B/C Ratio</b> |
|--------------------------|------------------|
| Utility Cost Test        | 2.98             |
| Total Resource Cost Test | 2.98             |
| Participant Test         | 12.02            |
| Rate Impact Measure      | 0.50             |

## 5.13 Residential Pilot Programs

|                            |  |
|----------------------------|--|
| <b>Program</b>             | <b>Residential Pilot Programs</b>  |
| <b>Objective</b>           | To identify and learn more about new energy efficient technologies and program strategies with potential to capture additional electric and natural gas energy savings.  |
| <b>Target Market</b>       | Dependent on specific technology/program.  |
| <b>Program Duration</b>    | In 2013, Consumers Energy focused on the development of pilot programs that had the potential to capture significant energy savings. In addition, Consumers Energy tested a program enhancement for its Income Qualified Program.  |
| <b>Program Description</b> | <p>Consumers Energy set aside a portion of the residential budget to pursue new initiatives and technology approaches that could capture additional energy savings within the residential sector. The Company worked with its implementation contractors to validate emerging strategies and applications that would support broader and more effective delivery of energy efficiency services to customers.</p> <p>Following are the emerging opportunities that were tested in 2013.</p> <ul style="list-style-type: none"> <li> <b>Multi-Measure Engagement (Energy Advisor)</b><br/> There is significant research into the barriers that keep customers from achieving deep energy savings in their homes. Many customers will take one or two actions and assume they have done all they can do. Furthermore, the savings related to doing one or two things may be hard to discern, and customers fail to see the value in doing more. This pilot provided customers with an online service to help them understand the savings potential they have and motivated them to pursue additional opportunities. Key components of the service were: <ul style="list-style-type: none"> <li>A survey to determine which behavioral segment customers fit best and a basic assessment of their home</li> <li>Email and website message testing for effective communication to behavioral segments</li> <li>The ability to ask efficiency/programmatic pertinent questions through the “Ask an Advisor” function (response time within 24 hours with a custom tailored response)</li> <li>A list of at least five recommendations to improve a home’s efficiency.</li> <li>Enhanced rebates for completing multiple measures that create deep savings, which included a time-based multiple measure incentive for two or more confirmed measures, and another incentive awarded after five completed and confirmed measures</li> </ul> The pilot was launched in the 4<sup>th</sup> quarter of 2013, and will continue through 2014 </li> <li> <b>Smart (Learning) Thermostats</b><br/> The thermostat technology available today offers an opportunity to engage customers with units that address the performance gap left by inadequate and underutilized programmable thermostats. There is also significant numbers of customers who still use traditional nonprogrammable units. The incremental savings over traditional and underutilized programmable thermostats is potentially significant, and may include long-term behavioral savings and </li> </ul> |

demand response potential. The Smart Thermostats Pilot completed its design and planning phase in 2013.

In 2014, the Smart Thermostat Pilot will offer smart thermostats to customers that further empower them to manage energy consumption. Three thermostat products have been selected based on their features, functions, and varying ease of use. The plan is to equally distribute the products in four Michigan areas including Jackson, Lansing, Kalamazoo, and Muskegon. The majority of candidates will be selected from past Home Energy Analysis participants. Some customers will be sent a thermostat and all associated installation materials. Other installations will be performed by contractors selected from the Consumers Energy network of trade allies.

In 2014, we will attempt to learn what product features appeal the most to different types of customers based on the characteristics of their homes and technical ability, and potential energy savings. Moreover, demand response event opportunities will be communicated to the Muskegon treatment group to identify effective demand response messaging and customer engagement with thermostats in that context.

- **Smart Energy Challenge**

The Smart Energy Challenge was designed to encourage community groups to recruit Consumers Energy customers to participate in a 45-minute in-home energy consultation designed to address energy education, savings, comfort, and behavior change. It was deployed in Muskegon in 2013. These in-home conversations were led by a contracted energy expert. Customers were able to capture the benefits of energy efficiency information and measures that were directly installed during the visit. They also had the opportunity to help their affiliated community group by earning rewards for their group. The reward was provided to each community group that attained a specified participation goal. An important goal of this program was to evaluate the effectiveness of a community-based approach to marketing and achieving energy efficiency. This program introduced and evaluated a variety of nontraditional, community marketing and promotional techniques. Many of these techniques were successful and have provided a viable model to build upon for a second Smart Energy Challenge Pilot deployment 2014.

- **Virtual Smart Energy Challenge**

The Consumers Energy Virtual Smart Energy Challenge Pilot (VSEC) was based on the community-based outreach of the Smart Energy Challenge Pilot. The VSEC was implemented using a multi-pronged approach including a number of community-based marketing concepts in an effort to test the model's virality, impacts of local organizations, effectiveness of credits toward community organization rewards, grassroots impacts, gamification, persistence of energy savings, and cost-effectiveness. Core components of the program included a uniquely branded VSEC website, a customer journey designed to lead customers through energy efficiency, on-the-ground community-based social marketing and events, nonprofit organization engagement, and social and local media.

Customers were able to experience the benefits of energy efficiency information, while helping their affiliated community organization. Based on customer VSEC website engagement and event participation, community organizations

were able to achieve rewards. Progress toward organization goals were communicated by the pilot team and on the website to encourage participation. This pilot introduced and evaluated a variety of nontraditional, community marketing and promotional techniques that will be tested in a second deployment of the pilot in 2014.

- **Demonstration Project (MEEp)**

Preliminary design and user interface mockups of the Mobile Energy Efficiency Pilot (MEEp) were developed in 2013. MEEp is a mobile application and volunteer management system that will enhance outreach event logistics. The app will be used at outreach events in 2014 as a means to guide customers to energy efficiency programs and rebates that are available in their ZIP Code. Customers will enter their ZIP Code and be led through a series of prompts. The app will provide information regarding incentive programs and subsequently send customers an email detailing appropriate energy efficiency program participation. Pilot development will continue into 2014 with pilot deployment anticipated in mid-year.

- **Made in Michigan**

Made in Michigan helped support Michigan's economy and provided customers with incremental incentives on energy efficiency home improvement projects. The program promoted the use of Michigan manufacturers' products (containing materials that are at least 50% Michigan made) and offered additional rebates for the installation of energy efficient products manufactured in Michigan. The program was coupled with the Consumers Energy Home Performance with ENERGY STAR® Program in 2013, with plans to expand the pilot to other program offerings in 2014.

- **Agriculture**

Residential pilot funds were used to support the Business Agricultural Pilot. The funds provided incentives for measures that were installed by residential rate agricultural customers related to their agricultural operation. The measures installed were typically business portfolio measures that are not included in the residential portfolio. These customers also had access to receive incentives for a Tier II United States Department of Agriculture (USDA) Audit that was performed by Michigan State University (MSU) certified agricultural auditors. The pilot ended in 2013 and will be reintroduced as a Specialty Program under the Comprehensive Business Solutions Program in 2014.

- **Habitat for Humanity - Phase Two**

Building on learnings from 2012, Consumers Energy conducted a second phase collaborative that included additional local Habitat for Humanity affiliates. The pilot targeted a modified prescriptive weatherization approach for 29 legacy homes that were constructed prior to 1990 in Saginaw and Oakland counties. The pilot also pursued a strategy to target homes located in Habitat for Humanity-designated neighborhood revitalization areas.

This second phase of the Habitat pilot achieved 1,441 Mcf in gross gas savings while providing practical experience on which to base future customer prescriptive weatherization solutions. A significant pilot finding was related to customer energy education. Customer energy education was deliberately



implemented post-weatherization via a web-based tool called Everyday Actions Save Energy (EASE). The tool's output is a Personal Energy Profile that provides the customer a series of tailored and prioritized energy conservation opportunities. Follow-up customer satisfaction phone surveying conducted two weeks after the administration of the EASE tool documented that customers were still maintaining several pledged conservation recommendations after completing their EASE training.

Although the pilot was completed in 2013, the collaboration established with Habitat for Humanity during the pilot will continue as an element of the Income Qualified Energy Assistance Program.

- **Secondary Education (Youth Energy Advisor)**

In September 2013, EcoWorks (formerly WARM Training Center) collaborated to research, design, and publish a concept study for a high school focused energy efficiency program. The joint research goal was to identify the needs confronting youth in the city of Flint and evaluate if a youth-oriented pilot initiative represented a suitable pilot opportunity for Consumers Energy. EcoWorks recommended a youth energy advisor pilot that merges an in-school apprenticeship program with a summer employment opportunity. This optimal program design would promote energy efficiency behaviors in and out of school, while establishing a new community resource to install energy saving products for utility customers in the greatest need. In addition, the pilot would mentor youth to become proficient in the administration of Everyday Actions Save Energy (EASE) to promote long-term behavior modification for area residents. It also would provide them with summer employment doing neighborhood energy efficiency assessments and outreach. This nontraditional approach to community engagement encourages community residents to appreciate their youth in a new capacity. Based on the concepts study and recommendations from EcoWorks, a pilot will begin deployment in early 2014.

## EM&V Strategy

The following evaluation activities were performed for pilot programs in 2013:

- **Program Staff and Implementation Contractor Interviews:** For various pilot efforts, the evaluation team conducted interviews with key staff to determine pilot objectives, key program activities, and metrics for determining pilot success.
- **Data Collection and Availability Review:** Early in the initiation of pilot efforts, database framework and structures were reviewed to ensure that the necessary information was available to inform pilot metrics.

## Consumers Energy Administrative Requirements

Consumers Energy staff was responsible for general administrative oversight of the pilots, including the following:

- Overall management of new product development process and identifying initiatives
- Management of the implementation contractor
- Coordination of marketing strategy among pilots and market sectors
- Data warehousing
- Management of the evaluation contractor
- Goal achievement within investment



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- Goal achievement within investment

## Investment

|          | 2013 Actual | 2013 Plan   |
|----------|-------------|-------------|
| Electric | \$1,398,767 | \$1,445,342 |
| Gas      | \$1,642,140 | \$1,698,486 |
| Total    | \$3,040,908 | \$3,143,829 |

## Energy Savings

Total deemed energy savings for all residential customer pilots is shown in Table 4-5 on page 13.

## 6 BUSINESS PROGRAMS

### 6.1 Comprehensive Business Program

#### 6.1.1 Comprehensive - Prescriptive Program

| Program             | Prescriptive Program  |
|---------------------|---|
| Objective           | <p>The goal of this program was to generate energy savings for all business customers through promotion of high-efficiency electric and natural gas equipment. There were three primary objectives:</p> <ul style="list-style-type: none"> <li>• To increase the <u>market share</u> of commercial-grade high-efficiency technologies sold through market channels.</li> <li>• To increase the <u>installation rate</u> of high-efficiency technologies in business facilities by businesses that would not have done so in the absence of the program.</li> <li>• To improve <u>operating energy efficiency</u> of existing long-life equipment to ensure peak operating efficiency for business customers.</li> </ul>   |
| Program Duration    | The Prescriptive Business Solutions Program is an ongoing element of the portfolio.   |
| Target Market       | <p>All business customers were eligible to participate in this prescriptive rebate program when they purchased qualifying equipment or services. Generally, the program was designed to offer cross-cutting technologies that addressed a variety of market sectors and industries. Targeted, proactive outreach efforts were utilized to influence specific market sector actors:</p> <ul style="list-style-type: none"> <li>• Trade allies (wholesalers, distributors, contractors, trade allies and retailers that market qualifying technologies)</li> <li>• High-impact/high-need customer sectors (such as schools, municipal buildings, and hospitals)</li> <li>• Medium and large customers</li> </ul>  |
| Program Description | <p>This program was designed to offer incentives to customers who purchased specific high-efficiency measures that would deliver a predetermined level of deemed energy savings based upon the Michigan Energy Measures Database. Prescriptive rebate application forms were completed by customers and trade allies on projects they installed.</p> <p>The program was designed to work through existing market channels to affect the installation of targeted technologies. Regardless of the channel, each offered high-efficiency technology alternatives in addition to their standard equipment offerings.</p> <p>The program encouraged the purchase and installation of high-efficiency technologies through a combination of “push and pull” strategies that stimulated market demand while simultaneously increasing trade ally investment in stocking and promotion in defined market channels.</p> |

Additionally, vendors who serviced and maintained existing high energy use equipment, such as HVAC technologies, were tapped to secure energy savings of operational equipment not ready for retrofit or replacement. These services were offered in the market channel that the respective equipment would be delivered to.

The program significantly increased demand by educating business customers about the energy and money saving benefits associated with the energy efficient products and equipping trade allies to communicate those benefits directly to their customers. To address the first-cost barrier for customers, the program utilized financial incentives (i.e., cash-back, mail-in rebates) typically averaging 20% to 70% of the incremental cost of purchasing qualifying technologies.

The program stimulated trade ally investment in stocking and promoting efficient products through a targeted outreach effort. The program team employed field sales representatives to proactively train and equip trade allies to convey the energy and money saving benefits to customers and communicate equipment eligibility requirements. Further the existence of cash-back incentives elevated efficiency to a competitive issue that naturally motivated trade allies to stock and promote targeted products.

The program also educated business customers on the benefits from tune-up and corrective action to increase the efficiency of existing equipment (e.g., HVAC and compressed air) to improve operational performance. This included items specifically related to boiler tune-ups, failed steam trap repair/replacement, etc. Trade allies educated customers about the importance and benefits of equipment maintenance. Field representatives also proactively trained the service providers on the merits of the activities as well as the incentives offered to perform them.

Both the Prescriptive and Custom Business customers derived many benefits from this program. Customers were provided with a list of about 240 prescriptive measures and unlimited custom measures that they could install which would save them energy. For those measures, customers were eligible to receive financial incentives covering on average 36% of the cost. In addition, customers received free energy assessment of their facilities to determine where they could save energy and what incentives were available for the measures. This was a valuable independent service provided by an unbiased source that wasn't selling any products. Customer's implementation of the projects in 2013 resulted in \$26 million annually in reduced energy costs. This improved the businesses bottom line, making them more competitive within their respective industries.

## Program Logic

Business customers' decisions for capital investments are financially driven and often considered on a first-cost basis. Their focus on project payback related to capital equipment often overlooks long-term operating costs when making choices to replace equipment. Traditionally, energy efficiency equipment is not directly related to the capital investment strategies of business customers. Therefore, it is essential to educate and provide financial incentives to overcome the following barriers to implementing energy efficiency

improvements:

#### Market Barrier

#### Program Element

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Higher first-cost</li> <li>• Lack of time to pursue comprehensive energy analysis</li> <li>• Lack of awareness regarding energy and non-energy benefits</li> </ul> | <ul style="list-style-type: none"> <li>• Financial incentives</li> <li>• Lifecycle/payback information</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Corporate purchasing policies that emphasize first-cost rather than lifecycle cost</li> </ul>  | <ul style="list-style-type: none"> <li>• Case studies, website and other collateral materials, outreach team, field engineers and website</li> <li>• Easy-to-read lists of qualifying products</li> <li>• Deemed savings and incentive levels reducing/eliminating customized calculations</li> <li>• Fast and simple application or direct incentive process at point-of-sale</li> <li>• Implementer working one-on-one with decision makers in targeted sectors</li> </ul> |
| <ul style="list-style-type: none"> <li>• Lack of immediate availability of efficient products</li> </ul>  | <ul style="list-style-type: none"> <li>• Aggressive outreach to trade allies</li> <li>• Increased demand generated by incentives encourages providers to stock qualifying product</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Risk aversion to new technologies</li> </ul>   | <ul style="list-style-type: none"> <li>• Financial incentive strategies to mitigate risk</li> <li>• Education and testimonials</li> </ul>  |

Strategies for increasing attribution through reduced free ridership include:

- Incentive claims submitted within fixed time periods
- Efficiency standards set well above baseline levels
- Incentive amounts sufficiently meaningful to influence purchase decision

#### Incentive Strategy

Cash-back mail-in incentives, which covered on average approximately 36% of the incremental cost to purchase energy efficient products, were offered. Tiered incentive approaches were designed to promote investment in premium-efficiency equipment and multi-measure projects.

## Eligible Measures, Efficiency Requirements, Energy Savings

The program targeted measures where the unit energy savings could be reliably predicted and, therefore, standard per-measure savings (deemed savings) and incentive levels were established. This simplified the application process and reduced administrative costs.

| Description   | Incentive /Unit |
|---|-----------------|
| Window Reduction  | \$0.50          |
| Window Reduction (Gas)  | \$0.50          |
| Strip Curtains (Cooler 40F)   | \$3             |
| Strip Curtains (Freezer 0F)   | \$6             |
| Process Steam Pipe Insulation - Conditioned (Combo)                               | \$2             |
| Boiler Modulating Burner Control 10 to 1 or 5 to 1 turn-down (retrofit)           | \$2,500         |
| Boiler Reset Control  | \$400           |
| High Efficiency Boiler with AFUE $\geq 86\%$ and $< 90\%$                         | \$2             |
| High Efficiency Boiler with AFUE $\geq 90\%$                                      | \$4             |
| Boiler Oxygen Trim Control  | \$1             |
| Boiler Tune-up Level 1 ( $\geq 110$ and $500$ kbtu/h)                             | \$150           |
| Boiler Tune-up Level 2 ( $\geq 500$ and $< 1200$ kbtu/h)                          | \$250           |
| Boiler Tune-up Level 3 ( $\geq 1200$ kbtu/h)                                      | \$350           |
| High Efficiency Process Boiler Replacement (Water)                                | \$2             |
| Process Boilers Tune-up $\geq 1200$ kbtu/h  | \$500           |
| Process Boiler Tune-up Level 5 ( $\geq 500$ and $< 1200$ kbtu/h)                  | \$350           |
| Process Boiler Tune-up Level 4 ( $\geq 300$ and $< 500$ MBH)                      | \$150           |
| Process Steam Pipe Insulation - Unconditioned                                     | \$3             |
| Process Steam Pipe Insulation - Conditioned (Gas)                                 | \$2             |
| Optimized Boiler Plant Sequencing   | \$0.50          |
| Process Steam Pipe Condensate Insulation - Conditioned                            | \$1             |
| Process Steam Pipe Condensate Insulation - Unconditioned                          | \$3             |
| High Efficiency Process Boiler Replacement (Steam)                                | \$2             |
| Linkageless Boiler Controls   | \$1             |
| Modulating Burner Control (GO)  | \$2.5           |
| Water Reset Control Retrofit (GO)   | \$2             |
| Boiler Reset Control  | \$2             |
| Optimized Boiler Plant Sequencing (Process)                                       | \$0.50          |
| Modulating Burner Control (Process)   | \$1             |
| Boiler Oxygen Trim Control (Process)  | \$1             |
| Linkageless Boiler Control (Process)  | \$1             |
| Low Flow Shower Heads $< 1.5$ gpm (Electric)                                      | \$15            |
| Heat Pump Domestic Water Heater - Tank Style ( $\geq 50$ Gallons; EF $\geq 2.0$ ) | \$750           |
| Heat Pump Domestic Water Heater ( $\leq 50$ MBH; COP $\geq 3.0$ )                 | \$1,000         |

|  |         |
|--|---------|
| Heat Pump Domestic Water Heater (> 100 MBH and <= 300 MBH; COP >= 3.0)   | \$6,000 |
| Heat Pump Domestic Water Heater (> 50 MBH and <= 100 MBH; COP >= 3.0)    | \$2,000 |
| Electric Domestic Hot Water - Unconditioned Space (140F)                 | \$2     |
| Electric Domestic Hot Water - Unconditioned Space (120F)                 | \$1     |
| Electric Domestic Hot Water - Conditioned Space (140F)                   | \$1     |
| Electric Domestic Hot Water - Conditioned Space (120F)                   | \$0.50  |
| Pipe Wrap - Domestic Hot Water - conditioned space (120F)                | \$0.50  |
| Natural Gas Domestic Hot Water - Conditioned Space (140F) (GO)           | \$1     |
| Pipe Wrap - Hydronic Space Heating                                       | \$3.50  |
| Gas Water Heater > 80 gal  | \$225   |
| Gas Water Heater <= 80 gal   | \$220   |
| Gas tankless water heater  | \$250   |
| Pre Rinse Sprayers - < 1.6 gpm Gas HW                                    | \$30    |
| Low Flow Shower Heads <1.5 gpm   | \$15    |
| Pipe Wrap - Domestic Hot Water - unconditioned space (140F)              | \$2     |
| Pipe Wrap - Domestic Hot Water - conditioned space (140F)                | \$1     |
| Pipe Wrap - Steam Space Heating  | \$6     |
| High Eff Domestic Water Heater (84% to 89%)                              | \$4     |
| High Eff Domestic Water Heater (90%)                                     | \$6     |
| Domestic Water Heater Tune-Up (199 - 499 MBH)                            | \$100   |
| Domestic Water Heater Tune-Up (500 - 1,199 MBH)                          | \$250   |
| Domestic Water Heater Tune-Up (>= 1200 MBH)                              | \$350   |
| High-Efficiency Domestic Boiler (84% to 89%)                             | \$4     |
| High-Efficiency Domestic Boiler (90%)                                    | \$6     |
| Pipe Wrap - Domestic Hot Water - unconditioned space (120F)              | \$1     |
| Gas Water Heater <= 80 gal   | \$85    |
| Natural Gas Domestic Hot Water - Conditioned Space (120F) (GO)           | \$0.50  |
| CFL Screw in (30 watts or less)  | \$2     |
| CFL Speciality (down-light, 3-way, dimmable)                             | \$8     |
| Compact Fluorescents: Screw-in, 31-115 W                                 | \$5     |
| Compact Fluorescents: Fixture  | \$22    |
| Air-cooled Chiller - 1.04 kW/ton IPLV                                    | \$30    |
| Water Cooled Chiller - Screw, Scroll, or Helical-Rotary - 150 - 300 Tons | \$30    |
| Water Cooled Chiller - Screw, Scroll, or Helical-Rotary - > 300 Tons     | \$30    |
| Water Cooled Chiller - Reciprocating < 75 Tons                           | \$30    |
| Water Cooled Chillers- Scroll or Helical-Rotary <75 tons, IPLV = 0.57    | \$30    |

|   |        |
|---|--------|
| Water Cooled Chillers- Scroll or Helical-Rotary > 75tons and <= 150tons, IPLV =0.55 | \$30   |
| Water Cooled Chillers- Centrifugal <300 tons, IPLV = 0.54                           | \$30   |
| Water Cooled Chillers- Centrifugal >300 tons and <= 600 tons, IPLV = 0.49           | \$30   |
| Water-Cooled Chillers- Centrifugal >600 tons, IPLV =0.49                            | \$30   |
| Water-Cooled Chillers- Reciprocating >75 tons and <=150 tons IPLV = 0.55            | \$30   |
| Water-Cooled Chillers- Reciprocating >150 tons and <=300 tons, IPLV = 0.52          | \$30   |
| Water-Cooled Chillers >300 tons, IPLV = 0.49  | \$30   |
| Air and Water-Cooled Chiller Tune-up  | \$350  |
| Electric Dryer, Electric Water Heat   | \$50   |
| High Efficiency Clothes Washer (Gas Water Heat, Electric Dryer)                     | \$50   |
| High Efficiency Clothes Washer (Gas Water Heat, Gas Dryer)                          | \$50   |
| Gas Dryer, Electric Water Heat - Combination Customer                               | \$50   |
| VSD Air Compressor  | \$100  |
| Refrigerated Cycling Thermal Mass Air Dryer   | \$1    |
| Added Compressed Air Storage Tanks  | \$1.50 |
| Low-Pressure Drop Air Filter  | \$0.80 |
| Zero Loss Condensate Drain  | \$50   |
| Compressed Air Energy Audit   | \$0    |
| Air Compressor Outdoor Air Intake   | \$4    |
| Compressed Air Pressure Flow Controller   | \$10   |
| Correct Sizing Compressed Air System  | \$50   |
| Refrigerated Cycling - Digital Scroll   | \$1.50 |
| Refrigerated Cycling - Variable Speed   | \$2    |
| Compressed Air Engineered Nozzle (1,000 hours)                                      | \$75   |
| Air Compressor Waste Heat Recovery  | \$35   |
| Demand Control Ventilation - Combination Customers                                  | \$0.04 |
| Demand Control Ventilation - Electric Customers                                     | \$0.04 |
| Demand Control Ventilation  | \$0.02 |
| EMS - Combination Customers   | \$0.40 |
| EMS (Electric Cooling)- Electric Customers  | \$0.13 |
| EMS (Gas Heating)- Gas Customers  | \$0.27 |
| Enthalpy Wheels ERUs  | \$0.75 |
| Fixed-Plate Air to Air ERUs   | \$0.50 |
| Process Heating Ventilation Reduction   | \$1.50 |
| Laboratory Fume-Hood Ventillation   | \$2    |
| Boiler Stack Economizer (80F) - Process   | \$1.20 |
| Laboratory Fume-Hood Ventillation Reduction (EO)                                    | \$2    |
| Boiler Stack Economizer (80F)   | \$0.80 |
| Boiler Stack Economizer (120F)  | \$1.20 |

|  |         |
|--|---------|
| Boiler Stack Economizer (200F)   | \$1.50  |
| Boiler Stack Economizer (200F) – Process                                   | \$2     |
| Boiler Stack Economizer (120F) - Process                                   | \$1.50  |
| Process Heating Ventillation Reduction (GO)                                | \$1.50  |
| Laboratory Fume-Hood Ventillation Reduction (GO)                           | \$2     |
| Enthalpy Wheel Energy Recovery Unit (GO)                                   | \$0.75  |
| LED, T-1, or Electroluminescent Exit Signs                                 | \$12.50 |
| Infrared Heaters - Combination Customers                                   | \$10    |
| Programmable Thermostat - Electric Customer                                | \$0.05  |
| High Efficiency Furnace/Rooftop, <= 200 kBtuh                              | \$1,050 |
| High Efficiency Furnace/Rooftop, > 200 kBtuh                               | \$6     |
| Infrared Heaters - Gas Customer Only                                       | \$8     |
| Gas Furnace or RTU Tune-up (>=40 and <300 MBH)                             | \$50    |
| Gas Furnace or RTU Tune-up (>=300 MBH)                                     | \$125   |
| High Efficiency Furnace or Unit Heater (92-94% AFUE)                       | \$3     |
| High Efficiency Furnace or Unit Heater (>94% AFUE)                         | \$4     |
| 4-foot Standard T8 to Reduced Wattage T8 (lamp only)                       | \$0.75  |
| High Performance or Reduced Wattage T8: HP 4-foot lamp and ballast upgrade | \$5     |
| Programmable Thermostat - Combination Customers                            | \$0.05  |
| Guestroom Energy Management Control - Combination Customer                 | \$80    |
| Air Side Economizer (Combo)  | \$15    |
| Critical Zone Supply Air Reset Control (Combo)                             | \$20    |
| Hydronic HVAC Pump (Combo)   | \$0.04  |
| Chilled Water Reset Retrofit (10 degrees)                                  | \$1.50  |
| Optimal Start/Stop on Air Handling Units (Combo)                           | \$0.05  |
| Occupancy Sensor Controls on HVAC Units (Combo)                            | \$0.10  |
| Chilled Water Reset Retrofit (5 degrees)                                   | \$1     |
| Critical Zone Supply Air Reset Control                                     | \$20    |
| Air Side Economizer  | \$15    |
| Hydronic HVAC Pump   | \$0.04  |
| Occupancy Sensor Controls on HVAC Units (Electric)                         | \$0.05  |
| Chilled Water Reset Retrofit (10 degrees) - Electric                       | \$1.50  |
| Chilled Water Reset Retrofit (5 degrees) - Electric                        | \$1     |
| Optimal Start/Stop on Air Handling Units (EO)                              | \$0.05  |
| Occupancy Sensor for Toilet Room Exhaust Retrofit (EO)                     | \$50    |
| Critical Zone Supply Air Reset Control (EO)                                | \$20    |
| Programmable Thermostat -- Gas Customers                                   | \$0.05  |
| Guestroom Energy Management Control - Gas Customer                         | \$80    |
| Optimal Start/Stop on Air Handling Units (Gas)                             | \$0.05  |
| Occupancy Sensor Controls on HVAC Units (Gas)                              | \$0.05  |
| Critical Zone Supply Air Reset Control (Gas)                               | \$20    |



|  |        |
|--|--------|
| Occupancy Sensor for Toilet Room Exhaust Retrofit (GO)               | \$50   |
| Critical Zone Supply Air Reset Control (GO)                          | \$20   |
| Ground Source Heat Pump EER =17 replacing a GSHP                     | \$30   |
| Heat Pumps <= 65,000 Btuh (5.4 tons)                                 | \$30   |
| Heat Pumps > 65,000 Btuh (5.4 tons) and <= 120,000 Btuh (10 tons)    | \$40   |
| Heat Pumps > 120,000 Btuh (10 tons) and <= 240,000 Btuh (20 tons)    | \$40   |
| Heat Pumps > 240,000 Btuh (20 tons) and <= 760,000 Btuh 63 tons)     | \$30   |
| Heat Pumps >760,000 Btuh (63 tons)                                   | \$30   |
| Destratification Fans  | \$0.20 |
| Energy Efficient Ice Machines less than 500 lbs                      | \$200  |
| Energy Efficient Ice Machines 500-1000 lbs                           | \$400  |
| Energy Efficient Ice Machines 1000-1500 lbs                          | \$700  |
| Reach-In Refrigerated Case Door; Medium Temp - Combination Customers | \$45   |
| Reach-In Refrigerated Case Door; Low Temp - Combination Customer     | \$100  |
| Temperature and Optical Sensor on Exhaust - Combo                    | \$0.50 |
| Combo Dishwasher (Low Temp; Door)                                    | \$225  |
| Combo Dishwasher (Low Temp; Under Counter)                           | \$200  |
| Combo Dishwasher (Low Temp; Multi Tank)                              | \$400  |
| Combo Dishwasher (High Temp; Under Counter)                          | \$100  |
| Combo Dishwasher (High Temp; Single Tank)                            | \$350  |
| Combo Dishwasher (High Temp; Multi Tank)                             | \$450  |
| Combo Dishwasher (High Temp; Door)                                   | \$250  |
| Combo Dishwasher (Low Temp; Single Tank)                             | \$250  |
| Pre Rinse Sprayers - < 1.6 gpm - Electric Customer Elec HW           | \$30   |
| Night Covers   | \$6    |
| AntiSweat Heater Controls  | \$80   |
| LED Lighting for Refrigeration Cases                                 | \$10   |
| Walk-in EC Motor replacing SP Motor                                  | \$70   |
| Walk-in EC Motor replacing PSC Motor                                 | \$70   |
| Case EC Motor  | \$50   |
| LED Lighting Occupancy Sensor for Refridgeration Cases               | \$15   |
| A/C Reduction From Lighting Reduction (-20F to 0F)                   | \$0.18 |
| A/C Reduction From Lighting Reduction (0F to 20F)                    | \$0.13 |
| A/C Reduction From Lighting Reduction (20F to 40F)                   | \$0.08 |
| Evaporator Fan Control (non EC motor)                                | \$40   |
| Evaporator Fan Control (EC motor)                                    | \$20   |
| Reach-In Refrigerated Case Door; Medium Temp - Electric Customers    | \$60   |
| Electric Dishwasher (High Temp; Under Counter)                       | \$100  |

|  |         |
|--|---------|
| Reach-In Refrigerated Case Door; Low Temp - Electric Customers | \$120   |
| Night Covers (Combo)   | \$6     |
| EnergyStar Steam Cookers - 3 Pan; Electric                     | \$1,000 |
| Electric Dishwasher (High Temp; Door)                          | \$400   |
| Electric Dishwasher (Low Temp; Multi Tank)                     | \$600   |
| Electric Dishwasher (High Temp; Multi Tank)                    | \$750   |
| Electric Dishwasher (Low Temp; Single Tank)                    | \$250   |
| Electric Dishwasher (High Temp; Single Tank)                   | \$500   |
| Electric Dishwasher (Low Temp; Under Counter)                  | \$250   |
| Electric Dishwasher (Low Temp; Door)                           | \$300   |
| EnergyStar Steam Cookers - 6 Pan; Electric                     | \$1,750 |
| EnergyStar Steam Cookers - 4 Pan; Electric                     | \$1200  |
| Evaporator Fan Control (PSC motor)                             | \$60    |
| EnergyStar Steam Cookers - 5 Pan; Electric                     | \$1,500 |
| Evaporator Fan Control (SP motor)                              | \$60    |
| Floating Suction Pressure Control                              | \$80    |
| Walk-in EC Motor replacing non-EC Motor                        | \$70    |
| Commercial Conveyor Oven (<=25" Conveyor Width)                | \$400   |
| Commercial Conveyor Oven (>25" Conveyor Width)                 | \$500   |
| Flexible Batch Broilers  | \$550   |
| Temperature and Optical Sensor on Exhaust - Gas                | \$0.50  |
| Gas Dishwasher (Low Temp; Door)                                | \$125   |
| Gas Dishwasher (Low Temp; Under Counter)                       | \$100   |
| Gas Dishwasher (Low Temp; Multi Tank)                          | \$200   |
| Gas Dishwasher (High Temp; Under Counter)                      | \$50    |
| Gas Dishwasher (High Temp; Multi Tank)                         | \$300   |
| Gas Dishwasher (High Temp; Door)                               | \$100   |
| EnergyStar Steam Cookers - 6 Pan; Gas                          | \$1,750 |
| EnergyStar Steam Cookers - 5 Pan; Gas                          | \$1,750 |
| Gas Dishwasher (High Temp; Single Tank)                        | \$250   |
| Gas Dishwasher (Low Temp; Single Tank)                         | \$150   |
| Fixed-Plate Energy Recovery Unit (GO)                          | \$0.50  |
| LED Replacing Incandescent Candelabra and Globe                | \$5     |
| LED Replacing Incandescent BR-Series                           | \$15    |
| 4-ft T12 to LED Tube Lights                                    | \$5     |
| LED or Induction fixture replacing 175W HID (Exterior)         | \$45    |
| LED or Induction fixture replacing 176W to 250W HID (Exterior) | \$65    |
| LED or Induction fixture replacing 251W to 400W HID (Exterior) | \$120   |
| LED or Induction fixture replacing 175W HID (Garage)           | \$100   |
| LED or Induction fixture replacing 176W to 250W HID (Garage)   | \$150   |
| LED or Induction fixture replacing 251W to 400W HID (Garage)   | \$180   |
| LED Downlight Fixture Replacing Incandescent Lights            | \$22    |

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|--|---|--------|
|  | LED Lamps replacing incandescent lights                                     | \$10   |
|  | LED Replacing A19   | \$15   |
|  | LED MR16 Replacing Halogen MR16   | \$7    |
|  | LED Par Replacing Halogen Par   | \$15   |
|  | Lamp Removal: Remove 2-foot T12 fluorescent lamp (with T8 ballast retrofit) | \$4    |
|  | Lamp Removal: Remove 3-foot T12 fluorescent lamp (with T8 ballast retrofit) | \$4    |
|  | Lamp Removal: Remove 4-foot T12 fluorescent lamp (with T8 ballast retrofit) | \$5    |
|  | Lamp Removal: Remove 8-foot T12 fluorescent lamp (with T8 ballast retrofit) | \$10   |
|  | Lighting Occupancy Sensors  | \$0.08 |
|  | Central Lighting Control  | \$0.06 |
|  | Switching Controls for Multilevel Lighting                                  | \$0.06 |
|  | Daylight Sensor controls  | \$0.09 |
|  | Controls: Exterior Lighting BiLevel Control w Override, 150 to 1000 HID     | \$100  |
|  | Exterior Multi-Step Dimming Occ Sensor                                      | \$0.09 |
|  | Parking Garage Multi-Step Dimming Occ Sensor                                | \$0.09 |
|  | Probe Start to Pulse Start Lighting(Lamp and Ballast Retrofit)              | \$0.30 |
|  | Interior LED/Induction Lighting   | \$0.35 |
|  | Probe Start to Pulse Start Lighting   | \$0.10 |
|  | CFL Replacing MH  | \$0.15 |
|  | Exterior Linear Fluorescent Lighting Retrofit                               | \$0.35 |
|  | Parking Garage LED/Induction Lighting Retrofit                              | \$0.60 |
|  | Neon to LED Sign Lighting Retrofit (Continuous Operation)                   | \$0.50 |
|  | Interior LED Lighting Retrofit  | \$0.40 |
|  | Exterior LED/Induction Lighting Retrofit                                    | \$0.40 |
|  | Neon to LED Sign Lighting Retrofit (Commercial Hours)                       | \$0.25 |
|  | Beverage Vending Machine Controller   | \$65   |
|  | Guestroom Energy Management Control (electric heat)                         | \$80   |
|  | Snack Vending Machine Miser   | \$40   |
|  | Drinking Water Cooling Miser  | \$50   |
|  | Roof Insulation - Attic Roof (Combo)  | \$0.30 |
|  | Roof Insulation - Flat Roof (Combo)   | \$0.40 |
|  | BOC (Combo Customer)  | \$900  |
|  | Wall Insulation - Combination Customer                                      | \$1    |
|  | Compressed Air Engineered Nozzle  | \$100  |
|  | Intelligent Surge Protector   | \$14   |
|  | Barrel Wraps - Injection Molding and Extruders                              | \$2    |
|  | Network Power Management Software   | \$12   |

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|--|--|---------|
|  | Lighting Power Density   | \$0.35  |
|  | UPS - Multiple Normal Mode - VFI/VFD (P > 1.5 kW and P <= 10 kW) | \$6.50  |
|  | UPS - Multiple Normal Mode - VFI/VFD (P > 10 kW)                 | \$7.50  |
|  | UPS - Multiple Normal Mode - VI/VFD (P > 1.5 kW and P <= 10 kW)  | \$5.50  |
|  | UPS - Multiple Normal Mode - VI/VFD (P > 10 kW)                  | \$4     |
|  | UPS - Single Normal Mode - VFD (P <= 1.5 kW)                     | \$4.50  |
|  | UPS - Single Normal Mode - VFD (P > 1.5 kW and P <= 10 kW)       | \$4.50  |
|  | UPS - Single Normal Mode - VFD (P > 10 kW)                       | \$3     |
|  | UPS - Single Normal Mode - VFI (P <= 1.5 kW)                     | \$12.50 |
|  | UPS - Single Normal Mode - VFI (P > 1.5 kW and P <= 10 kW)       | \$5     |
|  | UPS - Single Normal Mode - VFI (P > 10 kW)                       | \$7     |
|  | UPS - Single Normal Mode - VI (P <= 1.5 kW)                      | \$7.25  |
|  | UPS - Single Normal Mode - VI (P > 1.5 kW and P <= 10 kW)        | \$4.75  |
|  | UPS - Single Normal Mode - VI (P > 10 kW)                        | \$5     |
|  | Battery Charger - Continuous                                     | \$350   |
|  | Battery Charger - 1 Shift/Day                                    | \$125   |
|  | Battery Charger - 2 Shift/Day                                    | \$250   |
|  | NEMA Premium Transformers - 3 Phase - 30 kVA                     | \$120   |
|  | Lighting Power Density (Exterior)                                | \$0.40  |
|  | NEMA Premium Transformers - Single Phase - 75 kVA                | \$225   |
|  | NEMA Premium Transformers - Single Phase - 50 kVA                | \$150   |
|  | NEMA Premium Transformers - Single Phase - 37.5 kVA              | \$150   |
|  | NEMA Premium Transformers - Single Phase - 333 kVA               | \$670   |
|  | NEMA Premium Transformers - Single Phase - 260 kVA               | \$500   |
|  | NEMA Premium Transformers - Single Phase - 25 kVA                | \$100   |
|  | NEMA Premium Transformers - Single Phase - 167 kVA               | \$340   |
|  | NEMA Premium Transformers - Single Phase - 15 kVA                | \$60    |
|  | NEMA Premium Transformers - Single Phase - 100 kVA               | \$300   |
|  | NEMA Premium Transformers - 3 Phase - 750 kVA                    | \$750   |
|  | NEMA Premium Transformers - 3 Phase - 75 kVA                     | \$220   |
|  | NEMA Premium Transformers - 3 Phase - 500 kVA                    | \$550   |
|  | NEMA Premium Transformers - 3 Phase - 300 kVA                    | \$500   |
|  | Lighting Power Density (Parking Garage)                          | \$0.60  |
|  | NEMA Premium Transformers - 3 Phase - 225 kVA                    | \$450   |
|  | NEMA Premium Transformers - 3 Phase - 150 kVA                    | \$300   |
|  | NEMA Premium Transformers - 3 Phase - 15 kVA                     | \$60    |
|  | NEMA Premium Transformers - 3 Phase - 112.5 kVA                  | \$240   |
|  | NEMA Premium Transformers - 3 Phase - 1000 kVA                   | \$1,000 |
|  | NEMA Premium Transformers - 3 Phase - 45 kVA                     | \$135   |
|  | Ozone Generation System  | \$40    |
|  | Truck Loading Dock Seals   | \$350   |

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|--|---|--------|
|  | Truck Loading Dock Leveler Ramp Seals                                       | \$175  |
|  | Greenhouse Heat Curtains  | \$0.25 |
|  | Greenhouse Infrared Film  | \$0.10 |
|  | Wall Insulation - Gas Customer  | \$1    |
|  | Roof Insulation - Flat Roof   | \$0.40 |
|  | Roof Insulation - Attic Roof  | \$0.30 |
|  | Destratification Fans (GO)  | \$0.20 |
|  | Room Air Conditioner - ENERGY-STAR  | \$30   |
|  | Package Terminal AC - AC $\geq$ 10% EER higher than IECC 2006 standard      | \$30   |
|  | Package Terminal AC-Heat Pump $\geq$ 10% EER higher than IECC 2006 standard | \$30   |
|  | Ductless Heat Pump  | \$30   |
|  | Ductless Air Conditioning   | \$30   |
|  | Leaking Steam Trap Repair or Replacement -- Special Incentive               | \$140  |
|  | High Efficiency Pool Heater .84+ EF   | \$3    |
|  | Pool Covers   | \$0.50 |
|  | 8-foot T12 to Two (2) 4-ft HP/RW T8   | \$5    |
|  | T12 to Standard T8: 2-foot lamp and ballast upgrade                         | \$3    |
|  | T12 to Standard T8: 3-foot lamp and ballast upgrade                         | \$3    |
|  | T12 to Standard T8: 4-foot lamp and ballast upgrade                         | \$4    |
|  | T12 to Standard T8: 8-foot lamp and ballast upgrade                         | \$5    |
|  | 8-FT T12 to 2 4-FT T8 (with ballast)  | \$5    |
|  | 8-FT T12HO to 2 4-FT T8HP   | \$10   |
|  | New T8/T5 Fixture (Includes HID to Fluorescent conversions)                 | \$0.30 |
|  | LED Traffic Signal  | \$25   |
|  | LED Pedestrian Signal   | \$25   |
|  | Occ Sensor For Toilet Rm Exhaust  | \$50   |
|  | AC < 65,000 Btuh (5.4 tons)   | \$30   |
|  | AC > 240,000 Btuh (20 tons) & $\leq$ 760,000 Btuh (63.3 tons)               | \$30   |
|  | AC > 760,000 Btuh (63.3 tons)   | \$30   |
|  | AC Units > 65,000 Btuh (5.4 tons) and $\leq$ 120,000 Btuh (10 tons)         | \$40   |
|  | AC Units > 120,000 Btuh (10 tons) and $\leq$ 240,000 Btuh (20 tons)         | \$40   |
|  | Constant Volume AHU to Hydronic Heat Pump Loop (Combo)                      | \$0.70 |
|  | Constant Volume AHU to VAV with Hydronic Reheat (Combo)                     | \$0.90 |
|  | Constant Volume AHU to VAV AHU (Combo)                                      | \$0.40 |
|  | Constant Volume Hot-Deck/Cold Deck AHU to VAV AHU (Combo)                   | \$0.30 |
|  | VFD for Process Pumping, $\leq$ 50 HP                                       | \$60   |
|  | VFD/HVAC Fans and Pumps < 100HP - Electric Customers                        | \$60   |
|  | VFD/HVAC Fans and Pumps $\geq$ 100HP - Electric Customers                   | \$40   |
|  | VFD/Chiller Motors - Electric Customers                                     | \$40   |
|  | Constant Volume AHU to VAV AHU (Electric)                                   | \$0.27 |

|                         |   |        |
|-------------------------|---|--------|
|                         | Constant Volume Hot-Deck/Cold Deck AHU to VAV AHU (Electric)  | \$0.20 |
|                         | VFD/HVAC Fans and Pumps >= 100HP - Electric Customers   | \$40   |
|                         | EC Motors   | \$70   |
|                         | VFD on Process Fans (< 50 HP)   | \$50   |
|                         | Constant Volume AHU to Hydronic Heat Pump Loop (Electric)   | \$0.45 |
|                         | Constant Volume AHU to VAV with Hydronic Reheat (Electric)  | \$0.45 |
|                         | VFD on HVAC Fans (< 100 HP)   | \$60   |
|                         | VFD on HVAC Fans (100HP - 250HP)  | \$40   |
|                         | VFD on HVAC Pumps (< 100 HP)  | \$60   |
|                         | VFD on HVAC Pumps (100HP - 250HP)   | \$40   |
|                         | Constant Volume AHU to Hydronic Heat Pump Loop (Gas)  | \$0.25 |
|                         | Constant Volume AHU to VAV with Hydronic Reheat (Gas)   | \$0.45 |
|                         | Constant Volume AHU to VAV AHU (Gas)  | \$0.13 |
|                         | Constant Volume Hot-Deck/Cold Deck AHU to VAV AHU (Gas)   | \$0.10 |
|                         |   |        |
| Implementation Strategy | Key elements of the implementation strategy included:   |        |
|                         | <p><b>Outreach to Trade Allies.</b> Field representatives informed and recruited participation by trade allies. Outreach focused more on bolstering relationships with existing and new trade allies alike in 2013, as well as developing new contractors into high-performance contributors to the program. Additionally, the team worked to engage the state's major electrical distributors to drive the program through their contractors. The group of trade ally energy advisors conducted more than 1,800 visits with roughly 600 different contractors throughout the 2013 program year.</p>  |        |
|                         | <p><b>Outreach to Targeted Customers.</b> Consumers Energy corporate account managers (CAMs) and program outreach personnel focused on providing high-quality service to high-profile end users, primarily the larger energy users across the service territory. This strategy included several market-segmented initiatives to address customers by similar operational profiles, including schools, industrial, and healthcare. The program team and CAMs assisted business customers in determining whether the prescriptive incentives, custom approach, or a combination of both programs would be most appropriate for their operations. The program team also assisted customers, as necessary, to complete rebate application requirements.</p> |        |
|                         | <p><b>Program Operations.</b> The implementation contractor handled program-specific administrative requirements including the following:</p> <ul style="list-style-type: none"> <li>• Marketing strategy and materials (joint coordination with Consumers Energy)</li> <li>• Trade ally outreach, recruitment and training</li> <li>• Trade ally relations and problem resolution</li> <li>• Product eligibility knowledge and communication</li> <li>• Utility reporting (progress to goals, customer issues/resolution, trade ally outreach, issues, etc.)</li> <li>• Data warehousing and tracking</li> </ul>   |        |

## Marketing Strategy

- Processing prescriptive applications
- Customer relations (inquiries, complaint resolution, etc.)

**Engage Trade Allies.** Outreach and training were offered to a targeted group of trade allies who had business motivations for promoting prescriptive incentives to their customers. They were equipped with marketing and promotional materials (e.g., measure fact sheets, case studies) and training on program terms and conditions. Marketing activities included:

- Training and open house events
- Email newsletters
- Bonus program for trade allies
- Promotional materials

**Directly Market to Targeted Customers.** Marketing strategy was primarily focused on positively impacting customer awareness of the energy efficiency programs. Therefore the marketing team launched numerous high-visibility campaigns with a vibrant media presence to deliver effective messaging to all customers in Consumers Energy's service territory.

The following sections outline the campaigns that were implemented throughout the year and contributed to this success. These marketing activities included:

- Radio ads
- Targeted advertising in trade and business publications
- Web banner ads targeted in Consumers Energy's service territory
- Aggressive marketing outreach to trade and business associations to recruit their assistance in distributing information about programs through existing communication channels
- Billboard advertising throughout Consumers Energy's service territory
- Service vehicles with program information
- Stadium Advertising Campaign

**Provide Complete Website Presence.** The program was outlined in detail on the Consumers Energy website. Customers and trade allies were able to review qualifying measures and download incentive applications and important program documents. Customers could also view a list of trade allies by territory served.

## Milestones

| Major Milestone                              | Date    |
|--|---------|
| Formal 2013 program launched to trade allies | 11/2012 |
| Began accepting 2013 applications            | 12/2012 |
| 2013 Program closed                          | 11/2013 |
| All final applications approved for payment  | 12/2013 |



## EM&V Strategy

The following evaluation activities were performed for the 2013 Comprehensive Business Solutions Program. Evaluations for the Comprehensive Business Solutions and Custom Business Solutions Programs have been combined so the summary below includes both programs.

**Trade Ally Interviews:** The evaluation team conducted two web surveys with 79 trade allies involved with the Business Solutions Program. The objectives of the surveys were to determine satisfaction with 2012 program operations, document experiences with program participation, and collect regular feedback on program developments.

**Customer Surveys:** Between September and November 2013, the evaluation team completed telephone surveys with 150 participants who completed energy efficiency projects through the Business Solutions Program between the dates of October 1, 2012, and June 30, 2013. Data were collected from 137 customers with prescriptive measures and 13 customers' with custom projects. The objectives of the surveys were to estimate net-to-gross ratios and assess participant satisfaction with program participation.

**Customer Web Surveys:** In 2013, the evaluation team completed Web surveys with 36 participants of the Business Solutions Program. The objectives of the surveys were to explore customers' awareness of and satisfaction with energy efficiency programs and Consumers Energy.

**On-Site Surveys:** From November 2013 through February 2014, the evaluation team conducted on-site surveys with 152 participants from the 2013 Business Solutions Program (132 Prescriptive and 20 Custom participants), including a sub-sample of phone survey participants. The objectives of the surveys were to verify accuracy of self-reported data (including telephone survey respondents' reported spillover savings), confirm measure installation and operation, and collect metered usage and/or facility data for further assessment of equipment performance.

## Consumers Energy Administrative Requirements

Consumers Energy staff were responsible for general administrative oversight of the program portfolio, including:

- Management of the implementation contractor
- Coordination of marketing strategy/public relations among programs and market sectors
- Development and placement of marketing materials and advertising
- Coordination of all educational services
- Data warehousing
- Management of the evaluation contractor
- Goal achievement within investment
- Coordination with other programs



## Participation

| Measure Category               | Number of Installed Projects |
|--------------------------------|------------------------------|
| Building Envelope              | 82                           |
| Boilers and Boiler Controls    | 608                          |
| C&I Water Heating              | 134                          |
| CFL                            | 114                          |
| Chiller                        | 112                          |
| Compressed Air                 | 101                          |
| Custom                         | 148                          |
| DCV and Economizers            | 83                           |
| Energy Management Systems      | 112                          |
| Energy Recovery                | 18                           |
| Exit Signs                     | 140                          |
| Furnaces and Heaters           | 359                          |
| Heat Pump                      | 3                            |
| Heating                        | 1                            |
| HP or RW Fluorescent           | 605                          |
| HVAC Controls                  | 118                          |
| Ice Machines                   | 14                           |
| Kitchen and Refrigeration      | 623                          |
| Lamp Removal                   | 134                          |
| LED or Induction Fixtures      | 841                          |
| Lighting Controls              | 351                          |
| Lighting Retrofit Fixtures     | 1006                         |
| Occupancy Sensors and Controls | 10                           |
| Other                          | 114                          |
| Room AC/PTAC                   | 17                           |
| Steam Traps                    | 31                           |
| Swimming Pool                  | 7                            |
| T8 Fluorescent                 | 270                          |
| T8/T5 Fixture                  | 706                          |
| Unitary/Split HVAC             | 119                          |
| Variable Frequency Drives      | 296                          |
| Whole Building                 | 5                            |

## Investment

|          | 2013 Actual  | 2013 Plan    |
|----------|--------------|--------------|
| Electric | \$21,534,553 | \$23,695,126 |
| Gas      | \$8,630,429  | \$8,960,995  |
| Total    | \$30,164,982 | \$32,656,120 |

Includes total investment from Custom Business Solutions Program.

## Savings Targets

|     | 2013 Actual | 2013 Actual<br>w/ LLES<br>Multiplier | 2013 Plan |
|-----|-------------|--------------------------------------|-----------|
| MWh | 154,270     | 166,076                              | 210,142   |
| MW  | 23.9        | 25.6                                 | 37.6      |
| Mcf | 702,517     | 749,590                              | 728,132   |

Includes total energy savings from Custom Business Solutions Program.

## Benefit-Cost Test Results

| Benefit-Cost Test        | B/C Ratio |
|--------------------------|-----------|
| Utility Cost Test        | 4.29      |
| Total Resource Cost Test | 1.54      |
| Participant Test         | 3.62      |
| Rate Impact Measure      | 0.49      |

Benefit-Cost test results include Custom Business Solutions Program.

## 6.1.2 Comprehensive – Custom Program

| Program                    | Custom Business Solutions   |
|----------------------------|---|
| <b>Objective</b>           | <p>Influence business customers to select and install high-efficiency measures, such as process improvements or projects involving multiple technologies, which are not addressed through the Prescriptive Business Solutions Program when considering equipment retrofits or other energy-saving improvements.</p>   |
| <b>Target Market</b>       | <p>Emphasis was placed on targeting large customers (electric demand &gt;300kW or gas usage &gt;10,000 Mcf) whose operations could most benefit from a custom approach to installing measures not covered by the Comprehensive Prescriptive Business Solutions Program incentives. In 2013, large manufacturing, hospitals, the food industry and municipalities were targeted. The program also focused on new technologies.</p>   |
| <b>Program Duration</b>    | <p>The Custom Business Solutions Program is an ongoing element of the portfolio.</p>  |
| <b>Program Description</b> | <p>The program helped customers and trade allies identify complex energy-savings projects, analyze the economics of each project, and complete the incentive application. The program affected the purchase and installation of efficient technologies or implementation of process improvements. It achieved this by working directly with key end-use customers and trade allies.</p> <p>The program team, including the implementation contractor, worked with customers and trade allies on prospective projects to help complete custom engineering calculations that assessed the energy-savings potential, payback horizon, project eligibility (see measure characterization below), and incentive amounts. If projects qualified, customers were issued an approval letter accepting the project and asking the customer to complete the application form. Upon receipt of the application by Consumers Energy, the customer was provided 90 days to complete the project to qualify for reimbursement. If special circumstances and project lead times affected the ability to complete a project within the time frame, extensions were granted.</p> <p>Customers unable to complete a project, either within the original project time frame or with an extension, could reapply at a future date. The program team approved projects, referencing the original project scope, depending on investment availability within the program year. This protocol minimized commitment of program incentives on projects not moving toward completion. Once projects were completed, the program team assisted the customer in finalizing the rebate application. The program team ensured that all relevant documentation supporting recommended high-efficiency equipment was provided and processed incentive claims for payment. Large projects were required to undergo pre- and post-inspection visits to verify equipment installation and operation.</p> <p>As needed, expanded technical support was offered to help customers evaluate</p> |

|  | comprehensive energy efficiency opportunities and increase participation. Such services included: <ul style="list-style-type: none"> <li>• Walk-through energy assessments to help identify energy-saving measures</li> <li>• Assistance in specifying projects</li> </ul>  |                       |                        |  |  |  |  |  |  |  |   |
|--|---|-----------------------|------------------------|--|--|--|--|--|--|--|---|
| <b>Program Logic</b>   | <p>Large business customers typically have more complex mechanical equipment supporting facility operations and manufacturing processes. As a result, many barriers prevent projects from being implemented. The program was designed to help motivate and assist customers in taking the necessary steps from conceptual project to completed project.</p> <p>Following is a list of the primary barriers in this market and the program elements that addressed them:</p> <table> <tr> <th><b>Market Barrier</b></th><th><b>Program Element</b></th></tr> <tr> <td> <ul style="list-style-type: none"> <li>• Risk aversion to new designs and technologies</li> <li>• Higher first-cost</li> </ul> </td><td> <ul style="list-style-type: none"> <li>• Availability of case studies and access to demonstration sites</li> <li>• Financial incentives to drive down payback and cover incremental costs</li> </ul> </td></tr> <tr> <td> <ul style="list-style-type: none"> <li>• Lack of awareness regarding energy and non-energy benefits</li> <li>• Corporate purchasing policies that emphasize first-cost rather than lifecycle cost</li> </ul> </td><td> <ul style="list-style-type: none"> <li>• Website, case studies and other collateral materials</li> <li>• Direct marketing to customers</li> <li>• Lifecycle/payback info</li> <li>• Targeted audit co-pay incentive</li> </ul> </td></tr> <tr> <td> <ul style="list-style-type: none"> <li>• Lack of resources to conduct initial feasibility analysis to identify energy-saving projects</li> </ul> </td><td> <ul style="list-style-type: none"> <li>• Implementation contractor energy advisors working one-on-one with decision makers in targeted sectors</li> <li>• Walk-through audits were made available</li> </ul> </td></tr> <tr> <td> <ul style="list-style-type: none"> <li>• Not enough time to complete the custom application</li> </ul> </td><td> <ul style="list-style-type: none"> <li>• Provided assistance with application development and energy savings calculations when necessary</li> </ul> </td></tr> </table> | <b>Market Barrier</b> | <b>Program Element</b> | <ul style="list-style-type: none"> <li>• Risk aversion to new designs and technologies</li> <li>• Higher first-cost</li> </ul> | <ul style="list-style-type: none"> <li>• Availability of case studies and access to demonstration sites</li> <li>• Financial incentives to drive down payback and cover incremental costs</li> </ul> | <ul style="list-style-type: none"> <li>• Lack of awareness regarding energy and non-energy benefits</li> <li>• Corporate purchasing policies that emphasize first-cost rather than lifecycle cost</li> </ul> | <ul style="list-style-type: none"> <li>• Website, case studies and other collateral materials</li> <li>• Direct marketing to customers</li> <li>• Lifecycle/payback info</li> <li>• Targeted audit co-pay incentive</li> </ul> | <ul style="list-style-type: none"> <li>• Lack of resources to conduct initial feasibility analysis to identify energy-saving projects</li> </ul> | <ul style="list-style-type: none"> <li>• Implementation contractor energy advisors working one-on-one with decision makers in targeted sectors</li> <li>• Walk-through audits were made available</li> </ul> | <ul style="list-style-type: none"> <li>• Not enough time to complete the custom application</li> </ul> | <ul style="list-style-type: none"> <li>• Provided assistance with application development and energy savings calculations when necessary</li> </ul> |
| <b>Market Barrier</b>  | <b>Program Element</b>  |                       |                        |  |  |  |  |  |  |  |   |
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| <ul style="list-style-type: none"> <li>• Lack of resources to conduct initial feasibility analysis to identify energy-saving projects</li> </ul>   | <ul style="list-style-type: none"> <li>• Implementation contractor energy advisors working one-on-one with decision makers in targeted sectors</li> <li>• Walk-through audits were made available</li> </ul>  |                       |                        |  |  |  |  |  |  |  |   |
| <ul style="list-style-type: none"> <li>• Not enough time to complete the custom application</li> </ul>   | <ul style="list-style-type: none"> <li>• Provided assistance with application development and energy savings calculations when necessary</li> </ul>   |                       |                        |  |  |  |  |  |  |  |   |
| <b>Incentive Strategy</b>  | <p>The program used the following criteria for offering financial incentives:</p> <ul style="list-style-type: none"> <li>• Award incentives based on per-kWh and/or per Mcf energy savings for installed measures not covered in the Prescriptive Business Solutions Program.</li> <li>• The incentive amount was calculated case by case for qualifying equipment or processes. The following criteria were used to determine incentive amounts: <table> <tr> <td>Electric incentive:</td><td>\$0.08/kWh</td></tr> <tr> <td>Natural gas incentive:</td><td>\$8.00/Mcf</td></tr> </table> </li> </ul>   | Electric incentive:   | \$0.08/kWh             | Natural gas incentive:   | \$8.00/Mcf   |  |  |  |  |  |   |
| Electric incentive:  | \$0.08/kWh  |                       |                        |  |  |  |  |  |  |  |   |
| Natural gas incentive:   | \$8.00/Mcf  |                       |                        |  |  |  |  |  |  |  |   |

|  |  |
|--|--|
|  | <p>Maximum project incentive: \$300,000/year</p> <p>Maximum customer incentive: \$750,000/year</p> <p>Minimum project payback: 1.0 year</p> <p>Maximum project payback: 8.0 years</p> <p>Maximum % of total project cost: 50%</p> <p>Maximum custom project incentive limited to \$100,000 for large gas transport customers using &gt;100,000 Mcf/year</p> <p>The program team worked closely with prospective customers to determine if projects qualified for incentives and assisted them in completing an incentive application.</p>  |
| Eligible Measures, Efficiency Requirements, Energy Savings, & Incentives | <p>The program was designed to address any cost-effective electric or natural gas saving measures not available through the Comprehensive Business Solutions Program. Often these projects were more complex and addressed a system or process requiring unique technologies. Savings and incentives were determined when the project was specified. All technologies were subject to eligibility and verification of energy savings.</p>  |
| Implementation Strategy  | <p>By design, the Custom Business Solutions Program had the ability to control participation levels, program investment levels, and achievement of project goals. Program investment was managed by accepting applications on a first-come, first-served basis. Key elements of the implementation strategy included:</p> <ul style="list-style-type: none"> <li>• <b>Outreach to Targeted Customers.</b> In coordination with the CAMs, the program team targeted high-energy use customers that had not yet implemented existing energy efficiency recommendations. The CAMs identified key personnel with a vested interest in energy reduction strategies and recruited their participation. Such personnel included energy managers, energy teams, facility managers, financial and operations managers, chief engineers and facility/property managers, maintenance supervisors, and building operators.</li> <li>• <b>Outreach to Key Influencers.</b> Presentations and seminars with appropriate trade associations (ASHRAE, American Public Works Association, East Michigan Association of Energy Engineers etc.).</li> <li>• <b>Outreach to Trade Allies.</b> Promotion of the custom option to key trade allies to solicit their support by providing referrals for potential custom incentive projects.</li> <li>• <b>Technical Assistance.</b> The program team assisted customers and trade allies with engineering support to identify and analyze the cost-effectiveness of energy-saving opportunities. This involved high-level walk-through audits to identify and understand the potential impacts of proposed improvements. The program team worked with the customer and trade ally to complete custom engineering calculations that assessed the energy savings potential, payback horizon, project eligibility, and incentive amount. If the project was eligible, the program team assisted the customer and trade ally in completing a Custom Business Solutions application. To ensure equitable program</li> </ul> |

access, it was the customer's responsibility to provide all required data and calculations. Some customers elected to do this work themselves or hired and paid for technical assistance to complete the custom project application requirements.

- **Quality Assurance.** Incentive applications were subject to a quality assurance review by program technical staff to ensure accuracy of savings estimates and incentive calculations.
- **Verification.** The program team provided on-site pre- or post- installation verification for all completed custom projects over \$5,000, and also confirmed proper installation and conformance with measure specifications when deemed necessary.
- **Measurement and Verification.** The program team provided a method to perform a more rigorous QA/QC process for custom projects. Projects from a custom program have higher risks of inaccuracies due to project size and nonstandard design. Projects that did not have reliable information to accurately assess savings were required to undergo monitoring both before and after implementation to determine savings.

To minimize free ridership, the program was designed to motivate trade allies and customers to: (1) pursue projects they would otherwise not have implemented; (2) pursue projects sooner than they otherwise would have; and (3) implement equipment/measures at a higher efficiency level than they otherwise would have.

All program-specific administrative requirements were handled by the program team including:

- Trade ally outreach, recruitment and training
- Quality assurance of project/technology eligibility
- Co-development of marketing strategy and messaging
- Incentive claim processing
- Data tracking and reporting
- Investment tracking and reporting
- Managing public relations in coordination with Consumers Energy
- Customer satisfaction/Problem resolution

The program team also supported the implementation of the program by providing the following services:

- Outreach to customers that have assigned CAMs
- Technical assistance to end-use customers (e.g., audits, specifying projects, savings calculations)
- Administrative assistance to end-use customers in completing incentive applications
- Assistance to customers in preparing a mutually acceptable Measurement & Verification Plan for selected projects

## Marketing Strategy

The marketing strategy for the Custom Business Solutions Program involved a direct networking approach using CAMs and trade allies. Marketing via direct mail to trade allies, local economic development organizations, and other

|  | <p>business associations was included in the effort. The program affected the purchase and installation of efficient technologies or implementation of process improvements by working directly with key end-use customers to encourage their participation and trade allies to refer projects, identify potential projects, analyze the economics of each project, and complete an incentive application.</p> <p>The program team identified successful projects and innovative technologies that were highlighted in 2013 as case studies to promote energy efficiency and increase the participation and market adoption of key technologies. In addition to networking activities, the program was promoted through advertising in targeted media including trade and business journals, press releases, and media outreach. Offering Web access to tools and best practices also was an effective way to prompt customers to action.</p> |                 |                      |  |         |                                   |         |                     |         |   |         |
|--|---|-----------------|----------------------|--|---------|-----------------------------------|---------|---------------------|---------|---|---------|
| <b>Milestones</b>                              | <table> <tr> <th>Major Milestone</th><th>Date</th></tr> <tr> <td>Formal 2013 program launch to Trade Allies</td><td>11/2012</td></tr> <tr> <td>Began accepting 2013 applications</td><td>12/2012</td></tr> <tr> <td>2013 Program closed</td><td>11/2013</td></tr> <tr> <td>All final applications approved for payment</td><td>12/2013</td></tr> </table>   | Major Milestone | Date                 | Formal 2013 program launch to Trade Allies | 11/2012 | Began accepting 2013 applications | 12/2012 | 2013 Program closed | 11/2013 | All final applications approved for payment | 12/2013 |
| Major Milestone                                | Date  |                 |                      |  |         |                                   |         |                     |         |   |         |
| Formal 2013 program launch to Trade Allies     | 11/2012   |                 |                      |  |         |                                   |         |                     |         |   |         |
| Began accepting 2013 applications              | 12/2012   |                 |                      |  |         |                                   |         |                     |         |   |         |
| 2013 Program closed                            | 11/2013   |                 |                      |  |         |                                   |         |                     |         |   |         |
| All final applications approved for payment    | 12/2013   |                 |                      |  |         |                                   |         |                     |         |   |         |
| <b>EM&amp;V Strategy</b>                       | <p>Evaluations for the Comprehensive Business Solutions and Custom Business Solutions programs have been combined. 2013 evaluation activities for the Custom Business Solutions Program are summarized in the Comprehensive Business Solutions Program section.</p>   |                 |                      |  |         |                                   |         |                     |         |   |         |
| <b>Consumers Energy Administrative Require</b> | <p>Consumers Energy staff were responsible for general administrative oversight of the program portfolio, including:</p> <ul style="list-style-type: none"> <li>• Solicitation, selection, and management of the implementation contractor</li> <li>• Coordination of marketing strategy/public relations among programs and market sectors</li> <li>• Direct customer outreach to larger customers</li> <li>• Development and placement of marketing materials and advertising</li> <li>• Coordination of all educational services</li> <li>• Data warehousing</li> <li>• Solicitation, selection, and management of the evaluation contractor</li> <li>• Goal achievement within investment</li> </ul>  |                 |                      |  |         |                                   |         |                     |         |   |         |
| <b>Participation</b>                           | <table> <tr> <th></th><th>Projects Implemented</th></tr> <tr> <td>Electric</td><td>41</td></tr> <tr> <td>Gas</td><td>17</td></tr> </table>  |                 | Projects Implemented | Electric                                   | 41      | Gas                               | 17      |                     |         |   |         |
|  | Projects Implemented  |                 |                      |  |         |                                   |         |                     |         |   |         |
| Electric                                       | 41  |                 |                      |  |         |                                   |         |                     |         |   |         |
| Gas  | 17  |                 |                      |  |         |                                   |         |                     |         |   |         |



## Investment

This program provided incentives for a wide range of customized energy savings measures for a wide variety of industries. These included the following: improvements in production processes, improved compressed air system efficiency, insulated fertilizer dryers, reduced energy consumption in waste treatment aeration systems, improved cure oven efficiency, increased thermal oxidizer efficiency, reduced pump energy to supply city water and helped companies use less energy in heat treat furnaces. The Custom Business Solutions Program provided funding that helped customers implement energy-saving projects that required a unique solution not found in our other programs.

Combined with Prescriptive Business Solutions Program and included in that section.



## 6.1.3 Comprehensive – Specialty: New Construction Program

| Program             | New Construction Program   |
|---------------------|--|
| Objective           | <p>The objective of this program was to work through the design community to influence business owners to capture immediate and long-term energy efficiency opportunities that were available during the design and construction phases of new buildings, additions, and/or renovations in the nonresidential market. To secure the opportunities, it was necessary to overcome multiple barriers that included resistance in the design community to adopt new practices, reluctance by owners to accept increased first-cost for efficient options, removing energy efficiency measures through value engineering processes to reduce costs, and the tendency to design individual systems for worst-case conditions rather than the efficiency of an integrated system over the range of expected operating conditions.</p>   |
| Target Market       | <p>Any size commercial, industrial, government (local, state, and federal) or institutional new construction project in the planning or early design stage was considered, provided the design team and owner were willing to pursue an integrated design strategy and improve multiple building systems. In order to be eligible for participation in the major renovation program, the project had to either involve a change in the type of business operated at a facility or affect at least two of the three following building systems: building envelope, HVAC system or lighting system.</p>  |
| Program Duration    | <p>The incentive element for designers and owners was implemented in 2010 and continued through 2013. This program primarily offered technical assistance during the first year with incentives added in the second through fourth year to determine customer/designer interest levels. This pilot was transitioned to operate under the auspices of the Comprehensive Business Solutions Program in 2013 as a Specialty Program.</p>  |
| Program Description | <p>This program captures energy efficiency opportunities through comprehensive efforts to influence building design and construction practices. The program worked with design professionals and construction contractors to influence prospective building owners and developers to construct high-performance buildings that provided improved energy efficiency, systems performance and comfort. Energy-savings targets were achieved by stimulating incremental improvements of efficiency in lighting, HVAC, and other building systems. The program seeks to capture synergistic energy savings by encouraging the design and construction of buildings as integrated systems. A variety of different standards for new commercial construction are used, including U.S. Green Buildings Council, ASHRAE, and LEED. An important focus was moving the knowledge gained by designers and architects through program participation into their standard construction practices. The program was designed to integrate educational activities into implementation while achieving energy savings from</p> |

active construction projects.

Program resources to achieve energy saving were applied through four primary offerings to participants (design team members, contractors, owners and developers):

- Targeted **Education, Information, and Outreach** on integrated design practices and benefits were provided directly to participants through the program and to the broader market by coordinating with professional groups, Program staff time and resources were focused on information dissemination and teach/learn-by-example during projects with program participants. To encourage market transformation while recruiting program participants, the program team coordinated with outside efforts including U.S. Green Buildings Council, American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE), American Institute of Architects, and others. The credibility and relationships built through the involvement from outside efforts helped the program recruit construction projects that were early in the design process, when opportunities to integrate energy-saving measures into the project were greatest.
- The program offered technical assistance services to provided capabilities that were not yet fully adopted in the market. Services included facilitation in the design process, reviewing plans and construction bid documents, assisting with design selections, building energy modeling analyzing energy savings, and verifying installation and operation of measures.
- The program offered financial design incentives to teams to help offset the costs of developing designs that provided as-built performance that was more energy efficient than standard practice. Payments to primary design teams were made at the completion of construction once program payment criteria were met.
- The program offered financial measure incentives to owners and developers that helped reduce cost barriers to adopting electric/natural gas energy-saving measures that had not yet been accepted as standard practice for construction. Payments were made after verification that measures were installed and fully operating or capable of full operation in the case of seasonal uses.

Technical assistance, design incentives, and measure incentives were offered in varying degrees on individual projects to balance the program resources with the potential for saving energy and changing behavior. The program channeled projects through one of the following approaches:

- **Comprehensive “Whole-Building” Approach** offered the highest level of technical assistance and financial incentives for custom design solutions. This approach allowed the design team the greatest flexibility to meet energy performance goals by adopting integrated design solutions analyzed through whole-building energy simulations. This approach was chosen when project size, schedule, complexity, and interest level justified a high level of program resources to achieve the full benefits of integrated building design.
- **Prescriptive Approach** provided a menu of financial incentives patterned after the list of incentives provided by the Comprehensive Business Solutions Program. This was for projects that were optimizing only select systems in a new building or major renovation rather than the “Whole

|  | <p>Building” Approach. Measure incentives were paid for meeting performance criteria described in the program materials for system and component performance.</p> <p>Building size, project type, design stage, and project opportunities helped guide the selection of participation approach offered on the project. This determination was made by the program team on a case-by-case basis. Generally, new construction and major “gut” renovation projects over 80,000 square feet were channeled to the comprehensive approach when there was a commitment by the owner and design team in the pre-design or schematic design stage to explore a wide range of design options. New construction and major renovation projects smaller than 80,000 square feet were usually referred to the prescriptive approach as well as projects larger than 80,000 square feet that did not justify the comprehensive approach. Single end-use lighting, HVAC projects, or those too late in design to follow an integrated approach were referred to other programs in the Consumers Energy portfolio.</p>           |                |                 |  |  |
|--|--|----------------|-----------------|--|--|
| <p><b>Program Logic</b></p>  | <table> <tr> <th data-bbox="492 785 688 814">Market Barrier</th><th data-bbox="922 785 1146 814">Program Element</th></tr> <tr> <td data-bbox="540 827 883 1260"> <ul style="list-style-type: none"> <li>• Risk aversion for new designs and technologies</li> <li>• Higher first-cost</li> <li>• Lack of awareness regarding energy and nonenergy benefits</li> <li>• Lack of resources to conduct initial feasibility analysis to identify energy-saving design options</li> </ul> </td><td data-bbox="971 827 1341 1302"> <ul style="list-style-type: none"> <li>• Availability of case studies</li> <li>• Financial incentives to help offset incremental costs</li> <li>• Website, case studies, and other collateral materials</li> <li>• Technical assistance provided through program</li> <li>• Financial incentives to help offset the cost of energy simulations and design studies</li> </ul> </td></tr> </table>  | Market Barrier | Program Element | <ul style="list-style-type: none"> <li>• Risk aversion for new designs and technologies</li> <li>• Higher first-cost</li> <li>• Lack of awareness regarding energy and nonenergy benefits</li> <li>• Lack of resources to conduct initial feasibility analysis to identify energy-saving design options</li> </ul> | <ul style="list-style-type: none"> <li>• Availability of case studies</li> <li>• Financial incentives to help offset incremental costs</li> <li>• Website, case studies, and other collateral materials</li> <li>• Technical assistance provided through program</li> <li>• Financial incentives to help offset the cost of energy simulations and design studies</li> </ul> |
| Market Barrier   | Program Element  |                |                 |  |  |
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| <p><b>Incentive Strategy</b></p>   | <p>Financial incentives for the Comprehensive Approach were tiered and corresponded to the percent of energy savings over the baseline standard. The design team and measure incentive levels were designed to cover 15% to 50% of the incremental cost. Incentives were set relative to a baseline for cost and energy performance to reflect Michigan practices. The default baseline was current code, researched standard practice determined through EM&amp;V or legally required design specifications. Under the Prescriptive Approach, measures installed were eligible for incentives at the same baseline levels as those measures listed in the Comprehensive Business Solutions Program. Pre-approval was required for all incentives.</p> <p>Of the pool of financial incentive dollars available for a project, the program directed up to approximately 30% to design team incentives and 70% to efficiency measure incentives.</p> <p>The baseline assumptions were evaluated at the end of 2010 and revised to meet the updated Michigan Energy Code (ASHRAE 90.1-2007) that took effect in</p> |                |                 |  |  |

|  | March 2011. Incentives were adjusted as needed in response to market acceptance, evaluation feedback, changing baseline practices, and state energy code upgrades. The 2012 and 2013 program years also adhered to the ASHRAE 90.1-2007 standard.   |                 |      |   |       |  |       |  |       |
|--|---|-----------------|------|---|-------|--|-------|--|-------|
| <b>Eligible Measures, Efficiency Requirements &amp; Incentives</b> | Cost-effective natural gas and electric efficiency measures that improved upon the program's baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives.  |                 |      |   |       |  |       |  |       |
| <b>Implementation Strategy</b>                                     | The program team provided staff to conduct program management, tracking, marketing, and implementation. The program team provided technical assistance services to participants, assisted participants with program requirements, conducted technical assistance and simulation services, performed quality control duties, and inspected measure installations.  |                 |      |   |       |  |       |  |       |
| <b>Marketing Strategy</b>  | The key element for the success in the program was securing the involvement of the professional design community early in the design process of construction projects. Project recruitment was a byproduct of the educational effort on sustainable design targeting the design community. Projects sought were early in the design phase where program intervention can produce significant natural gas or electric savings. Marketing employed "lunch and learn" presentations, individual contact, and outreach through professional organizations to engage design professionals as well as coordination with locally active education efforts. The design community was a key resource in reaching building owners and developers, and the program team will continue to actively assist the design community in educating owners on the benefits of high-performance buildings. |                 |      |   |       |  |       |  |       |
| <b>Milestones</b>  | <table border="1"> <thead> <tr> <th>Major Milestone</th><th>Date</th></tr> </thead> <tbody> <tr> <td>2013 New Construction Specialty Program year launched</td><td>12/12</td></tr> <tr> <td>Specialty achieved 100% of program goals</td><td>11/13</td></tr> <tr> <td>2013 New Construction Specialty Program year ended</td><td>12/13</td></tr> </tbody> </table>  | Major Milestone | Date | 2013 New Construction Specialty Program year launched | 12/12 | Specialty achieved 100% of program goals | 11/13 | 2013 New Construction Specialty Program year ended | 12/13 |
| Major Milestone  | Date  |                 |      |   |       |  |       |  |       |
| 2013 New Construction Specialty Program year launched              | 12/12   |                 |      |   |       |  |       |  |       |
| Specialty achieved 100% of program goals                           | 11/13   |                 |      |   |       |  |       |  |       |
| 2013 New Construction Specialty Program year ended                 | 12/13   |                 |      |   |       |  |       |  |       |
| <b>EM&amp;V Strategy</b>   | No evaluation activity was performed in 2013.   |                 |      |   |       |  |       |  |       |
| <b>Consumers Energy Administrative Requirements</b>                | Consumers Energy was responsible for oversight of the implementation contractor, managing the tracking system, and providing funds for administration, marketing, implementation, incentive check disbursement, and overall program goal achievement. The implementation contractor's responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, site verification of installed measures, incentive amount approval, and program goal achievement.  |                 |      |   |       |  |       |  |       |
| <b>Participation</b>   | The efforts of the program staff resulted in 260 new applications in 2013, a significant increase from 99 applications the previous year. Of the processed  |                 |      |   |       |  |       |  |       |

**Investment and  
Energy Savings**

new construction applications, 108 projects were paid, including five Whole Building Design and 103 New Construction – Major Renovation projects.

The table below provides an overview of the distribution of incentives and energy savings by project type.

| Project Type                             | Incentive      | MWh Savings | Mcf Savings |
|--|----------------|-------------|-------------|
| New Construction - Major Renovation 2013 | \$910,372.61   | 6,771       | 24,915      |
| Whole-Building Design - Design Team 2013 | \$88,272.86    | -           | -           |
| Whole-Building Design - Owner 2013       | \$176,545.71   | 774         | 9,856       |
| Total                                    | \$1,175,191.18 | 7,545       | 34,771      |

Total investment and deemed energy savings are included in the Comprehensive Business Programs values.

## 6.1.4 Comprehensive – Specialty: Building Operator Certification Program

|                            |   |
|----------------------------|---|
| <b>Program</b>             | <b>Building Operator Certification (BOC)</b>  |
| <b>Objective</b>           | The objective of this program was to introduce building operations and maintenance personnel to training and techniques that would assist them in implementing energy efficiency measures in their facilities.  |
| <b>Target Market</b>       | Building operations and maintenance personnel working in large commercial, institutional, or industrial buildings.  |
| <b>Program Duration</b>    | This pilot was an element of the program portfolio that was evaluated for program performance in the Michigan market in 2011. It continued with a third phase in 2012 utilizing the knowledge learned in phases one and two. In 2013, BOC was introduced under the Comprehensive Business Solutions Program as a Specialty Program.   |
| <b>Program Description</b> | <p>BOC is a competency-based training and certification program for operations and maintenance staff working in commercial, institutional, or industrial buildings. BOC achieves energy savings by training individuals directly responsible for the maintenance of energy-using building equipment and day-to-day building operations.</p> <p>The BOC Program offers two levels of training and certification for building operations and maintenance professionals. Both levels are designed to improve job skills and lead to improved comfort and energy efficiency at the participant's facility or facilities. Two incentivized Level I training series classes were offered to Consumers Energy customers during 2013 and focused on expanding knowledge of building systems and equipment.</p> <p>BOC Level I training consists of seven courses and covers topics related to energy transfer, air movement, heating systems and maintenance, motors, cooling, ventilation and control systems, lighting, electrical safety, environmental health and safety, and indoor air quality.</p> <p>BOC Level II training consists of six courses and covers topics related to equipment troubleshooting and diagnostics, as well as best practices in facilities management and enhances skills to effectively analyze building systems to optimize efficiency.</p> |



| <b>Program Logic</b>  | <p>Following is a list of the primary barriers in this market and the program elements that addressed them:</p> <table> <tr> <th data-bbox="540 317 740 348">Market Barrier</th><th data-bbox="959 317 1187 348">Program Element</th></tr> <tr> <td data-bbox="589 405 833 499"> <ul style="list-style-type: none"> <li>Finding time for training/staffing restrictions</li> </ul> </td><td data-bbox="1008 405 1365 499"> <ul style="list-style-type: none"> <li>Scheduling classes with enough advance notice to allow customers to plan</li> </ul> </td></tr> <tr> <td data-bbox="589 516 824 548"> <ul style="list-style-type: none"> <li>Cost of training</li> </ul> </td><td data-bbox="1008 516 1365 579"> <ul style="list-style-type: none"> <li>Financial incentives to offset training costs</li> </ul> </td></tr> <tr> <td data-bbox="589 594 902 625"> <ul style="list-style-type: none"> <li>Management approval</li> </ul> </td><td data-bbox="1008 594 1365 688"> <ul style="list-style-type: none"> <li>Presentation that includes case studies to show business value</li> </ul> </td></tr> </table> | Market Barrier | Program Element | <ul style="list-style-type: none"> <li>Finding time for training/staffing restrictions</li> </ul> | <ul style="list-style-type: none"> <li>Scheduling classes with enough advance notice to allow customers to plan</li> </ul> | <ul style="list-style-type: none"> <li>Cost of training</li> </ul> | <ul style="list-style-type: none"> <li>Financial incentives to offset training costs</li> </ul> | <ul style="list-style-type: none"> <li>Management approval</li> </ul> | <ul style="list-style-type: none"> <li>Presentation that includes case studies to show business value</li> </ul> |
|---|---|----------------|-----------------|---|--|--|---|---|--|
| Market Barrier  | Program Element   |                |                 |   |  |  |   |   |  |
| <ul style="list-style-type: none"> <li>Finding time for training/staffing restrictions</li> </ul> | <ul style="list-style-type: none"> <li>Scheduling classes with enough advance notice to allow customers to plan</li> </ul>  |                |                 |   |  |  |   |   |  |
| <ul style="list-style-type: none"> <li>Cost of training</li> </ul>                                | <ul style="list-style-type: none"> <li>Financial incentives to offset training costs</li> </ul>   |                |                 |   |  |  |   |   |  |
| <ul style="list-style-type: none"> <li>Management approval</li> </ul>                             | <ul style="list-style-type: none"> <li>Presentation that includes case studies to show business value</li> </ul>  |                |                 |   |  |  |   |   |  |
| <b>Incentive Strategy</b>   | <p>Customers were offered the opportunity to send up to five individuals to the class. Participants who completed the course work and passed the examinations were provided tuition reimbursement of \$600 for natural gas or electric account holders or \$900 for combined natural gas and electric account holders. Customers were responsible for travel expenses to and from the classes.</p>  |                |                 |   |  |  |   |   |  |
| <b>Eligible Measures, Efficiency Requirements, Energy Savings, &amp; Incentives</b>               | <p>The Specialty Program was geared toward training interested individuals in attaining a Building Operator Certification. Any energy savings as a result of projects implemented by the participants and submitted for an incentive were claimed as part of the Prescriptive Business Solutions Program. In the 2013 program year, BOC energy savings were recognized for the first time through the Michigan Energy Measures Database (MEMD) for each certified BOC participant in Michigan. The program to claimed savings based on the following:</p> <ul style="list-style-type: none"> <li>Annual electrical energy savings per participant was 23,534.5-kWh/year, with an assumed average per-participant square footage of 194,500.</li> <li>Annual natural gas savings per participant is 152.3-Mcf/year, with an assumed average per-participant square footage of 194,500.</li> </ul>  |                |                 |   |  |  |   |   |  |
| <b>Implementation Strategy</b>  | <p>The program was administered by the Midwest Energy Efficiency Alliance (MEEA) which conducted the classes and participant certification.</p> <p>One course was held every two to three weeks and was structured to allow for lecture, work in small groups, completion of tests and assignments, and performance of work at one's own facility. In addition to attending classes and passing all tests and quizzes, students completed a series of assignments specific to their facility. Projects included facility benchmarking using ENERGY STAR® Portfolio Manager and a lighting survey. Participants who passed an exam at the end of each course and completed all coursework were eligible for certification. Level I</p>   |                |                 |   |  |  |   |   |  |

|   | <p>certification must be renewed each year by completing at least five hours of additional training. This training can be acquired through continued employment in the field of building operations, membership in relevant professional associations, enrollment in other courses on building operations and maintenance, or the completion of an energy efficiency project at one's facility among other actions.</p> <p>Consumers Energy and MEEA implemented the BOC Program in partnership since the 2010 program inception. Initially, the Consumers Energy team administered the BOC Program through 2012 and was responsible for coordinating the training series schedule, securing classrooms, and generally managing program delivery. MEEA is the regional coordinator for the program and provided online registration for students, oversaw the instructor recruitment process, and provided education materials for distribution to instructors and students. The structure of the program implementation changed in 2013 when partnering utilities joined Consumers Energy as program sponsors. MEEA has since taken on the responsibility of program administrator and manages the program. Program sponsors are responsible for program recruitment and the issuance of tuition rebates to graduates.</p> |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |
|---|---|-----------------|------|----------------------|------|--|------|--|------|---|------|---|-------|----------------------------------|-------|
| <b>Marketing Strategy</b>                           | <p>Consumers Energy corporate account managers were utilized to identify prospective large customers that qualified for the program and helped recruit their participation</p>  |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |
| <b>Milestones</b>                                   | <table border="1"> <thead> <tr> <th>Major Milestone</th><th>Date</th></tr> </thead> <tbody> <tr> <td>Launched BOC Program</td><td>1/13</td></tr> <tr> <td>First Level 1 instruction series began</td><td>3/13</td></tr> <tr> <td>First Level 1 instruction series completed</td><td>6/13</td></tr> <tr> <td>Second Level 1 instruction series began</td><td>8/13</td></tr> <tr> <td>Second Level 1 instruction series completed</td><td>11/13</td></tr> <tr> <td>Final tuition reimbursement paid</td><td>12/13</td></tr> </tbody> </table>   | Major Milestone | Date | Launched BOC Program | 1/13 | First Level 1 instruction series began | 3/13 | First Level 1 instruction series completed | 6/13 | Second Level 1 instruction series began | 8/13 | Second Level 1 instruction series completed | 11/13 | Final tuition reimbursement paid | 12/13 |
| Major Milestone                                     | Date  |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |
| Launched BOC Program                                | 1/13  |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |
| First Level 1 instruction series began              | 3/13  |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |
| First Level 1 instruction series completed          | 6/13  |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |
| Second Level 1 instruction series began             | 8/13  |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |
| Second Level 1 instruction series completed         | 11/13   |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |
| Final tuition reimbursement paid                    | 12/13   |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |
| <b>EM&amp;V Strategy</b>                            | <p>No formal evaluation activity was performed during 2013. The evaluation team intends to conduct a study during the 2014 program year.</p>  |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |
| <b>Consumers Energy Administrative Requirements</b> | <p>Consumers Energy staff were responsible for oversight of the implementation contractor and providing funds for administration, marketing, and implementation. The implementation contractor's responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, issuing tuition rebates, and program goal achievement.</p>  |                 |      |                      |      |  |      |  |      |   |      |   |       |                                  |       |



## Participation

|                       | Participants | Certified |
|-----------------------|--------------|-----------|
| <b>First Level 1</b>  | 18           | 18        |
| <b>Second Level 1</b> | 13           | 13        |

## Investment & Energy Savings

Total investment and deemed energy savings are included in the Comprehensive Business Programs values.

## 6.1.5 Comprehensive – Specialty: Compressed Air Program

| Program   |   |                |                 |   |  |
|---|---|----------------|-----------------|---|--|
| Compressed Air  |   |                |                 |   |  |
| Objective   | The objective of this program was to implement compressed air system audits at a number of facilities in order to determine the potential savings that would result from the implementation of the measures identified in the audits.   |                |                 |   |  |
| Target Market   | Manufacturing sites that have central compressed air systems of at least 50 but not more than 1,600 combined horsepower.  |                |                 |   |  |
| Program Duration  | This pilot was an element of the program portfolio that was assessed for program performance in the Michigan market in 2009. It continued with a second phase in 2010, utilizing the knowledge learned in the first phase and with reduced incentives for audits. A third phase with restructured incentives was offered in 2011. In 2012, prescriptive incentives were incorporated into the Prescriptive Business Solutions Program application, for both the compressed air audit as well as improvement measures. During 2013, this program was conducted as an initiative and will continue as such under the Comprehensive Business Solutions Program.  |                |                 |   |  |
| Program Description   | <p>All air compressors run efficiently when running at full load; however, the work schedule of the facility dictates the run time and loading of the compressor. Manufacturing requirements do not always necessitate running at full load, while running at intermittent and/or partial load significantly increases the cost of operation.</p> <p>Additionally, distribution maintenance for compressed air systems is typically a low priority. A compressed air system still works even if leaks develop in the distribution system. Since these leaks do not slow production, leave a mess on the floor, or cause harm to employees, they are often a low priority for repair. However, these leaks are a large source of waste in the system that can easily be fixed.</p> <p>By performing audits, customers were made aware of energy-saving opportunities available to them and had the opportunity to make improvements at a reduced cost.</p> |                |                 |   |  |
| Program Logic   | <p>Following is a list of the primary barriers in this market and the program elements that addressed them:</p> <table> <tr> <th>Market Barrier</th><th>Program Element</th></tr> <tr> <td> <ul style="list-style-type: none"> <li>Risk aversion for new designs and technologies</li> <li>Higher first-cost</li> </ul> </td><td> <ul style="list-style-type: none"> <li>Availability of audit reports</li> <li>Financial incentives to help offset incremental</li> </ul> </td></tr> </table>  | Market Barrier | Program Element | <ul style="list-style-type: none"> <li>Risk aversion for new designs and technologies</li> <li>Higher first-cost</li> </ul> | <ul style="list-style-type: none"> <li>Availability of audit reports</li> <li>Financial incentives to help offset incremental</li> </ul> |
| Market Barrier  | Program Element   |                |                 |   |  |
| <ul style="list-style-type: none"> <li>Risk aversion for new designs and technologies</li> <li>Higher first-cost</li> </ul> | <ul style="list-style-type: none"> <li>Availability of audit reports</li> <li>Financial incentives to help offset incremental</li> </ul>  |                |                 |   |  |



- Lack of awareness regarding energy and nonenergy benefits.
- Lack of resources to conduct initial feasibility analysis to identify energy-saving design options
- costs
- Audit reports and other collateral materials
- Technical assistance provided through the program

## Incentive Strategy

In 2013, custom Compressed Air projects were still available, however, the following prescriptive measures also were offered to customers through the Prescriptive Business Solutions Program:

| Measure                               | Incentive | Unit   |
|---------------------------------------|-----------|--------|
| Compressed Air Energy Audit           | \$15.00   | HP     |
| VSD Air Compressor (50 to 300 HP)     | \$100.00  | HP     |
| Refrigerated Cycling Thermal Mass Air | \$1.50    | SCFM   |
| Added Compressed Air Storage Tanks    | \$1.50    | Gallon |
| Low-Pressure Drop Air Filter          | \$0.80    | SCFM   |
| Zero Loss Condensate Drain            | \$50.00   | Drain  |
| Compressed Air Engineered Nozzle      | \$100.00  | Nozzle |
| Air Compressor Waste Heat Recovery    | \$35.00   | HP     |

## Eligible Measures, Efficiency Requirements, Energy Savings, & Incentives

Cost-effective electric efficiency measures that showed improvement above the program's baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives.

## Implementation Strategy

The program team utilized trade allies to perform the audits. The program was open to all qualified trade allies who could fulfill the requirements of the program including those who had participated in the program previously.

### Detailed Audit

The goal of this specialty program was to make sure that compressed air was being used as inexpensively as possible. It was possible that the compressors were not being run as a system to enable lower costs.

Customers wishing to pursue the compressed air audit incentive were able to select a contractor from our list of trade allies to perform the work. The following activities were conducted by the trade ally during the audit:

- Determined the average hours of operation
- Flow diagram with description of flow path and pressures
- Brief description of the facility's air utilization by process
- Description of system storage capacity and demand/flow controllers
- A detailed description of each air compressor, which included: full-load kW, full-load cfm, full-load rated pressure, control mechanism, machine status (i.e., either lead or lag), manufacturer and model number

|  | <ul style="list-style-type: none"><li>On-site data collection of the individual compressed air equipment. Data was logged for a minimum of seven days, and the parameters measured included: power (in kW), pressure and cfm where possible</li><li>Major compressed air leak detection survey, including identification, tagging and quantification of air leaks</li><li>Detailed potential energy/cost savings calculations based on measurements (both from leaks and compressed air system)</li><li>Approximate cost to improve system operation</li><li>Identified the existing and proposed system efficiency in units of cfm/ HP</li><li>Written report and presentation of audit findings and recommendations</li><li>Detailed description of the technology proposed to the customer</li></ul> <p>Following the completion of the detailed audit, the trade ally prepared an in-depth analysis of the customer facility and the compressed air system. The report presentation was conducted in person and the findings and energy efficiency proposals shared with the customer.</p> <p>The final report detailed all of the findings and suggested a design and schedule of improvements for the compressed air system to offer the highest return for the customer’s time and money.</p> |                  |                    |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
|--|--|------------------|--------------------|------------------|-----------------|-----------------------------|----|-----------|-----------|--------------------|----|-----------|-----------|---------------------------------------|----|--------|---------|--------------|---|---|---|------------------------------------|---|-----|---------|--------------------------------|----|-----------|-----------|---|----|--------|---------|
| Marketing Strategy                           | Consumers Energy corporate account managers and compressed air trade allies identified prospective large customers that qualified for the program. In addition, the trade allies who performed the audits were encouraged to promote the program to their clients who met the minimum requirements.  |                  |                    |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
| EM&V Strategy                                | No formal evaluation activity was performed during 2012 or 2013; however, the evaluation team intends to conduct a study during the 2014 program year.   |                  |                    |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
| Consumers Energy Administrative Requirements | Consumers Energy staff were responsible for oversight of the implementation contractor and providing funds for administration, marketing, and implementation. The implementation contractor’s responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and trade ally dispute resolution, tracking and reporting, site verification of installed measures, and program goal achievement.  |                  |                    |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
| Participation                                | <p>The table below provides an overview of the distribution of incentives and energy savings by project type included within the Comprehensive Business Program.</p> <table><tr><th>Measure Type</th><th>Paid Measure Count</th><th>kWh/ Mcf Savings</th><th>Incentives Paid</th></tr><tr><td>Compressed Air Energy Audit</td><td>35</td><td>2,781,721</td><td>\$158,502</td></tr><tr><td>VSD Air Compressor</td><td>22</td><td>2,849,500</td><td>\$205,000</td></tr><tr><td>Refrigerated Cycling Thermal Mass Air</td><td>11</td><td>41,323</td><td>\$6,300</td></tr><tr><td>Storage Tank</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Compressed Air Waste Heat Recovery</td><td>3</td><td>742</td><td>\$6,475</td></tr><tr><td>Compressed Air Custom Projects</td><td>11</td><td>3,172,303</td><td>\$247,328</td></tr><tr><td>Other (Drains, Low-Pressure Filter, etc.)</td><td>19</td><td>89,363</td><td>\$4,790</td></tr></table>   | Measure Type     | Paid Measure Count | kWh/ Mcf Savings | Incentives Paid | Compressed Air Energy Audit | 35 | 2,781,721 | \$158,502 | VSD Air Compressor | 22 | 2,849,500 | \$205,000 | Refrigerated Cycling Thermal Mass Air | 11 | 41,323 | \$6,300 | Storage Tank | 0 | 0 | 0 | Compressed Air Waste Heat Recovery | 3 | 742 | \$6,475 | Compressed Air Custom Projects | 11 | 3,172,303 | \$247,328 | Other (Drains, Low-Pressure Filter, etc.) | 19 | 89,363 | \$4,790 |
| Measure Type                                 | Paid Measure Count   | kWh/ Mcf Savings | Incentives Paid    |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
| Compressed Air Energy Audit                  | 35   | 2,781,721        | \$158,502          |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
| VSD Air Compressor                           | 22   | 2,849,500        | \$205,000          |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
| Refrigerated Cycling Thermal Mass Air        | 11   | 41,323           | \$6,300            |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
| Storage Tank                                 | 0  | 0                | 0                  |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
| Compressed Air Waste Heat Recovery           | 3  | 742              | \$6,475            |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
| Compressed Air Custom Projects               | 11   | 3,172,303        | \$247,328          |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |
| Other (Drains, Low-Pressure Filter, etc.)    | 19   | 89,363           | \$4,790            |                  |                 |                             |    |           |           |                    |    |           |           |                                       |    |        |         |              |   |   |   |                                    |   |     |         |                                |    |           |           |   |    |        |         |

**COMPREHENSIVE- SPECIALTY: COMPRESSED AIR PROGRAM**

|  |                                 |     |           |           |
|--|---------------------------------|-----|-----------|-----------|
|  | Compressed Air New Construction | 7   | 249,123   | \$19,200  |
|  | Total                           | 108 | 9,184,075 | \$647,505 |

**Investment &  
Energy Savings**

Total investment and deemed energy savings are included in the Comprehensive Business Programs values.

## 6.1.6 Comprehensive – Specialty: Smart Buildings (EBCx) Program

|                            |   |
|----------------------------|---|
| <b>Program</b>             | <b>Smart Buildings (EBCx) Program</b>   |
| <b>Objective</b>           | The objective of the Smart Buildings (EBCx) Program was to assist business customers with existing building commissioning activities to reduce energy consumption.  |
| <b>Target Market</b>       | <p>Basic requirements for building eligibility were as follows:</p> <ul style="list-style-type: none"> <li>• Facilities had 100,000 square feet or more of conditioned area</li> <li>• Facilities had a building automation system with direct digital controls</li> <li>• Preferred facilities had central heating and cooling plants</li> <li>• Facilities had a dedicated facility staff</li> </ul>  |
| <b>Program Duration</b>    | The Smart Buildings Program was an element of the 2009 program portfolio that was assessed for program performance in the Michigan market. It continued in 2010 with those customers from the first phase of the pilot determined to be good candidates for more in-depth retro-commissioning studies. 2011 was the last year it operated under the pilot phase. In 2012, the program was incorporated into the Comprehensive Business Solutions Program and continued to be offered as a Specialty Program in 2013.  |
| <b>Program Description</b> | <p>The Smart Buildings Program offers a retro-commissioning audit and consulting service to customers with energy management systems in need of improvement. The program structure allows the Comprehensive Business Solutions Program a method to achieve energy savings related to low-cost/no-cost building system optimization measures previously not available to be incentivized as capital measures. The Smart Building Program operated as part of the Comprehensive Business Solutions Program in 2013, with savings recognized by the program and cost sharing incentives for the assessments paid from the program. A qualified group of third-party assessors have been trained and operated independently to provide the customer an engineering evaluation, ENERGY STAR<sup>®</sup> ranking, and recognition and quantification of the facility improvement measures. The assessors also have been a great source of customer recruitment for the program.</p> <p>The 2013 Smart Buildings Program was designed to utilize operations and maintenance (O&amp;M) reviews in combination with enhanced energy audits that draw upon existing building commissioning techniques to help Consumers Energy customers optimize the energy efficiency of their existing facilities. An independent evaluation by reputable engineering assessors allows Consumers Energy customers the opportunity to identify and prioritize energy-saving measures without additional resources and with minimal investment. The focus of the Smart Building Program is optimizing the existing HVAC systems, including the Building Automation System (BAS) and individual heating, cooling and ventilation components, to meet their Current Facilities</p> |

|  | <p>Requirements (CFR). The O&amp;M reviews are particularly effective at identifying no- or low-cost opportunities with short paybacks and prioritizing future improvements. Historically and nationally these types of programs have provided 5% to 15% energy savings annually. The Smart Buildings Pilot delivered similar results.</p> <p>The additional measures detailed in these studies provide deeper savings and qualify for Custom or Prescriptive incentives. The Smart Buildings Program also promotes the ENERGY STAR® Portfolio Manager benchmarking tool for energy management.</p>   |                       |                        |  |  |
|--|---|-----------------------|------------------------|--|--|
| <b>Program Logic</b>   | <p>Following is a list of the primary barriers in this market and the program elements that addressed them:</p> <table> <tr> <th><b>Market Barrier</b></th><th><b>Program Element</b></th></tr> <tr> <td> <ul style="list-style-type: none"> <li>• Risk aversion for new designs and technologies</li> <li>• Higher first-cost</li> <li>• Lack of awareness regarding energy and non-energy benefits.</li> <li>• Lack of resources to conduct initial feasibility analysis to identify energy-saving design options</li> </ul> </td><td> <ul style="list-style-type: none"> <li>• Availability of case studies</li> <li>• Financial incentives to help offset incremental costs</li> <li>• Collateral materials</li> <li>• Technical assistance provided through the program</li> </ul> </td></tr> </table> | <b>Market Barrier</b> | <b>Program Element</b> | <ul style="list-style-type: none"> <li>• Risk aversion for new designs and technologies</li> <li>• Higher first-cost</li> <li>• Lack of awareness regarding energy and non-energy benefits.</li> <li>• Lack of resources to conduct initial feasibility analysis to identify energy-saving design options</li> </ul> | <ul style="list-style-type: none"> <li>• Availability of case studies</li> <li>• Financial incentives to help offset incremental costs</li> <li>• Collateral materials</li> <li>• Technical assistance provided through the program</li> </ul> |
| <b>Market Barrier</b>  | <b>Program Element</b>  |                       |                        |  |  |
| <ul style="list-style-type: none"> <li>• Risk aversion for new designs and technologies</li> <li>• Higher first-cost</li> <li>• Lack of awareness regarding energy and non-energy benefits.</li> <li>• Lack of resources to conduct initial feasibility analysis to identify energy-saving design options</li> </ul> | <ul style="list-style-type: none"> <li>• Availability of case studies</li> <li>• Financial incentives to help offset incremental costs</li> <li>• Collateral materials</li> <li>• Technical assistance provided through the program</li> </ul>  |                       |                        |  |  |
| <b>Incentive Strategy</b>  | <p>The screening energy audit and O&amp;M review phases were provided to selected customers at no charge. Customers who completed the first phase were selected to proceed to the next phases, provided they agreed to implement the low-cost / no-cost recommendations from the previous phase.</p>  |                       |                        |  |  |
| <b>Eligible Measures, Efficiency Requirements, Energy Savings &amp; Incentives</b>   | <p>Cost-effective natural gas and electrical efficiency measures that improve upon the program's baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives through this program.</p>   |                       |                        |  |  |
| <b>Implementation Strategy</b>   | <p>This program was operated by the implementation contractor who provided qualified technical personnel to perform the preliminary screening (first phase), followed by the utilization of engineers specializing in building commissioning services to implement the second and final phase, as required.</p>   |                       |                        |  |  |
| <b>Marketing Strategy</b>  | <p>A key element for success in this program was utilizing the Consumers Energy corporate account managers to identify qualified participants. This was due to the limited nature of the program and the desire to market it specifically to larger customers who met the criteria of the pilot.</p>  |                       |                        |  |  |

|   |   |
|---|---|
| <b>EM&amp;V Strategy</b>                            | No evaluation activity took place in 2013.  |
| <b>Consumers Energy Administrative Requirements</b> | Consumers Energy was responsible for oversight of the implementation contractor, and providing funds for administration, marketing, and implementation. The implementation contractor's responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, site verification of installed measures, and program goal achievement. |
| <b>Participation</b>                                | Of nine sites enrolled in the program in 2013, five sites completed the assessment and implementation. The remaining four completed assessments and will complete implementation in 2014.   |
| <b>Investment &amp; Energy Savings</b>              | Total investment and deemed energy savings are included in the Comprehensive Business Programs values.  |



## 6.2 Small Business Direct Install Program

| Program             | Small Business Direct Install  |
|---------------------|--|
| Objective           | Provide direct install energy efficiency services to small businesses and not-for-profit customers typically considered “hard to reach” and who have limited resources to participate in standard business programs.   |
| Target Market       | <p>Small business customers with an average 12-month individual facility electricity usage of less than 400,000 kWh and 6,000 Mcf were eligible to participate in the program.</p> <p>Eligible participants were owner-occupied or tenant facilities with owner permission. This included small retail businesses such as convenience and grocery stores, small offices, service stations, restaurants, hotels/motels, nonprofit organizations, and small manufacturers.</p>   |
| Program Duration    | The Small Business Direct Install Program is an ongoing element of the program portfolio, but was designed as a “lever” to be scaled back or ramped up depending on overall portfolio performance.   |
| Program Description | <p>This program consisted of several components each targeting small, non-residential customers underserved by other energy efficiency programs. These small customers typically lack the technical and financial resources necessary to participate in other efficiency programs. Often they are sole proprietorships where the owner or manager sees little value in committing time and effort to reducing energy usage. Market providers of energy efficiency products and services seldom target these small customers due to higher costs relative to larger customers. To overcome these barriers, several special initiatives were offered in 2013 to reach sub-segments of this market:</p> <p>The <b>Small Business Solutions Core program</b> was designed to promote energy-saving opportunities to small businesses through the installation of common lighting and refrigeration measures. Program-approved trade allies provided efficiency audits, customer education, and the installation of cost-effective measures on a turnkey basis. Much like other similar programs, lighting retrofits yielded the highest energy savings.</p> <p>Delivery of program services was designed by the implementation contractor, who provided web-based proposal generation software with uniform pricing for established services. At no charge, customers received an energy audit that resulted in a standardized report detailing costs and potential savings from recommended measures. Customers were entitled to choose all, some, or none of the eligible recommended measures and schedule installation services with a program-approved trade ally. Program-approved trade allies were required to meet the following criteria:</p> <ul style="list-style-type: none"> <li>• Complete and sign the “Trade Ally Application &amp; Agreement” document</li> <li>• Be an established trade ally with references, required licenses, and insurance</li> <li>• Offer program warranties</li> <li>• Complete work in a timely fashion</li> </ul> |

- Dispose/recycle old equipment even if customers requested to keep it
- Explain the scope of retrofit work and customer co-pay requirements

The program-approved trade allies were responsible for auditing the site, proposing energy efficiency measures, specifying equipment, performing the installations, and providing required warranties. The program team was responsible for conducting inspections to verify pre- and post-installation conditions and equipment, disbursing incentives, and overall program oversight. The program team also provided the trade allies with program information and an Internet based tool to enter, track, and receive approval and payment for projects.

Incentives were paid up to 100% of the installation costs, up to a \$7,500 maximum incentive per premise. Energy bill reductions coupled with the measure incentives yielded an average payback of just less than one year.

The **Thermostat Initiative** targeted small businesses specifically to install thermostats and other low cost measures in combination service areas. The installation was performed by the implementation contractor. The team performing the installations was given a schedule and route, installing thermostats at scheduled locations. They then canvassed the area to find additional interested, qualifying customers.

The **Hospitality Initiative** was designed to introduce energy efficiency to the hospitality segment. This initiative was modeled after the thermostat initiative but provided LEDs to hotels, motels and restaurants. The restaurant sector was mainly an LED effort to invoke market transformation.

The **Nonprofit Initiative** was a new offering in 2013, which was launched to help nonprofit customers save money by installing electric energy-saving measures. These measures included: LEDs, pre-rinse sprayers, faucet aerators, kitchen faucet swivel aerators, programmable thermostats, vending misers and a small demonstration of linear fluorescent to LED retrofits. The nonprofit sector was identified using applicable SIC codes and was not limited to the small business usage caps.

The program team also implemented a **CFL Drop Initiative**, in which boxes of CFLs were delivered by the implementation contractors directly to small businesses located in electric and combination territories.

A **CFL Buy-Down Initiative** also was offered in which Consumers Energy discounted the cost of CFL bulbs at common retail locations to encourage small business customers to purchase energy efficient lighting for their establishments.

## Program Logic

Following is a list of the primary barriers in this market and the program elements used to address them:

| Market Barrier  | Program Element   |
|---|---|
| <ul style="list-style-type: none"> <li>• Lack of funds and cash flow to invest in energy efficiency improvements</li> <li>• Lack of time to pursue energy analysis</li> </ul> | <ul style="list-style-type: none"> <li>• Incentives that cover up to 100% of total measure cost</li> <li>• Free energy audit followed by direct installation of measures</li> </ul> |

|   |   |
|---|---|
|   | <ul style="list-style-type: none"> <li>• Lack of awareness regarding energy and nonenergy benefits</li> <li>• Risk aversion to new technologies</li> <li>• Educational materials and testimonials</li> <li>• Financial incentives to mitigate risk</li> </ul> <p>Strategies for increasing attribution through reduced free ridership included:</p> <ul style="list-style-type: none"> <li>• Targeting small business customers not targeted by other programs and who seldom pursue improvements on their own initiative</li> <li>• Incentive amounts sufficiently meaningful to influence purchase decisions</li> <li>• Proactive solicitation of customers</li> <li>• Direct installation of measures</li> </ul>   |
| <b>Incentive Strategy</b>   | <p>To encourage participation in the program, incentives for measures were set at up to 100% of the installed measure cost. Customers who participated in the Small Business Solutions Core Program were also subject to a cap of \$7,500 incentive per customer. This incentive cap coupled with an average incentive \$0.17/kWh resulted in just under a one-year payback. Customers subject to the \$7,500 cap were able to invest in additional projects through the Comprehensive Business Solutions Program's prescriptive incentives. Customers who participated in one of the other initiatives received direct installation of measures at no charge to the customer.</p>  |
| <b>Eligible Measures, Efficiency Requirements, Energy Savings, &amp; Incentives</b> | <p>For the Small Business Solutions Core Program, lighting measures delivered the majority of the energy savings as they are a universal technology at small nonresidential facilities with high hours of operation. Typical lighting measures included conversion of incandescent and standard T12 fluorescent to T8 or T5 fluorescent lighting, compact fluorescent lighting, high-bay fluorescent lighting, occupancy sensors, LED and induction fixtures, and LED exit sign retrofit kits. The lighting measures were responsible for 77% of the program savings with the balance attributed to refrigeration measures such as anti-sweat heater controls and ECM motors. The other direct install initiatives offered other low-cost measures including thermostats, LEDs, faucet aerators, and vending misers.</p>  |
| <b>Implementation Strategy</b>  | <p>The program team was responsible for updates to program design and program procedures, and improvements to the audit tool that produced the custom report recommendation. Both program-approved trade allies and program staff were responsible for soliciting participants, conducting the no-cost audit, and obtaining customer approval to install measures.</p> <p>A network of electrical and refrigeration trade allies delivered a large portion of the direct installation program services. Program-approved trade allies were responsible for installing energy-saving measures as well as removing existing products for disposal and recycling. Direct installation trade allies could provide ongoing maintenance services, lamp and ballast replacement, and installation of non-reimbursed equipment through separate arrangements with the customer.</p> |
| <b>Marketing Strategy</b>   | <p>The program team provided ongoing training to program-approved trade allies to ensure they fully understood the program so they could successfully solicit participation. Program staff also conducted door-to-door canvassing to find additional interested, qualifying customers to participate in the other direct install initiatives.</p>   |

## Milestones

| Major Milestone   | Date  |
|---|-------|
| Small Business Direct Install Programs open for participation | 1/13  |
| CFL Drop Initiative started                                   | 3/13  |
| Core Small Business Program waitlisted                        | 9/13  |
| Core Small Business Program re-opened with additional funding | 10/13 |
| Payment of final projects in core program                     | 12/13 |
| Hospitality installation complete                             | 12/13 |
| Thermostat installations completed                            | 12/13 |
| Nonprofit installations completed                             | 12/13 |

## EM&V Strategy

The following evaluation activities were performed for the 2013 Small Business Direct Install program.

**Program Staff Interviews:** In-depth telephone interviews were conducted with three program staff members (the Consumers Energy program manager, who manages the Small Business Program, as well as the implementation coordinators for two programs). The objectives of these interviews were to better understand program operations and future plans to help develop evaluation priorities.

**Direct Install Trade Ally Surveys:** The evaluation team fielded two online Web surveys with 28 trade allies involved with the Direct Install Program. The objectives of the surveys were to determine satisfaction with 2013 program operations, document experiences with programs, and collect regular feedback on program developments.

**Small Business Customer Web Surveys:** In 2013, the evaluation team completed Web surveys with 115 participants from the 2013 Small Business Program. This effort included 40 participants in the Direct Install Program, 79 participants in the Programmable Thermostat Initiative, and four participants in the Hospitality Initiative. The objectives of these surveys were to explore customers' awareness of and satisfaction with energy efficiency programs and Consumers Energy.

## Consumers Energy Administrative Requirements

Consumers Energy staff were responsible for general administrative oversight of the program, including:

- Management of the implementation contractor
- Coordination of marketing strategy/public relations
- Development and placement of marketing materials and advertising
- Coordination of all educational services
- Data warehousing
- Management of the evaluation contractor

- Goal achievement within investment

## Participation

| Measure                                     | Number of Measures Installed |
|---|------------------------------|
| Lighting Controls                           | 131                          |
| Lighting                                    | 9,122                        |
| ECMs  | 46                           |
| Anti-Sweat Heater Controls                  | 325                          |
| Evaporator Fan Motor Controls on PSC Motors | 1                            |
| Programmable Thermostats - Gas Only         | 1,608                        |
| Programmable Thermostats - Electric Only    | 917                          |
| Programmable T-Stats - Combination          | 603                          |
| Programmable Thermostat (DTE)               | 184                          |
| LED bulbs                                   | 15,632                       |
| LED Floods                                  | 8,656                        |
| Vending Equipment Controller                | 12                           |
| Linear Fluorescent to LED Retrofits         | 339                          |

## Investment

|          | 2013 Actual  | 2013 Plan   |
|----------|--------------|-------------|
| Electric | \$10,068,877 | \$8,389,353 |
| Gas      | \$981,572    | \$937,434   |
| Total    | \$11,050,450 | \$9,326,788 |

## Energy Savings

|     | 2013 Actual | 2013 Actual w/ LLES Multiplier | 2013 Plan |
|-----|-------------|--------------------------------|-----------|
| MWh | 81,964      | 84,184                         | 31,110    |
| MW  | 16.2        | 16.5                           | 6.9       |
| Mcf | 131,420     | 132,612                        | 127,478   |

## Benefit-Cost Test Results

| Benefit-Cost Test        | B/C Ratio |
|--------------------------|-----------|
| Utility Cost Test        | 2.94      |
| Total Resource Cost Test | 2.94      |
| Participant Test         | -         |
| Rate Impact Measure      | 0.44      |

## 6.3 Business Multifamily Program

| Program             | Business Multifamily Program   |
|---------------------|--|
| Objective           | <p>The primary goal of this program was to produce immediate electric and natural gas energy savings in multifamily buildings through the direct installation of energy-saving measures in the individual living units and common areas. A second program objective was to achieve additional energy savings through the promotion of high-efficiency equipment for prescriptive, custom, and comprehensive retrofit projects.</p>   |
| Target Market       | <p>All property owners of multifamily buildings, including apartments, condominiums, dorms, and assisted living, were eligible to participate. In 2013, the Multifamily Program offered direct installation and prescriptive, custom, and comprehensive measures to both residential and commercial customers. Targeted, proactive outreach efforts were utilized to influence the multifamily market sector.</p>  |
| Program Duration    | <p>The commercial segment of the Multifamily Program has been an ongoing element of the Company's portfolio since 2012.</p>  |
| Program Description | <p>The Multifamily Program was designed to offer property owners a turnkey service for helping residents reduce energy use in their living units through the direct installation of various energy-saving devices. The direct install service was provided at no cost to the property owners and the tenants. In addition to the products installed, educational materials were left behind in the individual units that explained the energy and money-saving benefits associated with the energy efficient measures.</p> <p>The Multifamily Program was designed to also offer incentives to property owners who purchased specific high-efficiency measures to retrofit individual units and common areas within the property. In 2013, 105 prescriptive and custom rebate applications were submitted by customers and trade allies for projects they completed in a building that had Consumers Energy commercial electric and/or gas rate code.</p> <p>For properties that were interested in reducing a significant portion of their energy use, the Multifamily Program offered the Comprehensive Whole Building Initiative. This initiative targeted properties that were undergoing multiple retrofits that, when combined, saved at least 10% of their annual energy use.</p> |

## Program Logic

The Multifamily Program encounters market barriers from two groups: the property owner and the tenant. The following common barriers are described below, along with program strategies that were employed to address them:

### Market Barrier

### Program Element

#### For residents:

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Hassle of researching how to reduce their energy bills</li> <li>• Hesitancy to invest in products that may stay with the unit when they leave</li> <li>• Lack of information about potential energy savings</li> <li>• Concern regarding installation technicians entering the apartment</li> </ul> | <ul style="list-style-type: none"> <li>• Turnkey service; work was performed for them</li> <li>• Materials and installation were provided free to the resident</li> <li>• Leave-behind educational materials for residents</li> <li>• A member of the apartment community staff was present at all times to escort the installation technicians</li> </ul> |
|--|--|

#### For property owners:

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Hassle of making arrangements to install measures</li> <li>• Lack of awareness regarding energy and nonenergy benefits</li> <li>• Emphasis on first-cost rather than lifecycle cost</li> <li>• Hesitancy to invest in products that are unfamiliar</li> </ul> | <ul style="list-style-type: none"> <li>• Simple turnkey service</li> <li>• Marketing materials, case studies, website, and “good-will” benefit of offering free measures to their residents</li> <li>• Financial incentives, lifecycle/payback information, and proactive outreach meetings with decision makers for budget expenditures</li> <li>• Products were left behind for the owner to install and test</li> </ul> |
|--|--|

## Incentive Strategy

**Direct Install of In-unit Measures.** Property owners were offered a free direct install service for reducing in-unit energy use.

**Prescriptive and Custom Measures.** Common energy-saving measures for multifamily complexes were added to an application with the incentive amounts based on deemed energy savings from the Michigan Energy Measures Database (MEMD). This portion of the Multifamily Program was added to address deeper energy-saving opportunities than were possible through direct install measures.

**Comprehensive Whole Building Initiative.** Properties were given extra incentives when their overall energy use was reduced by at least 10%. The program team used energy modeling to predict energy reduction based on measures installed. By working closely with property managers, the Multifamily Program staff created an energy model of the building. Based on the energy savings information provided by the model, the customer then created a plan to remodel their building. The predicted energy savings from the retrofits determined the level at which the measure incentives would be increased. The table below illustrates the tiered incentive amounts at various energy-savings levels.



## Eligible Measures, Efficiency Requirements, Energy Savings & Incentives

### Comprehensive Program Incentive Structure

| Energy Savings Tier | Incentive per kWh saved | Incentive per Mcf Saved |
|---------------------|-------------------------|-------------------------|
| Tier 1 – 10% +      | \$0.09                  | \$9.00                  |
| Tier 2 – 20% +      | \$0.12                  | \$10.00                 |
| Tier 3 – 30% +      | \$0.14                  | \$11.00                 |

Deemed savings values were based on the MEMD.

The Multifamily Program offered the following measures as part of the Direct Install portion of the program. The products were installed at no cost to the property owner or residents.

| Direct Install Measure  | Efficiency Requirements  |
|-------------------------|--------------------------|
| CFL Lamp                | ENERGY STAR <sup>®</sup> |
| LED Lamp                | 9.5 watt                 |
| CFL Candelabra          | 9 watt                   |
| LED Candelabra          | 3 watt                   |
| LED Exit Sign           | 1.2 watt                 |
| Low-Flow Showerhead     | 1.5 gpm                  |
| Bathroom Faucet Aerator | 1.0 gpm                  |
| Kitchen Faucet Aerators | 1.5 gpm                  |
| DHW Pipe Wrap           | R-4                      |

The Multifamily Program offered the following measures as part of the Prescriptive portion of the program. Property owners and managers were eligible to receive incentives for the retrofit improvements listed below.

| Multifamily Prescriptive Measures        |                               |         |
|--|-------------------------------|---------|
| Prescriptive Measures – Common Area      | Prescriptive Incentive Amount |         |
| CFL ≤115W or Specialty                   | \$1–\$8                       | Lamp    |
| Compact Fluorescent Fixture              | \$25                          | Fixture |
| LED Lamp Replacing 50W-100W Incandescent | \$20-\$25                     | Lamp    |
| LED PAR Flood Lamp                       | \$20                          | Lamp    |
| LED MR16 Lamp                            | \$5                           | Lamp    |
| LED Candelabra Lamp 3W-5W                | \$10-\$15                     | Lamp    |
| CFL Candelabra Lamp 5W-13W               | \$8-\$10                      | Lamp    |
| LED Fixture Replacing Incandescent       | \$25                          | Lamp    |

|  |   |            |              |
|--|---|------------|--------------|
|  | HP T8 Lamp replacing T12                            | \$3        | Lamp         |
|  | HP T8 Lamp replacing T12HO                          | \$10       | Lamp         |
|  | 1-4 Lamp HP T8 replacing T12                        | \$15-\$40  | Lamp         |
|  | 1-4 Lamp RW HP T8 replacing T12                     | \$20-\$50  | Lamp         |
|  | 4 Ft. Lamp Removal w/ HP/RW T8                      | \$5        | Lamp         |
|  | 8ft Lamp Removal w/ HP or RW T8 retrofit            | \$10       | Lamp         |
|  | LED, T-1, or Electroluminescent Exit Signs          | \$12.50    | Fixture      |
|  | Exterior HID to CFL $\leq$ 400W \$45 / Fixture      | \$45-\$120 | Fixture      |
|  | Exterior HID to T5/T8 Linear Fluorescent            | \$0.50     | Watt Reduced |
|  | Exterior HID to LED/Induction <400W                 | \$45-\$180 | Fixture      |
|  | Vending Equipment Controller                        | \$50       | Unit         |
|  | Occupancy Sensor for Interior Lights                | \$40-\$100 | Fixture      |
|  | Occupancy Sensor for Exterior Fixtures              | \$0.20     | Watt         |
|  | Space Heating Boiler Tune-Up                        | \$0.25     | MBH          |
|  | DHW Boiler Tune-Up                                  | \$0.25     | MBH          |
|  | Furnace Tune-Up 40 - 120 MBH                        | \$40-\$60  | Tune-Up      |
|  | Furnace Tune-Up >120 MBH                            | \$0.50     | MBH          |
|  | Chiller Tune-Up                                     | \$15       | Ton          |
|  | High-Efficiency Space Heating Boiler $\geq$ 90%     | \$3-\$5    | MBH          |
|  | Furnace Replacement $\geq$ 92%                      | \$80-\$150 | Furnace      |
|  | Infrared Heater Replacing Standard Unit Heater      | \$6        | MBH          |
|  | Boiler Water Reset Control                          | \$0.35     | MBH          |
|  | Indirect Water Heater with Efficiency of $\geq$ 84% | \$1-\$2.50 | MBH          |
|  | Instant Hot Water Heater $\geq$ 82% Efficient       | \$175      | MBH          |
|  | Tank Style Water Heater EF $\geq$ 0.80              | \$200      | MBH          |
|  | Variable Frequency Drive on HVAC Fans               | \$60       | HP           |
|  | Variable Frequency Drive on HVAC Pumping            | \$100      | HP           |
|  | Pipe Wrap   | \$1.50-\$6 | Foot         |
|  | Leaking Steam Trap Repair or Replacement            | \$100      | Trap         |
|  | Programmable Thermostat                             | \$10       | Unit         |
|  | Air Conditioner - <5.4 Tons, 1 ph - 14 SEER         | \$6        | Ton          |
|  | Air Conditioner - <5.4 Tons, 3 ph - 11.6 SEER       | \$6        | Ton          |
|  | Air Conditioner - <20 Tons - 11 SEER                | \$8-\$15   | Ton          |
|  | Air Conditioner - <63.3 Tons - 10 SEER              | \$15       | Ton          |

|  |                                      |               |
|--|--------------------------------------|---------------|
| Pool Water Heater $\geq 84\%$ Efficient          | \$2                                  | MBH           |
| Pool Cover                                       | \$0.50                               | Sq. Ft.       |
| <b>Prescriptive Measures – In Unit</b>           | <b>Prescriptive Incentive Amount</b> |               |
| CFL $\leq 115$ W or Specialty                    | \$1-\$4                              | Lamp          |
| Compact Fluorescent Fixture                      | \$10                                 | Fixture       |
| LED Fixture                                      | \$10                                 | Fixture       |
| LED replacing 40W-100W Incandescent              | \$4-\$8                              | Lamp          |
| LED PAR Flood Lamp                               | \$10                                 | Lamp          |
| Low-Flow Bath Aerator $\leq 1.75$ GPM            | \$2                                  | Aerator       |
| Low-Flow Kitchen Sprayer Aerator $\leq 1.75$ GPM | \$3                                  | Aerator       |
| Low-Flow Showerhead $\leq 1.75$ GPM              | \$15-\$30                            | Showerhead    |
| Tank-less Gas Water Heater                       | \$50                                 | Unit          |
| Pipe Wrap - Gas Domestic Hot Water               | \$0.75                               | Foot          |
| Space Heating Furnace Replacement $\geq 92\%$    | \$80                                 | Furnace       |
| Furnace Replacement $\geq 95\%$                  | \$125-\$150                          | Furnace       |
| Furnace Tune-up $\geq 40$ MBH                    | \$40-\$80                            | Tune-Up       |
| Package Terminal Heat Pump - 9.1 EER             | \$50                                 | Unit          |
| Room Air Conditioner CEE Tier 2                  | \$20                                 | Unit          |
| Programmable Thermostat                          | \$10                                 | Unit          |
| <b>Prescriptive Measures – Building Envelope</b> | <b>Prescriptive Incentive Amount</b> |               |
| ENERGY STAR® Door                                | \$10                                 | Door          |
| Door Weather Stripping                           | \$1.75                               | Door          |
| ENERGY STAR® Window                              | \$100                                | 100 Sq. Ft.   |
| Airtight Can Light                               | \$5                                  | Fixture       |
| Duct Sealing                                     | \$6                                  | 1,000 Sq. Ft. |
| Duct Insulation                                  | \$10                                 | 1,000 Sq. Ft. |
| Wall Insulation                                  | \$40                                 | 1,000 Sq. Ft. |
| Roof Insulation                                  | \$20                                 | 1,000 Sq. Ft. |
| Reduce Air Infiltration by 30%                   | \$5-\$25                             | 1,000 Sq. Ft. |

## Implementation Strategy

Key elements of the implementation strategy included:

- Targeted Outreach to Property Owners.** Program representatives concentrated on building relationships with property management companies, owners, associations and their members to recruit participation in the program. The program team assisted customers as necessary to coordinate direct installations and complete rebate application requirements. In addition, property owners

were reached through direct mail, participation in association events, one-on-one meetings with program staff, and other channels.

On several occasions, the Multifamily Program outreach team utilized Resident Education events to reach the individual residents before installation occurred. The outreach team provided dinner and educated the residents on the benefits of the direct install products. The residents were shown samples of the showerheads, aerators, and light bulbs to get a preview of what would be installed in their apartment units. These education events helped the direct install technicians achieve a higher installation rate because the residents were educated on the program and more receptive to the energy efficiency products.

- **Targeted Outreach to HVAC Trade Allies.** Program representatives informed and recruited participation from trade allies for a Furnace Tune-Up Program. This program was offered at low or no cost to the owner or tenant. Outreach included orientation meetings and training of trade allies to perform and communicate HVAC tune-up benefits. Program representatives also worked directly with property owners to schedule and coordinate the furnace tune-up and other direct installation measures for individual living units. Due to the incentives available for this measure, several trade allies were able to hire additional staff to support the furnace tune-up portion of their business.
- **Direct Installs.**
  - **Standard Direct Install:** Program representatives identified interested property owners and scheduled appointments for the free installation of energy-saving devices in the individual living units and common areas. In 2013, three new direct install offerings were added to the Multifamily Program: LED 60-watt equivalent replacement bulbs, LED/CFL candelabra bulbs, and LED exit signs. The installation crews were trained on the technical and educational benefits of all of the energy-saving devices installed. In addition, educational materials describing the work performed and promoting the energy-saving benefits of the installed items were left in each of the living units. The Multifamily Program contributed to market transformation by installing 28,680 screw-in LED bulbs in 2013.
  - **Pipe Wrap:** Property owners also were offered pipe wrap insulation on unwrapped domestic hot water piping in both common areas and in-unit areas. The insulating pipe wrap prevented heat loss through the piping in unconditioned spaces. The program was able to install up to 500 linear feet of pipe wrap for every domestic water heater. In 2013, the Multifamily Program installed 12,018 linear feet of pipe wrap.
- **Prescriptive and Custom Programs.** Going beyond the direct installation of low-cost measures and to help building owners continue to reduce their energy use and costs, program representatives conducted site assessments to help target common high-efficiency retrofit opportunities. Opportunities for energy efficiency improvements would then be presented to the building owner in an effort to encourage participation in the prescriptive and custom portion of the program. In 2013, more than 105 projects received nearly \$300,000.
- **Comprehensive Whole Building Program.** The Comprehensive Whole Building Program was developed to encourage and address large improvement projects that reduced a significant percentage of the property's overall energy use. Qualifying projects needed to include measures from at least two energy-saving measure categories and show a reduction in the overall energy use of the building of at least 10%. The Multifamily Program team used building energy

modeling to provide a customized estimate of the yearly energy savings expected after the recommended retrofits were complete. Incentives were then awarded based on the level and potential of energy savings. Higher incentives were provided based on energy-saving tiers of 10-19%, 19-29%, and 30%+.

- **Collaboration Efforts.** Beginning in September 2011, Consumers Energy and DTE began coordinating multifamily direct install projects in single-fuel service territories. This collaborative effort continued in 2013 and resulted in a total of 11,772 direct install units at 113 properties that had both Consumers Energy and DTE as their utility provider.
- **Program Operations.** The following implementation-related administrative requirements, were handled by the implementation contractor:
  - Marketing and educational materials
  - Field services including direct install of products and QA/QC inspections
  - Product ordering and inventory
  - Data tracking and reporting
  - Investment tracking and reporting
  - Prescriptive and custom application processing
  - Call Center services
  - Trade ally and customer outreach/training
  - Customer satisfaction/Problem resolution
  - Engineering support and energy modeling

## Marketing Strategy

A highly targeted marketing strategy was employed in 2013. Recruitment efforts targeted property management companies in an effort to secure agreements to address multiple properties through a single point of contact before targeting owners and managers of individual properties.

A targeted marketing strategy with property owners and management companies increased awareness of the Consumers Energy Multifamily Program offerings. The targeted marketing approach focused on specific measures and specific target markets. Based on these targets, direct mail campaigns were created, program collateral was designed, and recognition of program participants was generated.

Marketing and outreach strategies included:

- In-person visits by program representatives
- Walk-through energy assessments of properties to encourage participation in the direct install, prescriptive and custom measures
- Targeted advertising in trade organization and association publications
- Outreach to property management associations to recruit assistance in distributing information about the program through existing channels
- Direct mailings promoting the program offerings and benefits
- Utilizing our trade ally network to promote and distribute information about the program
- Trade ally recognition awards
- Redesigned Multifamily Program Catalog

As market penetration of direct install measures increases, program staff has identified additional energy saving opportunities to meet program goals. In 2013, there was a greater focus on prescriptive and custom measures, going beyond direct install and introducing a more targeted marketing approach.

|  | <p>The 2013 Program Catalog was expanded to create a more complete overview of all the program offerings. Included in the 2013 catalog were descriptions of all direct install product offerings, prescriptive and custom measures, efficiency requirements, and all of the necessary forms and worksheets necessary to submit rebate applications.</p>  |                 |      |   |      |  |      |  |      |
|--|--|-----------------|------|---|------|--|------|--|------|
| Milestones   | <table> <tr> <th>Major Milestone</th><th>Date</th></tr> <tr> <td>Launched redesigned Multifamily Program Catalog</td><td>3/13</td></tr> <tr> <td>Increased market transformation by switching from direct install CFLs in individual units to direct install LEDs</td><td>3/13</td></tr> <tr> <td>Launched Direct Install Furnace Tune-Up Initiative</td><td>4/13</td></tr> </table>   | Major Milestone | Date | Launched redesigned Multifamily Program Catalog | 3/13 | Increased market transformation by switching from direct install CFLs in individual units to direct install LEDs | 3/13 | Launched Direct Install Furnace Tune-Up Initiative | 4/13 |
| Major Milestone  | Date   |                 |      |   |      |  |      |  |      |
| Launched redesigned Multifamily Program Catalog  | 3/13   |                 |      |   |      |  |      |  |      |
| Increased market transformation by switching from direct install CFLs in individual units to direct install LEDs | 3/13   |                 |      |   |      |  |      |  |      |
| Launched Direct Install Furnace Tune-Up Initiative   | 4/13   |                 |      |   |      |  |      |  |      |
| EM&V Strategy  | <p>The following evaluation activities were performed for the Multifamily Direct Install Program in 2013.</p> <p><b>Evaluability Assessment:</b> As the program focused on increased common area savings opportunities, including comprehensive, multi-measure efficiency upgrades and the utilization of a building energy simulation model, an evaluability assessment was conducted. The assessment included a review of: data collection protocols; development of model inputs; model algorithms; calibration approaches; and assumption sensitivity. Guidelines for evaluable and accurate modeling were developed.</p> <p><b>Benchmarking and Best Practices Study:</b> The Multifamily program was benchmarked against 16 other utility programs that were of similar size or geography; identified as exemplary programs, (e.g., designated by the American Council for an Energy Efficient Economy); offered similar measures (including both direct install measures and common area measures). The benchmarking sought to compare programs in terms of the magnitude of savings, the comprehensiveness and diversity of measures offered through the program, and cost-effectiveness. In addition, the analysis identified best practices for effectively addressing barriers faced by this hard-to-reach market segment in order to achieve comprehensive energy savings.</p> |                 |      |   |      |  |      |  |      |
| Consumers Energy Administrative Requirements   | <p>Consumers Energy staff were responsible for general administrative oversight of the program portfolio including:</p> <ul style="list-style-type: none"> <li>• Management of the implementation contractor</li> <li>• Coordination of marketing strategy/public relations among programs and market sectors</li> <li>• Coordination of all educational services</li> <li>• Data warehousing</li> <li>• Management of key performance metrics and reporting</li> <li>• Goal achievement within investment</li> </ul>  |                 |      |   |      |  |      |  |      |
| Participation  | <p>Thanks to a greater focus on LED and Pipe Wrap, the Consumers Energy Multifamily Program experienced excellent participation in the direct install portion</p>  |                 |      |   |      |  |      |  |      |

of the program in 2013. Below are the total quantities of products installed by the Business Multifamily Program technicians in 2013.

| <b>Business Direct Install Product Count</b> |   |
|--|---|
| <b>In-Unit Direct Install Measure</b>        | <b>Number of Installed Measures in 2013</b> |
| CFLs   | 13,738                                      |
| LED Candelabra Bulbs                         | 2,727                                       |
| Low-Flow Showerhead                          | 3,053                                       |
| Faucet Aerator                               | 6,107                                       |
| Pipe Wrap (ft.) Common Area                  | 12,018                                      |

- Prescriptive and Custom Projects: 105 projects received incentives through the multifamily prescriptive and custom application.
- Comprehensive Whole Building Retrofits: In 2013, five comprehensive projects were completed.

### Investment

|          | <b>2013 Actual</b> | <b>2013 Plan</b> |
|----------|--------------------|------------------|
| Electric | \$391,573          | N/A              |
| Gas      | \$295,176          | N/A              |
| Total    | \$686,749          | N/A              |

### Energy Savings

|     | <b>2013 Actual</b> | <b>2013 Actual w/ LLES Multiplier</b> | <b>2013 Plan</b> |
|-----|--------------------|---------------------------------------|------------------|
| MWh | 4,317              | 4,576                                 | N/A              |
| MW  | 0.4                | 0.4                                   | N/A              |
| Mcf | 28,218             | 30,823                                | N/A              |

### Benefit-Cost Test Results

| <b>Benefit-Cost Test</b> | <b>B/C Ratio</b> |
|--------------------------|------------------|
| Utility Cost Test        | 4.92             |
| Total Resource Cost Test | 4.92             |
| Participant Test         | -                |
| Rate Impact Measure      | 0.50             |



## 6.4 Business Pilot Programs

### 6.4.1 Business Pilots – Multiple Measure Bonus

| Program             | Business Pilots – Multiple Measure Bonus   |
|---------------------|--|
| Objective           | <p>The objective of this pilot was to implement a bonus incentive strategy to motivate customers to pursue deeper energy savings by implementing multiple measures at the same time.</p>   |
| Target Market       | <p>Commercial and/or industrial natural gas and/or electric customers pursuing multiple measures within the Consumers Energy Business Solutions Programs.</p>  |
| Program Duration    | <p>This pilot was an element of the program portfolio that was introduced for program performance in the Michigan market mid-year 2012. It continued as a pilot program in 2013.</p>   |
| Program Description | <p>Customers pursuing the bonus incorporate two or more categories of energy saving measures into one project. By doing so, the customer will create a more significant reduction in energy usage than those only pursuing energy savings from a single measure with a quick return on investment. The intent of this program was to evaluate the impact a bonus incentive had on influencing customers to install multiple measures and technologies, ultimately pursuing a “deep-dive” energy efficiency project.</p> <p>If the customer meets the program requirements, they may be eligible to receive a 15% bonus incentive of the total, paid application incentive amount of their Business Solutions program application. For the application to qualify the customer had to meet the customer eligibility requirements, and submit the applicable Business Solutions Program application:</p> <ul style="list-style-type: none"> <li>• The measure category submitted with the highest incentive was used to measure incentive eligibility. If the sum of all additional measure categories listed on the application equaled at least 25 % of the measure category with the highest incentive, the customer qualified for a 15% bonus incentive based on the total, paid application incentive.</li> <li>• The measure categories defined in the Business Solutions Program applications are as follows: <ul style="list-style-type: none"> <li>• Lighting</li> <li>• HVAC Equipment</li> <li>• Variable Frequency Drives</li> <li>• Compressed Air</li> <li>• Energy Recovery</li> <li>• Pipe Insulation</li> <li>• HVAC Controls</li> <li>• Domestic Hot Water</li> <li>• Power Management</li> <li>• Tune-Up/Maintenance</li> </ul> </li> </ul> |



|   | <ul style="list-style-type: none"> <li>• Commercial Kitchen &amp; Refrigeration</li> <li>• Building Envelope</li> <li>• Custom</li> </ul>  |                       |                        |   |  |
|---|--|-----------------------|------------------------|---|--|
| <b>Program Logic</b>  | <p>Following is a list of the primary barriers in this market and the program elements that addressed them:</p> <table> <tr> <th><b>Market Barrier</b></th><th><b>Program Element</b></th></tr> <tr> <td> <ul style="list-style-type: none"> <li>• Persuading customers to pursue multiple measures, which can potentially involve more of an up-front financial commitment</li> <li>• Marketing the message to the end user</li> <li>• Find the trade allies who can perform turn-key projects with multiple measures</li> </ul> </td><td> <ul style="list-style-type: none"> <li>• Incentive levels that will make it possible for customers to pursue more measures</li> <li>• Using combination of outreach staff and mass marketing</li> <li>• Driving awareness through performance contractors</li> </ul> </td></tr> </table> | <b>Market Barrier</b> | <b>Program Element</b> | <ul style="list-style-type: none"> <li>• Persuading customers to pursue multiple measures, which can potentially involve more of an up-front financial commitment</li> <li>• Marketing the message to the end user</li> <li>• Find the trade allies who can perform turn-key projects with multiple measures</li> </ul> | <ul style="list-style-type: none"> <li>• Incentive levels that will make it possible for customers to pursue more measures</li> <li>• Using combination of outreach staff and mass marketing</li> <li>• Driving awareness through performance contractors</li> </ul> |
| <b>Market Barrier</b>   | <b>Program Element</b>   |                       |                        |   |  |
| <ul style="list-style-type: none"> <li>• Persuading customers to pursue multiple measures, which can potentially involve more of an up-front financial commitment</li> <li>• Marketing the message to the end user</li> <li>• Find the trade allies who can perform turn-key projects with multiple measures</li> </ul> | <ul style="list-style-type: none"> <li>• Incentive levels that will make it possible for customers to pursue more measures</li> <li>• Using combination of outreach staff and mass marketing</li> <li>• Driving awareness through performance contractors</li> </ul>   |                       |                        |   |  |
| <b>Incentive Strategy</b>   | <p>Customers' projects that met the program requirements received a bonus incentive of an additional 15% of the total paid application incentive for Multiple Measure Bonus categories that qualified under the Consumers Energy Business Solutions Program.</p>   |                       |                        |   |  |
| <b>Eligible Measures, Efficiency Requirements, Energy Savings &amp; Incentives</b>  | <p>Cost-effective natural gas and electrical efficiency measures that improve upon the program's baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives through this program.</p>  |                       |                        |   |  |
| <b>Implementation Strategy</b>  | <p>The program team provided staff to conduct program management, tracking, marketing, and implementation. A heavy focus on outreach and marketing were a key factor for the success of this program.</p>  |                       |                        |   |  |
| <b>Marketing Strategy</b>   | <p>Marketing was accomplished using mass marketing techniques as well as individual outreach by program staff. Marketing campaigns to both end users and trade allies, including direct mail postcards, digital Internet banner advertisements, and articles in an electronic newsletter were used to drive customer participation.</p> <p>The Consumers Energy Business Solutions outreach staff also promoted the program to all business customers, trade allies and Consumers Energy corporate account managers.</p>   |                       |                        |   |  |

## Milestones

| Major Milestone                   | Date     |
|-----------------------------------|----------|
| Launched Multiple Measure Program | 12/12/12 |
| Paid final 2013 projects          | 12/13/13 |

## EM&V Strategy

The following evaluation activities were performed for the 2013 Multiple Measures Pilot Program:

**Trade Ally Surveys:** The evaluation team surveyed 83 trade allies as part of the Trade Ally Engagement Panel study. As part of this panel, the evaluation team asked trade allies how they referred jobs to complementary firms and their interest in a trade ally incentive for completing multiple measure projects.

**Customer Surveys:** The evaluation team surveyed 95 Business Solutions participants regarding the Multiple Measures pilot. The objectives of this portion of the survey were to assess customer awareness of the Multiple Measure pilot, explore customers' reasons for not installing multiple measures, identify the best methods to market the program to customers, and examine if the bonus incentive influenced the customer's decision to install multiple measures.

## Participation

In 2013, a total of 115 projects were paid resulting in \$173,323 in bonus incentives to customers.

| Primary Fuel Type | Secondary Fuel Type | Number of Projects | Bonus Incentive |
|-------------------|---------------------|--------------------|-----------------|
| Electric          | Electric            | 73                 | \$66,476        |
| Electric          | Gas                 | 9                  | \$6,978         |
| Gas               | Electric            | 18                 | \$16,734        |
| Gas               | Gas                 | 15                 | \$87,135        |
| Total             |                     | 115                | \$173,323       |

## Investment & Energy Savings

Total investment and deemed energy savings for all business customer pilots are shown in Tables 4-4 and 4-5 on pages 13 and 14.

## 6.4.2 Business Pilots – Buy Michigan

| Buy Michigan Pilot Program  |   |                |                 |   |   |   |  |   |   |
|---|---|----------------|-----------------|---|---|---|--|---|---|
| Program   |   |                |                 |   |   |   |  |   |   |
| Objective   | The Buy Michigan Pilot Program was designed to study the effects of creating a bonus for participants in the Consumers Energy Business Solutions Business Program that installed an energy efficient product manufactured in Michigan.  |                |                 |   |   |   |  |   |   |
| Target Market   | Commercial and/or industrial natural gas and/or electric customers purchasing a Michigan manufactured product and submitting a Consumers Energy Business Solutions program application.   |                |                 |   |   |   |  |   |   |
| Program Duration  | This pilot was introduced in the Michigan market during the 4 <sup>th</sup> quarter of 2012, and continued through the end of 2013.   |                |                 |   |   |   |  |   |   |
| Program Description   | <p>The customer submits a Business Solutions Program application and an affidavit from the manufacturer that complies with the following condition:</p> <ul style="list-style-type: none"><li>At least 50% of the cost to manufacture and assemble this product (exclusive of packaging) is performed in the state of Michigan.</li></ul> <p>Upon approval of the application and affidavit, the customer qualified for a 15% bonus of the total incentive of the measure that is Michigan made. The bonus is intended to drive customer’s participation in the Consumers Energy Business Solutions programs to purchase their equipment and/or materials locally, ultimately attracting and expanding business opportunities in the state of Michigan.</p> <p>In order to qualify the customer must meet the customer eligibility requirements, and submit a Business Solutions program application that includes a copy of the manufacturer affidavit and specification sheets for the qualifying products.</p> |                |                 |   |   |   |  |   |   |
| Program Logic   | <p>Following is a list of the primary barriers in this market and the program elements that addressed them:</p> <table><tr><th>Market Barrier</th><th>Program Element</th></tr><tr><td><ul style="list-style-type: none"><li>Persuading customers to pursue the bonus, which can potentially involve more of an up-front time commitment to seek out qualifying products and manufacturers</li></ul></td><td><ul style="list-style-type: none"><li>Indication on the trade ally list which manufacturers qualify</li></ul></td></tr><tr><td><ul style="list-style-type: none"><li>Marketing the message to the end user</li></ul></td><td><ul style="list-style-type: none"><li>Using combination of outreach staff and mass marketing</li></ul></td></tr><tr><td><ul style="list-style-type: none"><li>Find the manufacturers that</li></ul></td><td><ul style="list-style-type: none"><li>Driving awareness through</li></ul></td></tr></table>   | Market Barrier | Program Element | <ul style="list-style-type: none"><li>Persuading customers to pursue the bonus, which can potentially involve more of an up-front time commitment to seek out qualifying products and manufacturers</li></ul> | <ul style="list-style-type: none"><li>Indication on the trade ally list which manufacturers qualify</li></ul> | <ul style="list-style-type: none"><li>Marketing the message to the end user</li></ul> | <ul style="list-style-type: none"><li>Using combination of outreach staff and mass marketing</li></ul> | <ul style="list-style-type: none"><li>Find the manufacturers that</li></ul> | <ul style="list-style-type: none"><li>Driving awareness through</li></ul> |
| Market Barrier  | Program Element   |                |                 |   |   |   |  |   |   |
| <ul style="list-style-type: none"><li>Persuading customers to pursue the bonus, which can potentially involve more of an up-front time commitment to seek out qualifying products and manufacturers</li></ul> | <ul style="list-style-type: none"><li>Indication on the trade ally list which manufacturers qualify</li></ul>   |                |                 |   |   |   |  |   |   |
| <ul style="list-style-type: none"><li>Marketing the message to the end user</li></ul>   | <ul style="list-style-type: none"><li>Using combination of outreach staff and mass marketing</li></ul>  |                |                 |   |   |   |  |   |   |
| <ul style="list-style-type: none"><li>Find the manufacturers that</li></ul>   | <ul style="list-style-type: none"><li>Driving awareness through</li></ul>   |                |                 |   |   |   |  |   |   |

|   | produce products that meet our specifications and are made in Michigan  | manufacturers and supply chains |                 |      |                                     |       |                          |       |
|---|---|---------------------------------|-----------------|------|-------------------------------------|-------|--------------------------|-------|
| Incentive Strategy  | Customers whose projects met the program requirements received a bonus incentive of an additional 15% of the normal measure incentive paid under the Consumers Energy Business Solutions Program.   |                                 |                 |      |                                     |       |                          |       |
| Eligible Measures, Efficiency Requirements, Energy Savings & Incentives | Cost-effective natural gas and electrical efficiency measures that improve upon the program’s baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives through this program.  |                                 |                 |      |                                     |       |                          |       |
| Implementation Strategy   | The program team provided staff to conduct program management, tracking, marketing, and implementation. A heavy focus on outreach and marketing was a key factor for the success of this program.   |                                 |                 |      |                                     |       |                          |       |
| Marketing Strategy  | <p>Marketing was accomplished using mass marketing techniques as well as individual outreach by program staff.</p> <p>Marketing campaigns to both end users and trade allies included direct mail postcards, digital Internet banner advertisements, and articles in an electronic newsletter to drive customer participation.</p> <p>The Consumers Energy Business Solutions outreach staff also promoted the program to all business customers, trade allies and corporate account managers. Marketing campaigns to both end users and trade allies including direct mail postcards, digital Internet banner advertisements, and articles in an electronic newsletter used to drive customer participation.</p> |                                 |                 |      |                                     |       |                          |       |
| Milestones  | <table><tr><th>Major Milestone</th><th>Date</th></tr><tr><td>Launched Buy Michigan Bonus Program</td><td>12/12</td></tr><tr><td>Paid final 2013 projects</td><td>12/13</td></tr></table>  |                                 | Major Milestone | Date | Launched Buy Michigan Bonus Program | 12/12 | Paid final 2013 projects | 12/13 |
| Major Milestone   | Date  |                                 |                 |      |                                     |       |                          |       |
| Launched Buy Michigan Bonus Program                                     | 12/12   |                                 |                 |      |                                     |       |                          |       |
| Paid final 2013 projects  | 12/13   |                                 |                 |      |                                     |       |                          |       |
| EM&V Strategy   | <p>The following evaluation activities were performed for the 2013 Pilot Buy Michigan Program.</p> <p><b>Customer Surveys:</b> The evaluation team conducted online surveys with 367 commercial and industrial customers regarding the Buy Michigan Pilot Program as part of the Customer Engagement Panel. The objectives of this survey included assessing awareness of the pilot program, identifying sources used by customers for finding Michigan-made products, and estimating customers’ willingness to pay a premium for local energy efficient equipment.</p> <p><b>Best Practice Review:</b> The evaluation team conducted a best practice</p>   |                                 |                 |      |                                     |       |                          |       |

|   |  |
|---|--|
|   | review of similar programs implemented across the nation. The objective of this research was to identify any successful approaches used elsewhere to provide short-term feedback to program staff regarding program design.  |
| <b>Consumers Energy Administrative Requirements</b> | Consumers Energy staff were responsible for oversight of the implementation contractor and providing funds for administration, marketing, and implementation. The implementation contractor's responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, site verification of installed measures, and program goal achievement.  |
| <b>Participation</b>                                | <p>In 2013, a total of 16 manufacturers registered with the program and 8 were active participants (*).</p> <ul style="list-style-type: none"> <li>• AlumaLight*</li> <li>• Great Lakes LED*</li> <li>• LightCorp*</li> <li>• Lumecon*</li> <li>• Lumerica*</li> <li>• Detroit Radiant*</li> <li>• SourceOne LED*</li> <li>• ZonLED*</li> <li>• Sky Blade</li> <li>• Toggled</li> <li>• Best Lights</li> <li>• Commercial Retrofit –CBR Insulation</li> <li>• Everlast*</li> <li>• Duro-Last Roofing</li> <li>• Reihl Efficient</li> <li>• Kimberly LED Lighting</li> </ul> <p>The program paid 87 project bonuses, awarding \$75,846 in incentives.</p> |
| <b>Investment &amp; Energy Savings</b>              | Total investment and deemed energy savings for all business customer pilots are shown in Tables 4-4 and 4-5 on pages 13 and 14.  |

### 6.4.3 Business Pilots – Agriculture

| Business Pilots: Agriculture   |   |                |                 |   |   |  |  |
|--|---|----------------|-----------------|---|---|--|--|
| Program  |   |                |                 |   |   |  |  |
| Objective  | The Agriculture Pilot Program was designed to offer both commercial and residential agriculture customers incentives for energy-saving measures included within the Business Solutions Program. By utilizing funding from the Consumers Energy residential program, the Consumers Energy Business Solutions Program was able to offer commercial incentives to residential farms that had industrial-grade equipment and operations.  |                |                 |   |   |  |  |
| Target Market  | Commercial and/or industrial natural gas and/or electric customers or residential electric and/or natural gas customers on an eligible farm rate code, operating a full-time agricultural operation at the facility where the measures were being installed.  |                |                 |   |   |  |  |
| Program Duration   | This pilot was an element of the program portfolio that was introduced in the Michigan market in 2011. It continued phase two in 2012 and completed its final year as a pilot in 2013.  |                |                 |   |   |  |  |
| Program Description  | <p>This program provided participating customers access to prescriptive and custom incentives through the Business Solutions Program for both commercial and residential agricultural farm customers.</p> <p>This program collaborated with Michigan State University’s Farm Audit Program to offer incentives to customers who had an audit completed at their facility. Program staff worked with MSU to collect leads generated by the MSU Farm Audit Program, funded through the USDA REAP Program. By having access to the audit reports of farms that have participated in the MSU/REAP program, program staff were able to create a targeted approach to assist customers applying for incentives offered through the Business Solutions Program. By combining resources of the residential and commercial programs, the agriculture sector had greater access to participate in Consumers Energy’s efficiency programs.</p> |                |                 |   |   |  |  |
| Program Logic  | <p>Following is a list of the primary barriers in this market and the program elements that addressed them:</p> <table><thead><tr><th>Market Barrier</th><th>Program Element</th></tr></thead><tbody><tr><td><ul style="list-style-type: none"><li>Incentivizing residential agriculture customers for energy efficient upgrades</li></ul></td><td><ul style="list-style-type: none"><li>Offering commercial/industrial types of incentives to these customers</li></ul></td></tr><tr><td><ul style="list-style-type: none"><li>Developing trust with these customers who are typically reluctant to share proprietary information about their operation</li></ul></td><td><ul style="list-style-type: none"><li>Utilizing pre-existing relationships between MSU and the agricultural industry</li></ul></td></tr></tbody></table>   | Market Barrier | Program Element | <ul style="list-style-type: none"><li>Incentivizing residential agriculture customers for energy efficient upgrades</li></ul> | <ul style="list-style-type: none"><li>Offering commercial/industrial types of incentives to these customers</li></ul> | <ul style="list-style-type: none"><li>Developing trust with these customers who are typically reluctant to share proprietary information about their operation</li></ul> | <ul style="list-style-type: none"><li>Utilizing pre-existing relationships between MSU and the agricultural industry</li></ul> |
| Market Barrier   | Program Element   |                |                 |   |   |  |  |
| <ul style="list-style-type: none"><li>Incentivizing residential agriculture customers for energy efficient upgrades</li></ul>  | <ul style="list-style-type: none"><li>Offering commercial/industrial types of incentives to these customers</li></ul>   |                |                 |   |   |  |  |
| <ul style="list-style-type: none"><li>Developing trust with these customers who are typically reluctant to share proprietary information about their operation</li></ul> | <ul style="list-style-type: none"><li>Utilizing pre-existing relationships between MSU and the agricultural industry</li></ul>  |                |                 |   |   |  |  |

|  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>• Monetary resources and financing to pursue projects</li> <li>• Audit incentive as well as financial incentives</li> </ul>   |
| <b>Incentive Strategy</b>  | <p><b>Audit Incentive</b></p> <p>The pilot provided a rebate of up to \$500 for the customer’s portion of the energy audit performed by MSU/REAP. Typical audit costs were \$1,700 per farm for small- and medium-size agricultural operations. For large operations, the farm paid the incremental difference. The requirements to receive the rebate included completion of a Rural Farm Energy Audit Agreement application, an invoice from the auditor valued at \$500 or more, and submission of the summary of energy conservation measures from the audit.</p> <p><b>Measure Incentives</b></p> <p>This program also provided participating customers access to prescriptive and custom incentives through the Business Solutions Program for both commercial and residential customers. Residential agricultural customers were an integral portion of this pilot, as many farms were served under a residential rate code, but had business operations.</p> |
| <b>Eligible Measures, Efficiency Requirements, Energy Savings &amp; Incentives</b> | <p>Cost-effective natural gas and electric efficiency measures that improved upon the program’s baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives through this program.</p>   |
| <b>Implementation Strategy</b>   | <p>The program team provided staff to conduct program management, tracking, marketing, and implementation. Collaboration with MSU’s REAP Audit Program was critical to the success of this program. A heavy focus on outreach was crucial to identify eligible residential and commercial customers.</p>   |
| <b>Marketing Strategy</b>  | <p>Marketing was accomplished using mass marketing techniques as well as individual outreach by program staff, in particular the Agriculture Pilot project manager.</p> <p>Marketing campaigns to customers such as dairy farmers, greenhouses and grain processors included direct mail postcards, newspaper ads, digital Internet banner advertisements, and billboards throughout the Consumers Energy service territory to drive customer participation.</p> <p>The Consumers Energy Business Solutions outreach staff also promoted the program to all agricultural customer segments, trade allies and CAMs.</p>   |

## Milestones

| Major Milestone                         | Date  |
|---|-------|
| Launched 2013 Agriculture Pilot Program | 1/13  |
| Paid final 2013 projects                | 12/13 |

## EM&V Strategy

The following evaluation activities were performed for the 2013 Pilot Agricultural Program.

**Agricultural Customer Surveys:** The evaluation team conducted 29 online surveys with participating and nonparticipating agricultural customers. The objectives of these surveys were to assess satisfaction with the pilot, identify potential barriers to participation, and evaluate the impact of the audits provided for future recommendations.

**Auditor Interviews:** The evaluation team conducted 16 interviews with representatives of the Michigan State University audit team, including three program staff, three auditors, and 10 trade allies. The objectives of these interviews were to determine the barriers to agricultural customers' participation and the most successful strategies used to encourage participation.

## Participation

| 2013 Agriculture Program Results |           |                      |                          |                            |
|----------------------------------|-----------|----------------------|--------------------------|----------------------------|
| Program Year/Type                | Audits    | Project Applications | Audit Incentives Paid \$ | Project Incentives Paid \$ |
| 2013 Residential                 | 12        | 28                   | \$ 11,000                | \$ 67,238                  |
| 2013 Commercial                  | 20        | 95                   | \$ 9,000                 | \$ -                       |
| <b>Total 2013</b>                | <b>32</b> | <b>111</b>           | <b>\$ 20,000</b>         | <b>\$ 67,238</b>           |

## Consumers Energy Administrative Requirements

Consumers Energy was responsible for oversight of the implementation contractor and providing funds for administration, marketing, and implementation. The implementation contractor's responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, site verification of installed measures, and program goal achievement.

## Investment & Energy Savings

Total investment and deemed energy savings for all business customer pilots are shown in Tables 4-4 and 4-5 on pages 13 and 14.



## 6.4.4 Business Pilots – Building Performance with ENERGY STAR®

| Program                    | <b>Business Pilots – Building Performance with ENERGY STAR®</b>   |
|----------------------------|---|
| <b>Objective</b>           | <p>The Building Performance with ENERGY STAR® for K-12 Schools Pilot Program focused on buildings owned and operated by school districts. The program staff provided services to school districts to benchmark their buildings using Environmental Protection Agency's Portfolio Manager, provided a comprehensive energy assessment performed by a third-party engineering firm on one of the buildings in their district, and worked with school officials to develop an energy-savings goal, and an energy management policy and plan. This program aided the school in developing an energy team comprised of a school business official or superintendent, as well as representatives from the departments within the district.</p>  |
| <b>Target Market</b>       | <p>Consumers Energy commercial/industrial customers that are K-12 school districts with three or more school buildings that received electric and/or natural gas services.</p>  |
| <b>Program Duration</b>    | <p>This pilot was an element of the program portfolio that was introduced in the Michigan market in 2012 and continued through the 2013 program year.</p>   |
| <b>Program Description</b> | <p>The pilot was designed to assist school districts in developing an energy management plan that would help direct their efforts to become more energy efficient. Energy teams, comprised of both school officials and program staff were assembled, to develop a roadmap for strategic implementation of improvement measures using a mix of low-cost/no-cost measures, best practices and capital projects.</p> <p>Customers were eligible to receive technical assistance from program staff with an ENERGY STAR® portfolio manager, a third-party assessment, and assistance developing an energy management plan for their district. The program was structured to follow ENERGY STAR® building performance protocol, including:</p> <ul style="list-style-type: none"> <li>• Step 1: Benchmark all buildings within the district using EPA's Portfolio Manager</li> <li>• Step 2: Work with a multi-departmental team to determine the energy and cost-saving goals</li> <li>• Step 3: Select and perform an energy assessment on the worst performing building based on the EPA's scoring. This assessment is done by a third-party assessor with experience performing energy audits for commercial and institutional buildings</li> <li>• Step 4: Use the assessment results to develop a roadmap for improvement and extrapolate the results throughout the district</li> <li>• Step 5: Update Portfolio Manager to track improvements and energy</li> </ul> |

|  | <p>savings</p> <ul style="list-style-type: none"> <li>• Step 6: Re-benchmark buildings to show savings</li> </ul> <p>As part of this program, each district made the commitment to spend at least \$5,000 to implement some of the low-cost/no-cost measures identified as part of the energy assessment. Recommendations within the plan typically included:</p> <ul style="list-style-type: none"> <li>• Procurement practices for new equipment</li> <li>• Low- to no-cost operation and maintenance strategies, which can potentially account for 5-15% energy savings</li> <li>• Potential capital improvement projects including associated costs and payback analysis</li> </ul> |                       |                        |  |  |
|--|---|-----------------------|------------------------|--|--|
| <b>Program Logic</b>   | <p>Following is a list of the primary barriers in this market and the program elements that addressed them:</p> <table> <tr> <th><b>Market Barrier</b></th><th><b>Program Element</b></th></tr> <tr> <td> <ul style="list-style-type: none"> <li>• Availability of financial funds and resources within school districts to implement projects</li> <li>• Getting the time commitment of the decision maker within the district</li> </ul> </td><td> <ul style="list-style-type: none"> <li>• Offering services and incentives to these customers</li> <li>• A business official or superintendent is required to participate on the energy team</li> </ul> </td></tr> </table>         | <b>Market Barrier</b> | <b>Program Element</b> | <ul style="list-style-type: none"> <li>• Availability of financial funds and resources within school districts to implement projects</li> <li>• Getting the time commitment of the decision maker within the district</li> </ul> | <ul style="list-style-type: none"> <li>• Offering services and incentives to these customers</li> <li>• A business official or superintendent is required to participate on the energy team</li> </ul> |
| <b>Market Barrier</b>  | <b>Program Element</b>  |                       |                        |  |  |
| <ul style="list-style-type: none"> <li>• Availability of financial funds and resources within school districts to implement projects</li> <li>• Getting the time commitment of the decision maker within the district</li> </ul> | <ul style="list-style-type: none"> <li>• Offering services and incentives to these customers</li> <li>• A business official or superintendent is required to participate on the energy team</li> </ul>  |                       |                        |  |  |
| <b>Incentive Strategy</b>  | <p>This pilot was available to a limited number of participants who met the eligibility criteria and the overall pilot goals. Customers accepted into the pilot received technical assistance and financial incentives.</p> <p>In addition to any incentives received from the Consumers Energy Business Solutions Program, participants were eligible to receive a bonus incentive from the Building Performance with ENERGY STAR® Pilot Program of \$5,000 for every 1% in energy reduction across the district, capped at \$50,000.</p>  |                       |                        |  |  |
| <b>Eligible Measures, Efficiency Requirements, Energy Savings, &amp; Incentives</b>  | <p>Cost-effective natural gas and electrical efficiency measures that improved upon the baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives through this program.</p>  |                       |                        |  |  |
| <b>Implementation Strategy</b>   | <p>The program team provided staff to conduct program management, tracking, marketing, and implementation. The program team also provided technical assistance services to participants, assisted participants with program requirements, conducted technical assistance and simulation services, performed quality control, and inspected measure installations.</p>   |                       |                        |  |  |

## Milestones

| Major Milestone  | Date  |
|--|-------|
| Launched 2013 Building Performance with ENERGY STAR® Pilot Program | 01/13 |
| Closed 2013 Pilot Program  | 12/13 |

## EM&V Strategy

The following evaluation activities were performed for the 2013 Pilot Building Performance with ENERGY STAR® Program.

**On-Site Interviews:** The evaluation team conducted three on-site interviews with program participants. The objectives of these interviews were to identify ways to improve the program's delivery and how, if at all, the program should be altered if expanded to a larger audience.

**Telephone Interviews:** The evaluation team conducted eight telephone interviews with program participants. The objectives of these interviews were to assess satisfaction with the various program components, identify the motivations for program participation and audit follow-through, and identify potential process improvements for program delivery.

**Desk Review of Audits:** The evaluation team conducted a desk review of three of the audit reports provided to participants. The objective of this review was to assess the quality and comprehensiveness of the audits in terms of specific recommendations and usability.

## Consumers Energy Administrative Requirements

Consumers Energy was responsible for oversight of the implementation contractor and providing funds for administration, marketing, and implementation. The implementation contractor's responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, site verification of installed measures, and program goal achievement.

## Participation

In 2012, this pilot worked with 11 school districts across Michigan. Of these, 51 buildings were benchmarked using ENERGY STAR® Portfolio Manager software. In 2013, these 11 districts continued in the pilot program, as this is a multi-year pilot offering. Of the original 11, five more completed the audit phase. Five new 2013 participants were registered, benchmarked, and audited, including another 65 buildings benchmarked through Portfolio Manager.

2013 was the second year of implementation and each district was at a different stage in the six-step process of the ENERGY STAR® protocol. From the total 16 participating districts, 2,038,450 kWh and 12,425 Mcf energy savings were identified, 493,480 kWh and 3,770 Mcf being low-cost/no-cost measures.

## Investment & Energy Savings

The Building Performance Pilot for the 2013 program year influenced 40% of the districts involved in the two years of the pilot to submit additional projects for the C&I Program. Over 20 Comprehensive Business Solutions projects of various sizes can be attributed to the 2012 and 2013 Building Performance participants. Many were exterior LED lighting and HVAC performance related. Implemented project savings are summarized below.

| Program Year | kWh Saved | Mcf Saved | Incentives Paid |
|--------------|-----------|-----------|-----------------|
| 2012         | 246,469   | 4,320     | \$28,715        |
| 2013         | 10,416    | 0         | \$751           |
| Total        | 256,885   | 4,320     | \$29,466        |

Total investment and deemed energy savings for all business customer pilots are shown in Tables 4-4 and 4-5 on pages 13 and 14.

## 6.4.5 Business Pilots – Refrigeration

| Program   | Business Pilots – Refrigeration   |                |                 |   |   |
|---|---|----------------|-----------------|---|---|
| <b>Objective</b>  | <p>The Refrigeration Pilot was intended to determine and study the best practices or process implementations at large commercial cold storage facilities. The Consumers Energy Business Solutions team provided technical services and financial incentives to customers through this program. Program staff helped customers identify opportunities for energy management to reduce energy consumption and associated costs.</p>   |                |                 |   |   |
| <b>Target Market</b>  | <p>Consumers Energy electric or electric and natural gas customers operating a year-round commercial or industrial cold storage facility.</p>   |                |                 |   |   |
| <b>Program Duration</b>   | <p>This pilot was an element of the program portfolio that was introduced in the Michigan market in 2012 and continued through the end of the 2013 program year.</p>  |                |                 |   |   |
| <b>Program Description</b>  | <p>The objective of the refrigeration pilot was to help customers identify operational and maintenance issues resulting in inefficiencies and to identify opportunities to upgrade refrigeration systems to realize greater energy savings.</p>   |                |                 |   |   |
| <b>Program Logic</b>  | <p>Following is a list of the primary barriers in this market and the program elements that addressed them:</p> <table> <tr> <th data-bbox="524 1136 724 1167">Market Barrier</th><th data-bbox="946 1136 1170 1167">Program Element</th></tr> <tr> <td data-bbox="540 1213 911 1423"> <ul style="list-style-type: none"> <li>• Unfamiliarity of low-/no-cost measures that would pertain to refrigeration</li> <li>• Unfamiliarity of the trade ally market associated with this niche</li> </ul> </td><td data-bbox="954 1213 1357 1423"> <ul style="list-style-type: none"> <li>• Inclusion of low-/no-cost expenditure clause in the application</li> <li>• Comprehensive audit offering to help identify potential firms that work in this market</li> </ul> </td></tr> </table> | Market Barrier | Program Element | <ul style="list-style-type: none"> <li>• Unfamiliarity of low-/no-cost measures that would pertain to refrigeration</li> <li>• Unfamiliarity of the trade ally market associated with this niche</li> </ul> | <ul style="list-style-type: none"> <li>• Inclusion of low-/no-cost expenditure clause in the application</li> <li>• Comprehensive audit offering to help identify potential firms that work in this market</li> </ul> |
| Market Barrier  | Program Element   |                |                 |   |   |
| <ul style="list-style-type: none"> <li>• Unfamiliarity of low-/no-cost measures that would pertain to refrigeration</li> <li>• Unfamiliarity of the trade ally market associated with this niche</li> </ul> | <ul style="list-style-type: none"> <li>• Inclusion of low-/no-cost expenditure clause in the application</li> <li>• Comprehensive audit offering to help identify potential firms that work in this market</li> </ul>   |                |                 |   |   |
| <b>Incentive Strategy</b>   | <p>Eligible customer projects were incentivized following the Custom Business Solutions Program guidelines and specifications. Custom projects were incentivized at the current program year custom rate.</p>   |                |                 |   |   |
| <b>Eligible Measures, Efficiency Requirements, Energy Savings &amp; Incentives</b>  | <p>Cost-effective natural gas and electric efficiency measures that improved upon the program's baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives.</p>   |                |                 |   |   |

## Implementation Strategy

The program team provided staff to conduct program management, tracking, marketing, and implementation. The program team also provided technical assistance services to participants, assisted participants with program requirements, conducted technical assistance and simulation services, performed quality control, and inspected measure installations.

## Marketing Strategy

Because this program was limited in scope, outreach was accomplished through the Consumer Energy corporate account managers (CAMs).

## Milestones

| Major Milestone                                      | Date  |
|--|-------|
| Launched 2013 Industrial Refrigeration Pilot Program | 01/13 |
| Program closed                                       | 9/13  |

## EM&V Strategy

No evaluation activity was performed during 2013.

## Consumers Energy Administrative Requirements

Consumers Energy staff was responsible for oversight of the implementation contractor and providing funds for administration, marketing, and implementation. The implementation contractor's responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, site verification of installed measures, and program goal achievement.

## Participation

During the 2012 program year, four audits were conducted for customer sites. In 2013, another four audits were conducted for a total of eight reports delivered to participating customers. Individual audit reports were delivered to each of the eight participating sites. Below is a summary of the potential measures identified through the eight audits.

During the 2012 program year, Phase 1 audits were performed for three customers, with reports completed in early stages 2013.

| Customers | Measures | Annual kWh Savings | Annual Savings \$ | Incremental Measure Cost | CE Incentive (\$) | Simple Payback (yrs) |
|-----------|----------|--------------------|-------------------|--------------------------|-------------------|----------------------|
| 8         | 36       | 4,640,565          | \$384,165         | \$1,265,325              | \$236,026         | 2.7                  |

## Investment & Energy Savings

Total investment and deemed energy savings for all business customer pilots are shown in Tables 4-4 and 4-5 on pages 13 and 14.

## 6.4.6 Business Pilots – Industrial Continuous Improvement

|                            |  |
|----------------------------|--|
| <b>Program</b>             | <b>Business Pilots – Industrial Continuous Improvement (ICIP)</b>  |
| <b>Objective</b>           | <p>This Industrial Continuous Improvements Pilot was designed to help industries integrate Energy Management Systems (EnMS) into continuous improvement processes to help reduce energy consumption, CO<sub>2</sub> emissions, and operational costs.</p> <p>The pilot program provided technical assistance and financial incentives to customers implementing the necessary strategies for ISO 50001, ENERGY STAR® for Industry and/or Superior Energy Performance (SEP) certification and resulting energy saving actions.</p>  |
| <b>Target Market</b>       | Industrial customers with electric and/or natural gas interested in pursuing ISO 50001 certification or ENERGY STAR® for Industry.   |
| <b>Program Duration</b>    | This pilot was an element of the program portfolio that was introduced in the Michigan market in 2012 and continued through the end of the 2013 program year.  |
| <b>Program Description</b> | <p>The Industrial Continuous Improvement Pilot (ICIP) was developed to help manufacturing companies in the Consumers Energy's service territory adopt Energy Management System practices to improve the energy performance of the facility.</p> <p>This program supports development of an EnMS: a set of organizational tools, systems and processes necessary for a holistic and systematic approach to achieve continuous improvement of energy performance, i.e., energy efficiency, use, consumption and intensity. Specifically, the pilot program provided technical assistance and financial incentives to customers implementing the necessary strategies for ISO 50001, ENERGY STAR® Challenge for Industry, and/or SEP certification and resulting energy-saving actions.</p> <p>The ICIP Program had two paths for customers to pursue based on company priorities and structure. Paths were available to help customers achieve ISO 50001 and optionally SEP or the ENERGY STAR® Challenge for Industry. Each path was structured with a two-phase delivery system and designed as follows.</p> <p><b>ISO 50001/SEP Path</b></p> <p>Consumers Energy offers incentives for large- and medium-sized industrial customers to achieve ISO 50001 certification, and (optionally) SEP Certification. Phase I offers the customer a better understanding of ISO 50001. During Phase I, the customer selected an energy manager, formulated an energy team, tracked energy consumption, developed an</p> |



energy policy and set a goal to improve the energy performance of the facility (typically 2% per year for the first three years). Phase I did not include financial incentives, however participating facilities received technical assistance in the form of training sessions and an analysis of current energy management practices in relation to ISO 50001.

During Phase II, the customer created energy action plans, pursued improvement opportunities and worked toward compliance and certification of ISO 50001. Customers received a focused energy audit aid with planning and implementation of the EnMS, and ISO 50001 compliance assistance. After ISO 50001 certification, medium sized customers qualify for 25% matching incentive funds for efficiency projects paid through the Consumers Energy Business Solutions Program. These matching funds were limited to a total of \$5,000. ISO 50001 does not recognize actual energy improvement. A customer received recognition for realized savings through SEP by employing a monitoring and verification protocol. SEP gave facilities a rating of Gold, Silver, or Platinum for achieving improvements of 5, 10, and 15%, respectively, during a three-year time period. Large customers qualified for incentives if SEP certification was achieved.

### **ENERGY STAR® Challenge for Industry Path**

Consumers Energy medium and large industrial customers also qualify for the ENERGY STAR® pathway. Phase I offered the customer a better understanding of the ENERGY STAR® Challenge for Industry. During Phase I, the customer selected an energy manager, formulated an energy team, tracked energy consumption, and developed an energy policy and set a goal to improve the energy performance of the facility by 10% within five years.

During Phase II, the customer created energy action plans, pursued improvement opportunities and worked toward compliance and certification of ENERGY STAR® Challenge for Industry. Customers received a focused energy audit aid with planning and implementation of the EnMS, and ENERGY STAR® compliance assistance. If a customer completed the Challenge in two years or less, a bonus incentive of 25% was paid for projects approved through the Commercial & Industrial Program during pilot participation. This bonus was limited to \$10,000 and was subject to the availability of funds.

## **Program Logic**

Following is a list of the primary barriers in this market and the program elements that addressed them:

| <b>Market Barrier</b>  | <b>Program Element</b>   |
|--|--|
| <ul style="list-style-type: none"> <li>Resource allocation of the facility staff to commit the time to the certification process</li> <li>Allocating funds to pursue capital intensive projects</li> </ul> | <ul style="list-style-type: none"> <li>Technical services and financial incentives to assist the customer</li> <li>Financial incentives to help offset the cost of upgrades</li> </ul> |



| <b>Incentive Strategy</b>  | <p>Large customers (&gt;5,000 MWh) achieving ISO 50001 certification received \$7,500. Matching funds for energy efficiency measures were not applicable. Those customers achieving SEP certification received up to \$22,500 (\$7,500 Silver, \$15,000 Gold, or \$22,500 Platinum) based on energy consumption. Incentives could total \$30,000 in addition to any Comprehensive Business Solutions incentives pursued.</p> <p>Medium customers (1,000 to 5,000 MWh) achieving ISO 50001 certification received \$3,000. Matching funds of 25% for EE measures completed, up to \$5,000 was available. The SEP certification is not applicable. Incentives could total \$8,000 in addition to any Comprehensive Business Solutions incentives pursued.</p> <p>Industrial customers of any size achieving the ENERGY STAR® Challenge for Industry were eligible for 25% matching funds for EE measures, up to \$10,000. Incentives could total \$8,000 in addition to any Comprehensive Business Solutions incentives pursued.</p> |                 |      |  |       |                                      |       |
|--|--|-----------------|------|--|-------|--------------------------------------|-------|
| <b>Eligible Measures, Efficiency Requirements, Energy Savings &amp; Incentives</b> | <p>Cost-effective natural gas and electric efficiency measures that improve upon the program's baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives through this program.</p>  |                 |      |  |       |                                      |       |
| <b>Implementation Strategy</b>   | <p>The program team provided staff to conduct program management, tracking, marketing, and implementation. The program team also provided technical assistance services to participants, assisted participants with program requirements, conducted technical assistance and simulation services, performed quality control, and inspected measure installations.</p>  |                 |      |  |       |                                      |       |
| <b>Marketing Strategy</b>  | <p>Because this program was limited in scope, outreach was accomplished through the CAMs.</p>  |                 |      |  |       |                                      |       |
| <b>Milestones</b>  | <table border="1"> <thead> <tr> <th>Major Milestone</th><th>Date</th></tr> </thead> <tbody> <tr> <td>Launched 2013 Industrial Continuous Improvements Pilot Program</td><td>01/13</td></tr> <tr> <td>Eight Energy Audit Reports delivered</td><td>12/13</td></tr> </tbody> </table>  | Major Milestone | Date | Launched 2013 Industrial Continuous Improvements Pilot Program | 01/13 | Eight Energy Audit Reports delivered | 12/13 |
| Major Milestone  | Date   |                 |      |  |       |                                      |       |
| Launched 2013 Industrial Continuous Improvements Pilot Program                     | 01/13  |                 |      |  |       |                                      |       |
| Eight Energy Audit Reports delivered   | 12/13  |                 |      |  |       |                                      |       |
| <b>EM&amp;V Strategy</b>   | <p>No evaluation activity was performed during 2013.</p>   |                 |      |  |       |                                      |       |
| <b>Consumers Energy Administrative Requirements</b>                                | <p>Consumers Energy staff were responsible for oversight of the implementation contractor and providing funds for administration, marketing, and implementation. The implementation contractor's responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, site verification of installed measures, and program goal achievement.</p>   |                 |      |  |       |                                      |       |

## Participation

Nine companies participated in the Industrial Continuous Improvement Pilot Program in 2013. Of the 16 participating companies, eight comprehensive audit reports were delivered during the 2013 program year. From the eight audit reports delivered, the following three technology categories represented almost 80% of the potential energy savings identified:

- Process – 28%
- Lighting – 25%
- Compressed Air – 25%

The table below represents the potential energy savings, cost savings, and payback value from the eight audit reports.

| Annual Electricity Savings (MWh) | Annual Natural Gas Savings (Mcf) | Annual Energy Cost Savings (\$/year) | Incremental Measure Cost (\$) | Consumers Energy Incentive (\$) | Simple Payback Period (years) |
|----------------------------------|----------------------------------|--------------------------------------|-------------------------------|---------------------------------|-------------------------------|
| 11,673                           | 138,902                          | \$1,464,914                          | \$3,662,711                   | \$1,296,526                     | 1.6                           |

Three of those companies qualified for the streamlined path and the other four qualified for the certification path.

## Investment & Energy Savings

Total investment and deemed energy savings for all business customer pilots are shown in Tables 4-4 and 4-5 on pages 13 and 14.

## 6.4.7 Business Pilots – Energy Check

| Program                    | Business Pilots – Energy Check  |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
|----------------------------|---|--------------------|--------|-------------------|-------------------|------|-------------|--------------|---------------|-----------------------|-------------|----------------------|-----------------|-----------------|-------------------|--------------------|----------------|----------------|-------------------------|--------------|-------------|--------------------|-------------------|-----------|------------|----------------|-------------------|-------------|------------------|
| <b>Objective</b>           | <p>The Energy Check Pilot was designed to touch a broad spectrum of small and medium business customers with individualized energy reports based on their facility's energy use. Energy Check is also intended to drive to higher participation in energy efficiency programs using a Web-based platform which offered detailed information of their energy use. Education, motivation and engagement were key factors in the success of this pilot, which also intended to deliver a broad positive marketing message to a sometimes underserved segment of Consumers Energy business customers.</p>   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| <b>Target Market</b>       | <p>The target markets for the first program year were Consumers Energy commercial electric or electric and natural gas customers with energy usage &lt;400,000 kWh/year in the following business sectors:</p> <table data-bbox="505 835 1104 1381"> <tbody> <tr> <td>Accounting Offices</td><td>Hotels</td></tr> <tr> <td>Automotive Repair</td><td>Insurance Offices</td></tr> <tr> <td>Bars</td><td>Laundromats</td></tr> <tr> <td>Barber Shops</td><td>Legal Offices</td></tr> <tr> <td>Beer, Wine and Liquor</td><td>Nail Salons</td></tr> <tr> <td>Chiropractic Offices</td><td>New Car Dealers</td></tr> <tr> <td>Clothing Stores</td><td>Physician Offices</td></tr> <tr> <td>Convenience Stores</td><td>Realty Offices</td></tr> <tr> <td>Dental Offices</td><td>Religious Organizations</td></tr> <tr> <td>Dry Cleaners</td><td>Restaurants</td></tr> <tr> <td>Elementary Schools</td><td>Secondary Schools</td></tr> <tr> <td>Fast Food</td><td>Snack Bars</td></tr> <tr> <td>Grocery Stores</td><td>Trade Contractors</td></tr> <tr> <td>Hair Salons</td><td>Used Car Dealers</td></tr> </tbody> </table> | Accounting Offices | Hotels | Automotive Repair | Insurance Offices | Bars | Laundromats | Barber Shops | Legal Offices | Beer, Wine and Liquor | Nail Salons | Chiropractic Offices | New Car Dealers | Clothing Stores | Physician Offices | Convenience Stores | Realty Offices | Dental Offices | Religious Organizations | Dry Cleaners | Restaurants | Elementary Schools | Secondary Schools | Fast Food | Snack Bars | Grocery Stores | Trade Contractors | Hair Salons | Used Car Dealers |
| Accounting Offices         | Hotels  |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Automotive Repair          | Insurance Offices   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Bars                       | Laundromats   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Barber Shops               | Legal Offices   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Beer, Wine and Liquor      | Nail Salons   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Chiropractic Offices       | New Car Dealers   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Clothing Stores            | Physician Offices   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Convenience Stores         | Realty Offices  |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Dental Offices             | Religious Organizations   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Dry Cleaners               | Restaurants   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Elementary Schools         | Secondary Schools   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Fast Food                  | Snack Bars  |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Grocery Stores             | Trade Contractors   |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| Hair Salons                | Used Car Dealers  |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| <b>Program Duration</b>    | <p>This pilot was an element of the program portfolio that was introduced in the Michigan market in 2013 and will continue in the 2014 program year.</p>  |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |
| <b>Program Description</b> | <p>Energy Check was developed to engage owners of small and medium-sized businesses to examine their consumption using analysis and benchmarking tools, provided through a series of individualized energy reports and an Internet portal. The program mission was to give business owners insight into how they compare to similar businesses in terms of energy efficiency. Suggestions offered to customers based on their business type help them make improvements to their energy footprint, and motivate them to begin to make changes.</p> <p>The initial Energy Check Program cycle is 12 months. Approximately 20,000 customers were chosen based on business sector and consumption. The 20,000 customers were then separated into a 5,000-member control group and a</p>  |                    |        |                   |                   |      |             |              |               |                       |             |                      |                 |                 |                   |                    |                |                |                         |              |             |                    |                   |           |            |                |                   |             |                  |

|  | 15,000-member treatment group. The treatment group received a series of seven printed individualized energy reports in the mail over 12-months, and were invited to view the information on the web through a simple registration process. In 2013, the first customers received three reports, and four additional print reports were scheduled to be mailed in 2014 (January, March, May and July).  |                       |                        |  |   |
|--|--|-----------------------|------------------------|--|---|
| <b>Program Logic</b>   | <p>Following is a list of the primary barriers in this market and the program elements that addressed them:</p> <table> <tr> <th><b>Market Barrier</b></th><th><b>Program Element</b></th></tr> <tr> <td> <ul style="list-style-type: none"> <li>Customers are not motivated to take action and implement energy efficiency projects</li> <li>Determining the persistency of savings and how to claim</li> </ul> </td><td> <ul style="list-style-type: none"> <li>Tips and recommendations for energy efficiency actions tailored to their business</li> <li>Inclusion of primary, secondary and tertiary control and treatment groups for program evaluation</li> </ul> </td></tr> </table> | <b>Market Barrier</b> | <b>Program Element</b> | <ul style="list-style-type: none"> <li>Customers are not motivated to take action and implement energy efficiency projects</li> <li>Determining the persistency of savings and how to claim</li> </ul> | <ul style="list-style-type: none"> <li>Tips and recommendations for energy efficiency actions tailored to their business</li> <li>Inclusion of primary, secondary and tertiary control and treatment groups for program evaluation</li> </ul> |
| <b>Market Barrier</b>  | <b>Program Element</b>   |                       |                        |  |   |
| <ul style="list-style-type: none"> <li>Customers are not motivated to take action and implement energy efficiency projects</li> <li>Determining the persistency of savings and how to claim</li> </ul> | <ul style="list-style-type: none"> <li>Tips and recommendations for energy efficiency actions tailored to their business</li> <li>Inclusion of primary, secondary and tertiary control and treatment groups for program evaluation</li> </ul>  |                       |                        |  |   |
| <b>Incentive Strategy</b>  | Eligible customer projects were incentivized following the Custom Business Solutions Program guidelines and specifications. Custom projects were incentivized at the current program year custom rate.   |                       |                        |  |   |
| <b>Eligible Measures, Efficiency Requirements, Energy Savings, &amp; Incentives</b>  | Cost-effective natural gas and electric efficiency measures that improve upon the program's baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives through this program.   |                       |                        |  |   |
| <b>Implementation Strategy</b>   | The program team provided staff to conduct program management, tracking, marketing, and implementation. The program team also provided technical assistance services to participants, assisted participants with program requirements, conducted technical assistance and simulation services, performed quality control, and inspected measure installations.   |                       |                        |  |   |
| <b>Marketing Strategy</b>  | Outreach was not intended for the first year of Energy Check, as customers were chosen based on customer business sector and consumption. In 2014 Energy Check could become an "opt-in" program available to customers who wish to use it to more effectively manage their energy costs.   |                       |                        |  |   |

|   |
|---|
| <b>Milestones</b>                                   |
| <b>EM&amp;V Strategy</b>                            |
| <b>Consumers Energy Administrative Requirements</b> |
| <b>Participation</b>                                |
| <b>Investment &amp; Energy Savings</b>              |

| <b>Major Milestone</b>                        | <b>Date</b> |
|---|-------------|
| Launched 2013 Energy Check Pilot Program      | 09/13       |
| 1 <sup>st</sup> Energy Check report delivered | 09/13       |
| 2 <sup>nd</sup> Energy Check report delivered | 10/13       |
| 3 <sup>rd</sup> Energy Check report delivered | 12/13       |

Evaluation activity was started at the end of 2013. Evaluation will be completed in the 2014 program year.

Consumers Energy staff were responsible for oversight of the implementation contractor and providing funds for administration, marketing, and implementation. The implementation contractor's responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, site verification of installed measures, and program goal achievement.

During the 2013 program year there were 222 customers who registered in the Energy Check web portal, and an additional 105 customers who contacted the Consumers Energy Business Solutions Program to update or request information about their written reports. This totals 327 customers who engaged with the program in the first four months of operation. Savings evaluation activities are slated at the end of the first year cycle of the program, approximately September 2014.

Total investment and deemed energy savings for all business customer pilots are shown in Tables 4-4 and 4-5 on pages 13 and 14.

## 6.4.8 Business Pilots – HVAC Quality Maintenance

|                            |  |
|----------------------------|--|
| <b>Program</b>             | <b>Business Pilots – HVAC Quality Maintenance</b>  |
| <b>Objective</b>           | The HVAC Quality Maintenance Pilot (QM) was designed to identify energy-saving opportunities and achieve energy savings by performing preventive maintenance on rooftop unit (RTU) air conditioning units while transforming the trade ally market via education and implementation of the ASHRAE/ACCA Quality Maintenance Standards.  |
| <b>Target Market</b>       | Customers receiving Consumers Energy electric service are the primary target market for this program. This pilot also engaged and served the commercial HVAC service industry by requiring trade ally participation  |
| <b>Program Duration</b>    | This pilot was an element of the program portfolio that was introduced in the Michigan market in 2013 and will continue in the 2014 program year.  |
| <b>Program Description</b> | <p>This pilot engaged and served the commercial HVAC service industry by requiring the trade allies to practice the ASHRAE/ACCA Quality Maintenance Standards when performing tune-up maintenance on rooftop air conditioning units.</p> <p>The HVAC QM pilot established and conducted the following:</p> <ul style="list-style-type: none"> <li>• Training on the ASHRAE/ACCA Quality Maintenance Standard</li> <li>• Training on the use of the Amprobe TMA-21HW Hotwire Anemometer with Temperature that provided test-in and test-out data to allow a technician to accurately test, measure, balance, and retest for refrigerant charge and airflow</li> <li>• Ongoing mentoring and support for participating Trade Allies on the program and use of the tool</li> <li>• Incentives for successful tests performed on RTUs and a reimbursement incentive for the purchase of up to three diagnostic tools per trade ally</li> <li>• Verification of project data and on-site results to ensure participating contractors are performing the QM tasks and diagnostic testing accurately</li> </ul> |
| <b>Program Logic</b>       | Following is a list of the primary barriers in this market and the program elements that addressed them:   |

|   | Market Barrier   | Program Element   |         |                     |                          |  |                           |  |                            |  |
|---|--|---|---------|---------------------|--------------------------|--|---------------------------|--|----------------------------|--|
|   | <ul style="list-style-type: none"><li>• Trade ally participation</li><li>• Customer acceptance of the program</li><li>• Proper application of QM and diagnostic testing for units needing servicing</li></ul>  | <ul style="list-style-type: none"><li>• Project incentives; Advanced diagnostic tool reimbursement; comprehensive training; program staff support</li><li>• Program promotion and awareness by Consumers Energy Business Solutions</li><li>• Program training, on-site verification, and vendor support staff</li></ul> |         |                     |                          |  |                           |  |                            |  |
| Incentive Strategy  | <p>The pilot program was designed to maximize the implementation of comprehensive, cost-effective, energy efficient measures to eligible customers in Consumers Energy’s service territory. The program set incentive levels capable of driving this market. Below is a table listing the applicable incentive tiers based on the size of the unit that received the tune-up.</p> <table><tr><th>Measure</th><th>Incentive (\$/Unit)</th></tr><tr><td>RTU Tune-Up (4 - 6 Tons)</td><td>\$200/per Rooftop Air Conditioner unit</td></tr><tr><td>RTU Tune-Up (7 - 15 Tons)</td><td>\$325/per Rooftop Air Conditioner unit</td></tr><tr><td>RTU Tune-Up (16 - 40 Tons)</td><td>\$425/per Rooftop Air Conditioner unit</td></tr></table> <p>Trade allies were also reimbursed up to 80% of the cost of the diagnostic tool for participating in the program.</p> |   | Measure | Incentive (\$/Unit) | RTU Tune-Up (4 - 6 Tons) | \$200/per Rooftop Air Conditioner unit | RTU Tune-Up (7 - 15 Tons) | \$325/per Rooftop Air Conditioner unit | RTU Tune-Up (16 - 40 Tons) | \$425/per Rooftop Air Conditioner unit |
| Measure   | Incentive (\$/Unit)  |   |         |                     |                          |  |                           |  |                            |  |
| RTU Tune-Up (4 - 6 Tons)  | \$200/per Rooftop Air Conditioner unit   |   |         |                     |                          |  |                           |  |                            |  |
| RTU Tune-Up (7 - 15 Tons)   | \$325/per Rooftop Air Conditioner unit   |   |         |                     |                          |  |                           |  |                            |  |
| RTU Tune-Up (16 - 40 Tons)  | \$425/per Rooftop Air Conditioner unit   |   |         |                     |                          |  |                           |  |                            |  |
| Eligible Measures, Efficiency Requirements, Energy Savings & Incentives | <p>Cost-effective natural gas and electric efficiency measures that improve upon the program’s baseline were eligible for consideration in the program. Fuel switching (electric to alternative fuel) measures, hybrid fuel, and grid connected renewable energy systems were not eligible for incentives through this program.</p>  |   |         |                     |                          |  |                           |  |                            |  |
| Implementation Strategy   | <p>The program team provided staff to conduct program management, tracking, marketing, and implementation. The program team also provided technical assistance services to participants, assisted participants with program requirements, conducted technical assistance and simulation services, performed quality control, and inspected measure installations.</p>  |   |         |                     |                          |  |                           |  |                            |  |

## Marketing Strategy

The trade allies were the main program outreach source for the program. The only marketing effort was through a program flyer, which was created and printed for the trade allies to distribute to customers. This was the most effective way to attract interested customers and drive program awareness based on the limited program funds available.

## Milestones

| Major Milestone               | Date  |
|-------------------------------|-------|
| Launched 2013 HVAC QM Program | 05/13 |
| Paid final 2013 projects      | 10/13 |

## EM&V Strategy

The following evaluation activities were performed for the 2013 Pilot HVAC Quality Maintenance program.

**Participating Trade Ally Surveys:** The evaluation team implemented pre/post surveys to 64 contractors attending the HVAC QM training. The objectives of this survey were to identify current practices among participating contractors and garner feedback from the contractors on the content of the training

## Utility Administrative Requirements

Consumers Energy staff were responsible for oversight of the implementation contractor and providing funds for administration, marketing, and implementation. The implementation contractor's responsibilities included ongoing program design, marketing materials, program marketing and implementation, project management and QA/QC, customer and contractor dispute resolution, tracking and reporting, site verification of installed measures, and program goal achievement.

## Participation

| Paid Applications | Total Units Paid | Incentives Paid |
|-------------------|------------------|-----------------|
| 111               | 560              | \$ 165,450      |

## Investment and Energy Savings

Total investment and deemed energy savings for all business customer pilots are shown in Tables 4-4 and 4-5 on pages 13 and 14.



## 6.5 Self-Direct Option for Large Business Customers

### Overview

A total of 11 large electric customers chose to opt out of participating in Consumers Energy's energy efficiency programs and instead self-direct their own energy efficiency projects. These customers were required to design and submit plans to achieve energy savings equal to or greater than the statutory requirements.

### Eligibility Requirements

To be eligible for the self-direct option a customer was required to have a single account with greater than 1 megawatts (MW) of demand or an aggregation of several accounts with greater than 5 MW of demand.

### Customer Enrollment

One open enrollment period was held for plan year 2013 starting June 15, 2012. Eligible customers were notified with an on bill messaging and existing self-direct customers with expiring plans were mailed information in May. The plan application form and other useful self-direct program information was posted on the MPSC and Consumers Web sites. Customers were given until July 15, 2012, to submit their plans. In total, one new customer applied and subsequently enrolled in the 2013 self-directed program.

### Energy Savings

Participating customers submitted self-direct plans totaling 5,936 MWh in electric savings for 2013. This total is being counted towards Consumers Energy's overall portfolio savings goals.

### 2013 Self Direct Program Planned Savings

Projected savings from measures to be implemented under a self-directed plan (cumulative summary of planned savings):

|                      | <b>Number of Customer Plans Participating</b> | <b>Approximate Number of Accounts (sites)</b> | <b>2013 Minimum Saving MWh</b> | <b>2013 Planned Saving MWh</b> | <b>2013 Annual Based Usage MWh</b> |
|----------------------|---|---|--------------------------------|--------------------------------|------------------------------------|
| 2013 Planned Savings | 11  | 267   | 5,934.90                       | 5,936.50                       | 593,475                            |

### Full Terminations

| <b>Company Number</b> | <b>Number of Sites Terminated</b> | <b>Termination Approval Date</b> | <b>2013 Minimum Savings MWh</b> | <b>2013 Planned Saving MWh</b> |
|-----------------------|-----------------------------------|----------------------------------|---------------------------------|--------------------------------|
| #1                    | 6                                 | 6/13/2013                        | 443                             | 443                            |

### Partial Terminations

| Company Number | Number of Sites Terminated | Termination Approval Date | 2013 Minimum Savings MWh | 2013 Planned Saving MWh | 2013 Amended Minimum Saving MWh | 2013 Amended Plan Saving MWh |
|----------------|----------------------------|---------------------------|--------------------------|-------------------------|---------------------------------|------------------------------|
| Zero Reported  |                            |                           |                          |                         |                                 |                              |

### Amended Planned Savings

| Company       | Number of Customers Participating | Approximate Number of Accounts (sites) | 2013 Minimum Saving MWh | 2013 Planned Saving MWh | 2013 Annual Based Usage MWh |
|---------------|-----------------------------------|--|-------------------------|-------------------------|-----------------------------|
| Zero Reported |                                   |  |                         |                         |                             |

### 2013 Annual Report Results

Customer-prepared annual progress reports of implemented energy savings covering year 2013 is summarized in the tables below. Eleven reports are required from customers on March 1, 2014 covering year 2013. Of these reports only one report was delinquent and one report was deficient.

#### a.) Total Implemented Savings

| Plan Year | Number of Annual Reports | Minimum Savings MWh | Planned Savings MWh | Reported Savings MWh |
|-----------|--------------------------|---------------------|---------------------|----------------------|
| 2013      | 9                        | 4723.75             | 4725.65             | 5779.20              |

#### b.) 2013 Implemented Savings that are below the minimum standard

| Customer Number | Minimum Savings MWh | Reported Savings MWh |
|-----------------|---------------------|----------------------|
| #2              | 108                 | 88                   |

#### c.) 2013 Unreported Savings

| Customer Number | 2013 Minimum Savings Mwh | Cause             |
|-----------------|--------------------------|-------------------|
| #3              | 358.5                    | Delinquent Report |
| #4              | 608.7                    | Deficient Report  |

## 6.6 Opt-Out Option for Large Gas Business Customers

### Overview:

No large gas transportation customers chose to opt-out of participating in Consumers Energy's energy efficiency programs and instead run their own energy efficiency projects. These customers were required to submit reports demonstrating energy savings achieved equal to or greater than the statutory requirements.

### Eligibility Requirements:

To be eligible for the gas opt-out option, a customer was required to have been a gas transportation customer with greater than 100,000 Mcf annual gas usage.

### Customer Enrollment:

Customers may enroll at any time. The opt-out request letter and other useful opt-out program information was posted on the Consumers Energy website.

### Energy Savings:

None

## 6.7 Electric Rate GSG-2 Opt-In Option for Business Customers

### **Overview:**

No GSG-2 rate electric customers chose to opt-in to the energy efficiency program in 2013.

### **Eligibility Requirements:**

To be eligible for the electric GSG-2 opt-in program, a customer was required to be taking electric service under the General Service Self Generation Rate GSG-2.

### **Customer Enrollment:**

Customers may enroll at any time. The GSG-2 opt-in request letter and other useful opt-in program information was posted on the Consumers Energy website.

### **Energy Savings:**

Energy savings are submitted through the normal energy efficiency business programs described in the preceding sections.

## 7 PORTFOLIO MANAGEMENT

Most of the programs in the 2013 portfolio were introduced into the Michigan market during July 2009. Consumers Energy managed the portfolio of programs through a combination of in-house utility staff and six competitively selected third-party implementation contractors. With the exception of Franklin Energy being brought on-board in 2013, all other implementation contractors were brought on-board beginning with 2009 implementation efforts.

Table 7-1 lists the implementation contractors and the program(s) they were responsible for managing.

**Table 7-1. 2013 Program Implementation Contractors**

| Implementation Contractor  | Customer Class | Program                       |
|----------------------------|----------------|-------------------------------|
| CLEAResult                 | Residential    | Income Qualified              |
|                            | Residential    | New Construction              |
| Franklin Energy            | Residential    | Multifamily                   |
| DNV GL                     | Business       | All Business Programs         |
| ICF                        | Residential    | ENERGY STAR® Lighting         |
|                            | Residential    | ENERGY STAR® Appliances       |
|                            | Residential    | HVAC & Water Heating          |
|                            | Residential    | Home Energy Analysis (HEA)    |
|                            | Residential    | Home Energy Report (HER)Home  |
|                            | Residential    | Performance with ENERGY STAR® |
|                            | Residential    | Home Energy Analysis          |
|                            | Residential    | Insulation and Windows        |
| JACO Environmental         | Residential    | Appliance Recycling           |
| National Energy Foundation | Residential    | Energy Education Program      |

A portfolio of this size and scope required careful management oversight. Consumers Energy staff provided oversight of administrative, contract management, program design, program implementation, marketing, and cross-sector education and awareness activities.

The Company has a comprehensive tracking database to ensure accurate and comprehensive recording of all program participation. The database allowed Consumers Energy to research and track participation by customer class and geographic area, and to identify trends and untapped opportunities to advance program goals. Additionally, Consumers Energy staff assumed primary responsibility for general energy efficiency education and awareness strategies and activities, including the corporate website, online energy audit software, mass-market general education, and efficiency awareness marketing promotions. In summary, Company staff provided comprehensive program oversight, including management, financial planning, and budgeting, as well as:

- High-level guidance and direction to the implementation contractors, including review and revision of proposed annual implementation plans and proposed milestones and, additionally, engagement with the contractor teams when working through strategy and policy issues.

- Review and approval of implementation contractor invoices to ensure program activities were within investment targets and on schedule.
- Review of implementation contractor operational databases to ensure accurate incorporation of data into the Company's comprehensive tracking system to be used for overall tracking and regulatory reporting.
- Review of measure saving estimates maintained by the implementation contractors.
- Oversight and coordination of evaluation, measurement, and verification of contractors.
- Public education and outreach to community groups, trade allies, and trade associations.
- Guidance and direction on new initiatives or strategies proposed by the implementation contractors.
- Communication to implementation contractors regarding other Company initiatives that offered opportunities for cross-program promotion.
- Review and approval of printed materials and advertising plans.
- Evaluation of program and portfolio effectiveness and recommending modifications to programs and approach, as needed.
- Periodic review of program metrics, investment analysis, and evolving program design.

## 7.1 Marketing and Outreach Strategy

The marketing and outreach strategy for the Company's portfolio of EO programs was to make customers, as well as trade allies and other key market segments, aware of the Company's program offerings and their benefits and to influence customers who were purchasing and installing new energy systems or equipment to choose more energy efficient models.

The specifics of the marketing strategy were dependent on the program and the demographics of the group being engaged. Generally, it included a mix of television, radio, Internet, print media, direct contact, direct mail, bill inserts, and presentations. The primary call-to-action for broad-based promotions was to drive customer traffic to the Consumers Energy website for more information on the Company's energy efficiency programs.

## 7.2 Tracking and Reporting

Consumers Energy utilized a proprietary central data repository that enables tracking, reporting, and compliance for the Company's portfolio of EO programs. The system was designed to capture internal and external data across all EO programs for all classes of customers. The repository utilized a Web service to capture data to provide accurate, consistent, and timely reporting of program participation, energy savings, incentives and documentation.

## 7.3 Midstream Adjustments

Throughout 2013, the Company continuously reviewed customer participation levels in each of the programs to ensure it could meet customer demand. Building on lessons learned in the area of program participation since program launch in 2009, the Company kept a close eye on this metric and was able to successfully manage and satisfy customer demand. Residential programs like Multifamily and

commercial programs like Small Business Direct Install served as lever programs, and allowed for investment reallocation within customer classes to programs that were more highly visible in the market.

## 7.4 Inter-Utility Coordination

Consumers Energy worked with DTE Energy and other utilities to maximize the effectiveness of its EO programs. Ongoing communication and coordination with DTE was especially important in those areas where the companies' gas and electric service territories overlap. The two companies worked together to identify administrative and implementation cost-savings opportunities, provide a consistent message, and manage programs in a similar manner to reduce confusion and difficulty for customers and trade allies.

In the Multifamily Program alone, Consumers Energy and DTE completed nearly 11,722 units at 113 properties through collaborative efforts. This program continues to be very successful in capturing gas savings and making multifamily installations seamless to customers.

Consumers Energy worked with the Lansing Board of Water & Light to deliver the elementary education program, THINK! ENERGY®, to Lansing schools. The collaboration with the LBW&L provided program benefits to 1,334 student and 57 teachers. Also, collaboration with DTE provided program benefits to 6,576 student and 306 teachers.

Recycling drop events were conducted in collaboration with Holland Board of Public Works, Lowell Light and Power, city of South Haven, city of Sturgis and Traverse City Light and Power.

The Building Operator Certification (BOC) moved from a pilot to a program in 2013. Processes were developed enabling the Midwest Energy Efficiency Alliance, Michigan Economic Development Corporation, Lansing Board of Water & Light and Consumers Energy to offer rebates and encourage their customers to register for BOC in 2013 in a collaborative manner.

## 7.5 Leveraging Other Efficiency Initiatives

Within Michigan, several entities were promoting energy efficiency including the state government, federal government, the Midwest Energy Efficiency Alliance (MEEA), the U.S. Environmental Protection Agency and U.S. Department of Energy's ENERGY STAR® brand, and other Commission programs. The Company and its implementation contractors worked diligently to remain aware of and up to date on these efforts and to coordinate with them where possible.

## 7.6 Trade Ally Coordination

Trade allies were essential to the effective implementation and achievement of 2013 results. The Company had more than 1,000 participating HVAC contractors listed on the Consumers Energy website in the residential HVAC Program and about 75 contractors in the Home Performance with ENERGY STAR® (HPwES) Program. Five participating contractors in the HPwES program were recognized for their outstanding contribution and were presented with the Department of Energy Century Club award, as each performed more than 100 home performance jobs. In addition, 500 mechanical and electrical contractors have signed up as business trade allies and are all listed on Consumers Energy's website.

In the residential lighting program, the Company had agreements with 14 major retailers representing 404 retail locations where customers could purchase specially priced CFLs. Plus, the Company worked with many other retail locations that supported and encouraged participation in the ENERGY STAR® Appliances Program.

Relationships with key groups were cultivated and nurtured through numerous methods to ensure effective two-way communication. At program kickoff meetings involving trade allies, clear and concise program descriptions were distributed to each attendee. Ongoing training and program updates were a key part of program delivery, and this was effective in stimulating trade ally involvement and program participation. Trade allies were regularly informed of program progress. Changes and feedback from trade allies about “what is working and what is not” in the field were essential, and many suggestions for improvement were incorporated into program designs. The Company will continue to emphasize coordination, “listening sessions,” and frequent communications with these key partners to advance program goals.



## 8 EVALUATION, MEASUREMENT AND VERIFICATION (EM&V)

### 8.1 Overview

Program evaluation, measurement, and verification (EM&V) activities were central to the success of Consumers Energy's portfolio and were used to verify program savings impacts and monitor program performance. These activities served as a way to determine the actual program level savings being delivered and to maximize energy efficiency investments.

Effective EM&V ensures that expected results are measurable, achieved results are robust and defensible, program delivery is effective in maximizing participation, and the overall portfolio is cost-effective.

#### **Third-Party Evaluation Contractors**

The residential program evaluation consulting team was led by The Cadmus Group and also included Nexus Market Research and TetraTech. The commercial and industrial program evaluation consulting team was led by Energy Market Innovations (EMI) and also included Evergreen Economics, Michaels Energy, Research into Action, Wirtshafter Associates, PWP, and Market Strategies International.

#### **Objective of EM&V**

The overall objective of program evaluations was to provide an independent and objective assessment of both estimated (ex-ante) and realized (ex-post) energy and demand impacts. Evaluation work also assessed program and portfolio operational efficiency and determined the influence of programs on changes in the marketplace. The evaluation plans were designed and implemented to provide ongoing assessments of program performance, including measurements of program participation, measure installation and persistence, and achieved gross and net demand and energy impacts. Timely and on-going feedback allowed for mid-course adjustments in program implementation if results indicated progress was falling short of expectations.

There are three primary evaluation activities that were performed for Consumers Energy: impact evaluation, process evaluation, and market assessments.

**Impact Evaluation:** The primary objective of impact evaluations was to assess the changes in energy use that can be attributed to a particular intervention (such as the installation of energy efficient equipment). Impact Evaluations verified equipment installation and performance, proposed adjustments to MEMD saving estimates based on engineering or statistical methods, and estimated "net savings" directly attributable to a program.

**Process Evaluation:** Process evaluations assessed the effectiveness of program design and delivery. These evaluations studied all aspects of program administration and implementation, including internal and external procedures and operations, organization and efficiency of implementation contractor performance, the manner and effectiveness of how the programs were interacting with the marketplace (with customers, trade allies, etc.), and with respect to other perspectives identified through the course of the evaluation.

Market Assessment: This activity identified factors in the marketplace that could affect program design and delivery. These assessments also provided information concerning the impact EO programs have on transforming the energy service/product marketplace.

In addition to the activities identified above, EM&V also encompassed a variety of tasks that did not pertain to specific programs, but were important to the overall evaluation effort. Key crosscutting evaluation activities and responsibilities included (but were not limited to) the following:

- Reviewed deemed measure estimates and made recommendations for revisions (if needed) for the Michigan Energy Measures Database (MEMD);
- Coordinated and participated in the Evaluation Working Group and other statewide collaboratives established by the MPSC;
- Provided input and recommendations on the development and ongoing tracking of program enrollment and participation data; and
- Synthesized program evaluations and market assessments to provide a strategic performance assessment of the entire portfolio.

## 8.2 2013 Evaluation Activities

Summaries of 2013 evaluation activities are included in the program summaries appearing earlier in this report. Results of the studies performed will be communicated through the MPSC Evaluation Collaborative.

## 9 ENERGY OPTIMIZATION FUTURE INVESTMENT

### 9.1 2014-2017 Planned Investment

Table 9-1 details the Company's planned investments in its EO programs each year 2014 through 2017 as approved by the Commission in its December 19, 2013 Order in Case No. U-17351.

**Table 9-1. 2014-2017 Planned Investment**

| <b>Electric Investment</b>               | <b>2014</b> | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>Total</b> |
|--|-------------|-------------|-------------|-------------|--------------|
| Statutory Investment Cap as % of Revenue | 2.00%       | 2.00%       | 2.00%       | 2.00%       |              |
| Investment Cap (\$M)                     | \$77.4      | \$77.5      | \$79.3      | \$80.2      | \$314.4      |
| Planned Investment (\$M)                 | \$75.0      | \$76.5      | \$77.4      | \$78.8      | \$307.7      |
| % of Limit                               | 97%         | 99%         | 98%         | 98%         | 98%          |
|  |             |             |             |             |              |
| <b>Natural Gas Investment</b>            | <b>2014</b> | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>Total</b> |
| Statutory Investment Cap as % of Revenue | 2.00%       | 2.00%       | 2.00%       | 2.00%       |              |
| Investment Cap (\$M)                     | \$37.2      | \$39.9      | \$36.7      | \$35.7      | \$149.5      |
| Planned Investment (\$M)                 | \$40.7      | \$42.2      | \$40.1      | \$38.9      | \$161.9      |
| % of Limit                               | 109%        | 106%        | 109%        | 109%        | 108%         |

## Appendix A: Glossary of Terms

**Cost-effectiveness:** A measure of the relevant economic effects resulting from the implementation of an energy efficiency measure. If the benefits outweigh the cost, the measure is said to be cost-effective.

**Early Replacement:** Refers to an efficiency measure or efficiency program that seeks to encourage the replacement of functional equipment before the end of its operating life with a higher-efficiency unit.

**End-Use:** A category of equipment or service that consumes energy (e.g., lighting, refrigeration, heating, process heat).

**Energy Efficiency:** Using less energy to provide the same or an improved level of service to the energy consumer in an economically efficient way. Sometimes “conservation” is used as a synonym, but that term is sometimes perceived as using less of a resource even if it results in a lower service level (e.g., setting a thermostat lower or reducing lighting levels). This recognizes that energy efficiency includes using less energy at any time, including at times of peak demand through demand response and peak shaving efforts.

**Free Driver:** Individuals or businesses that adopt an energy efficient product or service because of an energy efficiency program, but are difficult to identify either because they do not receive an incentive or are not aware of exposure to the program.

**Free Rider:** Participants in an energy efficiency program who would have adopted an energy efficiency technology or improvement in the absence of a program or financial incentive.

**Incremental:** Savings or costs in a given year associated only with new installations happening in that year.

**Impact Evaluation:** Impact evaluations are the estimation of gross and net effects from the implementation of one or more energy efficiency programs. Most program impact projections contain ex-ante estimates of savings. These estimates are what the program is expected to save as a result of its implementation efforts and are often used for program planning and contracting purposes and for prioritizing program funding choices. In contrast, the impact evaluation focuses on identifying and estimating the amount of energy and demand savings the program actually provides.

**Market Transformation:** An approach in which a program attempts to influence “upstream” service and equipment provider market channels and what they offer end-use customers, along with educating and informing end-use customers directly. The emphasis is on influencing market channels and key market participants other than end-use customers.

**Measure:** Any action taken to increase efficiency, whether through changes in equipment, control strategies, or behavior. Examples include higher-efficiency central air conditioners, occupancy sensors to control lighting, and retro-commissioning. In some cases, bundles of technologies or practices may be modeled as single measures. For example, an ENERGY STAR<sup>®</sup> home package may be treated as a single measure.

**Mcf:** A measurement of gas, representing 1,000 cubic feet.

**MW:** A unit of electrical output, equal to 1 million watts or 1,000 kilowatts.

**MWh:** 1,000 kilowatt-hours, or 1 million watt-hours. One MWh is equal to the use of 1,000,000 watts of power in one hour.

**Portfolio:** Either a collection of similar programs addressing the same market, technology, or mechanisms or the set of all programs conducted by one organization.

**Process Evaluation:** The process evaluation is a systematic assessment of an energy efficiency program for the purposes of documenting program operations at the time of the examination and identifying improvements that can be made to increase the program's efficiency or effectiveness.

**Program:** A mechanism for encouraging energy efficiency. It may be funded by a variety of sources and pursued by a wide range of approaches. Typically, it includes multiple measures.

**Resource Acquisition:** An approach in which end-use customers are the primary target of program offerings (e.g., using rebates to influence customers' purchases of end-use equipment).

**Retrofit:** Refers to an efficiency measure or efficiency program that seeks to encourage the replacement of functional equipment before the end of its operating life with higher-efficiency units (also called "early retirement") or the installation of additional controls, equipment, or materials in existing facilities for purposes of reducing energy consumption (e.g., increased insulation, low-flow devices, lighting occupancy controls, economizer ventilation systems).

**Therm:** A measurement of natural gas representing 100,000 British thermal units (Btus).

**Useful Life:** The number of years (or hours) that the new energy efficient equipment is expected to function. Useful life also is commonly referred to as "measure life."

Calculation of 2013 Electric Savings Target

| Line No. | (a)<br>Description   | (b)<br>2010<br>Megawatt Hours | (c)<br>2011<br>Megawatt Hours | (d)<br>2012<br>Megawatt Hours | (e)<br>2013<br>Megawatt Hours |
|----------|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 1        | TOTAL Electric Sales*  | 33,290,120                    | 33,602,986                    | 33,756,264                    |                               |
| 2        | Calculation of Three Year Averages (Sales to Ultimate Customers) |                               |                               |                               |                               |
| 3        | 2010   |                               |                               | 33,290,120                    |                               |
| 4        | 2011   |                               |                               | 33,602,986                    |                               |
| 5        | 2012   |                               |                               | 33,756,264                    |                               |
|          | Three Year Average   |                               |                               | 33,549,790                    |                               |
| 6        | EO Annual Electric Savings Target ( %)                           |                               |                               |                               | 1.00%                         |
| 7        | EO Annual Electric Savings Target (MWH)                          |                               |                               |                               | 335,498                       |

Source: \* Case No. U-17351 Miller Exhibit A -1 (HWM-1).

Calculation of 2013 Natural Gas Savings Target

| Line No. | (a)<br>Description                                    | (b)<br>2010<br>MCF | (c)<br>2011<br>MCF | (d)<br>2012<br>MCF | (e)<br>2013<br>MCF |
|----------|---|--------------------|--------------------|--------------------|--------------------|
| 1        | TOTAL Gas Sales*                                      | 273,109,000        | 288,418,000        | 259,215,000        |                    |
| 2        | Total Gas Sales after Gas Transportation adjustment** | 236,686,240        | 249,585,751        | 220,093,788        |                    |
| 3        | Calculation of Three Year Average                     |                    |                    |                    |                    |
| 4        | 2010  |                    |                    | 236,686,240        |                    |
| 5        | 2011  |                    |                    | 249,585,751        |                    |
| 6        | 2012  |                    |                    | 220,093,788        |                    |
|          | Three Year Average                                    |                    |                    | 235,455,260        |                    |
| 7        | EO Annual Gas Savings Target (%)                      |                    |                    |                    | 0.75%              |
| 8        | EO Annual Gas Savings Targets (MCF)                   |                    |                    |                    | 1,765,915          |

Sources:

\* Case No. U-17351 Miller Exhibit A -2 (HWM-2).

\*\* Case No. U-17351 VanSumeren Exhibit A -9 (TLV-1).

Consumers Energy  
Energy Optimization -- 2013 Electric Plan Reconciliation  
2013 Electric Program Portfolio Savings and Investment Summary

Case No: U-17601  
Exhibit: A-13 (BMR-3)  
Witness: BMRuhl  
Date: May 2014  
Page: 1 of 1

| Line No. | (a)                                       | (b)                | (c)                 | (d)                | (e)                      | (f)            | (g)                   | (h)  | (i)          |
|----------|---|--------------------|---------------------|--------------------|--------------------------|----------------|-----------------------|--|--------------|
|          |   | UCT<br>Results (1) | CCE (\$/kWh)<br>(2) | MWh<br>Savings (3) | Actual<br>Investment (2) | MWh<br>Savings | Planned<br>Investment | Variance: Planned - Actual<br>MWh<br>Savings | Investment   |
| 1        | <b>Residential</b>                        |                    |                     |                    |                          |                |                       |  |              |
| 2        | Appliance Recycling                       | 3.34               | \$0.017             | 31,357             | \$4,521,572              | 43,840         | \$3,961,125           | -12,483                                      | \$560,447    |
| 3        | ENERGY STAR Appliances                    | 3.03               | \$0.018             | 446                | \$85,598                 | 877            | \$413,987             | -431   | -\$328,389   |
| 4        | ENERGY STAR Lighting                      | 7.99               | \$0.006             | 101,918            | \$6,418,208              | 59,439         | \$4,888,497           | 42,479                                       | \$1,529,711  |
| 5        | Home Energy Analysis (HEA)                | 1.01               | \$0.050             | 3,435              | \$1,730,680              | 0              | \$0                   | 3,435  | \$1,730,680  |
| 6        | Home Energy Report (HER)                  | 0.81               | \$0.068             | 28,410             | \$2,111,089              | 0              | \$0                   | 28,410                                       | \$2,111,089  |
| 7        | Home Performance with Energy Star         | 0.89               | \$0.081             | 759                | \$855,858                | 21,251         | \$5,446,437           | -20,492                                      | -\$4,590,579 |
| 8        | HVAC & Water Heating                      | 2.47               | \$0.024             | 6,002              | \$2,033,870              | 4,842          | \$3,334,469           | 1,160  | -\$1,300,599 |
| 9        | Income Qualified                          | 0.68               | \$0.077             | 2,075              | \$1,553,208              | 1,540          | \$1,554,158           | 535  | -\$950       |
| 10       | Insulation and Windows Program            | 1.51               | \$0.047             | 726                | \$678,638                | 0              | \$0                   | 726  | \$678,638    |
| 11       | Res. Multifamily Direct Install           | 1.15               | \$0.045             | 7,955              | \$3,679,529              | 5,758          | \$3,858,598           | 2,197  | -\$179,069   |
| 12       | New Home Construction                     | 1.21               | \$0.064             | 167                | \$208,928                | 101            | \$246,904             | 66   | -\$37,976    |
| 13       | THINK! Energy                             | 2.08               | \$0.022             | 2,685              | \$601,997                | 1,846          | \$601,484             | 839  | \$513        |
| 14       | Residential Pilots                        |                    |                     | 6,792              | \$1,398,767              | 6,322          | \$1,445,342           | 470  | -\$46,575    |
| 15       | <b>Commercial &amp; Industrial</b>        |                    |                     |                    |                          |                |                       |  |              |
| 16       | Comprehensive & Custom Business Solutions | 4.39               | \$0.010             | 166,774            | \$21,534,553             | 210,142        | \$23,695,126          | -43,368                                      | -\$2,160,573 |
| 17       | Small Business Direct Install             | 2.64               | \$0.018             | 84,184             | \$10,068,877             | 31,110         | \$8,389,353           | 53,074                                       | \$1,679,524  |
| 18       | Bus. Multifamily Direct Install           | 4.67               | \$0.010             | 4,576              | \$391,573                | 0              | \$0                   | 4,576  | \$391,573    |
| 19       | Business Pilots                           |                    |                     | 9,478              | \$1,952,000              | 10,536         | \$1,851,056           | -1,058                                       | \$100,944    |
| 20       | Self-Direct Projects                      |                    |                     | 5,936              | \$0                      | 5,936          | \$0                   | 0  | \$0          |
| 21       | <b>Portfolio Support Services</b>         |                    |                     |                    |                          |                |                       |  |              |
| 22       | Utility Oversight                         |                    |                     |                    | \$3,690,106              |                | \$3,655,606           |  | \$34,500     |
| 23       | Tracking System                           |                    |                     |                    | \$723,339                |                | \$886,424             |  | -\$163,085   |
| 24       | Education & Awareness                     |                    |                     | 9,370              | \$1,929,702              | 10,114         | \$2,047,271           | -744   | -\$117,569   |
| 25       | Evaluation, Measurement & Verification    |                    |                     |                    | \$2,928,945              |                | \$2,949,347           |  | -\$20,402    |
| 26       | <b>Totals</b>                             | 2.70               | \$0.018             | 473,045            | \$69,097,040             | 413,654        | \$69,225,184          | 59,391                                       | -\$128,147   |

Notes:

- (1) Source for the Utility System Resource Cost Test (UCT) results is Exhibit A-11 (BMR-1), Table 4-7. Summary of Electric Programs Benefit-Cost Test Results
- (2) Source: Exhibit A-11 (BMR-1), Table 4-4. 2013 Portfolio Investment
- (3) Source: Exhibit A-11 (BMR-1), Table 4-5. 2013 Portfolio Savings



Consumers Energy  
Energy Optimization -- 2013 Gas Plan Reconciliation  
2013 Gas Program Portfolio Savings and Investment Summary

Case No: U-17601  
Exhibit: A-14 (BMR-4)  
Witness: BMRuhl  
Date: May 2014  
Page: 1 of 1

| Line No. | (a)  | (b)                | (c)                 | (d)                   | (e)                      | (f)            | (g)                   | (h)            | (i)                                      |
|----------|--|--------------------|---------------------|-----------------------|--------------------------|----------------|-----------------------|----------------|--|
|          |  | UCT<br>Results (1) | CCE (\$/Mcf)<br>(2) | Mcf<br>Savings<br>(3) | Actual<br>Investment (2) | Mcf<br>Savings | Planned<br>Investment | Mcf<br>Savings | Variance: Planned - Actual<br>Investment |
| 1        | <b>Residential</b>                           |                    |                     |                       |                          |                |                       |                |  |
| 2        | Appliance Recycling                          | 1.80               | \$2.53              | 9,038                 | \$228,162                | 17,321         | \$46,125              | -86,895        | -\$46,125                                |
| 3        | ENERGY STAR Appliances                       |                    |                     | 0                     | \$0                      | 95,933         | \$197,524             | 0              | \$30,638                                 |
| 4        | ENERGY STAR Lighting                         | 1.83               | \$2.53              | 123,693               | \$2,861,933              | 0              | \$0                   | 123,693        | \$2,861,933                              |
| 5        | Home Energy Analysis (HEA)                   | 0.65               | \$10.18             | 51,858                | \$527,772                | 0              | \$0                   | 51,858         | \$527,772                                |
| 6        | Home Energy Report (HER)                     | 1.09               | \$3.51              | 50,999                | \$2,490,192              | 274,488        | \$6,008,366           | -223,489       | -\$3,518,174                             |
| 7        | Home Performance with Energy Star            | 3.21               | \$1.27              | 444,641               | \$7,252,346              | 423,405        | \$9,507,787           | 21,236         | -\$2,255,441                             |
| 8        | HVAC & Water Heating                         | 0.36               | \$12.40             | 89,201                | \$9,892,713              | 64,366         | \$9,895,367           | 24,835         | -\$2,654                                 |
| 9        | Income Qualified                             | 1.92               | \$1.78              | 71,963                | \$2,325,038              | 0              | \$0                   | 71,963         | \$2,325,038                              |
| 10       | Insulation and Windows Program               | 4.62               | \$0.87              | 199,006               | \$2,093,274              | 272,215        | \$2,250,111           | -73,209        | -\$156,837                               |
| 11       | Res. Multifamily Direct Install              | 1.70               | \$2.02              | 14,277                | \$515,788                | 6,375          | \$249,094             | 7,902          | \$266,694                                |
| 12       | New Home Construction                        | 3.54               | \$1.25              | 71,443                | \$973,912                | 31,762         | \$974,425             | 39,681         | -\$513                                   |
| 13       | THINK! Energy                                |                    |                     | 60,696                | \$1,642,140              | 58,662         | \$1,698,486           | 2,034          | -\$56,346                                |
| 14       | Residential Pilots                           |                    |                     |                       |                          |                |                       |                |  |
| 15       | <b>Commercial &amp; Industrial</b>           |                    |                     |                       |                          |                |                       |                |  |
| 16       | C&I Prescriptive & Custom Business Solutions | 4.05               | \$1.01              | 750,276               | \$8,630,429              | 728,132        | \$8,960,995           | 22,144         | -\$330,566                               |
| 17       | Small Business Direct Install                | 5.96               | \$0.82              | 132,612               | \$981,572                | 127,478        | \$937,434             | 5,134          | \$44,138                                 |
| 18       | Bus. Multifamily Direct Install              | 5.26               | \$0.77              | 30,823                | \$295,176                | 0              | \$0                   | 30,823         | \$295,176                                |
| 19       | Business Pilots                              |                    |                     | 23,034                | \$623,198                | 33,447         | \$584,153             | -10,413        | \$39,045                                 |
| 20       | <b>Portfolio Support Services</b>            |                    |                     |                       |                          |                |                       |                |  |
| 21       | Utility Administration                       |                    |                     |                       | \$2,564,311              |                | \$2,540,336           |                | \$23,975                                 |
| 22       | Tracking System                              |                    |                     |                       | \$502,659                |                | \$615,989             |                | -\$113,330                               |
| 23       | Education & Awareness                        |                    |                     | 49,565                | \$1,340,975              | 55,265         | \$1,422,680           | -5,700         | -\$81,705                                |
| 24       | Evaluation, Measurement & Verification       |                    |                     |                       | \$2,035,368              |                | \$2,049,547           |                | -\$14,179                                |
| 25       | <b>Totals</b>                                | 2.13               | \$1.94              | 2,173,124             | \$47,776,959             | 2,188,848      | \$47,938,419          | 1,597          | -\$161,461                               |

Notes:

- (1) Source for the Utility System Resource Cost Test (UCT) results is Exhibit A-11 (BMR-1), Table 4-8. Summary of Natural Gas Programs Benefit-Cost Test Results
- (2) Source: Exhibit A-11 (BMR-1), Table 4-4. 2013 Portfolio Investment
- (3) Source: Exhibit A-11 (BMR-1), Table 4-5. 2013 Portfolio Savings

| Line No. | (a)<br>Category              | (b)<br>UCT Score (1) | (c)<br>Metric Target (2) | (d)<br>Metric Amount Achieved (1)(3) | (e)<br>Award Percent Earned (2) | (f)<br>Program Investment (4) | (g)<br>Incentive Earned (4) |
|----------|------------------------------|----------------------|--------------------------|--------------------------------------|---------------------------------|-------------------------------|-----------------------------|
| 1        | <b>Electric</b>              |                      |                          |                                      |                                 |                               |                             |
| 2        | Energy Savings               | 2.70                 | 115% of Statutory        | 141% of statutory                    | 12%                             |                               |                             |
| 3        | Low Income Programs          |                      | 120% of Plan Svgs        | 134.77% of Plan Svgs                 | 2%                              |                               |                             |
| 4        | Multi-measure C&I            |                      | 60% over 2012 level      | 74.5% over 2012 level                | <u>1%</u>                       |                               |                             |
| 5        | Incentive Total              |                      |                          |                                      | 15%                             | \$69,097,040                  | \$10,364,556                |
| 6        | <b>Gas</b>                   |                      |                          |                                      |                                 |                               |                             |
| 7        | Energy Savings               | 2.13                 | 115% of Statutory        | 123% of statutory                    | 12%                             |                               |                             |
| 8        | Low Income Programs          |                      | 120% of Plan Svgs        | 138.58% of Plan Svgs                 | 2%                              |                               |                             |
| 9        | New Construction Residential |                      | 60% over 2012 level      | 63.92% over 2012 level               | <u>1%</u>                       |                               |                             |
|          | Incentive Total              |                      |                          |                                      | 15%                             | \$47,776,959                  | \$7,166,544                 |

Notes:

- (1) Source: Exhibit A-11 (BMR-1), Table 4-2. 2013 Electric Results and Table 4-3. 2013 Gas Results.  
(2) Per the September 29, 2009 Commission Order in Case Nos. U-15805/U-15889, as adjusted in U-17138 Order dated January 31, 2013.  
(3) Source: Certification Reports of Cadmus and EMI, Exhibit A-10 (MSK-1) and Exhibit A-5 (RDB-1), respectively.  
(4) Source: Exhibit A-16 (JPS-1)

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**DIRECT TESTIMONY**

**OF**

**JAMES P. SCHWANITZ**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

JAMES P. SCHWANITZ  
DIRECT TESTIMONY

1 Q. Please state your name and business address.

2 A. My name is James P. Schwanitz. My business address is One Energy Plaza, Jackson,  
3 Michigan 49201.

4 Q. Please describe your position and responsibilities.

5 A. I am employed by Consumers Energy Company (“Consumers Energy” or the  
6 “Company”) as a Senior Accounting Analyst in the Energy Efficiency Solutions group.  
7 I am responsible for all accounting and financial related activities associated with the  
8 investments in the electric and gas Energy Optimization (“EO”) program.

9 Q. Please describe your education and professional experience.

10 A. I received a Bachelor of Business Administration degree in General Business from  
11 Michigan State University in 1983. I also received a Masters of Business Administration  
12 degree from Wayne State University in 1989 with a concentration in Finance. Between  
13 1987 and 2004, I held numerous accounting positions for various companies. Between  
14 2004 and 2007, I was employed by CMS Enterprises, a subsidiary of CMS Energy, as a  
15 Senior Accounting Analyst. In 2007, I transferred to the General Accounting Department  
16 of Consumers Energy as a Senior Accounting Analyst responsible for Sarbanes Oxley  
17 compliance. In 2009, I assumed the general ledger accounting responsibilities for the EO  
18 and Renewable Energy programs. In 2011, I assumed my current position.

19 Q. Have you previously testified before the Michigan Public Service Commission (“MPSC”  
20 or the “Commission”)?

21 A. Yes. I provided direct testimony in Case Nos. U-16302, U-16303, U-16736, and  
22 U-17281 regarding the Company’s 2009, 2010, 2011, and 2012 annual reconciliations for  
23 its EO program, respectively. I also provided direct testimony in Case Nos. U-16300 and

JAMES P. SCHWANITZ  
DIRECT TESTIMONY

1 U-16301 regarding the Company's 2009 and 2010 annual reconciliations for its  
2 Renewable Energy program, respectively.

3 Q. What is the purpose of your testimony?

4 A. The purpose of my testimony is to provide 2013 EO investment results for its electric and  
5 gas EO programs, including a breakdown between Residential and Commercial &  
6 Industrial ("C&I") customer groups, and to demonstrate the level of EO incentive  
7 payment earned by the Company for its 2013 EO Plan performance per the methodology  
8 established by the Commission in its September 29, 2009 Order in Case Nos. U-15805  
9 and U-15889.

10 Q. Are you sponsoring any exhibits with your direct testimony?

11 A. Yes, I am sponsoring two exhibits.

- 12 • Exhibit A-16 (JPS-1): Electric Investments & Incentive Calculation
- 13 • Exhibit A-17 (JPS-2): Gas Investments & Incentive Calculation

14 Q. Were these exhibits prepared by you or under your supervision?

15 A. Yes.

16 Q. What information is provided in these exhibits?

17 A. These exhibits provide investment data for the electric and gas EO programs and a  
18 calculation of the earned incentive.

19 Q. What were the EO investments in 2013?

20 A. In 2013, the Company invested \$69,097,040 in its electric EO program. These costs are  
21 split between Residential and C&I in the amounts of \$30,352,119 and \$38,744,921,  
22 respectively, as shown on Exhibit A-16 (JPS-1), line 6. In 2013, the Company invested  
23 \$47,776.959 in its gas EO program. These costs are split between Residential and C&I in

JAMES P. SCHWANITZ  
DIRECT TESTIMONY

1 the amounts of \$35,511,599 and \$12,265,360, respectively, as shown on Exhibit A-17  
2 (JPS-2), line 6.

3 Q. Why do total investments differ from the amounts provided by Company accounting  
4 witness Katherine L. Allen in her direct testimony in this proceeding?

5 A. Ms. Allen's testimony and exhibits are based on 2013 general ledger activity. Actual  
6 investments exclude adjustments to 2012 Plan year costs that were recorded in the  
7 general ledger in 2013 and include 2013 Plan year costs that were recorded in the general  
8 ledger in 2014. These differences are caused by normal year-end accruals for costs  
9 incurred but not yet invoiced on an estimated basis. For investment testimony purposes,  
10 actual costs are recognized instead of estimated accruals.

11 Q. Was the Company's 2013 electric investment level within the Commission-approved  
12 investment level authorized in Case No. U-16670?

13 A. Yes. The Commission approved \$69,224,372 as the Company's 2013 electric investment  
14 level. *See*, April 17, 2012 Order in MPSC Case No. U-16670. The Company actually  
15 invested \$69,097,040 as shown on Exhibit A-16 (JPS-1), line 6.

16 Q. Was the Company's 2013 gas investment level within the Commission-approved  
17 investment level authorized in Case No. U-16670?

18 A. Yes. The Commission approved \$47,935,419 as the Company's 2013 gas investment  
19 limit. *See*, April 17, 2012 Order in Case No. U-16670. The Company actually invested  
20 \$47,776,959 as shown on Exhibit A-17 (JPS-2), line 6.

21 Q. Is the Company requesting incentive payments for its 2013 energy efficiency operations?

22 A. Yes. The Company has earned incentive payments for both its electric and gas results.  
23 The Company achieved 141% of its statutory electric savings target with a Utility Cost

JAMES P. SCHWANITZ  
DIRECT TESTIMONY

1 Test ("UCT") score of 2.70. The Company achieved 123% of its statutory gas savings  
2 target with a UCT score of 2.13. *See*, testimony of Company witness Benjamin M. Ruhl.  
3 Exhibits A-16 (JPS-1), line 7 and A-17 (JPS-2), line 7 illustrate the calculations of the  
4 performance incentives the Company has earned for the performance of its 2013 electric  
5 and gas EO program portfolios. The Company calculated these incentives as  
6 \$10,364,556 for the Company's electric EO program and \$7,166,544 for the Company's  
7 gas EO program.

8 Q. Why does the incentive amount differ from those provided by Company accounting  
9 witness Allen in her direct testimony in this proceeding?

10 A. Ms. Allen's incentive calculation is based on 2013 general ledger investment activity  
11 which includes estimated accruals for costs incurred but not yet invoiced at year end.  
12 The incentive calculation shown in exhibits A-16 (JPS-1), line 7 and A-17 (JPS-2), line 7  
13 excludes adjustments to 2012 Plan year costs recorded in the general ledger in 2013 and  
14 includes adjustments to 2013 Plan year costs recorded in the general ledger in 2014.

15 Q. Does that conclude your testimony?

16 A. Yes.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**EXHIBITS**

**OF**

**JAMES P. SCHWANITZ**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014



## Consumers Energy

### EO Electric Investments & Incentive Calculation

| <u>Line</u>               | (a)<br><u>Description</u>                            | (b)<br><u>Residential</u> | (c)<br><u>C&amp;I</u> | (e)<br><u>Total</u>  |
|---------------------------|--|---------------------------|-----------------------|----------------------|
| <u>Investment Summary</u> |  |                           |                       |                      |
| 1                         | Program Investments                                  | \$ 25,877,944             | \$ 33,947,003         | \$ 59,824,948        |
| 2                         | Administration (allocated)                           | \$ 1,780,632              | \$ 1,909,473          | \$ 3,690,106         |
| 3                         | Education & Awareness (allocated)                    | \$ 931,160                | \$ 988,542            | \$ 1,929,702         |
| 4                         | Evaluation, Measurement and Verification (allocated) | \$ 1,413,340              | \$ 1,515,605          | \$ 2,928,945         |
| 5                         | Database (allocated)                                 | \$ 349,042                | \$ 374,297            | \$ 723,339           |
| 6                         | Total Electric Investments                           | <u>\$ 30,352,119</u>      | <u>\$ 38,744,921</u>  | <u>\$ 69,097,040</u> |
| 7                         | Incentive Earned (15% of total investment)           | <u>\$ 4,552,818</u>       | <u>\$ 5,811,738</u>   | <u>\$ 10,364,556</u> |

## Consumers Energy

### EO Gas Investments & Incentive Calculation

| <u>Line</u>               | (a)<br><u>Description</u>                            | (b)<br><u>Residential</u> | (c)<br><u>C&amp;I</u> | (e)<br><u>Total</u>  |
|---------------------------|--|---------------------------|-----------------------|----------------------|
| <u>Investment Summary</u> |  |                           |                       |                      |
| 1                         | Program Investments                                  | \$ 30,803,270             | \$ 10,530,375         | \$ 41,333,645        |
| 2                         | Administration (allocated)                           | \$ 1,873,823              | \$ 690,488            | \$ 2,564,311         |
| 3                         | Education & Awareness (allocated)                    | \$ 979,888                | \$ 361,087            | \$ 1,340,975         |
| 4                         | Evaluation, Measurement and Verification (allocated) | \$ 1,487,308              | \$ 548,060            | \$ 2,035,368         |
| 5                         | Database (allocated)                                 | \$ 367,309                | \$ 135,350            | \$ 502,659           |
| 6                         | Total Gas Investments                                | <u>\$ 35,511,599</u>      | <u>\$ 12,265,360</u>  | <u>\$ 47,776,959</u> |
| 7                         | Incentive Earned (15% of total investment)           | <u>\$ 5,326,740</u>       | <u>\$ 1,839,804</u>   | <u>\$ 7,166,544</u>  |

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of Consumer )  
Energy Company for Authority to Reconcile )  
Its 2013 Energy Optimization Plan Costs )  
Associated With the Plan Approved in )  
Case Nos. U-16670 and U-17138. )  
\_\_\_\_\_)

Case No. U-17601

**DIRECT TESTIMONY**

**OF**

**THEODORE A. YKIMOFF**

**ON BEHALF OF**

**CONSUMERS ENERGY COMPANY**

May 2014

THEODORE A. YKIMOFF  
DIRECT TESTIMONY

1 Q. Please state your name and business address.

2 A. My name is Theodore A. Ykimoff. My business address is One Energy Plaza, Jackson,  
3 Michigan 49201.

4 Q. Please describe your current position and responsibilities.

5 A. As Residential Energy Efficiency Operations Director, I am responsible for the  
6 development and implementation of Consumers Energy Company's ("Consumers  
7 Energy" or the "Company") electric and gas energy optimization ("EO") programs for  
8 residential customers.

9 Q. Please describe your education and professional experience.

10 A. I hold a Bachelor's degree in Business Administration from Michigan State University. I  
11 have been employed at Consumers Energy since 1992, where I began my professional  
12 career as a Gas Conservation Program Manager with responsibility for managing  
13 marketing and operations for residential and business new construction programs. For  
14 nearly ten years I worked in the marketing area, where my responsibilities included  
15 supervising a team tasked with marketing value-added products and services to the  
16 Company's residential customers. In 2003, I assumed a position as a Corporate Account  
17 Manager for large electric and gas customers. In early 2008, I was promoted to a Senior  
18 Program Lead to lead and manage the development of the Company's 2009-2014 EO  
19 Plan. Since that first Plan filing, the Company has filed three amended Plans  
20 (2011-2014, 2012-2015, and 2014-2017) and four annual reconciliations (2009, 2010,  
21 2011, and 2012) in support of its EO efforts, and I have provided either a leadership  
22 and/or support role for each of those filings. In 2011, I was promoted to my current

THEODORE A. YKIMOFF  
DIRECT TESTIMONY

1 position to lead the Company's residential energy efficiency planning and  
2 implementation efforts.

3 Q. Have you previously testified before the Michigan Public Service Commission ("MPSC"  
4 or the "Commission")?

5 A. Yes, I filed testimony on behalf of the Company in following cases:

- 6 • Case No. U-17351 regarding Consumers Energy's 2014-2017 Amended EO Plan;
- 7 • Case No. U-16860 regarding Consumers Energy's Gas Revenue Pilot Decoupling  
8 Mechanism; and
- 9 • Case No. U-16670 regarding Consumers Energy's 2012-2015 Amended EO Plan.

10 Q. What is the purpose of your testimony in this proceeding?

11 A. I will provide in my testimony:

- 12 1. An overview of the Company's residential EO programs; and
- 13 2. Actual energy savings and investment for the residential portfolio.

14 Q. Are you sponsoring any exhibits with your direct testimony?

15 A. No.

16 Q. What EO residential programs were available during 2013?

17 A. There were 12-residential programs and nine-residential pilot programs. The programs  
18 included the following:

- 19 • Efficient Lighting
- 20 • ENERGY STAR<sup>®</sup> Appliances
- 21 • High-Efficiency heating, ventilation, and air conditioning ("HVAC") and Water  
22 Heating Equipment
- 23 • Low-Income Weatherization
- 24 • Multi-Family

THEODORE A. YKIMOFF  
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- Home Performance with ENERGY STAR®
- New Construction
- Appliance Recycling
- Think! Energy – Energy Education
- Home Energy Report
- Home Energy Analysis
- Insulation and Windows

Q. What EO residential pilot programs were available in 2013?

A. The residential pilot programs included the following:

- Multi-measure Engagement (Energy Advisor)
- Smart (Learning) Thermostats
- Smart Energy Challenge
- Visual Smart Energy Challenge
- Demonstration Project (Mobile Energy Efficiency Pilot)
- Made in Michigan
- Agriculture
- Habitat for Humanity – Phase Two
- Secondary Education (Youth Energy Advisor)

Q. For each of the residential programs and residential pilot programs listed above, is there detailed information available in this filing?

A. Yes. Company witness Benjamin M. Ruhl's Exhibit A-11 (BMR-1), Consumers Energy: 2013 Energy Optimization Annual Report, is a 184-page comprehensive Report that

THEODORE A. YKIMOFF  
DIRECT TESTIMONY

1 reviews the Company's 2013 EO performance that includes information on the  
2 12-residential programs and nine-residential pilot programs.

3 Q. What information is contained in this Report?

4 A. The Consumers Energy: 2013 Energy Optimization Annual Report is a comprehensive  
5 Report that reviews the Company's 2013 EO performance on its portfolio of programs.  
6 The Report provides detailed program sections that include; program objective, target  
7 market, program duration, program description, program logic, incentive strategy,  
8 eligible measures, implementation strategy, marketing strategy, key milestones,  
9 evaluation strategy requirements, Consumers Energy administrative requirements,  
10 participation, investment, energy saving, and benefit-cost test results. Detailed  
11 information on residential programs and pilot programs can be found beginning on  
12 page 22 of that document.

13 Q. From the residential programs and residential pilot programs that the Company  
14 implemented as part of this filing, what were the actual total annualized MWh, MW, and  
15 Mcf savings for 2013?

16 A. From the residential programs and residential pilot programs, the Company delivered  
17 192,728 MWh, 19.5 MW, and 1,186,815 Mcf of energy savings in 2013, respectively.  
18 Individual residential program energy saving results can be found in Exhibit A-11  
19 (BMR-1), Consumers Energy: 2013 Energy Optimization Annual Report on page 14 in  
20 Table 4-5. 2013 Portfolio Savings.

21 Q. Has the Company certified these electric and gas energy savings?

22 A. Yes. As detailed in Company witness Ruhl's direct testimony, the Company engaged  
23 The Cadmus Group, Inc. to certify the residential energy savings. Energy savings for

THEODORE A. YKIMOFF  
DIRECT TESTIMONY

1 residential pilot programs are done by calculation as detailed in Company witness Ruhl's  
2 direct testimony, and on page 15 of his Exhibit A-11 (BMR-1), Consumers Energy:  
3 2013 Energy Optimization Annual Report in section 4.2 Energy Savings for Pilot and  
4 Education and Awareness.

5 Q. Did the Company achieve its residential electric savings within the Commission-  
6 approved residential spend in Case No. U-16670?

7 A. The Company established its 2013 residential electric spend in Case No. U-16670 to be  
8 \$30,352,991. The Company actually spent \$30,352,119 as shown in Company witness  
9 James P. Schwanitz' direct testimony, and his Exhibit A-16 (JPS-1), EO Electric  
10 Investments & Incentive Calculation.

11 Q. Why does the actual electric spend vary from the planned electric spend?

12 A. Due to the large number of programs and timing of program expenses it is not possible to  
13 exactly match planned spending with actual spending. It should be noted that the  
14 variance between planned spending and actual spending is a de minimus amount when  
15 compared to the total spending.

16 Q. Did the Company achieve its residential gas savings within the Commission-approved  
17 residential spend in Case No. U-16670?

18 A. The Company established its 2013 gas spend in Case No. U-16670 to be \$35,667,978.  
19 The Company actually spent \$35,511,599 as shown in Company witness Schwanitz'  
20 direct testimony, and his Exhibit A-17 (JPS-2), EO Gas Investment & Incentive  
21 Calculation.



THEODORE A. YKIMOFF  
DIRECT TESTIMONY

1 Q. Why does the actual gas spend vary from the planned gas spend?

2 A. Due to the large number of programs and timing of program expenses it is not possible to  
3 exactly match planned spending with actual spending. It should be noted that the  
4 variance between planned spending and actual spending is a de minimus amount when  
5 compared to the total spending.

6 Q. Does that conclude your testimony?

7 A. Yes.

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\_\_\_\_\_ )

Case No. U-17601

PROOF OF SERVICE

STATE OF MICHIGAN )  
 ) SS  
COUNTY OF JACKSON )

Dorothy H. Wright, being first duly sworn, deposes and says that she is employed in the Legal Department of Consumers Energy Company; that on May 30, 2014, she served an electronic copy of Consumers Energy Company's **"Application and Testimony and Exhibits of Company witnesses Alfred A. Alatalo, Katherine L. Allen, Robert D. Bordner, Laura M. Collins, M. Sami Khawaja, Richard A. Morgan, Benjamin M. Ruhl, James P. Schwanitz, and Theodore A. Ykimoff"** upon the persons listed in Attachment 1 hereto, at the e-mail addresses listed therein.

\_\_\_\_\_  
Dorothy H. Wright

Subscribed and sworn to before me this 30<sup>th</sup> day of May, 2014.

\_\_\_\_\_  
Michelle Abbs, Notary Public  
State of Michigan, County of Jackson  
My Commission Expires: 08/09/17  
Acting in the County of Jackson

**ATTACHMENT 1 TO CASES NO. U-17601**

(Parties to Case Nos. U-16670 and U-17138)

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