



ENVIRONMENTAL LAW & POLICY CENTER

Protecting the Midwest's Environment and Natural Heritage

June 22, 2021

Ms. Lisa Felice
Michigan Public Service Commission
7109 W. Saginaw Hwy.
P. O. Box 30221
Lansing, MI 48909

RE: MPSC Case No. U-20963

Dear Ms. Felice:

The following is attached for paperless electronic filing:

Direct Testimony and Exhibits of Karl R. Rabago

Direct Testimony and Exhibits of Joseph Daniel

Direct Testimony and Exhibits of William D. Kenworthy

Proof of Service

Sincerely,

Margrethe Kearney
Environmental Law & Policy Center
mkearney@elpc.org

cc: Service List, Case No. U-20963

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Chicago, IL • Columbus, OH • Des Moines, IA • Grand Rapids, MI • Indianapolis, IN
* Minneapolis, MN • Madison, WI • North Dakota • South Dakota • Washington, D.C.

**STATE OF MICHIGAN
MICHIGAN PUBLIC SERVICE COMMISSION**

In the matter of the application of
CONSUMERS ENERGY COMPANY
for authority to increase its rates for the
generation and distribution of electricity
and for other relief.

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Case No. U-20963

**DIRECT TESTIMONY OF KARL R. RÁBAGO
ON BEHALF OF
THE ENVIRONMENTAL LAW & POLICY CENTER**

June 22, 2021

I. INTRODUCTION

Q. Please state your name, business name and address, and role with the Clean Energy Organizations.

A. My name is Karl R. Rábago. I am the principal of Rábago Energy LLC, a Colorado limited liability company, located at 2025 East 24th Avenue, Denver, Colorado. I appear here in my capacity as an expert witness on behalf of the Environmental Law & Policy Center.

Q. Please summarize your experience and expertise in the field of electric utility regulation.

A. I have worked for more than 30 years in the electricity industry and related fields. I am actively involved in a wide range of electric utility issues across the United States. My previous employment experience includes Commissioner with the Public Utility Commission of Texas, Deputy Assistant Secretary with the U.S. Department of Energy, Vice President with Austin Energy, Executive Director of the Pace Energy and Climate Center, Managing Director with the Rocky Mountain Institute, and Director with AES Corporation, among others. I earned a bachelor's degree in management, a law degree, and two post-doctoral law degrees in military and environmental law. A detailed resume is attached as Exhibit CEO-1 (KRR-1).

Q. Do you have specific experience relating to electrification of transportation and deployment of electric vehicle charging infrastructure?

A. Yes. I have extensive experience working in utility involvement in electric vehicles ("EVs"). As a vice president for Austin Energy, I had responsibility for the utility's electric vehicle initiatives. Building on the success of a national campaign called "Plug-In Partners," I led a team that successfully secured federal funding support to build out a

1 city-wide public charging network that comprises more than 100 Level 2 charging
2 stations. In my former position at the Pace Energy and Climate Center, I led the Center's
3 participation in a local stakeholder process aimed at advancing EV charging
4 infrastructure in Westchester County, New York. Finally, in several rate cases in New
5 York and Rhode Island, and in Consumers Energy Company's ("Consumers" or the
6 "Company") prior rate case, I have reviewed and submitted testimony relating to electric
7 utility EV-related programs and investments.

8 **Q. Have you ever testified before the Michigan Public Service Commission ("MPSC"**
9 **or "Commission") or other regulatory agencies?**

10 A. Yes. I submitted testimony in MPSC Cases U-20697, U-20359, U-20162, U-20134, U-
11 17302, U-17301, U-17767, U-18090, U-18091, U-18089, U-18092, U-18093, and U-
12 18094. In the past nine years, I submitted testimony, comments, or presentations in
13 proceedings in Alabama, Arkansas, Arizona, California, Colorado, Connecticut, District
14 of Columbia, Florida, Georgia, Guam, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky,
15 Louisiana, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nevada, New
16 Hampshire, New York, North Carolina, Ohio, Pennsylvania, Puerto Rico, Rhode Island,
17 Vermont, Virginia, Washington, and Wisconsin. I have also testified before the U.S.
18 Congress and the Federal Trade Commission. A listing of my recent previous testimony
19 is attached as Exhibit CEO-2 (KRR-2).

20 **Q. What materials did you review in preparing this testimony?**

21 A. I reviewed applicable provisions of Michigan Compiled Laws, relevant portions of the
22 Consumers application and testimony, Company and Commission reports and websites,

1 and relevant Company and other party responses to requests for discovery from ELPC
2 and other parties in this case.

3 **Q. What is the purpose of this testimony?**

4 A. In this testimony, I address the Company's proposal for continuation of its
5 PowerMIDrive EV pilot program, implying capitalization of EV rebates and other non-
6 capital expenses as well as capital investments made through the program. It is important
7 to note what my testimony does not address. This testimony is focused on whether the
8 rebate and other non-capital expenses incurred by the Company in its EV program
9 proposal should be recovered from customers through capitalization instead of ordinary
10 treatment as an operating expense for the EV Program. This testimony does not take issue
11 with the Company playing a role in encouraging EV adoption and EV infrastructure
12 deployment, which I support. I do not oppose the Company paying and recovering EV
13 charging equipment rebates from its customers as a cost of service. I do not oppose the
14 Company capitalizing on capital investments. However, I oppose the extraordinary action
15 of allowing capital investment treatment — "capitalization" — for ordinary variable
16 expenses associated with execution of the program, and payment of rebates to customers
17 installing approved EV charging equipment. Instead, I recommend that the Commission
18 invite the utility to propose a mechanism to earn an incentive for meeting performance
19 metrics that provide customer and societal benefits.

20 **Q: Are you sponsoring any exhibits?**

21 A: Yes. I am sponsoring the following exhibits:
22 CEO-1 (KRR-1) – Detailed Resume of Karl R. Rábago
23 CEO-2 (KRR-2) – Recent Testimony of Karl R. Rábago

1 **Q. How is your testimony organized?**

2 A. Above I provided an introduction, which is followed below by an overview of the
3 Company’s proposal for capitalization of EV Program Rebate Expenses. Next, I explain
4 why the Company’s proposal should not be approved unless the Commission finds
5 specific policy and ratemaking grounds for such treatment of ordinary rebate and
6 operating expenses. Finally, I summarize my conclusions and provide recommendations
7 for the Commission.

8 **II. OVERVIEW OF THE COMPANY’S PROPOSAL AND CAPITALIZATION OF**
9 **EV REBATE AND OTHER NON-CAPITAL EXPENSES**

10 **Q. Please describe the Company’s proposal and how that may lead to capitalization of**
11 **non-capital PowerMIDrive expenses.**

12 A. The Company proposes, primarily through the testimony of Company witness Anita J.
13 Griffin, the extension and expansion of a multi-part pilot EV program that it calls
14 “PowerMIDrive.” The current PowerMIDrive pilot, approved in Commission Docket
15 Number U-20134, included funding for operational rebate payments to customers
16 installing private residential, public Level 2, and public Direct Current Fast Chargers and
17 other ordinary operating/non-capital expenses, which the Commission allowed the
18 Company to record as a regulatory asset and upon which the Company would earn a
19 return through rates charged to customers. The Company proposes a three-year extension
20 on the pilot program, beginning in July 2022, and ending in July 2025, and assumes
21 continued regulatory asset treatment—capitalization—for rebate and other operating
22 expenses.

23 **Q. How does the Company propose to treat program costs, including rebates, for**
24 **accounting and rate purposes?**

1 A. Assuming the Company's PowerMIDrive pilot program extension request is a request to
2 continue the current accounting treatment in its extended pilot program, it appears to
3 intend to treat all program costs as a regulatory asset. If the Commission approves the
4 Company request for extension of the program, the Commission may or may not chose to
5 allow Consumers to amortize and earn a return on unamortized account balances
6 associated with PowerMIDrive program rebates and other program O&M costs.

7 **Q. What amounts of rebate and other spending does the Company propose to**
8 **capitalize in the PowerMIDrive pilot program extension?**

9 A. The Company, through its witness Anita J. Griffin, proposes a significant expansion of
10 the PowerMIDrive pilot program and a budget of nearly \$30 million. While I found that
11 no Company witness expressly proposes continued capitalization treatment for
12 PowerMIDrive program expenses, the testimony of Company witness Jason R. Coker
13 assumes such treatment continues through the extension of the first pilot period. The
14 current program was approved with a budget of \$10 million.¹ The current proposal is
15 three times larger, as shown in the following table replicated from Company witness
16 testimony.²

¹ Company witness Griffin at p. 76, lines 5-6.

² *Id.* at Figure 15.

Table 1: Company Proposed PowerMIDrive Program 07/22 through 06/25

Program Element	Proposed Budget
Education & Outreach	\$1,100,000
IT Data & Administration	\$6,150,000
Residential Incentives	\$1,000,000
L2 Hospitality & MDU Rebates	\$500,000
Public DCFC Rebates	\$14,500,000
Make Ready Funds	\$6,000,000
<i>Total Proposed Pilot Extension Costs</i>	<i>\$29,250,000</i>

Q. What does capitalization of program expenses mean in practical rate terms?

A. If the Commission approves the Company's requested budget and grants a continuation of the current program accounting treatment, and if the Company spends its entire program budgets for both phases of the PowerMIDrive pilot, it will add approximately \$10 million to the deferral account balance each year of the program and customers will pay amortization expenses each year of the amortization period.³ The Company will earn and recover a return on the unamortized balance at its allowed rate of return in each year in which a balance remains. In very simple terms, and assuming a 10% rate of return and a five-year amortization of program spending, I estimate that the existing and proposed spending program spending would generate more than \$10 million in profits for the Company out to the year 2030. Of the total program spending, some represents Company-owned DCFC facilities and make-ready spending—about one-quarter of the total program spend which would typically be capitalized—so the profit the Company

³ See Company witness Coker exhibit A-68 (JRC-54).

1 would earn from capitalization of non-capital spending would be about \$7.5 million.

2 Again, I do not oppose capitalization of the capital investments the Company proposes
3 under the program.

4 **Q. Does the Company provide any justification for regulatory asset treatment and**
5 **capitalization of PowerMIDrive pilot program operational expenses and rebates in**
6 **this proceeding?**

7 A. No. The Company makes no specific proposal for the accounting treatment of expenses
8 under a continued PowerMIDrive pilot program, and offers no evidence or justification
9 for capitalization of non-capital expenses in this proceeding that I can find. Company
10 witness Griffin addresses the benefits of transportation electrification and proposed
11 program elements, but does not explain why the extraordinary measure of capitalization
12 for operating expenses and rebates should be continued for three more years, especially
13 as the Company proposes to triple the size of its pilot program.

14 **III. THE COMPANY'S PROPOSAL TO CAPITALIZE PowerMIDrive REBATE AND**
15 **OTHER OPERATING EXPENSES IS NOT JUSTIFIED ON POLICY AND**
16 **RATEMAKING GROUNDS**

17 **Q. What are the major differences between capital investments and operating expenses**
18 **and how the two types of costs are traditionally treated in rate making?**

19 A. Capital investments are the costs of fixed or durable assets that are typically long-lived,
20 operated or maintained by the utility, and not intended for sale during the normal course
21 of business. Because capital assets are dedicated to service by the utility for the purpose
22 of providing electric service to customers, traditional rate making depreciates the capital
23 investment over the useful life of the asset and allows a return on the undepreciated
24 balance of the investment. Operating expenses are the expenses a utility incurs through its
25 ordinary business operations. Approved operating expenses are recoverable on a dollar-

1 for-dollar basis in rates. Where those costs are well-known and regular from year to year,
2 they are included in the rate base and recovered on a dollar-for-dollar basis without a
3 return on the expenses. When operating expenses vary significantly in the period between
4 rate cases, trackers or other expense recovery mechanisms can be used to avoid rate
5 shock to customers or cash-flow problems for the utility.

6 **Q. Why is it important to maintain the distinction in accounting treatment between**
7 **operating expenses and capital investments?**

8 A. There are several sound reasons to maintain the distinction in accounting treatment
9 between operating expenses and capital investments. Operating expenses are generally
10 for short-lived goods and services representing a variable cost of the utility—the goods
11 and services are used up quickly, usually within a single year. Conversely, long-lived
12 assets dedicated to use in serving a public purpose earn a return of and on the investment.
13 Short-term operating expenses, like the program education activities and the one-time
14 rebates paid to customers in the proposed PowerMIDrive program budget, are not
15 typically treated like capital investments in utility accounting. The alignment of asset life
16 and accounting recovery timing promotes intergenerational equity—goods and services
17 put to work immediately and for a short duration are charged to customers as they are
18 used. Capitalizing operating expenses puts future customers on the hook for products and
19 services that have already been consumed.

20 **Q. What other reasons are there for distinct accounting treatment of operating**
21 **expenses and capital investments?**

22 A. The profits earned through return on capital investments create a strong financial
23 incentive for the cost-of-service utility to increase capital spending. Treating operating

1 expenses as capital investments creates an incentive for utilities to increase, rather than
2 moderate, operating spending. Discipline in spending on operational expenses reduces the
3 risk of free-riders and encourages the utility to find optimal and efficient prices for goods
4 and services. This also applies to EV charging equipment rebates, especially at the very
5 early stages of market development. The Company proposal to target hospitality business
6 sites for Level 2 chargers is an example of the kind of focus on use cases that maximize
7 system benefits that the Company should pursue. Capitalization of rebates weakens the
8 incentive to the Company to maximize system value by providing profits to the Company
9 for any rebate paid, regardless of whether it is well-targeted.

10 **Q. Is the Company proposing to use PowerMIDrive funds to procure charging**
11 **equipment or make other capital investments?**

12 A. Yes. The Company proposes to spend about \$10 million of the PowerMIDrive pilot
13 extension budget on Company-owned DCFC installations and make-ready activities,
14 which I assume will be traditional long-lived, utility-owned capital investments.⁴ I do not
15 oppose the traditional capitalization of such capital investments.

16 **Q. Why is it important that a substantial amount of the PowerMIDrive budget is not**
17 **for capital investments?**

18 A. As shown in the Table above, rebates constitute \$16 million of the proposed
19 PowerMIDrive budget, or about 55% of the proposed spending. Education and outreach
20 and IT Data & Administration, which is mostly a labor expense, represents another \$7.25
21 million.⁵ As a result, nearly 80% of the proposed PowerMIDrive budget is operating
22 expenses, including rebates. At the most basic level, rebates pay customers for making

⁴ Company witness Griffin at p. 77, lines 3-21.

⁵ *Id.* at p. 76, lines 8-11.

1 investment decisions and leave the use of the rebate funds entirely to the discretion of the
2 customer; rebates do not pay for utility capital investments. The Company does not need
3 to seek investment capital to support the rebate funds for its program. The Company and
4 its shareholders are taking only a limited stake in the potential outcome of PowerMIDrive
5 program; their investment capital is not at risk for these expenses, though the
6 capitalization treatment pays them as if it were. The Company will not own or operate the
7 vast majority of the charging stations that the PowerMIDrive program will facilitate;
8 operational and maintenance risk is primarily on the customers and site-hosts who install
9 the equipment. The Company is not bearing a significant risk of technological
10 obsolescence. The Company proposal would result in the Company not bearing
11 significant capital risk to earn the load-building revenues associated with transportation
12 electrification, while also earning a profit on ordinary expense spending and on rebates it
13 pays to customers to encourage them to make the actual capital investments that the
14 Company is not undertaking.

15 **Q. Does the Company's PowerMIDrive program impose any conditions on rebate**
16 **acceptance by customers and site-hosts?**

17 A. Yes. The Company's PowerMIDrive program imposes several conditions on customers
18 and site-hosts relating to the types of charging equipment that qualify for rebates, the
19 sharing of operating data with the Company, and options to engage in demand-response
20 programs.⁶ The Company measures on- and off-peak charging behavior and is proposing
21 a rebate program for hospitality businesses with the expectation that hospitality
22 customers constitute a charging use-case that mostly charges at night.⁷

⁶ *Id.* at p. 14, lines 3-13.

⁷ *Id.* at p. 66, lines 8-21.

1 **Q. Do any of the conditions that the Company proposes to tie to rebate payments argue**
2 **for capitalization of rebate expenses?**

3 A. No. The conditions that the Company proposes could be imposed regardless of the
4 accounting and recovery mechanisms adopted. The capitalization method does nothing to
5 make the conditions easier to impose or more effective. The Company has goals for its
6 PowerMIDrive program, and an evaluation plan, but does not translate its goals or
7 evaluation results into conditions relating to rebates.⁸

8 **Q. Is capitalization of rebates and ordinary expenses necessary to achieve the goals of**
9 **the PowerMIDrive program?**

10 A. No. First, it is important to remember that charging electric vehicles brings new load to
11 electric utilities, for which they will earn additional profits. Even without capitalization of
12 rebate and other ordinary expenses, the Company has a strong incentive to achieve its
13 charging station deployment and usage goals. This raises the question of whether the
14 utility should receive any additional incentive to achieve objectives beyond the basic
15 deployment goals of the PowerMIDrive pilot program.

16 **Q. Based on your experience leading the building of a public charging network and**
17 **administering a transportation electrification program, what kinds of program**
18 **activities are good candidates for incentives above and beyond the added revenues**
19 **of EV charging load?**

20 A. The Company seems to recognize that it should do more than just get the equipment
21 installed and used. The Company recognizes that to prevent EV charging from becoming
22 a financial burden on customers it should encourage off-peak charging. The Company

⁸ *Id.* at p. 67, line 1 thru p. 72, line 12.

1 recognizes that there are barriers to market adoption of EV charging infrastructure at
2 many multi-family residences. There are also challenges siting charging infrastructure in
3 environmentally and economically disadvantaged communities. It is hard to pursue and
4 secure grants and government funding, and it adds administrative burdens to program
5 management. Achieving much higher levels of off-peak charging than would naturally
6 occur, facilitating the equitable distribution of charging infrastructure, accelerating local
7 air pollution benefits in environmentally disadvantaged communities through
8 transportation electrification, and leveraging customer dollars with government and
9 private sector grants and supplemental funding are all good candidates for incentive
10 structures. Each of these examples could serve, alone or together, as foundation for an
11 incentive-based program structure.

12 **Q. How should an incentive program that achieved objectives like you described**
13 **actually work?**

14 A. As with any performance-based regulatory initiative, there are a few basic steps. First,
15 there should a collaborative effort to define the goals. Second, the baseline and business-
16 as-usual conditions need to be characterized. Third, the level of achievement that merits
17 reward should be agreed upon. Fourth, the ways in which progress towards the goal is
18 measured (metrics) need to be defined. Fifth, the level of the incentive must be decided
19 Finally, the requirements for documentation and reporting of progress must be
20 established.

21 **Q. Are the Company's profits from operating the current and proposed PowerMIDrive**
22 **program tied to and conditioned upon achieving specific program goals as measured**
23 **by program metrics?**

1 A. The Company does not propose such a structure. As proposed, the only metric for the
2 PowerMIDrive program that impacts Company profitability is the level of spending on
3 program activities. While the Commission can always conduct an after-the-fact review of
4 the Company's spending under the PowerMIDrive program, economic and administrative
5 efficiency would counsel the setting of such standards in advance through a performance-
6 based program initiative.

7 **Q. Does the Company's proposal include a proposal for an incentive-based or**
8 **performance-based compensation mechanism to better align the PowerMIDrive**
9 **program results with desired regulatory and program outcomes?**

10 A. No. The Company's intention appears to be that every dollar of PowerMIDrive program
11 spending subsequently approved in a rate case will be amortized, and that unamortized
12 balances will earn a return set at the Company-wide allowed rate of return. The Company
13 has not proposed a shared savings or alternative approach that more directly ties utility
14 earnings to customer benefits based on what it has learned in the first phase of the
15 PowerMIDrive pilot, notwithstanding its stated intentions to do so in Docket No. U-
16 20134.⁹

17 **IV. CONCLUSIONS AND RECOMMENDATION**

18 **Q. Based on your testimony and review of the Company's proposal to extend and**
19 **expand PowerMIDrive pilot program spending and to continue capitalizing**
20 **program operating expenses, including rebates, what conclusions do you reach?**

21 A. The Company has not offered a case for the proposition that Commission approval of
22 regulatory asset treatment for rebate and other program operating expenses is necessary,

⁹ Company witness Michael Delany testimony in Docket No. 20134, at p. 28, lines 11-15; *see also* Company response to "20134-ELPC-CE-CONSUMERS-27," admitted as Exhibit ELP-6 in Docket No. U-20134.

1 reasonable, or appropriate. The Company provides no evidence in this case that such
2 accounting treatment for PowerMIDrive program spending, with the revenue requirement
3 burden it places on all customers, is necessary to achieve the objectives of the program.

4 **Q. What do you conclude regarding whether an accounting process of capitalization of**
5 **rebate and other ordinary operating expenses should be continued through a pilot**
6 **program extension as proposed by the Company?**

7 A. I reach three major conclusions. First, the Company position is that it is not yet ready to
8 run its PowerMIDrive pilot program as a full-fledged program, even though it proposes
9 that the extended program will have a budget three times greater than the ongoing pilot.
10 Second, the Company has not made any case for capitalization treatment of rebate and
11 other ordinary operating expenses. Third, the PowerMIDrive program can be designed
12 with an incentive earnings component tied to achieving performance goals that are in the
13 interests of customers and society.

14 **Q. What approach do you recommend that the Commission take on the Company's**
15 **proposal to expand and extend the PowerMIDrive pilot program and the implicit**
16 **proposal to allow regulatory asset and capitalization treatment of PowerMIDrive**
17 **program rebate and operating expenses?**

18 A. I recommend that the Commission make it clear that regulatory asset treatment for rebate
19 and other ordinary operating expenses is a significant departure from sound regulatory
20 practice and should be avoided unless compelling and substantial evidence supports such
21 treatment. The concept of regulatory asset treatment for operating expenses associated
22 with load-building programs requires and deserves much more careful consideration than
23 the Company has provided in this case. I recommend that if the Commission approves the

1 PowerMIDrive pilot program extension, it does so on the condition that ordinary
2 accounting treatment of capital investments and operating expenses be used. I further
3 recommend that the Commission invite the Company to work with stakeholders to
4 develop a performance-based incentive for achievement of specified objectives.

5 **Q. Does this conclude your testimony?**

6 A. Yes.

7

Karl R. Rábago

Rábago Energy LLC

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Nationally recognized leader and innovator in electricity and energy law, policy, and regulation. Experienced as a regulatory expert, utility executive, research and development manager, sustainability leader, senior government official, educator, and advocate. Successful track record of working with U.S. Congress, state legislatures, governors, regulators, city councils, business leaders, researchers, academia, and community groups. Nationally recognized speaker on energy, environment, and sustainable development matters. Managed staff as large as 250; responsible for operations of research facilities with staff in excess of 600. Developed and managed budgets in excess of \$300 million. Law teaching experience at Pace University Elisabeth Haub School of Law, University of Houston Law Center, and U.S. Military Academy at West Point. Military veteran.

Employment

RÁBAGO ENERGY LLC

Principal: July 2012—Present. Consulting practice dedicated to providing business sustainability, expert witness, and regulatory advice and services to organizations in the clean and advanced energy sectors. Prepared and submitted testimony in more than 30 states and 100 electricity and gas regulatory proceedings. Recognized national leader in development and implementation of award-winning “Value of Solar” alternative to traditional net metering. Additional information at www.rabagoenergy.com.

- Chairman of the Board, Center for Resource Solutions (1997-present). CRS is a not-for-profit organization based at the Presidio in California. CRS developed and manages the Green-e Renewable Electricity Brand, a nationally and internationally recognized branding program for green power and green pricing products and programs. Past chair of the Green-e Governance Board.
- Director, Solar United Neighbors (2018-present).

PACE ENERGY AND CLIMATE CENTER, PACE UNIVERSITY ELISABETH HAUB SCHOOL OF LAW

Senior Policy Advisor: September 2019—September 2020. Part-time advisor and staff member. Provide expert witness, project management, and business development support on electric and gas regulatory and policy issues and activities.

Executive Director: May 2014—August 2019. Leader of a team of professional and technical experts and law students in energy and climate law, policy, and regulation. Secured funding for and managed execution of regulatory intervention, research, market development support, and advisory services. Taught Energy Law. Provided learning and development opportunities for law students. Additional activities:

- Former Director, Alliance for Clean Energy – New York (2018-2019).
- Former Director, Interstate Renewable Energy Council (IREC) (2012-2018).
- Former Co-Director and Principal Investigator, Northeast Solar Energy Market Coalition (2015-2017). The NESEMC was a US Department of Energy’s SunShot Initiative Solar Market Pathways project. Funded under a cooperative agreement between the US DOE and Pace University, the NESEMC worked to harmonize solar market policy and advance supportive policy and regulatory practices in the northeast United States.

Karl R. Rábago

AUSTIN ENERGY – THE CITY OF AUSTIN, TEXAS

Vice President, Distributed Energy Services: April 2009—June 2012. Executive in 8th largest public power electric utility serving more than one million people in central Texas. Responsible for management and oversight of energy efficiency, demand response, and conservation programs; low-income weatherization; distributed solar and other renewable energy technologies; green buildings program; key accounts relationships; electric vehicle infrastructure; and market research and product development. Executive sponsor of Austin Energy's participation in an innovative federally-funded smart grid demonstration project led by the Pecan Street Project. Led teams that successfully secured over \$39 million in federal stimulus funds for energy efficiency, smart grid, and advanced electric transportation initiatives. Additional activities included:

- Director, Renewable Energy Markets Association. REMA is a trade association dedicated to maintaining and strengthening renewable energy markets in the United States.
- Membership on Pedernales Electric Cooperative Member Advisory Board. Invited by the Board of Directors to sit on first-ever board to provide formal input and guidance on energy efficiency and renewable energy issues for the nation's largest electric cooperative.

THE AES CORPORATION

Director, Government & Regulatory Affairs: June 2006—December 2008. Director, Global Regulatory Affairs, provided regulatory support and group management to AES's international electric utility operations on five continents. Managing Director, Standards and Practices, for Greenhouse Gas Services, LLC, a GE and AES venture committed to generating and marketing greenhouse gas credits to the U.S. voluntary market. Government and regulatory affairs manager for AES Wind Generation. Managed a portfolio of regulatory and legislative initiatives to support wind energy market development in Texas, across the United States, and in many international markets.

JICARILLA APACHE NATION UTILITY AUTHORITY

Director: 1998—2008. Located in New Mexico, the JANUA was an independent utility developing profitable and autonomous utility services that provide natural gas, water utility services, low income housing, and energy planning for the Nation. Authored "First Steps" renewable energy and energy efficiency strategic plan with support from U.S. Department of Energy.

HOUSTON ADVANCED RESEARCH CENTER

Group Director, Energy and Buildings Solutions: December 2003—May 2006. Leader of energy and building science staff at a mission-driven not-for-profit contract research organization based in The Woodlands, Texas. Responsible for developing, maintaining and expanding upon technology development, application, and commercialization support programmatic activities, including the Center for Fuel Cell Research and Applications; the Gulf Coast Combined Heat and Power Application Center; and the High-Performance Green Buildings Practice. Secured funding for major new initiative in carbon nanotechnology applications in the energy sector.

- President, Texas Renewable Energy Industries Association. As elected president of the statewide business association, led and managed successful efforts to secure and implement significant expansion of the state's renewable portfolio standard as well as other policy, regulatory, and market development activities.
- Director, Southwest Biofuels Initiative. Established the Initiative as an umbrella structure for a number of biofuels related projects.

Karl R. Rábago

- Member, Committee to Study the Environmental Impacts of Windpower, National Academies of Science National Research Council. The Committee was chartered by Congress and the Council on Environmental Quality to assess the impacts of wind power on the environment.
- Advisory Board Member, Environmental & Energy Law & Policy Journal, University of Houston Law Center.

CARGILL DOW LLC (NOW NATUREWORKS, LLC)

Sustainability Alliances Leader: April 2002—December 2003. Integrated sustainability principles into all aspects of a ground-breaking bio-based polymer manufacturing venture. Responsible for maintaining, enhancing and building relationships with stakeholders in the worldwide sustainability community, as well as managing corporate and external sustainability initiatives.

- Successfully completed Minnesota Management Institute at University of Minnesota Carlson School of Management, an alternative to an executive MBA program that surveyed fundamentals and new developments in finance, accounting, operations management, strategic planning, and human resource management.

ROCKY MOUNTAIN INSTITUTE

Managing Director/Principal: October 1999—April 2002. Co-authored “Small Is Profitable,” a comprehensive analysis of the benefits of distributed energy resources. Provided consulting and advisory services to help business and government clients achieve sustainability through application and incorporation of Natural Capitalism principles.

- President of the Board, Texas Ratepayers Organization to Save Energy. Texas R.O.S.E. is a non-profit organization advocating low-income consumer issues and energy efficiency programs.
- Co-Founder and Chair of the Advisory Board, Renewable Energy Policy Project-Center for Renewable Energy and Sustainable Technology. REPP-CREST was a national non-profit research and internet services organization.

CH2M HILL

Vice President, Energy, Environment and Systems Group: July 1998—August 1999. Responsible for providing consulting services to a wide range of energy-related businesses and organizations, and for creating new business opportunities in the energy industry for an established engineering and consulting firm. Completed comprehensive electric utility restructuring studies for the states of Colorado and Alaska.

PLANERGY

Vice President, New Energy Markets: January 1998—July 1998. Responsible for developing and managing new business opportunities for the energy services market. Provided consulting and advisory services to utility and energy service companies.

ENVIRONMENTAL DEFENSE FUND

Energy Program Manager: March 1996—January 1998. Managed renewable energy, energy efficiency, and electric utility restructuring programs. Led regulatory intervention activities in Texas and California. In Texas, played a key role in crafting Deliberative Polling processes. Participated in national environmental and energy advocacy networks, including the Energy Advocates Network, the National Wind Coordinating Committee, the NCSL Advisory Committee on Energy, and the PV-COMPACT Coordinating Council. Frequently appeared before the Texas Legislature, Austin City Council, and regulatory commissions on electric restructuring issues.

Karl R. Rábago

UNITED STATES DEPARTMENT OF ENERGY

Deputy Assistant Secretary, Utility Technologies: January 1995–March 1996. Manager of the Department's programs in renewable energy technologies and systems, electric energy systems, energy efficiency, and integrated resource planning. Supervised technology research, development and deployment activities in photovoltaics, wind energy, geothermal energy, solar thermal energy, biomass energy, high-temperature superconductivity, transmission and distribution, hydrogen, and electric and magnetic fields. Managed, coordinated, and developed international agreements. Supervised development and deployment support activities at national laboratories. Developed, advocated, and managed a Congressional budget appropriation of approximately \$300 million.

STATE OF TEXAS

Commissioner, Public Utility Commission of Texas. May 1992–December 1994. Appointed by Governor Ann W. Richards. Regulated electric and telephone utilities in Texas. Co-chair and organizer of the Texas Sustainable Energy Development Council. Vice-Chair of the National Association of Regulatory Utility Commissioners (NARUC) Committee on Energy Conservation. Member and co-creator of the Photovoltaic Collaborative Market Project to Accelerate Commercial Technology (PV-COMPACT).

LAW TEACHING

Professor for a Designated Service: Pace University Elisabeth Haub School of Law, 2014-2019. Non-tenured member of faculty. Taught Energy Law. Supervised a student intern practice.

Associate Professor of Law: University of Houston Law Center, 1990–1992. Full time, tenure track member of faculty. Courses taught: Criminal Law, Environmental Law, Criminal Procedure, Environmental Crimes Seminar, Wildlife Protection Law.

Assistant Professor: United States Military Academy, West Point, New York, 1988–1990. Member of the faculty in the Department of Law. Honorably discharged in August 1990, as Major in the Regular Army. Courses taught: Constitutional Law, Military Law, and Environmental Law Seminar.

LITIGATION

Trial Defense Attorney and Prosecutor, U.S. Army Judge Advocate General's Corps, Fort Polk, Louisiana, January 1985–July 1987. Assigned to Trial Defense Service and Office of the Staff Judge Advocate.

NON-LEGAL MILITARY SERVICE

Armored Cavalry Officer, 2d Squadron 9th Armored Cavalry, Fort Stewart, Georgia, May 1978–August 1981. Served as Logistics Staff Officer (S-4). Managed budget, supplies, fuel, ammunition, and other support for an Armored Cavalry Squadron. Served as Support Platoon Leader for the Squadron (logistical support), and as line Platoon Leader in an Armored Cavalry Troop. Graduate of Airborne and Ranger Schools. Special training in Air Mobilization Planning and Nuclear, Biological and Chemical Warfare.

Karl R. Rábago

Formal Education

LL.M., Environmental Law, Pace University School of Law, 1990: Curriculum designed to provide breadth and depth in study of theoretical and practical aspects of environmental law. Courses included: International and Comparative Environmental Law, Conservation Law, Land Use Law, Seminar in Electric Utility Regulation, Scientific and Technical Issues Affecting Environmental Law, Environmental Regulation of Real Estate, Hazardous Wastes Law. Individual research with Hudson Riverkeeper Fund, Garrison, New York.

LL.M., Military Law, U.S. Army Judge Advocate General's School, 1988: Curriculum designed to prepare Judge Advocates for senior level staff service. Courses included: Administrative Law, Defensive Federal Litigation, Government Information Practices, Advanced Federal Litigation, Federal Tort Claims Act Seminar, Legal Writing and Communications, Comparative International Law.

J.D. with Honors, University of Texas School of Law, 1984: Attended law school under the U.S. Army Funded Legal Education Program, a fully funded scholarship awarded to 25 or fewer officers each year. Served as Editor-in-Chief (1983–84); Articles Editor (1982–83); Member (1982) of the Review of Litigation. Moot Court, Mock Trial, Board of Advocates. Summer internship at Staff Judge Advocate's offices. Prosecuted first cases prior to entering law school.

B.B.A., Business Management, Texas A&M University, 1977: ROTC Scholarship (3–yr). Member: Corps of Cadets, Parson's Mounted Cavalry, Wings & Sabers Scholarship Society, Rudder's Rangers, Town Hall Society, Freshman Honor Society, Alpha Phi Omega service fraternity.

Karl R. Rábago

Selected Publications

“Distributed Generation Law,” contributing author, American Bar Association Environment, Energy, and Resources Section (August 2020)

“National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources,” contributing author, National Energy Screening Project (August 2020)

“Achieving 100% Renewables: Supply-Shaping through Curtailment,” with Richard Perez, Marc Perez, and Morgan Putnam, PV Tech Power, Vol. 19 (May 2019).

“A Radical Idea to Get a High-Renewable Electric Grid: Build Way More Solar and Wind than Needed,” with Richard Perez, The Conversation, online at <http://bit.ly/2YjnM15> (May 29, 2019).

“Reversing Energy System Inequity: Urgency and Opportunity During the Clean Energy Transition,” with John Howat, John Colgan, Wendy Gerlitz, and Melanie Santiago-Mosier, National Consumer Law Center, online at www.nclc.org (Feb. 26, 2019).

“Revisiting Bonbright’s Principles of Public Utility Rates in a DER World,” with Radina Valova, The Electricity Journal, Vol. 31, Issue 8, pp. 9-13 (Oct. 2018).

“Achieving very high PV penetration – The need for an effective electricity remuneration framework and a central role for grid operators,” Richard Perez (corresponding author), Energy Policy, Vol. 96, pp. 27-35 (2016).

“The Net Metering Riddle,” Electricity Policy.com, April 2016.

“The Clean Power Plan,” Power Engineering Magazine (invited editorial), Vol. 119, Issue 12 (Dec. 2, 2015)

“The ‘Sharing Utility:’ Enabling & Rewarding Utility Performance, Service & Value in a Distributed Energy Age,” co-author, 51st State Initiative, Solar Electric Power Association (Feb. 27, 2015)

“Rethinking the Grid: Encouraging Distributed Generation,” Building Energy Magazine, Vol. 33, No. 1 Northeast Sustainable Energy Association (Spring 2015)

“The Value of Solar Tariff: Net Metering 2.0,” The ICER Chronicle, Ed. 1, p. 46 [International Confederation of Energy Regulators] (December 2013)

“A Regulator’s Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation,” co-author, Interstate Renewable Energy Council (October 2013)

“The ‘Value of Solar’ Rate: Designing an Improved Residential Solar Tariff,” Solar Industry, Vol. 6, No. 1 (Feb. 2013)

“Jicarilla Apache Nation Utility Authority Strategic Plan for Energy Efficiency and Renewable Energy Development,” lead author & project manager, U.S. Department of Energy First Steps Toward Developing Renewable Energy and Energy Efficiency on Tribal Lands Program (2008)

“A Review of Barriers to Biofuels Market Development in the United States,” 2 Environmental & Energy Law & Policy Journal 179 (2008)

“A Strategy for Developing Stationary Biodiesel Generation,” Cumberland Law Review, Vol. 36, p.461 (2006)

“Evaluating Fuel Cell Performance through Industry Collaboration,” co-author, Fuel Cell Magazine (2005)

“Applications of Life Cycle Assessment to NatureWorks™ Polylactide (PLA) Production,” co-author, Polymer Degradation and Stability 80, 403-19 (2003)

Karl R. Rábago

“An Energy Resource Investment Strategy for the City of San Francisco: Scenario Analysis of Alternative Electric Resource Options,” contributing author, Prepared for the San Francisco Public Utilities Commission, Rocky Mountain Institute (2002)

“Small Is Profitable: The Hidden Economic Benefits of Making Electrical Resources the Right Size,” co-author, Rocky Mountain Institute (2002)

“Socio-Economic and Legal Issues Related to an Evaluation of the Regulatory Structure of the Retail Electric Industry in the State of Colorado,” with Thomas E. Feiler, Colorado Public Utilities Commission and Colorado Electricity Advisory Panel (April 1, 1999)

“Study of Electric Utility Restructuring in Alaska,” with Thomas E. Feiler, Legislative Joint Committee on electric Restructuring and the Alaska Public Utilities Commission (April 1, 1999)

“New Markets and New Opportunities: Competition in the Electric Industry Opens the Way for Renewables and Empowers Customers,” EEBA Excellence (Journal of the Energy Efficient Building Association) (Summer 1998)

“Building a Better Future: Why Public Support for Renewable Energy Makes Sense,” Spectrum: The Journal of State Government (Spring 1998)

“The Green-e Program: An Opportunity for Customers,” with Ryan Wiser and Jan Hamrin, Electricity Journal, Vol. 11, No. 1 (January/February 1998)

“Being Virtual: Beyond Restructuring and How We Get There,” Proceedings of the First Symposium on the Virtual Utility, Kluwer Press (1997)

“Information Technology,” Public Utilities Fortnightly (March 15, 1996)

“Better Decisions with Better Information: The Promise of GIS,” with James P. Spiers, Public Utilities Fortnightly (November 1, 1993)

“The Regulatory Environment for Utility Energy Efficiency Programs,” Proceedings of the Meeting on the Efficient Use of Electric Energy, Inter-American Development Bank (May 1993)

“An Alternative Framework for Low-Income Electric Ratepayer Services,” with Danielle Jaussaud and Stephen Benenson, Proceedings of the Fourth National Conference on Integrated Resource Planning, National Association of Regulatory Utility Commissioners (September 1992)

“What Comes Out Must Go In: The Federal Non-Regulation of Cooling Water Intakes Under Section 316 of the Clean Water Act,” Harvard Environmental Law Review, Vol. 16, p. 429 (1992)

“Least Cost Electricity for Texas,” State Bar of Texas Environmental Law Journal, Vol. 22, p. 93 (1992)

“Environmental Costs of Electricity,” Pace University School of Law, Contributor–Impingement and Entrainment Impacts, Oceana Publications, Inc. (1990)

Testimony Submitted by Karl R. Rábago
(as of 30 May 2021)

Date	Proceeding	Case/Docket #	On Behalf Of:
Dec. 21, 2012	VA Electric & Power Special Solar Power Tariff	Virginia SCC Case # PUE-2012-00064	Southern Environmental Law Center
May 10, 2013	Georgia Power Company 2013 IRP	Georgia PSC Docket # 36498	Georgia Solar Energy Industries Association
Jun. 23, 2013	Louisiana Public Service Commission Re-examination of Net Metering Rules	Louisiana PSC Docket # R-31417	Gulf States Solar Energy Industries Association
Aug. 29, 2013	DTE (Detroit Edison) 2013 Renewable Energy Plan Review (Michigan)	Michigan PUC Case # U-17302	Environmental Law and Policy Center
Sep. 5, 2013	CE (Consumers Energy) 2013 Renewable Energy Plan Review (Michigan)	Michigan PUC Case # U-17301	Environmental Law and Policy Center
Sep. 27, 2013	North Carolina Utilities Commission 2012 Avoided Cost Case	North Carolina Utilities Commission Docket # E-100, Sub. 136	North Carolina Sustainable Energy Association
Oct. 18, 2013	Georgia Power Company 2013 Rate Case	Georgia PSC Docket # 36989	Georgia Solar Energy Industries Association
Nov. 4, 2013	PEPCO Rate Case (District of Columbia)	District of Columbia PSC Formal Case # 1103	Grid 2.0 Working Group & Sierra Club of Washington, D.C.
Apr. 24, 2014	Dominion Virginia Electric Power 2013 IRP	Virginia SCC Case # PUE-2013-00088	Environmental Respondents
Apr. 25, 2014	North Carolina Utilities Commission 2014 Avoided Cost Case - Direct	North Carolina Utilities Commission Docket # E-100, Sub. 140	Southern Alliance for Clean Energy
May 7, 2014	Arizona Corporation Commission Investigation on the Value and Cost of Distributed Generation	Arizona Corporation Commission Docket # E-00000J-14-0023	Rábago Energy LLC (invited presentation and workshop participation)
Jun. 2, 2014	North Carolina Utilities Commission 2014 Avoided Cost Case – Response (Corrected)	North Carolina Utilities Commission Docket # E-100, Sub. 140	Southern Alliance for Clean Energy
Jun. 20, 2014	North Carolina Utilities Commission 2014 Avoided Cost Case – Rebuttal	North Carolina Utilities Commission Docket # E-100, Sub. 140	Southern Alliance for Clean Energy
Jul. 23, 2014	Florida Energy Efficiency and Conservation Act, Goal Setting – FPL, Duke, TECO, Gulf	Florida PSC Docket # 130199-EI, 130200-EI, 130201-EI, 130202-EI	Southern Alliance for Clean Energy

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Sep. 19, 2014	Ameren Missouri's Application for Authorization to Suspend Payment of Solar Rebates	Missouri PSC File No. ET-2014-0350, Tariff # YE-2014-0494	Missouri Solar Energy Industries Association
Aug. 6, 2014	Appalachian Power Company 2014 Biennial Rate Review	Virginia SCC Case # PUE-2014-00026	Southern Environmental Law Center (Environmental Respondents)
Aug. 13, 2014	Wisconsin Public Service Corp. 2014 Rate Application	Wisconsin PSC Docket # 6690-UR-123	RENEW Wisconsin and Environmental Law & Policy Center
Aug. 28, 2014	WE Energies 2014 Rate Application	Wisconsin PSC Docket # 05-UR-107	RENEW Wisconsin and Environmental Law & Policy Center
Sep. 18, 2014	Madison Gas & Electric Company 2014 Rate Application	Wisconsin PSC Docket # 3720-UR-120	RENEW Wisconsin and Environmental Law & Policy Center
Sep. 29, 2014	SOLAR, LLC v. Missouri Public Service Commission	Missouri District Court Case # 14AC-CC00316	SOLAR, LLC
Jan. 28, 2016 (date of CPUC order)	Order Instituting Rulemaking to Develop a Successor to Existing Net Energy Metering Tariffs, etc.	California PUC Rulemaking 14-07-002	The Utility Reform Network (TURN)
Mar. 20, 2015	Orange and Rockland Utilities 2015 Rate Application	New York PSC Case # 14-E-0493	Pace Energy and Climate Center
May 22, 2015	DTE Electric Company Rate Application	Michigan PSC Case # U-17767	Michigan Environmental Council, NRDC, Sierra Club, and ELPC
Jul. 20, 2015	Hawaiian Electric Company and NextEra Application for Change of Control	Hawai'i PUC Docket # 2015-0022	Hawai'i Department of Business, Economic Development, and Tourism
Sep. 2, 2015	Wisc. PSCo Rate Application	Wisconsin PSC Case # 6690-UR-124	ELPC
Sep. 15, 2015	Dominion Virginia Electric Power 2015 IRP	Virginia SCC Case # PUE-2015-00035	Environmental Respondents
Sep. 16, 2015	NYSEG & RGE Rate Cases	New York PSC Cases 15-E-0283, -0285	Pace Energy and Climate Center
Oct. 14, 2015	Florida Power & Light Application for CCPN for Lake Okeechobee Plant	Florida PSC Case 150196-El	Environmental Confederation of Southwest Florida
Oct. 27, 2015	Appalachian Power Company 2015 IRP	Virginia SCC Case # PUE-2015-00036	Environmental Respondents

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Nov. 23, 2015	Narragansett Electric Power/National Grid Rate Design Application	Rhode Island PUC Docket No. 4568	Wind Energy Development, LLC
Dec. 8, 2015	State of West Virginia, et al., v. U.S. EPA, et al.	U.S. Court of Appeals for the District of Columbia Circuit Case No. 15-1363 and Consolidated Cases	Declaration in Support of Environmental and Public Health Intervenor in Support of Movant Respondent-Intervenors' Responses in Opposition to Motions for Stay
Dec. 28, 2015	Ohio Power/AEP Affiliate PPA Application	PUC of Ohio Case No. 14-1693-EL-RDR	Environmental Law and Policy Center
Jan. 19, 2016	Ohio Edison Company, Cleveland Electric Illuminating Company, and Toledo Edison Company Application for Electric Security Plan (FirstEnergy Affiliate PPA)	PUC of Ohio Case No. 14-1297-EL-SSO	Environmental Law and Policy Center
Jan. 22, 2016	Northern Indiana Public Service Company (NIPSCO) Rate Case	Indiana Utility Regulatory Commission Cause No. 44688	Citizens Action Coalition and Environmental Law and Policy Center
Mar. 18, 2016	Northern Indiana Public Service Company (NIPSCO) Rate Case – Settlement Testimony	Indiana Utility Regulatory Commission Cause No. 44688	Joint Intervenors – Citizens Action Coalition and Environmental Law and Policy Center
Mar. 18, 2016	Comments on Pilot Rate Proposals by MidAmerican and Alliant	Iowa Utility Board NOI-2014-0001	Environmental Law and Policy Center
May 27, 2016	Consolidated Edison of New York Rate Case	New York PSC Case No. 16-E-0060	Pace Energy and Climate Center
June 21, 2016	Federal Trade Commission: Workshop on Competition and Consumer Protection Issues in Solar Energy	Invited workshop presentation	Pace Energy and Climate Center
Aug. 17, 2016	Dominion Virginia Electric Power 2016 IRP	Virginia SCC Case # PUE-2016-00049	Environmental Respondents
Sep. 13, 2016	Appalachian Power Company 2016 IRP	Virginia SCC Case # PUE-2016-00050	Environmental Respondents
Oct. 27, 2016	Consumers Energy PURPA Compliance Filing	Michigan PSC Case No. U-18090	Environmental Law & Policy Center, "Joint Intervenors"

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Oct. 28, 2016	Delmarva, PEPCO (PHI) Utility Transformation Filing – Review of Filing & Utilities of the Future Whitepaper	Maryland PSC Case PC 44	Public Interest Advocates
Dec. 1, 2016	DTE Electric Company PURPA Compliance Filing	Michigan PSC Case No. U-18091	Environmental Law & Policy Center, “Joint Intervenors”
Dec. 16, 2016	Rebuttal of Unitil Testimony in Net Energy Metering Docket	New Hampshire Docket No. DE 16-576	New Hampshire Sustainable Energy Association (“NHSEA”)
Jan. 13, 2017	Gulf Power Company Rate Case	Florida Docket No. 160186-EI	Earthjustice, Southern Alliance for Clean Energy, League of Women Voters-Florida
Jan. 13, 2017	Alpena Power Company PURPA Compliance Filing	Michigan PSC Case No. U-18089	Environmental Law & Policy Center, “Joint Intervenors”
Jan. 13, 2017	Indiana Michigan Power Company PURPA Compliance Filing	Michigan PSC Case No. U-18092	Environmental Law & Policy Center, “Joint Intervenors”
Jan. 13, 2017	Northern States Power Company PURPA Compliance Filing	Michigan PSC Case No. U-18093	Environmental Law & Policy Center, “Joint Intervenors”
Jan. 13, 2017	Upper Peninsula Power Company PURPA Compliance Filing	Michigan PSC Case No. U-18094	Environmental Law & Policy Center, “Joint Intervenors”
Mar. 10, 2017	Eversource Energy Grid Modernization Plan	Massachusetts DPU Case No. 15-122/15-123	Cape Light Compact
Apr. 27, 2017	Eversource Rate Case & Grid Modernization Investments	Massachusetts DPU Case No. 17-05	Cape Light Compact
May 2, 2017	AEP Ohio Power Electric Security Plan	PUC of Ohio Case No. 16-1852-EL-SSO	Environmental Law & Policy Center
Jun. 2, 2017	Vectren Energy TDSIC Plan	Indiana URC Cause No. 44910	Citizens Action Coalition & Valley Watch
Jul. 28, 2017	Vectren Energy 2016-2017 Energy Efficiency Plan	Indiana URC Cause No. 44645	Citizens Action Coalition
Jul. 28, 2017	Vectren Energy 2018-2020 Energy Efficiency Plan	Indiana URC Cause No. 44927	Citizens Action Coalition
Aug. 1, 2017	Interstate Power & Light (Alliant) 2017 Rate Application	Iowa Utilities Board Docket No. RPU-2017-0001	Environmental Law & Policy Center, Iowa Environmental Council, Natural Resources Defense Council, and Solar Energy Industries Assoc.

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Aug. 11, 2017	Dominion Virginia Electric Power 2017 IRP	Virginia SCC Case # PUR-2017-00051	Environmental Respondents
Aug. 18, 2017	Appalachian Power Company 2017 IRP	Virginia SCC Case # PUR-2017-00045	Environmental Respondents
Aug. 23, 2017	Pennsylvania Solar Future Project	PA Dept. of Environmental Protection - Alternative Ratemaking Webinar	Pace Energy and Climate Center
Aug. 25, 2017	Niagara Mohawk Power Co. d/b/a National Grid Rate Case	New York PSC Case # 17-E-0238, 17-G-0239	Pace Energy and Climate Center
Sep. 15, 2017	Niagara Mohawk Power Co. d/b/a National Grid Rate Case	New York PSC Case # 17-E-0238, 17-G-0239	Pace Energy and Climate Center
Oct. 20, 2017	Missouri PSC Working Case to Explore Emerging Issues in Utility Regulation	Missouri PSC File No. EW-2017-0245	Renew Missouri
Nov. 21, 2017	Central Hudson Gas & Electric Co. Electric and Gas Rates Cases	New York PSC Case # 17-E-0459, -0460	Pace Energy and Climate Center
Jan. 16, 2018	Great Plains Energy, Inc. Merger with Westar Energy, Inc.	Missouri PSC Case # EM-2018-0012	Renew Missouri Advocates
Jan. 19, 2018	U.S. House of Representatives, Energy and Commerce Committee	Hearing on "The PURPA Modernization Act of 2017," H.R. 4476	Rábago Energy LLC
Jan. 29, 2018	Joint Petition of Electric Distribution Companies for Approval of a Model SMART Tariff	Massachusetts D.P.U. Case No. 17-140	Boston Community Capital Solar Energy Advantage Inc. (Jointly authored with Sheryl Musgrove)
Feb. 21, 2018	Joint Petition of Electric Distribution Companies for Approval of a Model SMART Tariff	Massachusetts D.P.U. Case No. 17-140 - Surrebuttal	Boston Community Capital Solar Energy Advantage Inc. (Jointly authored with Sheryl Musgrove)
Apr. 6, 2018	Narragansett Electric Co., d/b/a National Grid Rate Case Filing	RI PUC Docket No. 4770	New Energy Rhode Island ("NERI")
Apr. 25, 2018	Narragansett Electric Co., d/b/a National Grid Power Sector Transformation Plan	Rhode Island PUC Docket No. 4780	New Energy Rhode Island ("NERI")

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(as of 30 May 2021)

Apr. 26, 2018	U.S. EPA Proposed Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 82 Fed. Reg. 48,035 (Oct. 16, 2017) – “Clean Power Plan”	U.S. EPA Docket No. EPA-HQ-OAR-2016-0592	Karl R. Rábago
May 25, 2018	Orange & Rockland Utilities, Inc. Rate Case Filing	New York PSC Case Nos. 18-E-0067, 18-G-0068	Pace Energy and Climate Center
Jun. 15, 2018	Orange & Rockland Utilities, Inc. Rate Case Filing	New York PSC Case Nos. 18-E-0067, 18-G-0068 – Rebuttal Testimony	Pace Energy and Climate Center
Aug. 10, 2018	Dominion Virginia Electric Power 2018 IRP	Virginia SCC Case # PUR-2018-00065	Environmental Respondents
Sep. 20, 2018	Consumers Energy Company Rate Case	Michigan PSC Case No. U-20134	Environmental Law & Policy Center
Sep. 27, 2018	Potomac Electric Power Co. Notice to Construct Two 230 kV Underground Circuits	District of Columbia Public Service Commission Formal Case No. 1144	Solar United Neighbors of D.C.
Sep. 28, 2019	Arkansas Public Service Commission Investigation of Policies Related to Distributed Energy Resources	Arkansas PSC Docket No. 16-028-U	Arkansas Audubon Society & Arkansas Advanced Energy Association
Nov. 7, 2018	DTE Detroit Edison Rate Case	Michigan PSC Case No. U-20162	Natural Resources Defense Council, Michigan Environmental Council, Sierra Club
Mar. 26, 2019	Guam Power Authority Petition to Modify Net Metering	Guam PUC Docket GPA 19-04	Micronesia Renewable Energy, Inc.
Apr. 4, 2019	Community Power Network & League of Women Voters of Florida v. JEA	Circuit Court Duval County of Florida Case No. 2018-CA-002497 Div: CV-D	Earthjustice
Apr. 16, 2019	Dominion Virginia Electric Power 2018 IRP – Compliance Filing	Virginia SCC Case # PUR-2018-00065	Environmental Respondents
Apr. 25, 2019	Georgia Power 2019 IRP	Georgia PSC Docket No. 42310	GSEA & GSEIA
May 10, 2019	NV Energy NV GreenEnergy 2.0 Rider	Nevada PUC Docket Nos. 18-11015, 18-11016	Vote Solar

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May 24, 2019	Consolidated Edison of New York Electric and Gas Rate Cases – Misc. Issues	New York PSC Case Nos. 19-E-0065, 19-G-0066	Pace Energy and Climate Center
May 24, 2019	Consolidated Edison of New York Electric and Gas Rate Cases – Low- and Moderate-Income Panel	New York PSC Case Nos. 19-E-0065, 19-G-0066	Pace Energy and Climate Center
May 30, 2019	Connecticut DEEP Shared Clean Energy Facility Program Proposal	Connecticut Department of Energy and Environmental Protection Docket No. 19-07-01	Connecticut Fund for the Environment
Jun. 3, 2019	New Orleans City Council Rulemaking to Establish Renewable Portfolio Standards	New Orleans City Council Docket No. UD-19-01	National Audubon Society and Audubon Louisiana
Jun. 14, 2019	Consolidated Edison of New York Electric and Gas Rate Cases – Rebuttal Testimony	New York PSC Case Nos. 19-E-0065, 19-G-0066	Pace Energy and Climate Center
Jun. 24, 2019	Program to Encourage Clean Energy in Westchester County Pursuant to Public Service law Section 74-a; Staff Investigation into a Moratorium on New Natural Gas Services in the Consolidated Edison Company of New York, Inc. Service Territory	New York PSC Case Nos. 19-M-0265, 19-G-0080	Earthjustice and Pace Energy and Climate Center
Jul. 12, 2019	Application of Virginia Electric and Power Company for the Determination of the Fair Rate of Return on Common Equity	Virginia SCC Case # PUR-2019-00050	Virginia Poverty Law Center
Jul. 15, 2019	New Orleans City Council Rulemaking to Establish Renewable Portfolio Standards – Reply Comments	New Orleans City Council Docket No. UD-19-01	National Audubon Society and Audubon Louisiana
Aug. 1, 2019	Interstate Power and Light Company – General Rate Case	Iowa Utilities Board Docket No. RPU-2019-0001	Environmental Law & Policy Center and Iowa Environmental Council
Aug. 19, 2019	Consolidated Edison of New York Electric and Gas Rate Cases – Surrebuttal	New York PSC Case Nos. 19-E-0065, 19-G-0066	Pace Energy and Climate Center
Aug. 21, 2019	Connecticut Department of Energy and Environmental Protection and Public Utility Regulatory Authority Joint Proceeding on the Value of Distributed Energy Resources - Comments	Connecticut DEEP/PURA Docket No. 19-06-29	Connecticut Fund for the Environment and Save Our Sound

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Sep. 10, 2019	Interstate Power and Light Company – General Rate Case - Rebuttal	Iowa Utilities Board Docket No. RPU-2019-0001	Environmental Law & Policy Center and Iowa Environmental Council
Sep. 18, 2019	Connecticut Department of Energy and Environmental Protection and Public Utility Regulatory Authority Joint Proceeding on the Value of Distributed Energy Resources – Comments and Response to Draft Study Outline	Connecticut DEEP/PURA Docket No. 19-06-29	Connecticut Fund for the Environment, Save Our Sound, E4theFuture, NE Clean Energy Council, NE Energy Efficiency Partnership, and Acadia Center
Sep. 20, 2019	Connecticut Department of Energy and Environmental Protection and Public Utility Regulatory Authority Joint Proceeding on the Value of Distributed Energy Resources – Participation in Technical Workshop 1	Connecticut DEEP/PURA Docket No. 19-06-29 http://www.ctn.state.ct.us/ctnplayer.asp?odID=16715	Connecticut Fund for the Environment and Save Our Sound
Oct. 4, 2019	Connecticut Department of Energy and Environmental Protection and Public Utility Regulatory Authority Joint Proceeding on the Value of Distributed Energy Resources – Participation in Technical Workshop 2	Connecticut DEEP/PURA Docket No. 19-06-29 http://www.ctn.state.ct.us/ctnplayer.asp?odID=16766	Connecticut Fund for the Environment and Save Our Sound
Oct. 15, 2019	Electronic Consideration of the Implementation of the Net Metering Act (KY SB 100)	Kentucky Public Service Commission Case No. 2019-00256	Kentuckians for the Commonwealth & Mountain Association for Community Economic Development
Oct. 15, 2019	New Orleans City Council Rulemaking to Establish Renewable Portfolio Standards – Comments on City Council Utility Advisors’ Report	New Orleans City Council Docket No. UD-19-01	National Audubon Society and Audubon Louisiana, Vote Solar, 350 New Orleans, Alliance for Clean Energy, PosiGen, and Sierra Club
Oct. 17, 2019	Indiana Michigan Power Co. General Rate Case	Michigan Public Service Company Case No. U-20359	Environmental Law & Policy Center, The Ecology Center, the Solar Energy Industries Association, and Vote Solar
Dec. 4, 2019	Alabama Power Company Petition for Certificate of Convenience and Necessity	Alabama Public Service Commission Docket No. 32953	Energy Alabama and Gasp, Inc.
Dec. 5, 2019	In the Matter of Net Metering and the Implementation of Act 827 of 2015	Arkansas Public Service Commission Docket No. 16-027-R	National Audubon Society and Arkansas Advanced Energy Association

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Dec. 6, 2019	Proposed Revisions to Vermont Public Utility Commission Rule 5.100	Vermont Public Utility Commission Case No. 19-0855-RULE	Renewable Energy Vermont ("REV")
Jan. 15, 2020	General Rate Case	Washington Utilities and Transportation Commission Docket Nos. UE-190529 & UG-190530	Puget Sound Energy
Feb. 11, 2020	Application of Entergy Arkansas, LLC for a Proposed Tariff Amendment: Solar Energy Purchase Option – Direct Testimony	Arkansas Public Service Commission Docket No. 19-042-TF	Arkansas Advanced Energy Association
Mar. 17, 2020	Application of Entergy Arkansas, LLC for a Proposed Tariff Amendment: Solar Energy Purchase Option – Surrebuttal Testimony	Arkansas Public Service Commission Docket No. 19-042-TF	Arkansas Advanced Energy Association
Jun. 16, 2020	PECO Energy Default Supply Plan V – Direct Testimony	Pennsylvania Public Utility Commission Docket No. P-2020-3019290	Environmental Respondents / Earthjustice
Jun. 24, 2020	Consumers Energy Company General Rate Case – Direct Testimony	Michigan Public Service Commission Case No. U-20697	Joint Clean Energy Organizations / Environmental Law & Policy Center
Jul. 14, 2020	Consumers Energy Company General Rate Case – Rebuttal Testimony	Michigan Public Service Commission Case No. U-20697	Joint Clean Energy Organizations / Environmental Law & Policy Center
July 23, 2020	PECO Energy Default Supply Plan V – Surrebuttal Testimony	Pennsylvania Public Utility Commission Docket No. P-2020-3019290	Environmental Stakeholders / Earthjustice
Sept. 15, 2020	Dominion Virginia Electric Power 2020 IRP – Direct Testimony	Virginia SCC Case # PUR-2020-00035	Environmental Respondents
Sept. 18, 2020	Avoided Cost Proceeding for Georgia Power – Direct Testimony	Georgia Public Service Commission Docket No. 4822	Georgia Solar Energy Industries Association, Inc.
Sept. 29, 2020	Madison Gas and Electric – General Rate Case – Affidavit in Opposition to Electric Rates Settlement	Wisconsin Public Service Commission Docket No. 3270-UR-123	Sierra Club
Sept. 30, 2020	Madison Gas and Electric – General Rate Case – Gas Rates	Wisconsin Public Service Commission Docket No. 3270-UR-123	Sierra Club
Oct. 2, 2020	Duke Energy Florida Petition for Approval of Clean Energy Connect Program	Florida Public Service Commission Docket No. 20200176-EI	League of United Latin American Citizens of Florida

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(as of 30 May 2021)

Sept. 30, 2020	Madison Gas and Electric – General Rate Case – Gas Rates	Wisconsin Public Service Commission Docket No. 3270-UR-123	Sierra Club
Oct. 2, 2020	Duke Energy Florida Petition for Approval of Clean Energy Connect Program	Florida Public Service Commission Docket No. 20200176-EI	League of United Latin American Citizens of Florida
Oct. 2, 2020	Ameren Illinois – Investigation re: Calculation of Distributed Generation Rebates	Illinois Commerce Commission Docket No. 20-0389	Joint Solar Parties
Dec. 9, 2020	Arkansas – In the Matter of a Rulemaking to Adopt an Evaluation, Measurement, and Verification Protocol and Propose M&V Amendments to the Commission’s Rules for Conservation and Energy Efficiency Programs; In the Matter of the Continuation, Expansion, and Enhancement of Public Utility Energy Efficiency Programs in Arkansas	Arkansas Public Service Commission Docket Nos. 10-100-R, 13-002-U	Arkansas Advanced Energy Association
Dec. 22, 2020	Appalachian Power Company 2020 Virginia Clean Economy Act Compliance Plan	Virginia SCC Case No. PUR-2020-00135	Environmental Respondent
Jan. 4, 2021	Dominion Virginia Electric Power Company Clean Economy Compliance Plan	Virginia SCC Case No. PUR-2020-00134	Environmental Respondent
Feb. 5, 2021	Ameren Illinois – Investigation re: Calculation of Distributed Generation Rebates - Rebuttal	Illinois Commerce Commission Docket No. 20-0389	Joint Solar Parties
Feb. 15, 2021	Kentucky Power Company General Rate Case	Kentucky Public Service Commission Case No. 2020-00174	Joint Intervenor – Mountain Association, Kentuckians for the Commonwealth, Kentucky Solar Energy Society
Mar. 2, 2021	Dominion Virginia Electric Power Company Rider RGGI Proposal	Virginia SCC Case No. PUR-2020-00169	Environmental Respondent
Mar. 5, 2021	Kentucky Utilities Company and Louisville Gas and Electric Company General Rate Cases	Kentucky Public Service Commission Case Nos. 2020-00349, 2020-00350	Joint Intervenor – Mountain Association, Kentuckians for the Commonwealth, Kentucky Solar Energy Society
Apr. 5, 2021	Docket to Review the Efficacy and Fairness of the Net Metering and Interconnection Rules – Comments	Mississippi Public Service Commission Docket No. 2021-AD-19	Entegrity Energy Partners, LLC & Audubon Delta / National Audubon Society

Testimony Submitted by Karl R. Rábago
(as of 30 May 2021)

Apr. 13, 2021	Petition of Guam Power Authority for Creation of a New Energy Storage Rate – Comments of Micronesia Renewable Energy, Inc.	Guam Public Utilities Commission Docket No. 20-09	Micronesia Renewable Energy, Inc.
May 25, 2021	Petition of Episcopal Diocese of Rhode Island for Declaratory Judgment on Transmission System Costs and Related “Affected System Operator” Studies	Rhode Island Public Utility Commission Docket No. 4981	Episcopal Diocese of Rhode Island

**STATE OF MICHIGAN
MICHIGAN PUBLIC SERVICE COMMISSION**

In the matter of the application of)	
CONSUMERS ENERGY COMPANY)	
for authority to increase its rates for)	Case No. U-20963
the generation and distribution of)	
electricity and for other relief.)	

DIRECT TESTIMONY OF

JOSEPH DANIEL

ON BEHALF OF

**THE ENVIRONMENTAL LAW AND POLICY CENTER,
THE ECOLOGY CENTER,
THE SOLAR INDUSTRIES ASSOCIATION,
AND
VOTE SOLAR**

June 22, 2021

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I. STATEMENT OF QUALIFICATIONS

Q. Please state your name and business address.

A. My name is Joseph M. Daniel. Prior to the COVID-19 pandemic, I worked from the Union of Concerned Scientists DC office at 1825 K street NW, Suite 800, Washington DC 20006.

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

A. I am employed by the Union of Concerned Scientists (“UCS”) as a Senior Energy Analyst and Manager, Electricity Markets. In that capacity, I conduct objective economic and technical analysis of energy policy and the electric sector. In my role, I lead research and advocacy efforts to shape state energy policies and electricity markets in order to develop a modern electric grid that can accommodate high levels of renewable energy, demand-side resources, and electric vehicles.

Q. Please describe the Union of Concerned Scientists.

A. The Union of Concerned Scientists was founded in 1969 by scientists and students at the Massachusetts Institute of Technology. UCS employs scientists, analysts, economists and engineers to develop and implement innovative, practical solutions to some of the most pressing problems that society faces today—from developing sustainable ways to feed, power, and transport ourselves, to reducing the threat of nuclear war. UCS’s mission is to put rigorous, independent research to work by combining technical analysis and effective advocacy to create policy solutions for a healthy, safe, and sustainable future.¹

¹ For more information, including UCS’s history and mission statement, visit: <https://www.ucsusa.org/about-us>.

1 **Q. On whose behalf are you testifying?**

2 A. I'm testifying on behalf of ELPC, the Ecology Center, and Vote Solar, which are
3 referred to collectively as the Clean Energy Organizations, or CEO.

4 **Q. Please describe your educational background and professional affiliations.**

5 A. I hold a Bachelor of Science in Chemical Engineering from the Florida Institute of
6 Technology and a Masters of Public Administration in Environmental Science and
7 Policy from Columbia University in the City of New York. I also hold a certificate in
8 Petroleum Fundamentals from the University of Texas.

9 I am a member of the American Economic Association, the International Association
10 for Energy Economists, and the US Association for Energy Economics. I am also a
11 recurring guest lecturer at various academic institutions including Columbia
12 University and Johns Hopkins University.

13 **Q. Please describe your professional background and work experience.**

14 A. I have 15 years of experience working on energy issues from engineering, regulatory,
15 and economic perspectives. In my current work at UCS, I focus on energy system
16 planning and the deployment of clean energy technologies, including storage. I have
17 applied my technical expertise on these topics in regulatory proceedings at the state,
18 regional, and national level. This includes serving as a participant in the joint
19 NARUC-NASEO Task Force on Comprehensive Electricity Planning.²

20 I began my career as an engineer working for Baker Hughes where I conducted
21 engineering studies at power plants, co-generation facilities, and petroleum refineries.

² For more information: <https://www.naruc.org/taskforce/>

1 I conducted engineering performance analyses at refineries across the US including
2 Texas, Washington, Louisiana, California, Delaware, New Jersey, and Hawaii.

3 In 2010, I was awarded a fellowship to work with the Deputy Mayor of Tel Aviv.

4 There I worked with the Deputy Mayor, her staff, the office of the mayor and the city
5 council to help quantify and monetize the social and economic benefits of existing
6 and proposed policies.

7 After Tel Aviv, I went on to graduate school where I focused on energy and
8 environmental economics while enrolled at Columbia's School of International and
9 Public Affairs, Environmental Science and Policy Program.

10 After earning my MPA, I conducted economic and technical analysis of utility plans
11 on behalf of public interest clients while employed at Synapse Energy Economics. At
12 Synapse, my clients included state and federal government agencies, state utility
13 commissions, consumer advocates, rural affair advocates, and environmental
14 advocates.

15 Prior to being hired by UCS, I was employed by the Sierra Club where I reviewed
16 numerous utility filings related to utility integrated resource plans and long-term
17 resource plans, PURPA, net metering, energy efficiency avoided costs, and
18 environmental compliance plans.

19 My resume is attached to this testimony as Exhibit CEO-3 (JD-1).

20 **Q. Have you provided testimony as an expert before this Commission?**

21 A. Yes. I testified in the 2018-19 Consumers Energy IRP, Case No. U-20195, and in the
22 2019 DTE IRP, Case No. U-20471.

23 **Q. Have you provided testimony or comment as an expert in other forums?**

1 A. Yes. I presented public testimony to the EPA regarding that Agency's proposal to
2 delay implementation of the Effluent Limitation Guidelines under the Clean Water
3 Act, providing my expert opinion on the costs of delayed implementation.³ I provided
4 a declaration to the Federal Court of Appeals in *Sierra Club, et al., v. FERC*, 867 F.3d
5 1357 (D.C. Cir. 2017), testifying regarding the utilization of the Sabal Trail gas
6 pipeline and the electric system's ability to meet electric demand.⁴ I presented a
7 framework for calculating avoided costs of rooftop solar projects to Commission
8 Staff at one of the Arkansas Net Metering Working Group meetings.⁵ I have also
9 assisted in the composition of regulatory comments in dockets across the country,
10 including Pennsylvania Avoided Costs⁶ and comments associated with a proceeding
11 related to a renewable portfolio standard in New Orleans.⁷ In 2020, I provided a
12 declaration in *Union of Concerned Scientists v. The Department of Energy* detailing
13 the value and need for certain types of data to be kept publicly available.⁸ Most

³ Testimony on Proposal to Postpone Certain Compliance Dates for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category. Docket No. EPA-HQ-OW-2009-0819. Public Hearing in Washington, D.C. July 31, 2017.

⁴ Declaration of Joseph Daniel. *Sierra Club, et al., v. Federal Energy Regulatory Commission, Duke Energy Florida, et al.,*. United States Court of Appeals Case #16-1329. October 31, 2017. Available online: http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2017/20171110_docket-16-1329_response.pdf

⁵ Presentation to Arkansas Public Service Commission Staff on a Framework for Calculating Avoided Costs of Rooftop Solar. On behalf of Net Metering Working Group, Sub-Group 1. Docket No. 16-027-R, Implementation of Act 827 of 2015. Little Rock, AR. February 8, 2017

⁶ Joint demand response comments on the tentative order on the Amended demand response study of: Citizens for Pennsylvania's Future; Clean Air Council; Keystone Energy Efficiency Alliance; the Sierra Club. Docket Numbers: M-2012-2289411 and M-2008-2069887 December, 2013. http://www.puc.state.pa.us/Electric/pdf/Act129/SWE_DRSFR-PF-CAC-KEEA-SC_C_111413TO.pdf

⁷ The Alliance for Affordable Energy's First Comments. Responsive to Resolution R-19-109 https://www.all4energy.org/uploads/1/0/5/6/105637723/2019_06_03_ud-19-01_aae_comments_final.pdf

⁸ Daniel, J. 2020. Declaration of Joseph Daniel. *Union of Concerned Scientists v. Department of Energy*. United States Court of Appeals Case No. 20-1247. 2020

1 recently, I co-authored UCS's public comments to the Federal Energy Regulatory
2 Commission (FERC) and spoke at FERC's public listening session regarding the
3 funding and formation of the Office of Public Participation.⁹

4 **Q. Are you sponsoring any exhibits?**

5 A, Yes. I am sponsoring eight exhibits.

- 6 • Exhibit CEO-3 (JD-1): Resume of Joseph Daniel; and,
- 7 • Exhibit CEO-4- (JD-2): Principles of Equitable Policy Design for Energy
8 Storage
- 9 • Exhibit CEO-5 (JD-3): Consumers Discovery Response U20963-ELPC-CE-
10 755;
- 11 • Exhibit CEO-6 (JD-4); Consumers' Discovery Response to U20963-ELPC-
12 CE-758;
- 13 • Exhibit CEO-7 (JD-5); Consumers' Discovery Response U20963-MEC-CE-
14 481(d).
- 15 • Exhibit CEO-8 (JD-6); Consumers' Discovery Response to U20963-ELPC-
16 CE-1040.
- 17 • Exhibit CEO-9 (JD-7); Consumers' Discovery Response to U20963-MEC-
18 CE-407.
- 19 • Exhibit CEO-10 (JD-8); Consumers' Discovery Response to U20963-ELPC-
20 CE-1039.

⁹ Daniel, J., S. Gomberg, E. Sitko. 2021. Comments of the Union of Concerned Scientists on the Office of Public Participation. Public Comments before the Federal Energy Regulatory Commission. Docket No. AD21-9-000. April 23, 2021.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to help the Commission evaluate the Company's proposed home battery pilot program and to offer recommendations to remedy deficiencies.

Q. Can you summarize your testimony?

A. While I am pleased that the Company is exploring the integration of distributed storage resources, the Company's home storage pilot program design is deficient in several aspects. My testimony identifies three primary deficiencies: (1) a failure to maximize system benefits; (2) lack of access for low-income families; and (3), improper or lack of metrics and targets required for gauging success. The later part of my testimony enumerates several recommendations to resolve each of those deficiencies, specifically the need to target the deployment of storage to maximize benefits.

Q. Can you summarize any conclusions you reached?

A. First, the Company's pilot would not maximize utility system benefits because it fails to target residential storage deployment to the specific geographic locations that would most benefit from storage. Second, the program would not be accessible to low-income families because the Company's options are too expensive for low-income families. And finally, the pilot's limited metrics for tracking, measuring, and gauging success mean that the pilot's success or failure will be difficult to judge.

Q. Can you summarize any recommendations you have for the Commission?

1 A. Yes. The Commission should order the Company to target the deployment of behind-
2 the-meter (“BTM”) storage to maximize benefits, create a carve out for low-income
3 families at no cost to those customers, and track metrics to ensure the deployment of
4 the pilot is equitable.

5 **III. CONSUMER’S PROPOSAL WOULD NOT MAXIMIZE SYSTEM/UTILITY**
6 **BENEFITS**

7 **Q. Can you please describe the Company proposal?**

8 A. The Company’s Home Battery Pilot is set up to be available to any residential
9 customer who either already has or wants to have a residential, BTM battery system.
10 The battery will be entirely operated by the Company save for when there is an
11 outage, and then the BTM battery will serve as backup power to the customer. The
12 Company offers two ownership options:

13 Option 1: The Company *owns and operates* the battery system and pays for the
14 entirety of the upfront costs associated with purchasing and installing the battery. The
15 customer pays a monthly payment for the battery to be available as backup power if
16 an outage occurs. The Company refers to this monthly payment as a “resiliency
17 payment.”

18 Option 2: The customer *owns*, but the Company *operates*, the battery system, and the
19 company provides the customer a lump sum incentive to reimburse a portion of the
20 upfront costs that the customer paid to purchase and install the battery. Like Option 1,
21 the customer retains the availability of the battery to run as backup power under this
22 option. This option is known as the “Bring your own device (BYOD)” option. The
23 Company proposes a tiered enrollment system as follows:

Enrollment Tier	Resiliency Payment Option (Customer pays this monthly fee)	Bring Your Own Device (Customer receives this level of incentive)
0 – 2.5 MW	\$29 / month	\$1,050 per kW
2.5 – 5 MW	\$39 / month	\$925 per kW
5 – 10 MW	\$49 / month	\$800 per kW

1 The Company estimates that the home battery pilot will come with a price tag of
2 \$14.3 million and will facilitate the deployment of 10MW of BTM storage across
3 2,000 homes within its service territory.

4 **Q. What are system benefits that the Company hopes to provide with the home**
5 **battery pilot program?**

6 A. According to Company witness Machi, the Company gained specific understanding
7 in the potential for batteries to provide system benefits in a previous “50-battery test.”
8 The witness explains: “In the 50-battery test, the two most important utility
9 applications that the Company learned about were: (i) upgrade deferral on a single
10 substation; and (ii) batteries as a generation capacity resource.”¹⁰ The Company
11 hopes to expand this limited list of understandable benefits to include a range of
12 ancillary services. Company witness Machi specifically identifies “voltage support,
13 frequency support, and distribution feeder investment deferrals.”¹¹

14 **Q. What are system benefits that BTM storage can provide that the Company**
15 **doesn’t identify as being achieved by the pilot program?**

16 A. As I discuss below, several studies have analyzed the ability of BTM storage, and
17 distribution level storage in general, as a resource that can be used to avoid a range of
18 transmission and distribution capital expenses. RMI’s 2015 analysis consisted of a

¹⁰ Machi Direct at p. 10, lines 5-7.

¹¹ Machi Direct at p. 10, lines 14-15.

1 meta-analysis of multiple studies and found that behind the meter storage could
2 provide a suite of benefits including: energy arbitrage, spinning and non-spinning
3 reserves, frequency regulation, voltage support, black start capabilities, resource
4 adequacy, transmission congestion relief, transmission deferral, and distribution
5 deferral.¹²

6 Storage, when located behind the meter, can also reduce demand, as opposed to
7 generating resources that serve demand. As a result, BTM storage helps reduce
8 reserve margin capacity requirements.

9 **Q. What transmission benefits did the Company overlook?**

10 A. According to the Energy Storage Association (ESA), energy storage can help reduce
11 the required size of a transmission upgrade, defer transmission upgrades, extend the
12 life of transmission equipment life, and reduce transmission congestion.¹³ This
13 benefit is far from hypothetical. In 2010, American Electric Power (AEP) installed a
14 battery system in Presidio, Texas to improve power quality, reduce momentary
15 outages due to voltage fluctuations, and serve as backup transmission power.¹⁴ In
16 2017, Arizona Public Service (APS) deployed 2 MW of battery storage rather than
17 upgrading 20 miles of transmission and distribution lines to serve Punkin Center,
18 Arizona. The project provided additional benefits like local voltage regulation,

¹² Fitzgerald, Garrett, James Mandel, Jesse Morris, and Hervé Touati. The Economics of Battery Energy Storage: How multi-use, customer-sited batteries deliver the most services and value to customers and the grid. Rocky Mountain Institute, September 2015. Retrieved online 6/8/21 <https://rmi.org/wp-content/uploads/2017/03/RMI-TheEconomicsOfBatteryEnergyStorage-FullReport-FINAL.pdf>

¹³ Energy Storage Association. 2013. "T&D Upgrade Deferral." ESA Blog. <https://energystorage.org/td-upgrade-deferral/>

¹⁴ Electric Transmission Texas. No date. "Presidio NaS Battery Project." Retrieved online 6/18/21. <http://ettexas.com/Projects/Presidio>

1 contribution to capacity obligations, and renewables integration.¹⁵ Six megawatts of
2 storage capacity were installed on the island of Nantucket to help avoid the need for
3 additional transmission capacity to the island.¹⁶

4 The fact that many, if not all, of these projects provided multiple benefits, beyond just
5 avoided transmission costs, shows that storage deployment for ensuring transmission
6 benefits does not require a sacrifice of the other benefits.

7 **Q. Are these benefits potentially significant?**

8 A. Yes. According to a study of the Texas grid, researchers found that the transmission
9 benefits of distributed storage exceeded distribution benefits over the long run.¹⁷ In
10 fact, some storage developers specifically advertise the benefit of storage as an asset
11 that can help avoid transmission costs.¹⁸

12 **Q. How does BTM storage provide a reduction in reserve margin requirements?**

13 A. Both in front of the meter and behind the meter storage installations contribute to the
14 capacity that the Company needs to have available to serve load. Supply-side capacity
15 resources, including supply-side batteries, provide capacity contribution to meeting
16 peak demand and reserve margin requirements. BTM resources, on the other hand,
17 not only contribute to meeting that peak demand but, because the batteries are located

¹⁵ Energy Storage North America. "Fluence, Arizona Public Service (APS) Punkin Center Energy Storage System." No Date. Retrieved online 6/18/21. https://www.esnaexpo.com/portfolio/fluence-arizona-public-service-aps-punkin-center-energy-storage-system-esna_fluence/

¹⁶ National Grid. 2019. "Two National Grid Projects Selected as Energy Storage North America 2019 Innovation Award Winner." Retrieved online 6/18/21. <https://www.nationalgridus.com/News/2019/11/Two-National-Grid-Projects-Selected-as-Energy-Storage-North-America-2019-Innovation-Award-Winner/>

¹⁷ Driscoll, William. 2020. "Distributed storage could save Texas \$344 million per year by deferring transmission and distribution costs." PV Magazine. Retrieved online 6/18/21. <https://pv-magazine-usa.com/2020/05/11/distributed-storage-could-save-texas-344-million-per-year-by-deferring-transmission-and-distribution-costs/>

¹⁸ Dyna Power. No Date. "Delay or Eliminate Costly Transmission and Distribution Upgrades with Energy Storage." Retrieved online 6/18/21. <https://www.dynapower.com/industries-applications/energy-storage-inverters/transmission-and-distribution-deferral/>

1 behind the meter, they do so by actually reducing peak demand. They also avoid line
2 losses on both the transmission and distribution system. This reduction in demand
3 plus avoided line loss provides a multiplier effect to benefit the capacity BTM
4 batteries avoid.

5 **Q. What reduction in reserves do BTM batteries provide?**

6 A. As a simplified example, suppose that Consumer's peak demand is 7,500 MW at the
7 meter.¹⁹ If its marginal line losses at peak hours are, for example, 8 percent, then it
8 would need an additional 600 MW of generation to account for these losses.²⁰ If
9 MISO's planning reserve requirement for LRZ 7 (Michigan) is 9.4%, then it must
10 maintain an additional 761 MW in reserves above the 8,100 MW of generator-level
11 capacity.²¹ Meaning that in order to meet a 7,500 MW demand at the meter, the
12 Company must have available a total of 8,861 MW.
13 Now, if Consumers were to install 10 MW of BTM batteries that were capable of
14 reducing its coincident peak demand, this would reduce peak demand from 7,500 to
15 7,490. In order to accommodate the 8 percent line loss, it would only need 599.2 MW
16 (as opposed to 600 MW). This would mean that the generation capacity needed to
17 serve load would only be 8,089.2 MW (compared to 8,100 MW when there was no
18 BTM storage). The Company still needs to maintain the 9.4 percent reserve margin

¹⁹ The system peak in the 2019 historical test year in this case is 7,476,495 on July 19 at 16:00:00. I have rounded that to an even 7,500 MW given that these numbers are illustrative.

²⁰ Eight percent is the distribution loss number that Consumers used in Case 20697. This number represents the average line losses, not the peak marginal line losses. To convert average, the commission adopted a 1.5x multiplier in DTE IRPcase U-20471. This makes the eight percent (8%) placeholder in this illustrative calculation an underestimation.

²¹ MISO. Sept. 2020. 2021/22 PY Planning Reserve Margin and Local Reliability Requirement- Draft Results. Loss of Load Expectation Working Group (LOLEWG).
<https://cdn.misoenergy.org/20200908%20LOLEWG%20Item%2003%202021-22%20PY%20PRM%20LRR%20Results472186.pdf>

but only on the reduced gen capacity needed to serve load so now the amount of capacity needed is reduced from 8,861.40 to 8,849.58. A 10 MW reduction of demand from BTM storage resulted in reducing total capacity needs by 11.82 MW.

Table JD.1: Peak demand and capacity needs with and without BTM storage.

Item	Without BTM Storage	With BTM Storage	Line
Peak demand (MW)	7,500.00	7,490.00	A
Line losses (%)	8.00%	8.00%	B
Additional capacity needed for line losses (MW)	600.00	599.20	C = A * B
Capacity needed to serve load (MW)	8,100.00	8,089.20	D = A + C
Reserve margin (%)	9.40%	9.40%	E
Reserves needed (MW)	761.40	760.38	F = D * E
Capacity needed to serve load and meet reserve margin (MW)	8,861.40	8,849.58	G = F + D
Difference		11.82	H

In the end, 10 MW of BTM storage ends up avoiding the need for 13.8 MW of generator-level capacity. This calculation can be simplified to:

$$10 * 1.08 * 1.094 = 10 * 1.182 = 11.82.$$

Q. How does the Company assess resiliency benefits?

A. The Company includes resiliency benefits as a potential benefit that could stem from the pilot program. However, the Company only identifies this benefit as a “customer” benefit, which is an incomplete assessment. Resiliency and reliability benefits to the customer are a de facto utility benefit and utility system benefit. The utility itself benefits from its customers enjoying increased reliability and resiliency. There are commonly tracked performance metrics that utilities across the country keep track of to measure resiliency and reliability of service to customers. If these metrics, explained further below, could be improved from increased resiliency benefits of BTM storage then there would be a direct benefit to the utility. Increased resiliency and reliability increase customer satisfaction, which is a benefit to the utility even if it is difficult to monetize that benefit for a monopoly utility like Consumers. If for no

1 other reason, it would be realized in the form of increased customer satisfaction from
2 reduced outages.

3 **Q. What is the right metric for measuring reliability as a system/utility benefit?**

4 A. According to the Institute of Electrical and Electronics Engineers (IEEE), there are
5 three commonly tracked measures of customer reliability. The first is System Average
6 Interruption Frequency Index (SAIFI). SAIFI measures how often the average
7 customers experience an interruption. The second is System Average Interruption
8 Duration Index (SAIDI). SAIDI measures the total length of time (in minutes or
9 hours) of interruption the average customer experiences. And finally, Customer
10 Average Interruption Duration Index (CAIDI), which is the average time required to
11 restore service. All three of these metrics can be measured at different geospatial
12 granularities ranging from the entire system down to the feeder level. However, BTM
13 storage, working as backup power, would not improve these metrics.

14 **Q. Would the Company proposal maximize the benefits outlined above?**

15 A. No.

16 **Q. Why not?**

17 A. Many of these benefits are geospatially specific. That is to say, the ability for storage
18 to be relied on to avoid certain costs is contingent on the storage being properly
19 located. This requires storage deployment to be targeted to those locations. There is
20 nothing in the Company's plan that targets storage in a way that would help achieve
21 the full suite and magnitude of benefits storage can provide. In response to discovery,
22 the Company indicates that they haven't developed a marketing program suggesting
23 that, at the time of their response, there is no intent to use the pilot program as a

1 learning opportunity for targeting storage deployment to maximize specific BTM
2 storage benefits.²²

3 **Q. Why is targeting necessary for maximizing select BTM storage benefits?**

4 A. A recent study by Berkeley Lab found that the energy and capacity value of storage
5 when co-located with renewables projects is about \$10/MWh, but when that same
6 amount of storage was allowed to be deployed in the optimal locations, it adds an
7 additional \$2.50/MWh in value.²³ That's a 25% increase in benefits. While that
8 specific value is not directly transferable to this proceeding; it helps illustrate that in
9 order to maximize the potential benefits of storage, utility companies have to be
10 thoughtful on where storage capacity is deployed.

11 **Q. Are there specific benefits that are sensitive to the location of storage
12 deployment?**

13 A. Yes. For example, the Company asserts that BTM storage will be evaluated for its
14 benefits to avoid distribution costs, specifically related to avoided substation
15 upgrades.²⁴ However, in order to avoid an upgrade at a substation, the storage would
16 need to be located on the portion of the distribution system served by that substation.
17 So, if there is a major system upgrade needed at a substation in Clare, for example,
18 but most of the storage gets installed in Traverse City, then the distribution upgrades
19 in Clare cannot be deferred or avoided. This example is illustrative and yet it provides
20 an easy way to understand why targeting is so necessary.

²² Exhibit CEO-5 (JD-3): Consumers Discovery Response U20963-ELPC-CE-755.

²³ Gorman, Will., et. al.. "Are coupled renewable-battery power plants more valuable than independently sited installations?" Lawrence Berkeley Lab. Retrieved online 6/18/21. <https://emp.lbl.gov/publications/are-coupled-renewable-battery-power>

²⁴ Machi Direct at p. 10.

1 **Q. Is the location specific nature of benefits limited to distribution benefits?**

2 A. No. The transmission system too can benefit from optimal locations of storage
3 deployment. According to a 2017 IREC study:

4 *[A] strategically located energy storage system can*
5 *charge or discharge to ensure that power flows from*
6 *multiple points on the grid are not limited by the capacity of*
7 *a single shared transmission line, thus providing important*
8 *congestion relief [emphasis added].*²⁵

9 In the examples I describe above of storage being deployed to avoid transmission
10 costs, the benefits were only realized because the storage was put in the right location.
11 In the earlier example where storage helped avoid transmission constraints on
12 Nantucket Island, if the storage was located in Boston, it wouldn't have helped
13 alleviate the constraint in Nantucket.

14 **Q. Are other benefits location specific?**

15 A. Yes. While the ability for storage to displace generation (and emissions) from power
16 plants is somewhat independent of location, which power plant that will get displaced
17 is location specific. For example, a power plant that is used to serve a load pocket
18 would most readily be displaced by storage also able to serve that load pocket. While
19 it is unlikely that any one residential, BTM storage installation will displace the
20 totality of such a power plant, it could reduce the reliance on such a power plant. If
21 large amounts of storage are targeted to that location, then the power plant would be

²⁵ Stanfield, Sky, et. al. 2017. "Charing Ahead: An Energy Storage Guide for State Policy Makers." IREC Retrieved 6/18/21 https://irecusa.org/wp-content/uploads/2017/04/IREC_Charging-Ahead_Energy-Storage-Guide_FINALApril2017.pdf

1 relied on less and less. This would translate to not only cost reductions but also
2 reductions in local air pollution.

3 The limited size of the Company's proposed pilot program is only expected to
4 procure 10 MW of storage, making it unlikely to reduce the need for an entire peaker
5 plant. Nevertheless, using storage to reduce reliance on peakers plants is a benefit that
6 can only be realized when the storage is deployed in the right location.

7 The research literature strongly supports the potential for strategically located storage
8 to displace targeted power plants. For example, research from 2016 by PSE Healthy
9 Energy found that, if properly sited and operated, storage, when paired with demand
10 response, could displace California's dirtiest peaker plants.²⁶ Similarly, UCS research
11 from 2019 of California found that numerous gas peaker plants, located in load
12 pockets across the state, could be displaced with sufficient 4-hour battery storage.²⁷

13 In 2020, California utilities verified the research literature's findings in real world
14 storage deployment demonstrations. The Oakland Clean Energy Initiative included
15 energy storage located on the distribution grid that allowed for the retirement of aging
16 fossil generation.²⁸

²⁶ Krieger, Elena M., Joan A. Casey, and Seth B.C. Shonkoff. 2016. "A Framework for Siting and Dispatch of Emerging Energy Resources to Realize Environmental and Health Benefits: Case Study on Peaker Power Plant Displacement." *Energy Policy* 96: 302–313.

<https://www.sciencedirect.com/science/article/abs/pii/S0301421516302798#!>

²⁷ Wisland, Laura. 2018. *Turning Down the Gas: The Role of Natural Gas in the State's Clean Energy Future*. Cambridge, MA: Union of Concerned Scientists. <https://www.ucsusa.org/resources/turning-down-gas-california>.

²⁸ Doherty, Paul. 2020. "PG&E Proposes Two Energy Storage Projects for Oakland Clean Energy Initiative to CPUC." *Currents*. Retrieved online 6/18/2021: <http://www.pgecurrents.com/2020/04/15/pge-proposes-two-energy-storage-projects-for-oakland-clean-energy-initiative-to-cpuc/>

1 **Q. Why should the Company focus on avoiding/displacing energy from specific**
2 **power plants?**

3 A. Deploying storage in a way that targets displacing peaker plants or the system's
4 dirtiest power plants would also have significant equity and environmental justice
5 benefits in the form of reduced local air pollution. Take the Oakland Clean Energy
6 Initiative as an example. That effort, which included the targeted deployment of
7 storage along with other distributed resources, facilitated the retirement of a fossil-
8 fueled power station that was located in a community with one of the worst pollution
9 profiles in the Bay Area.²⁹

10 In 2018, UCS convened a group of stakeholders, including environmental justice and
11 grassroots organizations, policy experts, industry, labor, consumer advocates, faith
12 groups, and renewable energy advocates focused on the equitable deployment of
13 energy storage.

14 *The participants developed a set of consensus principles for*
15 *storage deployment that elevate the critical importance of*
16 *community-led clean energy solutions. Together these*
17 *principles can help state policymakers focus on solutions*
18 *that ensure that the growth of energy storage improves all*
19 *communities, including environmental justice communities,*
20 *communities of color, low-income residents, tribal*
21 *communities, and historically disadvantaged*
22 *communities.*³⁰

²⁹ Doherty, Paul. 2020. "PG&E Proposes Two Energy Storage Projects for Oakland Clean Energy Initiative to CPUC." Currents. Retrieved online 6/18/2021: <http://www.pgecurrents.com/2020/04/15/pge-proposes-two-energy-storage-projects-for-oakland-clean-energy-initiative-to-cpuc/>

³⁰ Union of Concerned Scientists (UCS). 2019. Principles of Equitable Policy Design for Energy Storage. Cambridge, MA. <https://www.ucsusa.org/resources/principles-equitable-policy-design-energy-storage>.

1 One of the primary consensus principles developed in that effort was reducing
2 emissions by targeting energy storage to help reduce fossil-fuel-fired power plants
3 that would improve the health of front-line communities.

4 **Q. Could geo-targeting increase the resiliency benefits of BTM storage?**

5 A. Possibly. The Company submitted a geospatial analysis of SAIDI, SAIFI, and CAIDI
6 as part of the draft Electric Distribution Infrastructure Investment Plan, filed in Case
7 No. U-20147 on April 30, 2021.³¹ That analysis reports SAIDI, SAIFI, and CAIDI
8 numbers across several service regions and it reveals that there are considerable
9 differences in these reliability metrics across the Company's service territory.
10 According to the Company, "[T]he worst performing service region by SAIDI and
11 SAIFI has been Tawas ("TWS")." Tawas' SAIDI was 985, compared to 199 for the
12 system average and 83 for the best performer Bay City (BCY). Tawas' SAIFI was
13 4.2, compared to 1.01 for the system average and 0.5 for Bay City. Based on that
14 data, customers in Tawas more frequently suffer from outages than Bay City. The
15 reasons for this are explained by the Company:

16 *This is largely due to the nature of [the Tawas] service*
17 *region, which serves a rural component of the system with a*
18 *lower customer density per line mile than many other service*
19 *regions, meaning it has many circuits that cover long*
20 *distances. This region of Michigan can also require longer*
21 *travel times for crews to respond to outages that occur.*³²

22 The variation in service region reliability is not a criticism so much as it is a good
23 argument for why targeting storage is so important. If Tawas customers are more

³¹ Exhibit CEO-6 (JD-4); Consumers' Response to U20963-ELPC-CE-758.

³² See EDIIP Pg 40

likely to suffer an outage, then they are more likely to benefit from the backup power provided by BTM storage.

Q. Are there any other regions that are consistently poor performing with respect to reliability metrics?

A. Yes. There are five service regions that perform worse than average for all three reliability metrics (CAIDI, SAIFI, and SAIDI). They are:

1. Benzonia (BEN),
2. Big Rapids (BIG),
3. Coldwater (CLD),
4. Tawas (TWD); and,
5. West Branch (WBR).

The Company also offers a summary of the ten poorest performing circuits.³³ The Company states that it developed corrective action plans targeted at improving circuit reliability on each of the poor performing circuits and provided examples of the targeted investments that certain poor performing circuits will receive.³⁴ BTM storage should be a part of that targeted investment strategy, yet this pilot program is not designed to effectively inform the Company's learning in maximizing the benefits of such a strategy.

³³ Figures 38 and 39 on pages 46-47 of the draft EDIIP

³⁴ See EDIIP at page 47

1 **Q. Are there other ways the program fails to maximize benefits?**

2 A. Yes. According to the Company's own estimates, BTM storage is expected to cost
3 \$1,900 /kW.³⁵ The pilot program storage rebate doesn't exceed \$1,050, or 63% of a
4 storage project's expected cost. However, according to the Company's internal
5 estimates, distributed, non-BTM storage, costs \$580/kW.³⁶ This means the BTM
6 storage incentive (paid for entirely by ratepayers) is twice the cost of bulk distributed
7 storage and still not enough to cover the full costs of BTM storage.

8 **Q. Given those costs, should the Commission approve any BTM storage pilot at all?**

9 A. Yes. The need to explore the benefit of distributed BTM storage is clear. However,
10 the Company should not be given a free pass to be inefficient with its application of
11 capital in a pilot project. The Company has an obligation to act prudently in its capital
12 spend and should seek to maximize the benefits of its pilot program for its customers.

13 **Q. How can the Company improve the pilot program?**

14 A. The most efficient and effective way for the Company to improve upon the pilot is by
15 being more intentional in its geographic targeting of BTM storage.

16 **Q. How can geographic targeting help?**

17 A. Many distributed and BTM storage benefits are locationally specific. The largest of
18 those benefits are associated with avoiding, deferring, or reducing some future capital
19 costs or expediting the closure of something such as a peaker plant. Those benefits
20 can only be realized if the storage is located in the right locations; thus, the Company
21 needs to target BTM storage to those locations.

³⁵ Exhibit CEO-7 (JD-5); Blumenstock response to U20963-MEC-CE-481(d).

³⁶ Exhibit CEO-7 (JD-5); Blumenstock response to U20963-MEC-CE-481(d).

1 **Q. Could targeting help improve reliability metrics like SAIDI and SAIFI?**

2 A. No. According to the company, SAIDI, SAIFI, and CAIDI values will not be
3 impacted by BTM storage because those reliability metrics are measured at the
4 system level and do not account for customers that have backup power.³⁷ However,
5 SAIDI, SAIFI, and CAIDI, numbers could be used to help inform how the company
6 can engage in targeting storage deployment.

7 **Q. How could the Company engage in “targeting”?**

8 A. By identifying neighborhoods that are associated with the need for transmission and
9 distribution (T&D) upgrades, like new developments or re-developed commercial or
10 residential areas. Or by locating it in load pockets or other areas served by peaker
11 plants like Zeeland. The Company could have done an analysis of load growth at the
12 substation or feeder level, and found those locations that are due for upgrades in the
13 next 5 or so years. Targeting storage (along with demand response, energy efficiency,
14 and distributed solar) can help delay/defer those upgrades. The Company has already
15 assembled the geospatial analysis of SAIDI, SAIFI, and CAIDI for service regions,
16 but it failed to make the connection of how that analysis could inform residential
17 storage deployment.

18 **Q. How do you target behind the meter storage?**

19 A. The marketing program for the pilot will be tremendously important. According to
20 Witness Machi, “the Company does not yet have any specific marketing or
21 deployment plans for the Home Battery Pilot.”³⁸ Targeted marketing, via bill inserts,

³⁷ Exhibit CEO-8 (JD-6); Consumers’ Discovery Response to U20963-ELPC-CE-1040.

³⁸ Exhibit CEO-5 (JD-3); Consumers’ Discovery Response to U20963-ELPC-CE-755.

1 and/or email communications, will be important. And, creating eligibility
2 requirements or carve outs that require a certain amount of storage be developed in
3 certain areas will ensure that the targeted benefits of storage come to fruition.

4 **Q. Do you have any recommendations on this issue?**

5 A. The Company should conduct an analysis of their system and identify locations where
6 increased storage deployment would avoid/defer T&D, reduce reliance on one or
7 more peaker plants, and/or benefit neighborhoods with historically below average
8 CADI/CAFI numbers. It should then look to see if there is any overlap with those
9 areas. The Company should then prioritize areas with all three, then two, then one of
10 those benefits.

11 **IV. THE PROPOSED COMPANY PILOT WOULD NOT BE ACCESSIBLE TO**
12 **LOW-INCOME FAMILIES**

13 **Q. Would the Company proposals be accessible to low-income families?**

14 A. Generally, no. The energy burden for low-income families in Michigan is already
15 high and any increase in energy expenditures would likely be untenable. Neither pilot
16 option provides any customer bill savings to offset costs of the program. The only
17 “value” to the customer is the resiliency benefits, and the Company’s own statements
18 make it clear the batteries can’t be used to reduce customer bills.³⁹

19 **Q. How would the proposal limit access for low-income families?**

20 A. The Company offers two proposals. One would require a large upfront cost to
21 customers, followed by a rebate on some, but not all those costs.⁴⁰ For a family living

³⁹ Machi Direct at p. 14 and p. 16.

⁴⁰ The Company’s estimates are that a home battery installation will cost \$1,900/kW, see Exhibit CEO-7 (JD-5). The largest possible rebate is \$1,050/kW or a rebate of roughly 55 percent.

1 paycheck to paycheck, that type of upfront cost would be unaffordable. And the
2 ability for a low-income family to finance that cost, given that there are no bill
3 savings that are expected to flow to the customer, seems unlikely.

4 **Q. What about the Company's other option with no upfront costs?**

5 A. The other option is for the Company to pay the upfront costs and for the customer pay
6 a monthly fee. The energy burden is already high for low- to moderate-income (LMI)
7 families and increasing the monthly cost is unlikely to be tenable. The notion that
8 LMI families would voluntarily increase their energy burden shows a lack of
9 awareness of the energy burden in the state. That isn't to say LMI families wouldn't
10 potentially benefit from BTM storage. If the power goes out and a family's groceries
11 spoil a low-income family will have a harder time financially replacing that food than
12 a high-income family.

13 **Q. Are there other reasons why the program might be difficult for low-income**
14 **families?**

15 A. Yes. Most BTM storage is of the 4-hour duration battery variety, and unless the
16 storage system was oversized, the system would not provide benefits for multi-day
17 outages. Storage would only promote multi-day resiliency benefits if paired with
18 solar. Nationally speaking, LMI customers have difficulty accessing rooftop solar.
19 According to 2021 LBL study, "Solar adopters generally skew towards higher
20 incomes."⁴¹ The cost declines of solar are making it more affordable and accessible to

⁴¹ Barbose, Galen, et. al. 2021. "Residential Solar-Adoption Income and Demographic Trends: 2021 Update." Lawrence Berkeley Lab and Department of Energy. Retrieved online 6/18/21.
<https://emp.lbl.gov/publications/residential-solar-adopter-income-and>

1 low-income families and ultimately LMI households' lack of access to solar can be
2 solved but this isn't the docket to do it in.

3 **Q. Could low-income families benefit from BTM storage?**

4 A. Yes. The Company could offer the BTM storage to low- or low- and moderate-
5 income families for free, using the system benefits to offset the system costs and
6 offering the resiliency benefits for free to low-income families.

7 **Q. Could low-income communities benefit from BTM storage?**

8 A. Yes. BTM storage can benefit low-income communities by being located at places
9 like community centers and grocery stores in those communities. Nationally, lower
10 income households have struggled to achieve the same levels of roof-top solar
11 adoption as higher income households. Without solar on their roofs, the resiliency
12 benefit of storage is likely to only last a few (3-4) hours. Communities without
13 significant amounts of solar on households might prefer community centers, religious
14 sites, or grocery stores to be powered as opposed to individual households.⁴² Those
15 types of locations (community centers, religious sites, or grocery stores) might be
16 places where communities gather during winter storms or summer heat waves to
17 escape the extreme weather conditions if their homes are without electricity. Grocery
18 stores in particular might be important to communities in times of outages. Storage
19 could play an important part of setting up a microgrid and grocery centers with
20 functioning microgrids have been literally lifesaving in times of crisis. For example,
21 the grocery store chain, H-E-B, has several Texas locations set up on microgrids.

⁴² Richardson, Jeremy. 2019. "Principles of Equitable Policy Design for Energy Storage." Union of Concerned Scientists. Retrieved online 6/18/21: <https://www.ucsusa.org/sites/default/files/attach/2019/05/equitable-policy-storage-principles.pdf>

1 When Texas was hit by hurricane Harvey or summer time heat waves, hundreds of
2 thousands of residents lost power, but the H-E-B stores were able to maintain power
3 and provide local residents with a place to stay cool in the summer's heat while they
4 shopped for necessities like food or refrigerated bottled water.⁴³ The northeastern
5 grocery chain Stop and Shop has similar plants to set up microgrids at grocery store
6 locations.⁴⁴ At least some of these grocery store microgrids are set up with gas-fired
7 backup power, so microgrids can be set up with a combination of storage plus other
8 clean technologies like solar.

9 **Q. How should the program target benefits to low-income communities?**

10 A. The best way to target low-income community benefits is to ask those communities
11 what would be of most benefit to them. Different communities might have different
12 needs.

13 **Q. Are there other ways the Company could ensure low-income families benefits**
14 **from the pilot?**

15 A. Yes. The Company could create a “carve out” for low-income customers wherein the
16 Company would be required that a certain percent of the storage capacity be installed
17 at low-income households. Carve outs are a commonly used policy lever and not
18 uncommon in renewable portfolio standards (RPS).⁴⁵ Commissions in other states

⁴³ Maloney, Peter. 2019. “H-E-B as a ‘Community Hero’ during Hurricane Harvey.” Retrieved online 6/19/21: <https://microgridknowledge.com/h-e-b-microgrid-hurricane/>

⁴⁴ Wood, Elisa. 2020. “Stop & Shop, Major Northeast Grocery Store Chain, to Install 40 Microgrids.” Retrieved online 6/18/21: <https://microgridknowledge.com/grocery-stores-microgrids-bloom/>

⁴⁵ According to data from LBL, 19 states have technology specific carve outs in their RPS. See <https://emp.lbl.gov/sites/all/files/documents/lbnl-1005057.pdf>. Income based carve-outs are less common but do exist in California, Colorado, New York and Oregon See: <https://www.nrel.gov/state-local-tribal/lmi-solar.html>

1 have ordered regulated utilities to have carve out for low-income storage programs
2 including in California, where the CPUC ordered that, “25 percent of funds for
3 distributed energy storage to low-income households and environmentally burdened
4 communities throughout the state.”⁴⁶ A low-income carve out should reflect the
5 portion of Consumers Energy’s customers that are low-income.

6 **V. THE PILOT PROGRAM NEEDS CLEAR METRICS AND TARGETS.**

7 **Q. Do you have any other concerns with the home battery pilot program?**

8 A. Yes. The Company has not laid out sufficiently clear metrics and targets that define
9 what success looks like when it comes to the storage pilot and equity and inclusivity.

10 **Q. How do you measure inclusivity?**

11 A. In discovery response, the Company asserts that the pilot is ‘inclusive’ because all
12 customers are eligible to participate⁴⁷. However, eligibility alone doesn’t guarantee
13 inclusivity. Nationally, all customers are eligible to participate in rooftop solar but
14 research shows that adoption has not occurred in an equitable way. The Company
15 should be tracking demographics and other important metrics related to where people
16 are adopting BTM storage and making modifications to programs to help ensure
17 equitable deployment of BTM resources like storage.

18 **Q. Does the Company need to mandate customers provide race and income**
19 **information in order to sign-up for the pilot?**

⁴⁶ California Public Utilities Commission (CPUC). 2017. “CPUC Directs Investment for energy Storage Projects to Customers Located in Disadvantaged and Low Income Communities.” Press release. Docket #: R.12-11-005. October 13, 2017. <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M197/K258/197258268.PDF>

⁴⁷ Exhibit CEO-5 (JD-3), Consumers’ Discovery Response to U20963-ELPC-CE-755.

1 A. Income information should be mandatory for those customers wishing to sign up
2 under the low-income carve out (which should also include a waiver in fees). For the
3 remainder of customers, demographic information need not be provided.

4 **Q. How can the Company monitor diversity of pilot adoptees without customers**
5 **directly volunteering that information?**

6 A. The Company should, at the very least, be tracking the addresses of project
7 participants and therefore can map participation to census and zip code. The
8 Company can then monitor to see how adoption levels are distributed across parts of
9 their service territory. Doing so will help the Company ensure that the deployment of
10 BTM storage is equitable and inclusive. The Company is implicitly testing what type
11 of incentive structures will promote BTM storage. Consequently, the Company has an
12 obligation to evaluate if the proposed incentive structures will promote diverse and
13 inclusive deployment of BTM storage.

14 **Q. How can the Company do this?**

15 A. For residential customers, the Company can do this several ways including collecting
16 data on pilot program participants' demographics and analyzing it to see how the pilot
17 program adoption demographics compare to service territory demographics related to
18 race, income, and percent of non-English speaking households (to name a few).

19 **VI. RECOMMENDATIONS**

20 **Q. What are your recommendations?**

21 A. The Commission should issue an order with the following conditions for approval of
22 the proposed pilot:

1 (1) Prior to the launch of the pilot, the Company must develop priority neighborhoods
2 to target deployment of the BTM storage that will help ensure that the Company will
3 maximize benefits and promote diversity among adoption.

4 (2) During the pilot, the Company will track additional metrics related to diversity
5 and inclusion and, include a carve out and waiver for low-income customers.

6 **Q. How do you recommend the Company target deployment?**

7 A. The Company should conduct several geospatial analyses to determine the locations
8 of where the BTM storage pilot should be targeted. These analyses should focus on
9 projected T&D upgrades, historical outage data, and current demographics. When
10 these data are mapped together, areas of overlap should be prioritized to maximize
11 benefits like avoided T&D, avoided costs and emissions, improving disparities in
12 historical reliability/outages. This is difficult to articulate without the data and based
13 on the Company's response to discovery, the Company has not conducted even the
14 most basic analysis of these types of variables. Once target locations are developed,
15 the Company's marketing should target priority regions. Depending on the results of
16 that analysis, it may be appropriate to limit participation in the pilot to those
17 customers in the priority locations.

18 **Q. How do you recommend they set up and track metrics?**

19 A. The Company has already outlined a process for tracking metrics of the BTM storage
20 program. I recommend that aggregate demographics of participation including race
21 and income be added to that existing system for tracking, monitoring, and reporting.
22 This does not have to be done directly, and customers should not have to volunteer
23 their ethnicity when trying to sign up for the pilot. Instead, the company could track

1 and report adoption rates in geographic areas that reflect demographic variables the
2 Company is evaluating (either census blocks or by service region). As part of the
3 process for tracking these metrics, the company should compare storage deployment
4 distribution across regions paying close attention to the racial makeup of those areas.

5 **Q. What do you recommend for the BTM storage pilot low-income carve out?**

6 A. The company should have a specific low-income carve out that reflects the population
7 it serves. While Consumers did not identify the percentage of their residential
8 customers that are low-income in response to discovery requests,⁴⁸ statewide data
9 indicates that 30% of households live at or below 200% of the federal poverty line.⁴⁹
10 Assuming Consumers' customers are reasonably representative of the state as a
11 whole, the commission should direct the company to a 30% carve out for low-income
12 families. This would translate to a 3MW carve out.

13 **Q. Does this conclude your testimony?**

14 A. Yes.

⁴⁸ In response to ELPC-CE-1039, Company witness Torrey pointed to its response to MEC-CE-407, which did not have the data requested. *See* Exhibit CEO-9 (JD-7) and Exhibit CEO-10 (JD-8).

⁴⁹ Based on 2019 data reported by kff.org <https://www.kff.org/other/state-indicator/distribution-by-fpl/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>

PROFESSIONAL EXPERIENCE

Union of Concerned Scientists, Washington, D.C. *Manager, Electricity Markets*, 2018 – Present

- Leads a team of analysts and researchers conducting economic and technical analysis of the U.S. energy system, with a focus on the electric grid.
- Conducts economic and financial analysis of electricity markets and policies
- Provides expert testimony at regulatory proceedings on the financial and economic impacts associated with utility and energy company proposals
- Coordinates research and advocacy efforts at state public utility commission, regional transmission organizations, and the Federal Energy Regulatory Commission
- Briefs state and federal regulators on emerging issues associated with the utility industry
- Responsible for the training and development of a team of early career analysts

Sierra Club, Washington, D.C. *Electric Sector Analyst*, 2016 – 2018

- Responsible for conducting economic analysis of federal regulations of the power sector
- Served as lead analyst on federal policy, natural gas, coal economics, and energy markets
- Reviewed utility rate cases, integrated resource plans, and long term planning
- Led analysis to develop emerging economic strategies to secure coal plant retirements

Synapse Energy Economics Inc., Cambridge, MA. *Associate*, 2013 –2015

- Conducted analysis on utility economics, regulatory compliance, and energy technologies
- Used optimization models to conduct long term economic analysis of energy systems
- Modeled costs and benefits of energy efficiency and rooftop scale solar

Independent Consultant, New York, NY. 2011 – 2013

- Analyzed technical and economic drivers for “Green Palm Oil Production” for ETG
- Designed and developed mathematical models to help cities promote sustainable energy policy
- Assisted in building budget plans and developing fundraising strategies for the Coalition on the Environment and Jewish Life

Environmental Law & Policy Center, Madison, WI. *Policy and Science Intern*, 2011

- Investigated consequences of state policy changes related to wind turbine siting regulations
- Initiated research for a report to quantify jobs created in Wisconsin by wind and solar industries
- Analyzed USDA grant data associated with renewable energy provisions of 2008 Farm Bill

Democratic Party of Wisconsin, Madison, WI. *Finance Assistance*, 2010-2011

- Developed strategies for targeted fundraising events
- Managed phone banking staff, finance interns, and volunteers at fundraising events.
- Supervised the election night phone-bank for Wisconsin State Senate and Assembly committees.

Tel Aviv – Yafo Municipality, Tel Aviv, Israel. *Research Assistant to Deputy Mayor*, 2010

- Presented urban sustainability case studies and best practices to municipal
- Investigated US and European greenhouse gas emission reduction policies and programs

Baker Hughes - Baker Petrolite (Industrial Division), Honolulu, HI. *Engineer II*, 2006 – 2010

- Managed daily operation of the primary account on the island, worth over \$1.8 million annually
- Monitored performance metrics and calculated energy and cost savings

- Consulted with customers on reducing environmental impacts of facilities

EDUCATION

Columbia University – School of International Public Affairs, New York, NY

Master of Public Administration in Environmental Science and Policy, 2012

University of Texas, Austin, TX

PETEX Petroleum Fundamentals Program, 2007

Florida Institute of Technology – College of Engineering, Melbourne, FL

Bachelor of Science in Chemical Engineering, 2006

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Principles of Equitable Policy Design for Energy Storage

The Union of Concerned Scientists convened a group of diverse stakeholders, including environmental justice and grassroots organizations, policy experts, industry, labor, consumer advocates, faith groups, and renewable energy advocates, in December 2018 in Chicago, Illinois, focused on the equitable deployment of energy storage. Energy storage is poised to expand dramatically, transforming the way we produce and use electricity. It is critical that this expansion and the transition to a clean energy economy address the needs of vulnerable residents of disadvantaged neighborhoods and frontline communities without inadvertently causing harm.

The participants developed a set of consensus principles for storage deployment that elevate the critical importance of community-led clean energy solutions. Together these principles can help state policymakers focus on solutions that ensure that the growth of energy storage improves all communities, including environmental justice communities, communities of color, low-income residents, tribal communities, and historically disadvantaged communities. Importantly, these principles are not meant to constrain organizations taking stronger positions on particular policies, regulatory proceedings, or project proposals.

Principles

Reducing emissions. Incentivize energy storage in a variety of applications to help replace fossil fuel-fired power plants and pipelines or to substitute generation from those plants, thus improving the health of frontline communities by cutting emissions that harm local air quality and contribute to climate change.

These principles elevate the importance of community-led clean energy solutions, and help state policymakers ensure that energy storage improves all communities.

Improving resilience. Ensure that energy storage helps make residents and communities more resilient to both human-caused and natural disasters—which will become more frequent and severe due to climate change—by deploying local, onsite power to keep essential services operating during extended power outages and by restoring power after a disaster.

Promoting local economic development. Ensure access to federal, state, and local job training and career-oriented apprenticeship programs, including those certified by the Department of Labor, for energy storage installation and commissioning. Include complementary policies that drive local economic development in historically underinvested communities, train residents for long-term career opportunities, and provide economic benefits to disadvantaged communities without increasing costs of living.

Accelerating greater levels of renewable energy deployment. Accelerate the development and deployment of energy storage that accommodates higher levels of renewable energy on the grid to reduce heat-trapping emissions and other harmful pollutants, with a special focus on local reductions in environmentally overburdened communities.

Protecting consumers. Ensure that energy storage lowers electricity bills for ratepayers and is used maximally to ensure savings from all services it provides, and incentivize ownership models that lead to direct community benefits.

Ensuring participation. Engage in a robust and transparent stakeholder process that empowers community self-determination, facilitates collaboration, and responds to community perspectives so that industry can ensure that energy storage projects are successful and adequately elevate the views of most affected parties.

See reverse for information on participants and supporters.



Panelists discuss energy storage policies at the state level during the convening.

Convening Participants

The following organizations participated in the convening and support the principles outlined here.

Blacks in Green
Center for Earth, Energy and Democracy
Clean Energy Group
Clean Grid Alliance
Clean Power Lake County
Electrical Training Alliance
Environmental Law and Policy Center
Faith in Place
IBEW Local 134
Illinois Citizens Utility Board
Indiana State Conference of the NAACP
Interfaith Power & Light (DC, MD, NoVA)
Just Transition Fund
Little Village Environmental Justice Organization
Maryland Environmental Health Network
Minnesota Solar Energy Industry Association
NAACP Chicago Southside Branch
New York City Environmental Justice Alliance
PSE Healthy Energy
Renewable Energy Partners
Stem
Sunrun
The Greenlining Institute
The POINT Community Development Corporation
University of Minnesota Energy Transition Lab
Vote Solar

The Union of Concerned Scientists and the participating organizations would like to thank the Great Plains Institute for facilitating the convening.



Megan Rising/UCS

A wide range of stakeholders from across the country met in December 2018 to develop a set of principles to ensure equitable deployment of energy storage technologies.

[Union of Concerned Scientists

FIND THE FULLY REFERENCED VERSION ONLINE: www.ucsusa.org/storage-equity

The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with people across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

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Question:

21. Please describe any steps the company plans to take to ensure that the Home Battery pilot program is deployed in an equitable way that can benefit customers of all demographics.

Response:

The Company currently plans to make the Home Battery Pilot available to all residential customers across the Company's service territory meeting the eligibility criteria defined in the table on pg. 3 of my direct testimony. Beyond that, the Company does not yet have any specific marketing or deployment plans for the Home Battery Pilot.



Priya D. Machi
May 21, 2021

Strategic Projects

Question:

24. Has the company ever conducted any SAIDI, SAIFI, CAIDI, or CAIFI analyses at a geospatial granularity finer than whole system (for example, by zip code, county, feeder, etc.)?

Response:

Yes. Please refer to Chapter II.D of the draft Electric Distribution Infrastructure Investment Plan, filed in Case No. U-20147 on April 30, 2021.



RICHARD T. BLUMENSTOCK
May 21, 2021

Electric Planning

Question:

6. On Page 216-217, lines 21 – 2, of Mr. Blumenstock’s testimony, and in reference to the Commission’s disallowance of the Standish battery project, Mr. Blumenstock states: “However, in the 2021 bridge year and the 2022 test year in this case, the Company is still proposing to make investments in the portable battery, on a scaled down basis, because it is in the best interests of customers to do so.
- a. When was the decision to scale down the project?
 - b. What was the basis for scaling down the project?
 - c. How was the project “scaled down”?
 - d. What is the Company’s current estimate of the cost per kWh of battery capacity of the project as implemented by the Company and what is the cost per kWh that would make the full cost of the portable-battery deferral project equivalent to the cost of the Standish substation upgrade?
 - e. What is the Company’s current estimate of the cost of a traditional upgrade of the Standish substation?

Response:

- a. This decision was made in January 2021.
- b. The project was scaled down following the Commission’s disallowance of project costs in its Order in Case No. U-20697. As discussed on page 217, line 3, through page 218, line 10, of my direct testimony, the Company decided not to cancel the project, but did seek to reduce the spending amount.
- c. Project scope was reduced to limit expenditures to those related to critical tasks. Less critical tasks, like a dispatch optimization analysis and a third-party analysis on the battery’s performance one year after commissioning, were eliminated from the project scope.
- d. The current cost estimate for this project for battery capacity is \$580/kW. With an estimated substation upgrade cost of \$1.5 million, the equivalent cost per kW of the battery would need to be \$140/kW. However, that only counts the Standish substation, and this battery is intended to defer two additional substation upgrade projects. Factoring those two additional projects in as well, the battery cost would need to be \$472/kW to be equivalent to the upgrade costs of all three substations.

- e. The current estimate for a traditional capacity upgrade at Standish substation is \$1.5 million, which would involve building a new substation and removing the existing substation.



RICHARD T. BLUMENSTOCK

May 6, 2021

Electric Planning

Question:

5.Does the company believe that when used for resiliency purposes, that BTM storage will have any impact on reliability metrics like SAIDI, SAIFI, or CAIDI? If so, please explain how. If not, please explain why not.

Response:

No, the Company currently does not expect behind-the-meter storage to impact system-wide reliability metrics. Customer-sited storage, like other customer-sited backup power, can reduce outage minutes experienced by customers that have storage installed. However, SAIDI, SAIFI, and CAIDI are systemwide metrics that reflect outages of the electric grid and are not adjusted for customers with storage or backup power provisions. Therefore, the Company does not currently expect that customer-sited storage (either installed or in scope in the proposed Home Battery Pilot) would have an impact on those systemwide metrics.



RICHARD T. BLUMENSTOCK

June 8, 2021

Electric Planning

Question:

For the following questions, please refer to the Direct Testimony of Michael A. Torrey.

62. Refer to page 15, lines 5 to 17.

a. Using the gender (Male, Female), race (White, Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, and Some Other Race), and ethnicity (Hispanic and non-Hispanic) categories as used by the US Census,

i. What is the composition of the population in Consumers Energy's electric service territory?

ii. What is the composition of Consumers Energy's staff?

iii. What are the shares of Consumers Energy's employee compensation?

b. Please explain how Consumers Energy is incorporating consideration of Diversity, Equity, and Inclusion into the Company's investment planning.

c. Please explain how Consumers Energy is incorporating Diversity, Equity, and Inclusion into the Company's customer programs.

d. Please explain how Consumers Energy is incorporating Diversity, Equity, and Inclusion into its "investment in communities" as well as what is meant by "investment in communities".

e. Please explain how Consumers Energy is incorporating Diversity, Equity, and Inclusion into its charitable giving.

f. Please explain how Consumers Energy is incorporating Diversity, Equity, and Inclusion by addressing the cost burden placed on low-income and disadvantaged communities.

Response:

a.

- i. As of 4/26/21, the following represents the US Census Bureau Population estimates for the counties within the Consumers Energy Electric Service Territory.

US Census Bureau Population Estimates - 2019 American Community Survey (ACS) 2019, for all counties included in the Consumers Energy Electric Service territory	
Male/Female	% of population in Counties within Electric Service Territory
Female	50.56%
Male	49.44%
Ethnicity	% of population in Counties within Electric Service Territory
Hispanic/Latino	5.40%
Not Hispanic/Latino	94.60%

Race	% of population in Counties within Electric Service Territory
RACE Total population Two or more races	3.10%
RACE Total population White	83.62%
RACE Total population Black or African American	8.45%
RACE Total population American Indian and Alaska Native	0.47%
RACE Total population Native Hawaiian or Pacific Islander	0.03%
RACE Total population American Indian and Asian	3.20%
Some other Race	1.10%

- ii. As of 4/22/21, the breakdown of the Consumers Energy regular workforce is as follows.

Male/Female	#	% of Population
Female	2331	27.90%
Male	6024	72.10%
Ethnicity		
Hispanic/Latino	284	3.40%
Not Hispanic/Latino	8067	96.55%
Unknown	4	0.05%
Race		
American Indian or Alaskan Native	76	0.91%
Asian	147	1.76%
Black or African American	593	7.10%
Native Hawaiian or Other Pacific Islander	4	0.05%
Two or More Races	93	1.11%
Unknown	295	3.53%
White	7147	85.54%

- iii. Consumers Energy strives to provide fair employee compensation that is internally equitable and externally competitive. Using 2020 full year W2 wages, the breakdown of the Consumers Energy employee compensation is as follows:

Male/Female	% of 2020 W2 Wages
Female	23.76%
Male	76.24%
Ethnicity	% of 2020 W2 Wages
Hispanic/Latino	3.21%
Not Hispanic/Latino	96.75%
Unknown	0.04%

Race	% of 2020 W2 Wages
American Indian or Alaskan Native	0.95%
Asian	1.94%
Black or African American	6.65%
Native Hawaiian or Other Pacific Islander	0.03%
Two or More Races	0.82%
Unknown	3.12%
White	86.49%

It should be noted that in April 2021 Forbes named Consumers Energy as the top utility company in the country and second company overall in Michigan in its latest ranking of “America’s Best Employers for Diversity” recognizing the Company’s efforts to advance diversity, equity and inclusion. Consumers Energy was ranked No. 22 in the nation overall in the ranking, based on a survey of 50,000 Americans working for businesses with at least 1,000 employees.

- b. Consumers Energy’s Supply Chain organization is responsible for procuring goods and services to support investment planning. In 2019, the Company set a goal to double its diverse spend in five years. In 2021, the Company is planning to meet the initial five-year goal on the path to first quartile performance in supplier diversity in 2024. Supplier diversity at Consumers Energy can be observed through its policy of inclusion for diverse suppliers on bid events, its system for identifying diverse suppliers who have achieved certification through third-party organizations, and its supplier development through training and mentoring opportunities, scholarships for business certification, and networking opportunities among Tier I to Tier II suppliers. The Company recognizes the many benefits of a diverse supplier base which are in alignment with its triple bottom-line commitment to people, planet and prosperity.

Consumers Energy supports a variety of diverse business organizations in Michigan through membership, event sponsorship, and program participation including the Asian Pacific American Chamber of Commerce, Detroit Regional LGBT Chamber of Commerce, Great Lakes Women’s Business Council, Michigan Minority Supplier Development Council, and National Veteran Business Development Corporation. The Company has also provided capital availability for minority owned venture capitalists that invest in minority owned firms – addressing a significant barrier to growth and supporting individuals and groups with unique perspectives, strategies, and spheres of influence.

In addition, planned electric distribution investment is based on engineering models, historical reliability performance, and inspection results, all of which are focused on equipment and electric service, not on the gender, race, or ethnicity of the customers being served. The Company continues to examine its planning practices to ensure that investment decisions are fair and equitable for all communities served.

- c. The Company is continuously working to improve how it does business with customers, both through its operational practices and program offerings. As part of its standard operations, the Company works to ensure its materials are available in multiple languages. The Company’s Interactive Voice Recognition (IVR) system provides customers with a Spanish option, and the Company also contracts with a translation service to assist customers who speak other

languages. As noted in witness Anita Griffin's testimony, the Company is requesting funds for a ChatBot which will better assist customers who may be better served through written word. This is one of several projects that will seek to serve customers within their channel of choice.

As also outlined in Company Witness Anita Griffin's testimony, the Company is requesting funding for a two-year demand response pilot for low-income customers. Learnings from the first year of the pilot will be used to guide the operational activities in the second year. The Company expects to gain a greater understanding of how this customer group perceives the various demand response offerings and what types of programs would most benefit them. The Company has also proposed expansion of the PowerMIFleet pilot to include offerings to directly benefit disadvantaged communities and groups who may serve them.

The Company's Energy Waste Reduction (EWR) program provides rebates for approved energy efficiency measures for both gas and residential customers. Within these efforts is the Helping Neighbors program, which serves both single family and multi-family income-qualified customers. This program can provide qualified customers with free energy efficient interventions such as furnaces and water heaters. It can also provide a free home analysis, energy efficient lightbulbs, and Wi-Fi-enabled thermostats. Details about the EWR programs can be found in the Company's EWR biennial plan filings, reconciliation cases, and Company website.

The Company is a participant in the Energy Affordability and Accessibility workgroup which will include a Diversity, Equity, and Inclusion component in its work. This workgroup will focus on energy assistance programs in the state. The Company will also be a participant in the Customer Outreach and Education workgroup that is being established through the MIPowerGrid workgroup. The Company will have members represented from multiple teams at both workgroups.

In partnership with Michigan Rehabilitation Services under the Department of Labor and Economic Opportunity, the Company identified a color blindness simulator to test customer facing products. This ensures customer messaging and a full communications suite of materials are accessible for all.

- d. The Consumer Energy service area is divided into 17 territories supported by Community Affairs Managers. Funding is allocated to each manager and balanced across the entire service territory to invest in communities. In 2020, these managers invested \$318,877 with 208 local organizations spanning 58 counties. In 2021, the Company has an initiative to identify underrepresented communities and engage and invest in organizations within those communities. The Community Affairs team volunteers on 85 boards spanning 63 counties.

In addition to the Community Affairs team, there are dozens of Company employees throughout Michigan actively volunteering with local and statewide organizations working on behalf of women, minorities, LGBTQ, and the disabled. During the pandemic, the Consumers Energy Foundation focused heavily on providing COVID relief to underserved communities and communities of color most significantly impacted by COVID-19.

The Company's Diversity, Equity, and Inclusion Strategy team has partnered with Corporate Giving to provide financial support to several organizations, events and awards that advance Diversity, Equity, and Inclusion across the communities in Michigan. Examples of these organizations include Center for Energy Workforce Development Midwest Regional Conference, Michigan Energy Workforce Consortium Support, Michigan Veterans Affairs Agency Summer Forum, First Robotics, Society of Asian Scientists and Engineers Regional (Indiana), Society of Women Engineers Regional, Historically Black Universities and Colleges Career Fair, West Michigan Hispanic Chamber Of Commerce, Society of Hispanic Professional Engineers Regional Spring Events, American Association of Blacks in Engineering Conference, Disability Equality Index, Women of Power, Women of Color Conference, and Black Engineer of the Year Awards.

- e. The Consumers Energy Foundation is using 2021 to create a baseline to identify support for Diversity, Equity, and Inclusion. Specific questions have been added to the foundation's grant application to better track and measure outcomes and impacts. The foundation has reserved \$100,000 for Employee Resource Groups to help identify nonprofits focused on their diverse interests (women, minorities, veterans, differently abled, etc.). During 2020, corporate and foundation funds focused heavily on addressing our "people" priority, providing funds for basic needs during the pandemic, including the needs of low-income customers and those experiencing poverty.

As funding allows, the Company will provide non-profit agencies with assistance dollars to aid income-qualified customers to help ensure assistance is available to customers who may not be eligible for existing state programs, or who may require assistance in addition to state programs. In addition to direct energy assistance, donation dollars have been used for other activities such as customer outreach efforts and energy assistance pilot programs.

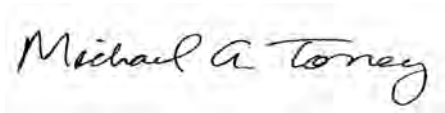
In recent years these agencies include, but are not limited to, United Way of Jackson County, United Way for Southeastern Michigan, Barry County United Way, The Salvation Army, TrueNorth, The Heat and Warmth Fund (THAW), St. Vincent de Paul, Superior Watershed Partnership, Michigan Community Action Agency, EmPower Genesee, Civilla, and the Michigan Veterans Trust Fund. The Company works with agencies to ensure 2-1-1 has timely information about the availability of assistance dollars.

- f. The Company partners with the State of Michigan and several non-profit agencies across the state to deliver energy assistance to income-qualified customers. This includes the State Emergency Relief (SER) program, which provides crisis bill assistance to customers under 150% of the Federal Poverty Level, and the Home Heating Credit (HHC) program, which provides qualified customers a credit calculated from their previous year's heating costs. Program eligibility, enrollment, and reporting for both programs are managed by the State.

The Company is an active participant in multiple groups that consider policy issues of energy assistance and have led to positive outcomes for customers such as increased energy assistance dollars to the State and improved experiences for customers. The Company is a member of the Coalition to Keep Michigan Warm, which is a diverse collection of non-profits, utilities, and state agencies that all have an interest in energy assistance policy. Currently, the Company has a member on the executive board. The Company is also a member of the National Energy Utility & Affordability Coalition which advocates for the continued need for the Low-Income Home

Energy Assistance Program (LIHEAP) federal block grant. LIHEAP funds both SER and HHC. Currently the Company has a member on the advisory board. The Company participates as a member of the Michigan Energy Assistance Program (MEAP) workgroup. The Company works with MEAP grantees and State partners within the workgroup to discuss how the program is faring and what improvements could be made to better serve customers. Outside of the workgroup, the Company meets regularly with each MEAP grantee that serves its customers to assist them with managing their program. The Company is not a MEAP grantee and does not receive customer demographic data from grantees. However, the Company often assists agencies with their outreach efforts specific to the areas they serve.

As mentioned above, the Company has the Helping Neighbors program to provide free energy efficient interventions. The Company participates in the Low-Income EWR workgroup to discuss areas of opportunities within this sector. This workgroup helped spur the creation of the Company's Health and Safety pilot that brings together multiple agencies, alongside the Company, to fix or replace items within a home that may have caused it to be deferred from traditional weatherization interventions.

A handwritten signature in black ink that reads "Michael A. Torrey". The signature is written in a cursive, slightly slanted style.

Michael A. Torrey

April 28, 2021

Rates and Regulation

Question:

4. Please refer to witness Blumenstock's response to U20963-ELPC-CE-758. Has the company conducted any analysis on the demographics of the "service regions" that includes (but is not limited to) analysis related to race or household income. If so, please provide. If not, please explain why not.

Response:

See discovery response U20963-MEC-CE-407.



RICHARD T. BLUMENSTOCK

June 8, 2021

Electric Planning

STATE OF MICHIGAN
BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of CONSUMERS
ENERGY COMPANY for authority to increase its
rates for the generation and distribution of electricity
and for other relief.

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)

Case No. U-20963

DIRECT TESTIMONY OF WILLIAM D. KENWORTHY

ON BEHALF OF
THE ECOLOGY CENTER, THE ENVIRONMENTAL LAW & POLICY CENTER,
AND VOTE SOLAR

June 22, 2021

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I. WITNESS IDENTIFICATION AND QUALIFICATIONS

Q: Please state your name, business name and address.

A: My name is William D. Kenworthy. My business address is 332 South Michigan Avenue, 9th Floor, Chicago, Illinois 60604.

Q: By whom are you employed and in what capacity?

A: I serve as Regulatory Director, Midwest for Vote Solar. I oversee policy development and implementation related to large scale and distributed solar generation in the region. I also review regulatory filings, perform technical analyses, and testify in commission proceedings on issues relating to solar generation and the distribution grid.

Q: What is Vote Solar?

Vote Solar is an independent 501(c)3 nonprofit working to repower the U.S. with clean energy by making solar power more accessible and affordable through effective policy advocacy. Vote Solar seeks to promote the development of solar at every scale, from distributed rooftop solar to large utility-scale plants. Vote Solar has over 120,000 members nationally, including over 5,000 members in Michigan. Vote Solar is not a trade organization nor does it have corporate members.

Q: On whose behalf are you submitting this direct testimony?

A: I appear here in my capacity as an expert witness on behalf of the Ecology Center, Environmental Law & Policy Center (“ELPC”), and Vote Solar (collectively, the “Clean Energy Organizations” or “CEO”).

Q: Can you please summarize your qualifications, experience and education?

A: I have nearly 30 years of experience in the energy industry in both the public and private sectors working in the renewable energy business and in energy policy. Of that

1 experience, I spent eight years in solar energy project development working primarily on
2 commercial and industrial distributed solar projects in the Midwest.

3 Prior to Vote Solar, I was Managing Director – Midwest for Microgrid Energy,
4 where I was responsible for leading Microgrid Energy's expansion of its solar project
5 development capabilities into markets in the Midwest. As a solar project developer, I
6 analyzed financial and economic aspects of projects. This involved understanding all
7 aspects of project finance and economics for our customers, partners, and financiers. My
8 project development experience includes project finance, rate analysis, economic
9 modeling, risk assessment, regulatory compliance, sales, and customer relations.

10 During my tenure at Microgrid Energy, we completed the Solar Chicago program,
11 a residential bulk purchase program, as well as a number of commercial projects ranging
12 in size from 25 kW to 2 MW. Prior to that, I was a partner with Tipping Point Renewable
13 Energy based in Dublin, Ohio, where we developed what was at the time the largest
14 rooftop solar project in Ohio for the City of Columbus.

15 In addition, my tenure at Microgrid Energy was punctuated with a one-year hiatus
16 during which time I served as President of Infer Energy, currently Root3 Technologies.
17 Infer Energy provided energy optimization services to large commercial and industrial
18 energy users. We used advanced data analytics and machine learning algorithms to
19 optimize complex energy systems. Prior to joining the solar energy industry, I worked on
20 energy policy at the federal and state level for over 20 years. As a consultant, I
21 represented electric utilities and other industry participants before Congress, the
22 Department of Energy, the Nuclear Regulatory Commission, the Environmental
23 Protection Agency, and the Office of Management and Budget. I began my career as a

1 Professional Staff Member to the House Energy & Commerce Committee, where I
2 represented Chairman John D. Dingell and other majority members of the Committee in
3 negotiations and legislative drafting on nuclear regulatory matters, the Clean Air Act
4 Amendments of 1990, and electric industry structure issues, among others.

5 I received a Master of Public & Private Management degree from the Yale
6 University School of Management with a concentration in Regulation and Competitive
7 Strategy. My research in graduate school focused on regulatory theory and practice. I also
8 have a Bachelor of Science in Foreign Service from Georgetown University.

9 A copy of my resume is included as Exhibit CEO-11(WDK-1).

10 **Q: Have you testified before the Michigan Public Service Commission Previously?**

11 A: Yes. I provided direct and rebuttal testimony in Case No. U-20162 (DTE rate case), Case
12 No. U-20471 (DTE IRP), Case No. U-20359 (I&M rate case), Case No. U-20561 (DTE
13 rate case), Case No. U-20649 (Consumers VGP Case), Case No. U-20697 (Consumers
14 Energy rate case), and Case Nos. U-20713/U-20851 (DTE Consolidated VGP and REP
15 Amendment).

16 **Q: Have you testified or provided comments in similar state regulatory proceedings?**

17 A: Yes. In addition to testimony noted above before the Michigan Public Service
18 Commission, I have provided testimony in rate cases before the Iowa Utilities Board and
19 the Wisconsin Public Service Commission. I have provided testimony on community
20 solar services and the value of distributed energy resources before the Illinois Commerce
21 Commission. I also have provided comments in numerous proceedings before the Illinois
22 Commerce Commission, the Illinois Power Agency, the Minnesota Public Utility

Commission, and the Wisconsin Public Service Commission. A list of testimony and comments that I have filed is included as Exhibit CEO-12 (WDK-2).

Q: Are you sponsoring any exhibits?

A: Yes, I am sponsoring the following exhibits:

- Exhibit CEO-11 (WDK-1), Resume of William D. Kenworthy
- Exhibit CEO-12 (WDK-2), Testimony and Comments of William D. Kenworthy
- Exhibit CEO-13 (WDK-3), JKB-1 in U20963-SA-CE-223.
- Exhibit CEO-14 (WDK-4), U20963-ELPC-CE-1037.
- Exhibit CEO-15 (WDK-5), U20963-MEC-CE-500.
- Exhibit CEO-16 (WDK-6), U20963-MEC-CE-477 (Partial).
- Exhibit CEO-17 (WDK-7), U20963-ELPC-CE-748-Blumenstock_ATT_3.
- Exhibit CEO-18 (WDK-8), U20963-ELPC-CE-748.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to review and make recommendations on several aspects of Consumers Energy's proposed expenditures and tariff modifications, including in particular certain proposed changes to its Distributed Generation Program, and certain distribution grid planning- and spending-related matters.

Q. Please summarize your conclusions and recommendations.

A. I recommend that:

- The proposed revisions to the Distributed Generation Program related to the Outflow Demand Credit calculation methodology be revised to reflect

1 a demand billing calculation that is consistent with the inflow demand
2 billing calculation;

- 3 • The Commission strengthen the alignment between investments proposed
4 in rate cases with the long-term distribution system planning process and
5 use long-term distribution plans to evaluate the reasonableness of
6 distribution system investments in rate cases;
- 7 • The Commission require the Company to develop equity metrics, and
8 performance incentives associated with those metrics, as a part of the
9 Company's ongoing development of a performance based ratemaking
10 proposal, and;
- 11 • The Commission disallow any cost recovery associated with the
12 Company's proposed investment in a Distributed Energy Resource
13 Management System (DERMS) until the Company provides additional
14 justification and analysis supporting the need for a DERMS.

15 **III. OUTFLOW DEMAND CREDIT**

16 **Q. What is the outflow demand credit?**

17 A. The outflow demand credit was approved by the Commission in the Company's last rate
18 case (U-20697) when the Distributed Generation Program was initially adopted. The
19 outflow credits approved in that case provide credit to customers for the energy and
20 power exported to the grid from their distributed energy resources. Those credits are
21 calculated for each rate class at the power supply component less transmission. Because
22 most rates for commercial and industrial customers include both volumetric (per
23 kilowatt-hour) rates and demand (per kilowatt) rates, the Company appropriately

1 included an outflow demand credit in the outflow credit calculations in the outflow credit
2 schedule that was finally included as Original Sheet No. C-64.30 through Original Sheet
3 No. C-64.50 in the Company's Rate Book for Electric Service.

4 **Q. Was there discussion of the methodology that the Company would use to calculate**
5 **the outflow demand credit in U-20697?**

6 A. No.

7 **Q. What has the Company proposed as a method to calculate the outflow demand**
8 **credit in this case?**

9 A. The Company is proposing to add definitions for Outflow Demand for Secondary Rate
10 Customers and Outflow Demand for Primary Rate Customers to Rule C11.3.B,
11 Distributed Generation Program Definitions on Tariff Sheet No. C-64.10.
12 Specifically, the following two definitions would be added to Section C11.3.B of Tariff
13 Sheet No. C-64.10:

14 1. Outflow Demand for Secondary Rate Customers – the total metered
15 outflow quantity of kilowatts (kW) during the billing period divided by the
16 number of hours in the billing period.

17 2. Outflow Demand for Primary Rate Customers – the total metered outflow
18 quantity of kilowatts (kW) during the On-Peak period divided by the number of
19 On-Peak hours in the billing period.¹

20 **Q. What is the Company's explanation for this change?**

21 A. Company Witness Hubert Miller explains the proposed changes in his testimony:

¹ Exhibit No.: A-16 (RLB-2), Schedule F-5, Page 9 of 79.

1 For secondary rate customers, I am recommending the definition clarify that the
2 outflow demand is based on the average kW recorded over the billing period.
3 Similarly, for primary rate customers, I am recommending the definition clarify
4 that the outflow demand is based on the average kW recorded over the on-peak
5 hours in the billing period.²

6 **Q. Did the Company clarify the calculation methodology that it plans to use?**

7 A. In response to discovery by the MPSC staff, the Company clarified its calculation
8 methodology:

9 The Company uses the instantaneous outflow of energy collected from the meters
10 on a 15 minute or hourly interval basis, depending on the reporting configuration
11 of the meter. For instance, large business customers have meters that report the
12 instantaneous energy over 15-minute intervals whereas small and medium sized
13 business customers tend to have meters that report the instantaneous energy
14 recorded over an hour. The reported information is then totaled for the billing
15 periods specified in the proposed definitions and divided by the corresponding
16 number of hours in that period.³

17 **Q. Please explain how this calculation methodology would be applied for customers**
18 **taking secondary demand service (Rate GSD).**

19 A. Rate GSD is a three part rate in which customers are billed fixed charges, volumetric
20 charges (per kilowatt-hour), and demand charges (per kilowatt (kW) of Peak Demand.⁴ In

² Miller Direct Testimony, page 24.

³ Exhibit CEO-13 (WDK-3), JKB-1 in U20963-SA-CE-223.

⁴ Peak Demand is defined in Rate GSD as Kilowatts (kW) supplied during the (hour-long or 15 minute-long?) period of highest use in the billing month but not less than 60% of the highest Peak Demand created during the

1 this tariff, the power supply charges consist only of demand and volumetric charges,
2 while the delivery portion of the bill consists of fixed, volumetric, and demand charges.

3 For customers that are not participating in the DG Program, the billing
4 determinants used to calculate the bill are the number of kilowatt-hours during the billing
5 period and the Peak Demand. However, for DG Program participants (C11.3), the
6 Company also uses the outflow kWh and the outflow demand as billing determinants.
7 Under the Company's proposed methodology, the outflow demand is the average outflow
8 over all hours of the billing period:

$$9 \quad \text{Outflow Demand} = \frac{\Sigma (\text{Hourly demand values in the billing period (month)})}{(\text{Number of hours in the billing period (month)})}$$

10 **Q. Does this outflow demand calculation accurately represent the outflow demand?**

11 A. No, the proposed calculation really represents the average energy outflow during the
12 billing period and does not reflect "demand" at all as the term is commonly used. As
13 most commonly used – and as used by the Company for billing the inflow power supply
14 components – demand is expressed as a measure of maximum power (kW) during the
15 billing period, not an average of values.

16 **Q. Is this problem the same for the outflow credit calculation for customers taking
17 primary service under rate GPD or secondary Time-of-use rates (GSTOU)?**

18 A. For customers taking service under primary demand rates, the Company proposes to use
19 the maximum of the demand values during the peak times (11:00 AM to 7:00 PM
20 weekdays as set forth in Rule C14) of the billing period in the numerator and the number
21 of hours in the peak times during the billing period. Thus, the denominator would be

preceding billing months of June through September, nor less than 5 kW. There is also a special ratchet provision for customers with Peak Demand greater than 100 kW.

1 considerably smaller since it would only include the number of peak hours in the billing
2 period. I note that this is also inconsistent with the inflow demand billing rate design
3 because demand is not billed using peak times.

4 **Q. What problem should the outflow credit be designed to address?**

5 A. The PV outflow demand credit should be designed to compensate customers' on demand
6 charge rates for additional PV generation benefits to the generation, transmission and
7 distribution systems that are not fully valued through reductions in billed demand. Under
8 the Company's proposal, these benefits that solar does provide are not valued because of
9 a mismatch between demand charge billing methodology and cost causation in the rate
10 structure.

11 **Q. Do customers with distributed generation benefit the grid during hours that**
12 **constitute distribution system peaks?**

13 A. Yes, system peaks typically occur in late summer afternoons. While the peak generation
14 from distributed solar typically occurs slightly before the system peaks, there is typically
15 generation from solar during system peaks.⁵ By reducing system peaks, the DG customer
16 is providing generation and distribution system capacity benefits to the grid. For inflow,
17 the question of compensation for those benefits has been decided in Michigan, as the
18 customer pays non-discriminatory rates for inflow at their normal rate. In the same
19 fashion, the Company proposed, and the Commission adopted in the last rate case, an
20 outflow credit rate that reflects the rate design for each class. However, the billing
21 calculation methodology should also be symmetric to the inflow billing calculation.

⁵ In the 2019 historical year, the system peak was 7,476 MW on July 19, 2019, at 4:00 pm. The residential class peak (RS) was on the same day at 5pm.

1 **Q. How is the Company’s proposal inconsistent with cost-causation and rate design**
2 **principles?**

3 A. The Company’s proposal to calculate what is essentially an average energy billing
4 determinant for its outflow demand credit does not match how it establishes cost
5 causation in its cost of service study. Production costs are based largely (75%) on peak
6 demand measures taken during the four highest load hours (4 CP). These approaches
7 reflect the nature of capacity resources – their ability to provide power during the hours
8 when it is most needed.

9 By contrast, the Company’s calculation of an average demand value for outflow
10 spreads out PV’s contribution during these key peak hours, devaluing its contribution to
11 reducing system and class peaks. Suppose a PV system exports 100 kW of power during
12 the peak hour of the month and none in any other hour. Its contribution to peak reduction
13 is 100 kW, and it should be compensated for this reduction.⁶ But the Company’s
14 approach under the GSD tariff would divide this figure by 720, resulting in an outflow
15 “average demand” of only 0.14 kW, grossly undercompensating the system owner.

16 This approach also conflicts with rate design principles. The outflow demand
17 credit is equivalent in \$/kW to the demand charge for the power supply component less
18 transmission of the inflow on these tariffs. However, the calculation of the demand
19 billing determinant is wildly different. The peak demand billing determinant for inflow
20 billing demand is based on a single 15-minute or one hour period, while the outflow is an
21 average demand value over the full month. Given that energy outflow is already

⁶ In reality, it should be compensated for a slightly higher reduction or at a slightly higher rate as the distributed PV system also avoids line losses.

1 compensated at an energy outflow credit value, there is no justification for converting a
2 peak outflow demand value into an average demand value.

3 **Q. What do you recommend?**

4 A. I recommend that the Commission require the Company to measure peak outflow
5 demand in the same way that it measures Peak Demand, based on the maximum power
6 during the applicable interval during the billing period for customers not on a time of use
7 rate or during the peak hours during a billing period for customers on a time of use
8 demand billed rate.⁷

9 **IV. DISTRIBUTION SYSTEM CAPITAL INVESTMENT PLAN**

10 A. *Alignment of Distribution System Plan with Rate Case Distribution System*
11 *Investments*

12 **Q. Please provide background on the Company's long-term distribution system**
13 **planning process.**

14 A. As part of the "Optimizing Grid Investments and Performance" area of emphasis of the
15 MI Power Grid initiative, the Commission launched a three phase "Advanced Planning
16 Processes" track. The first phase of the Advanced Planning track was the Electric
17 Distribution Planning Stakeholder Process that resulted in an MPSC Staff Report⁸ on
18 April 1, 2020, and an Order⁹ in Docket No. U-20147 on August 20, 2020. I would also
19 note that over the past several years, the Commission has been seeking alignment

⁷ Recognizing that at this time, no current tariffs have time of use demand billing on the power supply portion of a rate.

⁸ MPSC Staff, *Electric Distribution Planning Stakeholder Process*, April 1, 2020. Docket No. U-20147.

⁹ *In the matter, on the Commission's own motion, to open a docket for certain regulated electric utilities to file their distribution investment and maintenance plans and for other related uncontested matters.* Case Number U-20147, Order (Aug. 20, 2020).

1 between distribution system planning, transmission planning and integrated resource
2 planning.

3 **Q. What specific findings or direction did the Commission provide in its August 2020**
4 **Order in U-20147 that should inform the relationship between the distribution**
5 **system planning process and the investments proposed in this case?**

6 A. In its Order, the Commission cites to the MPSC Staff report:

7 The Commission envisions that future iterations of the five-year distribution plans
8 will not only improve the efficiency of utility rate cases but will also play key
9 roles in making informed decisions in other planning activities, such as the
10 integrated resource planning under the state’s new energy laws and local and
11 regional transmission expansion planning processes.¹⁰

12 **Q. Are there other sections of the August 2020 Order in U-20147 that are relevant to**
13 **the Commission’s consideration of the investments proposed in this case?**

14 A. Yes. In its discussion of Non-Wires Alternatives (“NWA”) in the Order, the Commission
15 indicated:

16 The Commission approaches NWAs from a fundamental tenet of utility
17 regulation—that major utility investments (individual projects or groups of
18 investments) should be examined for prudence through an open process and that
19 this should necessarily include an examination of alternatives, whether they are
20 “wires” or “non-wires” in nature, or a combination thereof.¹¹

¹⁰ MPSC Staff Report, pg. 17.

¹¹ Order U-20147, pg. 42.

1 The Commission then further clarified the way in which the assessment of alternatives
2 would inform its consideration of investments in future rate cases:

3 While the Commission will not be approving the distribution plans, it continues to
4 emphasize the role a robust consideration of alternatives will play in the
5 consideration of alternatives—including NWAs—in specific proposed investments
6 included in future rate cases.¹²

7 **Q. What context do other previous Orders give about the objectives of Michigan’s**
8 **long-term distribution system planning process?**

9 A. In its October 11, 2017 Order in Case Number U-17990 and Case Number U-18014, the
10 Commission explained the need for a long-term distribution system planning process as
11 follows:

12 On January 31, 2017 (January 31 order), in Case No. U-18014, and February 28,
13 2017 (February 28 order), in Case No. U-17990, while voicing support for
14 authorizing the cost of necessary investments for the utilities’ distribution systems
15 to ensure that they are “safe, reliable, and resilient” as DTE Electric Company’s
16 and Consumers Energy Company’s current distribution systems continue to age,
17 the Commission, nevertheless, expressed concern about being able to properly
18 evaluate such potential costs in the coming years.¹³

19 Likewise, later in the Order, the Commission explains further:

¹² Order U-20147, pg 45.

¹³ Order of the Commission *In the matter of the application of Consumers Energy Company for authority to increase its rates for the generation and distribution of electricity and for other relief*, Case Number U-17990, and *In the matter of the application of DTE Electric Company for authority to increase its rates, amend its rate schedules and rules governing the distribution and supply of electric energy and for miscellaneous accounting authority*, Case Number U-18014, October 11, 2017, pg. 1.

1 The Commission understands that there are significant benefits associated with a
2 comprehensive and forward-looking approach to distribution planning that
3 leverages greater Commission and stakeholder input. A longer-term planning
4 approach will help the Commission and stakeholders better understand the long-
5 term goals and objectives underlying utility investment plans and how the
6 execution of these plans can meet these goals and objectives in an affordable
7 manner. While this planning process would not provide regulatory approvals for
8 cost recovery purposes, the transparency around the need for, scope of, and
9 expected outcomes resulting from specific investment strategies may facilitate
10 ratemaking processes and the development of potential new approaches to provide
11 greater regulatory certainty, such as performance-based ratemaking currently
12 being studied pursuant to the 2016 energy laws.¹⁴

13 **Q. Based on these previous orders, including the orders in Docket U-20147, how do you**
14 **understand the role of the distribution system planning process as it relates to the**
15 **Commission’s evaluation of proposed investments in rate cases?**

16 A. Based on my review of the history and context of the distribution system planning orders
17 in distribution system planning dockets and my participation in the distribution system
18 planning workshops organized by the Commission staff, I understand that the
19 Commission has indicated an interest in using distribution system plans to inform and
20 evaluate the reasonableness of proposed rate case expenditures. I agree this would be
21 appropriate and recommend that the Commission more explicitly use the utilities’
22 distribution system plans to evaluate the reasonableness of rate case proposals.

¹⁴ Order in U-17990 *et al*, pages 14-15.

1 Distribution system plans can provide long-term strategic context within which the
2 Commission can evaluate particular investment proposals in rate cases. For example, in
3 future rate cases, the Commission could rely upon the utility's long-term plan for non-
4 wires solutions screening and deployment as approved in a distribution system plan when
5 evaluating the reasonableness of a battery storage pilot proposed in a rate case. While the
6 plan itself would not be determinative in the Commission's consideration of whether or
7 not to approve cost recovery, the utility and interested parties might use the distribution
8 system plan to evaluate whether a particular proposed investment is reasonable and
9 prudent.

10 I would caution, however, that distribution system plans are not contested cases in
11 Michigan at this point. Thus, the Commission does not "approve" or "reject" plans.
12 Under the current regulatory construct where plans are not contested, it is all the more
13 important that expenditures that are included or discussed in distribution system plans
14 should not be considered automatically "reasonable" or "prudent." The question for the
15 Commission is how a particular distribution system investment fits into, and is necessary
16 to effectuate, the longer-term strategic vision articulated by the distribution system plan.

17 **Q. Do you believe the distribution system planning process is valuable despite the fact**
18 **that it is not a contested case?**

19 **A.** Yes. In the process of developing the first distribution system plans in 2018, the utilities
20 that were required to produce distribution system plans took important steps to make their
21 strategic approaches more transparent to the Commission and to stakeholders. In
22 addition, the utilities learned more about their systems, and it seems that articulating their

1 strategic approaches refined their own knowledge of their systems and improved their
2 strategic decision making.

3 As an example of this, Mr. Blumenstock referred to the benefits the Company
4 realized in preparing its Electric Distribution Infrastructure Investment Plan (“EDIIP”,
5 the Company’s distribution system plan):

6 [W]hen the Company developed its 2018 EDIIP filing, it did not have a
7 comprehensive and accurate gauge of overall system conditions regarding
8 deterioration, affecting the SAIDI projections made in that filing. In addition to
9 deterioration, adverse weather has worsened in recent years, negatively affecting
10 system performance. Consequently, the Company’s projected SAIDI performance
11 in this filing is different from that shown in the 2018 EDIIP.¹⁵

12 Thus, it was in the context of the preparation for that filing that the Company
13 developed a “comprehensive and accurate gauge of overall system conditions.” This is an
14 important and valuable benefit for customers, the Company, the Commission, and other
15 stakeholders interested in this crucial aspect of the Company’s operations.

16 **Q. Have you compared the Company’s distribution system capital investments**
17 **proposed in this case to the Company’s draft 2021 EDIIP?**

18 A. Yes. The test year expenditures included in this rate case mirror the Company’s draft
19 EDIIP. In general, alignment between rate case expenditures and expenditures described
20 in a distribution system plan is a good thing. Misalignment between the investments
21 described in the distribution system plans and proposed for recovery in rate cases would
22 diminish the value of the distribution system planning process. But, again, distribution

¹⁵ Blumenstock Direct, pp. 20-21.

1 system plans are not currently evaluated as a part of a contested case in Michigan. So, for
2 example, to the extent that stakeholders (or the Commission) recommend changes that
3 are reflected in the Company’s final 2021 EDIIP, there may ultimately be some
4 misalignment between the proposed rate case expenditures and those described in the
5 final distribution system plan. This is a suboptimal result and I return to this issue below.

6 Here, the expenditures described in the Company’s Draft EDIIP are not properly
7 or fully justified in that plan. Although the Draft EDIIP improves on the Company’s
8 strategic vision, that vision needs further improvement in order to inform rate case
9 spending decisions.¹⁶ Additional views on the strengths and weaknesses of the
10 Company’s draft EDIIP will be provided in that case, but the bottom line is that draft
11 plans in an uncontested docket are insufficient as a basis for the Commission to evaluate
12 the reasonableness of proposed investments in a rate case—and certainly not as useful as
13 final plans that have been approved through a contested case.

14 **Q. Is there an example of the type of interaction that illustrates the disconnect between**
15 **rate case expenditures and the distribution system plan?**

16 A. Yes, the Company’s “Grid Modernization Roadmap” illustrates this disconnect. In his
17 testimony on the Grid Modernization Sub-program in Electric Distribution, Company
18 Witness Richard Blumenstock substantiates the proposed spending in the Grid Mod sub-
19 program partially based on the Grid Modernization Roadmap:

¹⁶ The groups comprising the JCEOs, along with Michigan Environmental Council and the Natural Resources Defense Council submitting comments detailing their concerns with the Draft EDIIP in Docket U-20147 on June 1, 2021. *See* Case No. U-20147, Comments of Environmental Groups (June 1, 2021). Advanced Energy Economy and the Michigan Energy Innovation Business Council also submitted comments detailing their concerns with the Draft EDIIP. *See* Case No. U-20147, Comments from AEE/MEIBC (June 1, 2021).

1 The Company worked extensively with a third-party consultant in 2019 and 2020
2 to develop a comprehensive Grid Modernization Roadmap, which defines the
3 Company's Grid Modernization strategy on two, five, and 10-year horizons. The
4 Grid Modernization Roadmap is designed to give the Company several advanced
5 capabilities, utilizing a series of initiatives rolled out on an interdependent basis.¹⁷

6 Similarly, later in his Testimony Mr. Blumenstock cites to the Roadmap again:

7 The Company's Grid Modernization Roadmap establishes a layered multi-year
8 investment approach that takes place over several years to develop several
9 interdependent technologies and capabilities, which builds on the Company's pre-
10 existing Grid Modernization strategy that saw the Company increase its Grid
11 Modernization spending in recent years. Continuing this trend, the Company's
12 projected 2022 spending is higher than historical levels. The level of spending
13 requested in this filing will enable the Company, in 2022, to: (i) install DSCADA
14 at 100 sites; (ii) install 37 ATR loops; (iii) install 2,193 line sensors; (iv) install
15 430 regulator controllers; and (v) install 149 capacitor upgrades and replacements.
16 This spending will also enable investments in several other technology projects,
17 as outlined in the investment category discussion above.¹⁸

18 Thus, notwithstanding the fact that the Company leans heavily on the Roadmap to justify
19 its grid modernization sub-program spending in this rate case, the Roadmap itself has not
20 been subject to the rigor of a contested case, nor is it even final in the EDIIP. While I
21 look forward to evaluating the Roadmap in the context of the EDIIP, the Commission

¹⁷ Direct Testimony of Richard T. Blumenstock, Case No. U-20963, page 154.

¹⁸ Blumenstock Direct, pg. 169.

1 cannot evaluate the reasonableness of any proposed investments in this case based on the
2 strategic vision in a Roadmap that has neither been litigated nor finalized nor approved.
3 That is not to say that the Roadmap is not a valuable piece of work worthy of serving as
4 the basis for decision-making, only that we cannot know whether the Roadmap is a useful
5 basis for the Commission's evaluation of proposals in this rate case.

6 **Q. Does filing the EDIIP concurrently with the rate case provide for improved**
7 **alignment between the planning process and the cost recovery proceeding?**

8 A. The Company, the Commission, and stakeholders would be better served by having
9 approved distribution system plans prior to proposing cost recovery in a rate case. Having
10 completed consideration of a strategic approach to grid modernization and reliability
11 enhancement in the distribution system plan would lend additional credence to the
12 Company's references to its EDIIP in its rate case. The distribution system planning
13 process would also be further strengthened by making it a contested case process.

14 **Q. What do you recommend to the Commission regarding the alignment between**
15 **Consumers' distribution system plan and its rate case proposals?**

16 A. Until the long-term distribution system planning process in Michigan is considered as
17 part of a contested case, I recommend that the Commission closely scrutinize the
18 Company's most recently filed distribution system plan (including comments filed on the
19 draft plan by interested parties), and use its review to evaluate the reasonableness of the
20 distribution system investments proposed in the utility's rate case.

21 **B. *Equity in Distribution System Spending***

22 **Q. How does the Company currently prioritize spending within the distribution system**
23 **capital investment programs?**

1 A. Mr. Blumenstock explains the investment prioritization beginning in Section V of his
2 testimony. On the issue of prioritization of distribution capital programs, he explains:

3 Broadly speaking, the Company uses several critical inputs and analyses to
4 aggregate multiple data sources in order to best target and prioritize customer
5 reliability issues to address, identifying specific investments based on the
6 probability of future issues, with customer reliability traditionally measured by
7 SAIDI, SAIFI, and CAIDI.¹⁹

8 He then goes on to explain how in 2021, the Company began using an approach to
9 consider “additional LVD circuit characteristics” beyond reliability to prioritize spending.
10 Mr. Blumenstock enumerates the “additional characteristics” included in this grouping
11 step including:

- 12 • Geographic characteristics (i.e. circuit line miles, distance to Company
13 service centers);
- 14 • Customer mix; and
- 15 • Circuit load and voltages.

16 In response to discovery on this question, Mr. Blumenstock also included average
17 customer Net Promoter Score, which is a measure of customer satisfaction.²⁰

18 **Q. Is this new approach to LVD capital prioritization explained in the Company’s**
19 **Draft EDIIP?**

20 A. Yes. While the description of the Company’s new approach to distribution system
21 investment prioritization is explained in Mr. Blumenstock’s testimony, it is more

¹⁹ Blumenstock Direct, pg. 45.

²⁰ Exhibit CEO-14 (WDK-4), U20963-ELPC-CE-1037.

thoroughly explained in the Draft EDIIP. The Draft EDIIP is referenced extensively in Mr. Blumenstock’s testimony, and the Company describes the revised prioritization process more thoroughly in the Draft EDIIP.

According to the Draft EDIIP, the Company developed the Grid Archetype approach beginning in 2018 “to consider additional LVD circuit characteristics, beyond these reliability metrics, to ensure investments are optimally made across the Company’s distribution system and across different capital spending programs.”²¹

The LVD Archetypes are described in Figure 44 of the EDIIP, recreated here as Table 1: List of LVD Archetypes

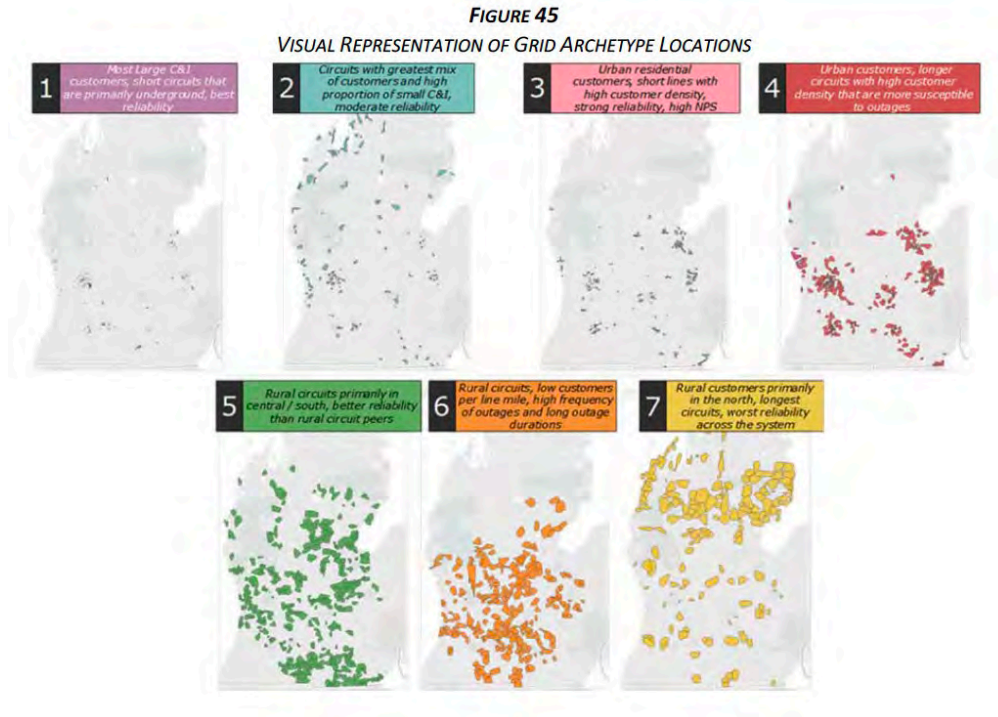
Table 1: List of LVD Archetypes

Archetype	Description
1	Mostly large C&I customers with short circuits that are primarily underground and have the best reliability
2	Greatest mix of customers (C&I and Residential) with a high proportion of small C&I and has moderate reliability
3	Urban residential customers with short lines, high customer density, strong reliability, and high net promoter score
4	Urban customers with longer circuits and high customer density that are more susceptible to outages
5	Rural circuits with better reliability than rural circuit peers
6	Rural circuits with low customers per line mile, high frequency of outages and long outage durations
7	Rural customers with the longest circuits and poorest reliability across the system

Figure 45 from the Draft EDIIP²² provides a visual representation of the Grid Archetype locations in the Company’s service territory:

²¹ Case U-20147, Draft EDIIP, page 53.

²² Case U-20147, Draft EDIIP, Figure 45: Visual Representation of Grid Archetype Locations, pg. 56.



1

2 **Q. Does the Company currently consider energy justice and equity in distribution**

3 **system investments prioritization?**

4 **A.** In describing the LVD distribution capital spending prioritization, Mr. Blumenstock

5 invokes the concept of investing “equitably”:

6 Beginning with projects planned for construction in 2021, the Company began

7 using an approach to consider additional LVD circuit characteristics, beyond

8 those reliability metrics discussed above, to ensure investment across the

9 Company’s distribution system and across several of the capital spending

10 programs that I will discuss below, and to ensure that the Company invests

11 equitably in urban, suburban, and rural areas and in serving residential,

12 commercial, and industrial customers.²³

²³ Blumenstock Direct, pg. 45.

1 **Q. What do you understand Mr. Blumenstock to mean when he says “ensure that the**
2 **Company invests equitably”?**

3 A. In his testimony, Mr. Blumenstock describes the process for prioritizing spending in the
4 Low Voltage Distribution (LVD) system by subdividing it into grid archetypes. In the
5 Strategic Direction step of the prioritization process, the Company takes its planned
6 system-wide LVD capital spending for a given year and allocates the spending to each
7 archetype based on “different archetype characteristics or archetype performance
8 measures.”²⁴

9 **Q. Does the approach described by Mr. Blumenstock appropriately address equity?**

10 A. The Company’s approach to prioritizing LVD capital spending is a good place to start to
11 begin to address what has been lacking in distribution system planning heretofore: the
12 impact of distribution system investment and performance on disadvantaged
13 communities. In my experience in the region, and based on my survey of other regions,
14 there has not been a systematic approach to understanding to what extent or whether
15 disadvantaged communities have been disproportionately impacted by poor reliability,
16 underinvestment in distribution systems, and/or other dimensions of LVD performance
17 such as hosting capacity or power quality. The Grid Archetype approach and the circuit
18 level analysis conducted by the Company in this process provide a framework within
19 which the Company could extend the analysis to include additional dimensions (circuit
20 characteristics) to measure the relationship between grid performance and equity.

21 **Q. What information and data exist that can inform consideration of equity in**
22 **distribution system investment?**

²⁴ Blumenstock Direct, pg. 46.

1 A. There are several specific dimensions of a conventional distribution system planning
2 framework that will be particularly useful in understanding equity in this context. Thanks
3 to the previous distribution system planning process, we now have extensive data on
4 reliability and system age throughout the system. In addition, the Company is apparently
5 working on a phased approach to understanding the ability of discrete parts of the system
6 to accommodate distributed energy resources. However, the Company has not presented
7 any way to correlate existing reliability, performance and investment metrics to the
8 common dimensions of understanding energy justice such as income, race, energy
9 burden, or pollution burden.

10 **Q. Please describe what dimensions of equity should be incorporated into the**
11 **Company’s distribution system investment decision-making?**

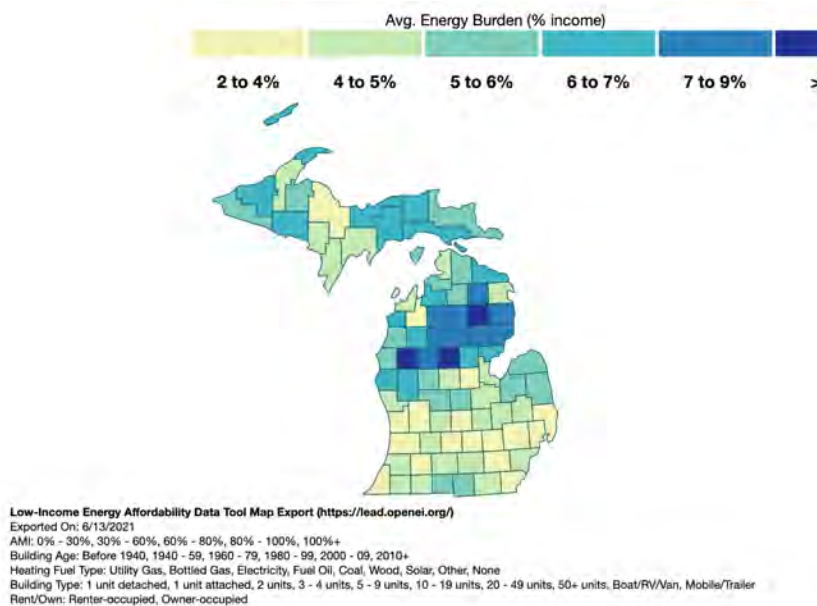
12 A. I recommend that the Company should include dimensions of energy justice and equity in
13 prioritizing all distribution system planning decisions, including prioritization of LVD
14 archetype decisions. For example, compare the map of the Archetype 7 from Figure 45
15 of the Draft EDIIP (excerpted below), which consists of “Rural customers with the
16 longest circuits and poorest reliability across the system” to a map of energy burden
17 produced by the Department of Energy’s Low-Income Energy Affordability Data Tool
18 (LEAD)²⁵:

²⁵ <https://www.energy.gov/eere/slsc/low-income-energy-affordability-data-lead-tool>

Figure 1: Excerpt from Grid Archetype Map from Draft EDIIP



Figure 2: Map of Energy Burden in Michigan by County from DOE LEAD Tool



The correlation between the worst reliability in the northern part of the Lower Peninsula and high energy burden seems apparent from observing the maps. However, the Company has not made the data to do a thorough analysis available.

The Michigan Environmental Council, Natural Resources Defense Council, Sierra Club, and Citizens Utility Board of Michigan (collectively “MEC”) requested that the

1 Company provide certain reliability data by census tract or Zip+4 code through a data
2 request, but the Company replied that: “The Company does not have SAIDI, SAIFI, or
3 CAIDI data by customer class, nor by customers connected to different parts of the
4 distribution system, nor by census tract or ZIP code.”²⁶

5 **Q. What do you recommend with respect to the Company’s consideration of justice**
6 **and equity in distribution system planning and investment?**

7 A. In Consumers’ previous rate case, Case No. U-20697, the Commission ordered the
8 Company to develop a performance based ratemaking proposal, including the
9 development of distribution system performance metrics and associated performance
10 incentive and mechanisms. I recommend that as a part of that ongoing effort, the
11 Company first develop justice and equity metrics to tie relevant existing system
12 performance metrics (such as reliability, hosting capacity, system age) to demographic
13 measures of energy justice (income, race, energy burden, and pollution burden), and
14 second, develop proposed incentives and disincentives associated with the justice and
15 equity metrics.

16 **C. *The Commission should disallow recovery of expenditures on a Distributed Energy***
17 ***Resources Management System (DERMS)***

18 **Q. What has the Company proposed for the Distributed Energy Resources**
19 **Management Systems (DERMS)?**

20 A. In the Grid Modernization sub-program of the Company proposes to spend \$1,191,000 on
21 a Distributed Energy Resources Management System (DERMS).

²⁶ Exhibit CEO-15 (WDK-5), U20963-MEC-CE-500.

1 **Q. Has the Commission previously considered and disallowed DERMS?**

2 A. Yes. The Company proposed DERMS spending in the 2021 test year in Case No. U-
3 20697. In that case, Joint Clean Energy Organization (JCEO) Witness Ronny Sandoval,
4 testifying on behalf of Vote Solar, ELPC and Ecology Center, recommended that the
5 Commission disallow the DERMs expenditures.

6 I believe a more thorough proposal for a DERMS deployment that illuminates the
7 progression of the deployment and anticipated end-state, takes into account its
8 comparative advantages and disadvantages with other technologies and
9 approaches, and demonstrates consideration for customer participation elements
10 such as compensation and the mandatory or voluntary nature of associated
11 programs, is warranted before investments in the technology move forward.²⁷

12 The Commission agreed and the proposal was disallowed in the December 17,
13 2020 Order:

14 The Commission agrees with the ALJ that Consumers’ proposal lacked clarity,
15 and the company failed to explain how reliability would benefit from the DERMS
16 program or how the information that will be generated from the program will then
17 be integrated into the reliability program. *See*, 8 Tr 3859-3863. Additional
18 planning, including details on the sequencing of DERMS and other technologies
19 to enhance system monitoring and controls and their integration with existing
20 systems such as Consumers’ outage management system, AMI, and distribution

²⁷ Direct Testimony of Ronny Sandoval on behalf of the Joint Clean Energy Organizations, Case No. U-20697, page 33.

1 supervisory control and data acquisition, is needed and prudent to pursue while
2 DER penetration is still low.²⁸

3 **Q. Has the Company provided additional justification for the DERMs proposal in the**
4 **instant case?**

5 A. To some extent, yes. However, the Company’s discussion of its DERMS proposal does
6 not suggest that a DERMS is warranted at this point.

7 Mr. Blumenstock provides additional background on the Company’s plans and
8 the justification for moving forward with DERMS. Mr. Blumenstock indicated that the
9 Company expects DERs to grow significantly in coming years, however he provided no
10 support for that assertion. In addition, when asked to provide additional detail on the
11 Company’s DER forecast by the MEC coalition in discovery, the Company indicated that
12 it does not have a forecast of DER penetration by type and ownership of DER to support
13 its assertion that “DER penetration will accelerate in the relatively near-term future.”²⁹
14 Nor has the Company stated at what level of DER penetration it would anticipate
15 experiencing operational challenges, other than to cite North American Electric
16 Reliability Corporation and Electric Power Research Institute findings that “operational
17 challenges begin to manifest themselves when DER penetration reaches between 20%
18 and 30% of electric demand being served.”³⁰ However, the “Concept Approval” for the
19 DERMS project, which was provided in response to a discovery request by the JCEO, the
20 Company indicated an expectation of a substantial amount of distribution connected
21 generation:

²⁸ Order of December 17, 2020 in Case Number U-20697, page 33.

²⁹ Exhibit CEO-16 (WDK-6) U20963-MEC-CE-477 (Partial).

³⁰ Blumenstock Direct, pg. 161.

1 To date, approximately 5 MW of DER is interconnected to our system. By 2022,
2 the company is estimating that approximately 550 MW will be interconnected to
3 our grid.³¹

4 **Q. What internal approvals has the DERMS received at the Company?**

5 A. In response to discovery, the Company produced the “Concept Approval” that provided
6 internal approval for the proposed DERMS project. The response is included as Exhibit
7 CEO-17 (WDK-7).

8 **Q. What alternatives did the Company consider to the DERMS pilot?**

9 A. In the discovery, the Company notes that it considered only two alternatives with respect
10 to the DERMS project:

- 11 • Do nothing; or
- 12 • Do the project as proposed.

13 The Company insists that “doing nothing” is “simply not an option, bordering on
14 irresponsibility, to allow for multiple DER installations absent a plan to have a system
15 installed to monitor and control them.”³² Beyond that did not establish the need for
16 DERMS at what level. Nor does the Company discuss whose DER they intend to control.
17 It is one thing to be able to exercise remote control over company-owned assets, or assets
18 that are participating in programs designed to allow for the surrender of operational
19 control (such as certain types of thermostat programs). However it is entirely another
20 proposition to assert that the Company must have operational control of any, much less

³¹ Exhibit CEO-17 (WDK-7), U20963-ELPC-CE-748-Blumenstock_ATT_3.

³² Exhibit CEO-17 (WDK-7) page 1.

1 all, distributed generation interconnected to its system. If that is not the Company's
2 intention, then it should be more clear.

3 **Q. Did the Company do a benefit-cost analysis of the proposals in the Grid**
4 **Modernization sub-program?**

5 A. The Company prepared benefits-cost analysis (BCA) of several items in the Grid
6 Modernization sub-program, including the DSCADA, the ATR loops, the line sensors,
7 and the CVR/VVO programs. They indicated that they have done the BCA for these
8 investment categories due to their "maturity in deployment and data availability."³³
9 However, the Company still has not done a BCA for the several other projects in this sub-
10 program, including the DERMS.

11 **Q. If the Company performed BCA on the DERMS would that alleviate your concerns**
12 **about the project?**

13 A. Even if the Company performed BCA on the DERMS project, the overarching strategic
14 concerns outlined by Witness Sandoval in U-20967 and echoes in the Commission's
15 December 2020 Order in that case remain. As such, the Commission should continue to
16 reject the DERMS spending until the use case for DERMS is better defined, the need is
17 more clearly established, alternatives are explored, and a BCA is presented to
18 demonstrate that it is the most cost effective means of meeting the system requirements.

19 **V. CONCLUSION AND RECOMMENDATIONS**

20 **Q: Please summarize your conclusions and recommendations with respect to the**
21 **Outflow Demand Credit.**

³³ Exhibit CEO-18 (WDK-18) - U20963-ELPC--CE-748.

1 A: I recommend that the proposed revisions to the Distributed Generation Program related to
2 the Outflow Demand Credit calculation methodology be revised to reflect a demand
3 billing calculation that is consistent with the inflow demand billing calculation.

4 **Q: Please summarize your conclusions and recommendations with respect to the**
5 **alignment of distribution system planning processes and rate cases.**

6 A: The Commission should strengthen the alignment between investments proposed in rate
7 cases with the long-term distribution system planning process and use long-term
8 distribution plans to evaluate the reasonableness of distribution system investments in
9 rate cases.

10 **Q: Please summarize your conclusions and recommendations with respect to analyzing**
11 **equity in the context of distribution system planning.**

12 A: I recommend that the Commission require that the Company consider equity when
13 prioritizing distribution system investments. Further, the Commission should require the
14 Company to develop equity metrics, and performance incentives associated with those
15 metrics, as a part of the Company's ongoing development of a performance based
16 ratemaking proposal.

17 **Q: Please summarize your conclusions and recommendations with respect to DERMS.**

18 A: The Commission should disallow any cost recovery associated with the Company's
19 proposed investment in a Distributed Energy Resource Management System (DERMS)
20 until the Company provides additional justification and analysis supporting the need for a
21 DERMS.

22 **Q: Does that conclude your testimony?**

23 A: Yes.

William D. Kenworthy

332 S. Michigan Avenue, Suite 900
Chicago, Illinois 60604

Phone: (704) 241-4394
Email: will@votesolar.org

Summary:

Energy industry advocate and executive with deep knowledge and experience in electric industry structure, energy economics and energy policy. Specific experience in renewable energy project development, energy optimization, machine learning for process optimization, financial analysis of distributed generation, economics and energy policy.

Experience

Vote Solar

Regulatory Director, Midwest / July 2018 - Present

Manage regulatory policy development and implementation related to large scale and distributed solar generation in the Midwest. Advocate for policies to ensure equitable and fair access to solar. Review regulatory filings, perform technical analyses, and testify in commission proceedings on issues relating to solar generation.

Microgrid Energy

Managing Director, Midwest / October 2017-June 2018 and October 2014-April 2016

Managed operations of Chicago office for solar energy project development and EPC (engineering, procurement, and construction) company. Coordinate business development, market development, state and local policy efforts. Leveraging industry experience, strategic industry insight and market knowledge to enter new markets.

October 2017-June 2018 and October 2014-April 2016

Infer Energy / Root3 Technologies

President / April 2016 – October 2017

Primary responsibility for marketing & business development for startup technology firm focused on providing energy optimization services to large industrial energy users. Successfully expanded business to the point at which it is being folded into the customer equipment health and maintenance offering of a large on-site energy generation provider.

Tipping Point Renewable Energy

Executive Vice President, Marketing & Business Development / January 2010 – April 2016

Led sales, marketing and business development process for startup solar energy project development and installation company

Governmental Strategies Incorporated

Vice President / Partner / October 1996 – December 2007

Senior partner in governmental affairs consulting practice. Developed and implemented strategic plans and marketing campaigns to affect public policy on behalf of Fortune 100 electric utility companies.

Nuclear Energy Institute

Director, Federal Legislative Affairs / May 1992 – October 1996

Developed and implemented strategic plans affecting public policy related to the ownership and operation of the nation's nuclear power plants and over 200 companies involved in the industry. Provided technical assistance to legislators and their staffs in the development of energy policy, including facilitating cross-functional communications between technical personnel and legislative staff.

House Energy & Commerce Committee, U. S. House of Representatives

Professional Staff Member

May 1987 - August 1990

Represented Chairman John D. Dingell (D-MI) and Members of the Committee in dealings with other Members of Congress, the Executive Branch, private interests, and public organizations on energy & environmental policy. Professional staff team during the negotiation and drafting of the Clean Air Act Amendments of 1990.

Education

Yale University, School of Management

MBA / MPPM, Regulation and Competitive Strategies / May 1992

Georgetown University

BSFS, International Politics / May 1987

Community and Volunteer Activities

Jackalope Theater Company

Erie Family Health Foundation

Jefferson Avenue Center

President, Board of Trustees & Member / May 2012 – Present

Georgetown University

Alumni Interviewer / June 2014 – Present

Columbus Academy

Member of Board of Trustees and Parent's Association President / June 2013 - December 2013

City of Upper Arlington Cultural Arts Commission

Commissioner and Chairman June 2012 – December 2013

CareRing of Charlotte

Member, Board of Trustees April 2004 - May 2008

Boy Scouts of America,

Assistant Scoutmaster, Cubmaster, Den Leader / September 2002 – September 2014

Skills / Software

Energy Modeling: NREL System Advisor Model (SAM), Encompass

Productivity: Microsoft Office Suite

Business Intelligence / Data Visualization: Tableau, Tableau Prep, Python, NumPy

Adobe Creative Suite

**Testimony and Comments
of
William D. Kenworthy
Regulatory Director, Midwest
Vote Solar
June 22, 2021**

Testimony

Rebuttal Testimony of William D. Kenworthy on behalf of the Ecology Center, the Environmental Law & Policy Center, and Vote Solar *In the matter, on the Commission's own motion, regarding the regulatory reviews, revisions, determinations and/or approvals necessary for DTE ELECTRIC COMPANY to comply with Section 61 of 2016 PA 342*, Michigan Public Service Commission, Case No. U-20713, and *In the matter of DTE ELECTRIC COMPANY'S application for the regulatory reviews, revisions, determinations, and/or approvals to fully comply with Public Act 295 of 2008*, Michigan Public Service Commission, Case No. U-20851, May 4, 2021.

Direct Testimony of William D. Kenworthy on behalf of the Ecology Center, the Environmental Law & Policy Center, and Vote Solar *In the matter, on the Commission's own motion, regarding the regulatory reviews, revisions, determinations and/or approvals necessary for DTE ELECTRIC COMPANY to comply with Section 61 of 2016 PA 342*, Michigan Public Service Commission, Case No. U-20713, and *In the matter of DTE ELECTRIC COMPANY'S application for the regulatory reviews, revisions, determinations, and/or approvals to fully comply with Public Act 295 of 2008*, Michigan Public Service Commission, Case No. U-20851, December 23, 2020.

Rebuttal Testimony of William D. Kenworthy on behalf of the Environmental Law & Policy Center, Vote Solar, and the Natural Resources Defense Council, *Investigation under Section 10-101 of the Public Utilities Act to determine whether Rider Net Metering requires amendment to comport with Section 16-107.5 of the Public Utilities Act*. Illinois Commerce Commission, Case No. 20-0738, October 26, 2020

Direct Testimony of William D. Kenworthy on behalf of the Environmental Law & Policy Center, Vote Solar, and the Natural Resources Defense Council, *Investigation under Section 10-101 of the Public Utilities Act to determine whether Rider Net Metering requires amendment to comport with Section 16-107.5 of the Public Utilities Act*. Illinois Commerce Commission, Case No. 20-0738, October 23, 2020.

Direct Testimony of William D. Kenworthy on behalf of the Environmental Law & Policy Center, Vote Solar, and the Natural Resources Defense Council, *Investigation under Section 16-107.6(e) of the Public Utilities Act into an annual process and formula for the calculation of distributed generation rebates*, Illinois Commerce Commission Case No. 20-0389, October 2, 2020.

Direct Testimony of William D. Kenworthy on behalf of the Citizens Action Coalition of Indiana, the Environmental Law & Policy Center, Solar United Neighbors, and Vote Solar on the *Petition of Southern Indiana Gas and Electric Company D/B/A Vectren Energy Delivery of Indiana, Inc. for Approval of a Tariff Rate for the Procurement of Excess Distributed Generation*

Pursuant to Indiana Code § 8-1.40 Et. Seq., Indiana Utility Regulatory Commission, Case No. 45378, August 20, 2020.

Rebuttal Testimony of William D. Kenworthy on behalf of the Environmental Law and Policy Center, the Ecology Center, the Solar Energy Industries Association, and Vote Solar, *In the matter of the application of CONSUMERS ENERGY COMPANY for approval of Voluntary Green Pricing programs pursuant to Section 61 of 2016 PA 342*, Michigan Public Service Commission, Case No. U-20649, June 25, 2020.

Direct Testimony of William D. Kenworthy on behalf of the Environmental Law and Policy Center, the Ecology Center, the Great Lakes Renewable Energy Association, the Solar Energy Industries Association, and Vote Solar. *In the matter of the application of CONSUMERS ENERGY COMPANY for authority to increase its rates for the generation and distribution of electricity and for other relief*, Michigan Public Service Commission, Case No. U-20697, June 24, 2020.

Direct Testimony of William D. Kenworthy on behalf of the Environmental Law and Policy Center, the Ecology Center, the Solar Energy Industries Association, and Vote Solar, *In the matter of the application of CONSUMERS ENERGY COMPANY for approval of Voluntary Green Pricing programs pursuant to Section 61 of 2016 PA 342*, Michigan Public Service Commission, Case No. U-20649, May 28, 2020.

Rebuttal Testimony of William D. Kenworthy on behalf of the Environmental Law & Policy Center and Vote Solar, *In the matter of Proposed Revisions to Rider Parallel Operation of Retail Customer Generating Facilities Community Supply*, Illinois Commerce Commission, Docket No. 19-1121, April 23, 2020.

Direct Testimony of William D. Kenworthy on behalf of the Environmental Law & Policy Center and Vote Solar, *In the matter of Proposed Revisions to Rider Parallel Operation of Retail Customer Generating Facilities Community Supply*, Illinois Commerce Commission, Docket No. 19-1121, February 21, 2020.

Direct Testimony of William D. Kenworthy on behalf of the Environmental Law and Policy Center, the Ecology Center, the Solar Energy Industries Association, and Vote Solar, *In the matter of the Application of DTE Electric Company for authority to increase its rates, amend its rate schedules and rules governing the distribution and supply of electric energy, and for miscellaneous accounting authority*. Michigan Public Service Commission, Case No. U-20561, November 6, 2019.

Direct Testimony of William D. Kenworthy on behalf of the Environmental Law and Policy Center, the Ecology Center, the Solar Energy Industries Association, and Vote Solar, *In the matter of the Application of Indiana Michigan Power Company for authority to increase its rates for the sale of electric energy and for approval of depreciation rates and other related matters*, Michigan Public Service Commission, Case No. U-20359, October 17, 2019.

Rebuttal Testimony of William D. Kenworthy on Behalf of the Environmental Law and Policy Center and Vote Solar, *In the Matter of the Joint Application of Wisconsin Power Company, Wisconsin Gas LLC, and Wisconsin Public Service Corporation to Adjust Electric, Natural Gas and Steam Rates*, Wisconsin Public Service Commission, Docket No. 5-UR-109, October 4, 2019.

Rebuttal Testimony of William D. Kenworthy on behalf of the Environmental Law and Policy Center and the Iowa Environmental Council, *In re: Interstate Power & Light Company*, Iowa Utilities Board, Docket No. RPU-2019-001, September 10, 2019.

Direct Testimony of William D. Kenworthy on Behalf of the Environmental Law and Policy Center and Vote Solar, *In the Matter of the Joint Application of Wisconsin Power Company, Wisconsin Gas LLC, and Wisconsin Public Service Corporation to Adjust Electric, Natural Gas and Steam Rates*, Wisconsin Public Service Commission, Docket No. 5-UR-109, August 23, 2019.

Rebuttal Testimony of Will Kenworthy on behalf of the Environmental Law and Policy Center, the Ecology Center, the Solar Energy Industries Association, and Vote Solar, *In the matter of Application of DTE ELECTRIC COMPANY for approval of its integrated resource plan pursuant to MCL 460.6t and for other relief*, Michigan Public Service Commission, Case No. U-20471, August 21, 2019.

Direct Testimony of William D. Kenworthy on behalf of the Environmental Law and Policy Center and the Iowa Environmental Council, *In re: Interstate Power & Light Company*, Iowa Utilities Board, Docket No. RPU-2019-001, August 1, 2019.

Rebuttal Testimony of Will Kenworthy on behalf of the Environmental Law and Policy Center, the Ecology Center, the Solar Energy Industries Association, and Vote Solar, *In the matter of the Application of DTE Electric Company for authority to increase its rate schedules and rules governing the distribution and supply of electric energy, and for other relief*, Michigan Public Service Commission, Case No. U-20162, November 28, 2018.

Direct Testimony of Will Kenworthy on behalf of the Environmental Law and Policy Center, the Ecology Center, the Solar Energy Industries Association, and Vote Solar, *In the matter of the Application of DTE Electric Company for authority to increase its rate schedules and rules governing the distribution and supply of electric energy, and for other relief*, Michigan Public Service Commission, Case No. U-20162, November 7, 2018.

Comments

Verified Reply Comments of the Joint Non-Governmental Organizations on Amendment of 83 Ill. Adm. Code Parts 466 and 467, Illinois Commerce Commission, Docket No 20-0700, April 29, 2021.

Joint Comments of Vote Solar, the Institute for Local Self Reliance, the Environmental Law & Policy Center, and Cooperative Energy Futures, *In the Matter of Xcel Energy's 2020-2034 Upper Midwest Resource Plan*, PUC Docket No. E002/RP-19-368, February 11, 2021.

Verified Initial Comments of the Joint Non-Governmental Organizations on Amendment of 83 Ill. Adm. Code Parts 466 and 467, Illinois Commerce Commission, Docket No 20-0700, February 4, 2021.

Comments of Vote Solar in the Matter of Updating Generic Standards for Utility Tariffs for Interconnection and Operation of Distributed Generation Facilities Established Under Minn. Stat. § 216B.1611, Minnesota Public Service Commission Docket No: E-999/CI-16-521, September 19, 2018.

Comments of Vote Solar, the Environmental Law and Policy Center, Natural Resources Defense Council, and Plugged In Strategies on the Michigan Distributed Planning Framework: MPSC

Report. *In the matter, on the Commission's own motion, to open a docket for certain regulated electric utilities to file their five-year distribution investment and maintenance plans and for other related, uncontested matters.* Case No. U-20147, October 5, 2018.

Comments of Vote Solar, the Environmental Law and Policy Center, Natural Resources Defense Council, and Plugged In Strategies on the Indiana Michigan Power Company's draft *Michigan Five Year Distribution Plan for 2019-2023* per the Commission's November 21, 2018 Order in Case No. U-20147, December 21, 2018.

Comments of Vote Solar in the Matter of the Commission's Inquiry into Standby Service Tariffs, Minnesota Public Service Commission Docket No: E999/CI-15-115, February 19, 2019.

Comments of Vote Solar in the Matter of a Commission Investigation to Identify and Develop Performance Metrics, and Potentially, Incentives for Xcel Energy's Electric Utility Operations, , Minnesota Public Service Commission Docket No: E002/CI-17-401, May 6, 2019.

Reply Comments of Vote Solar in the Matter of a Commission Investigation to Identify and Develop Performance Metrics, and Potentially, Incentives for Xcel Energy's Electric Utility Operations, , Minnesota Public Service Commission Docket No: E002/CI-17-401, June 6, 2019.

Supplemental Comments of Vote Solar in the Matter of the Commission's Inquiry into Standby Service Tariffs, Minnesota Public Service Commission Docket No: E999/CI-15-115, September 23, 2019.

U20963-SA-CE-223
Requested By: Julie K. Baldwin (JKB-1)
Respondent: Hubert W. Miller III
Date of Response: April 20, 2021
Page 1 of 1

Question:

Distributed Generation Program Outflow Demand Calculation Revision

The Company is proposing to add the following language to the Distributed Generation:

Outflow Demand for Secondary Rate Customers – the total metered outflow quantity of Kilowatts (kW) during the billing period divided by the number of hours in the billing period.

Outflow Demand for Primary Rate Customers – the total metered outflow quantity of Kilowatts (kW) during the On-Peak period divided by the number of On-Peak hours in the billing period.

JKB-1:

1. Would the Company please explain the methodology for determining “the total metered outflow quantity of Kilowatts (kW)”?

a. Please describe the meter data that will be used in the calculation.

b. Over what time interval will the kW measurement be based? ie: instantaneous, 5, 15, 30-minute periods, hourly, or something else?

Response:

a. The Company uses the instantaneous outflow of energy collected from the meters on a 15 minute or hourly interval basis, depending on the reporting configuration of the meter. For instance, large business customers have meters that report the instantaneous energy over 15-minute intervals whereas small and medium sized business customers tend to have meters that report the instantaneous energy recorded over an hour. The reported information is then totaled for the billing periods specified in the proposed definitions and divided by the corresponding number of hours in that period.

b. Please refer to my response in part (a).

Question:

2. Please refer to the testimony of Mr. Blumenstock at p. 45. Mr. Blumenstock states "Beginning with projects planned for construction in 2021, the Company began using an approach to consider additional LVD circuit characteristics, beyond those reliability metrics discussed above, to ensure investment across the Company's distribution system and across several of the capital spending programs that I will discuss below, and to ensure that the Company invests equitably in urban, suburban, and rural areas and in serving residential, commercial, and industrial customers."

a. Please list each of the additional LVD circuit characteristics that the Company has been using.

b. Please explain how the Company will determine whether an investment is "equitable" as between urban, suburban and rural areas.

c. Please explain how the Company will determine whether an investment is "equitable" as between residential, commercial, and industrial customers.

Response:

- a. Please refer to page 47, lines 5 through 8, of my direct testimony. Beyond what is listed there, additional circuit characteristics used to group circuits include the average customer Net Promoter Score, a measure of customer satisfaction. This is used to group circuits into archetypes of other similar circuits.
- b. After grouping circuits into archetypes of similar circuits, the Company calculates high and low bounds of total spending on each archetype and allocates spending across archetypes so that spending falls within those bounds. Because archetypes account for the residential/commercial/industrial mix of circuits and tend to account for rural/urban/suburban mix (by accounting for circuit length and distance from the nearest service center), the Company can ensure that investment is not disproportionately focused in any one archetype.
- c. Please see subpart c.



RICHARD T. BLUMENSTOCK

June 8, 2021

Question:

25. In Mr. Blumenstock's testimony, all SAIDI, SAIFI, and CAIDI appear to be (appropriately) reported as a ratio of outage minutes or events in a given category divided by the Company's total number of customers. In order to examine the experience of various subsets of the Company's customers, the SAIDI, SAIFI, or CAIDI statistics can be broken down as the sum of such a statistic for each subset of customers weighted by the ratio of the number of customers in the subset to the total number of customers. Please provide the following data in the form of an Excel spreadsheet:
- a. For historical test year 2019, provide SAIDI with and without MED, SAIFI with and without MED, and CAIDI with and without MED for each major customer class and the number of customers in each major customer class, as used in the Company's calculations of SAIDI, SAIFI, and CAIDI.
 - b. For historical test year 2019, provide SAIDI with and without MED, SAIFI with and without MED, CAIDI with and without MED, and the number of customers in each following category:
 - i. customers in the Metro system,
 - ii. customers outside the Metro system that are interconnected to the HVD system,
 - iii. customers outside the Metro system that are interconnected to the LVD system at primary voltage with overhead primary lines,
 - iv. customers outside the Metro system that are interconnected to the LVD system at primary voltage with underground primary lines,
 - v. customers outside the Metro system that are interconnected to the LVD system at secondary voltage with overhead primary lines, and
 - vi. customers outside the Metro system that are interconnected to the LVD system at secondary voltage with underground primary lines.
 - c. For historical test year 2019, provide SAIDI with and without MED, SAIFI with and without MED, CAIDI with and without MED, and the number of customers in each census tract served by Consumers Energy. In the alternative if the Company cannot provide these data by census tract, please provide it by Zip+4 code of the account address.

Response:

The Company does not have SAIDI, SAIFI, or CAIDI data by customer class, nor by customers connected to different parts of the distribution system, nor by census tract or ZIP code.



RICHARD T. BLUMENSTOCK
May 6, 2021

Question:

2. On page 161, lines 2-4 Mr. Blumenstock asserts: "If the Company delays its DERMS schedule beyond the 2021 bridge year or the 2022 test year in this case, there would be an increased risk that DER penetration gets too high to reliably manage and control before the Company's DERMS is ready." Further on page 161, lines 17-21 Mr. Blumenstock states: "Studies by the PJM Interconnection, the North American Electric Reliability Corporation, and the Electric Power Research Institute ("EPRI") have shown that operational challenges begin to manifest themselves when DER penetration reaches between 20% and 30% of the electric demand being served. At this point, DERMS is necessary to reliably manage DERs at peak conditions, and to generally coordinate DERs so as not to introduce voltage issues or other issues that threaten reliability. In short, while DERMS is not addressing a specific reliability threat that exists in 2021, it will prevent a reliability threat that is likely to exist by the time the project is complete if no action is taken."
- a. Does Mr. Blumenstock's use of the term "DER penetration" refer to Company owned grid scale DER deployed via the Company's anticipated schedule for deployment, plus third-party grid-scale generation contracted by the Company, plus customer sited DER such as that associated with the Company's DG program? Has the Company made a forecast of DER penetration, for each category, in setting its anticipated DERMS schedule?
 - b. If DERMS schedule is essentially complete by the end of the 2022 test-year, as proposed by the Company, what year will DERMS be ready for managing and controlling DER?
 - c. Referring to question (b) above, what level of DER is anticipated by the Company in the year that DERMS is ready? Please break out the level by (1) company owned DER, (2) third-party grid-scale DER contracted by the Company, and (3) customer sited DER.
 - d. In the Company's opinion, for every year the DERMS schedule is delayed beyond the 2022 test-year, is the year in which DERMS will be ready for managing and controlling DER delayed by one-year?
 - e. Please provide customer power inflow and outflow data integrated on an hourly basis for 200 randomly selected residential DG customers along with their associated nameplate PV capacity (as indicated on the customer's interconnection agreement)? Please provide the data for each month of the most currently available calendar year, and with the 8,760 hour data grouped by individual customer.
 - f. Please provide customer power inflow and outflow data integrated on an hourly basis for 200 randomly selected commercial solar PV customers. If the Company has less than 200 but at least 15 of such customers include all customers. For each customer, include the associated nameplate PV capacity (as indicated on the customer's interconnection agreement. Include the building type (e.g. small office, grocery store, warehouse etc.). Please provide the data for each month of the most currently available calendar year, and with the 8,760 hour data grouped by individual customer.

- g. Please provide customer inflow data integrated on an hourly basis for 200 randomly selected residential full-requirements customers? Please provide the data for each month of the most currently available calendar year, and with the 8,760 hour data grouped by individual customer.
- h. Please provide customer inflow data integrated on an hourly basis for 200 randomly selected commercial full-requirements customers? Please provide the data for each month of the most currently available calendar year, and with the 8,760 hour data grouped by individual customer. Include the building type (e.g. small office, grocery store, warehouse etc.).
- i. Any developments since the prior rate case U-20697, that the Commission should take into account in re-evaluating the proposed DERMS deployment?
- j. Has the Company evaluated, or developed any plans to own and rate-base customer-sited solar generation, similar to its desire to own and rate-base customer-sited battery back-up? If so, please summarize such evaluation or plan, and provide a copy of the analysis or plan.
- k. Is DERMS intended to be the core tool for scheduling and operating the proposed residential battery back-up pilot?

Response:

- a. Yes, the reference to “DER penetration” includes any of these types of DERs, regardless of ownership. As stated in discovery response 20963-MEC-CE-476, the Company does not have a forecast of DER penetration by type of ownership.
- b. DERMS deployment will not be essentially complete by the end of 2022. As stated on page 161, line 1, of my direct testimony, the Company will have developed its DERMS capabilities by the end of 2023. Given the need for testing, DERMS will not be fully functional until 2024. However, DERMS capabilities are not a binary function, with no capabilities one day and full capabilities the next day. As discussed on page 160, lines 1 through 8, and again on page 162, lines 1 through 14, of my direct testimony, the Company is phasing in DERMS by first using it at a specific location, meaning some capabilities are already being developed in 2021. To prepare for management and control of larger numbers of DERs, the Company must develop its understanding of the practical operation of DERMS through hands-on exercises. Even in early stages of this phase-in, DERMS can deliver benefits. Even when DER penetration is relatively low, DERMS allows for dynamic discovery and coordination of DERs on the system. Without DERMS, the Company does not have this ability. By 2024, DERMS capabilities will be much more developed and more ready to handle an influx of DER penetration.
- c. As discussed in discovery response 20963-MEC-CE-476, the Company does not have such a forecast. As stated on page 160, lines 17 through 22, of my direct testimony, the Company is confident that DER penetration will accelerate in the relatively near-term future, regardless of the specific resource mix determined through integrated resource planning.

- d. Yes.
- i. Yes. Recent developments in DERMS deployment include finalization of technical requirements. Work has started on the development of a conceptual architecture design for communications as well as defining use cases and developing a test strategy. This work will help the Company validate possible functions of DERMS. The first use cases will include core capabilities such as DER registration in the DERMS and Solar Smoothing using battery controls.
- j. The Company proposed a "Bring Your Own Bright Field" pilot in case No. U-20649 that would have allowed the Company to own solar energy systems installed at a customer's facility. Outside of this proposal, the Company has not developed any other plans to own and/or rate-base customer sited solar.



RICHARD T. BLUMENSTOCK

May 6, 2021

Electric Planning

**Consumers Energy
Grid Modernization
CONCEPT APPROVAL**

Case No. U-20963
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Concept Number: 20-8883

Project Title: Distributed Energy Resource Management System **Work HQ:** Statewide

Date: December 17, 2020 **Proposed Year of System Changes:** 2021-22

Problem Description:

The Company has begun integrating more Distributed Energy Resources (DER) onto the electric grid in support of our Integrated Resource Plan (IRP). To date, approximately 5 MW of DER is interconnected to our system. By 2022, the company is estimating that approximately 550 MW will be interconnected to our grid. The DER sources are predominately comprised of solar photovoltaic (PV) generation and battery storage. This amount of DER interconnected to our grid will create significant challenges for real time operation of the distribution system unless advanced technologies are deployed. Without the proper management, control, and operational oversight, increased penetration of DER – particularly solar PV generation – may cause operational issues. These operational issues can include: high voltage during peak solar production hours, abnormally low voltage during load recovery periods, intermittent voltage fluctuations, load masking/phantom load for outage recovery, protection scheme desensitization, and device mis-operation due to reverse power flow. A Distributed Energy Resource Management System (DERMS) that can operate and maintain the grid as well as facilitate management of DERs will provide opportunities to mitigate issues and result in less costly infrastructure investment requirements.

Alternatives:

Alternative 1: Do nothing. This is simply not an option, bordering on irresponsibility, to allow for multiple DER installations absent a plan to have a system installed to monitor and control them.

Alternative 2: Take a phased approach to installing a DERMS. Phase 1 will include the planning and initial DERMS field installation (may be hosted) connected to two or three LVD circuits that have or will soon have DER attached. This approach allows the complexity of DERMS to be evaluated on a small scale and allows the company to better understand how and where the DERMS solutions need to improve. The DERMS installation is presently broken into two phases: Phase 1 would be implemented in the field in 2021 and 2022; Phase 2 could be implemented as early as 2023.

- Phase 1 will focus on piloting a system to control a limited number of DERs and address potential local operational challenges associated with DER penetration at the LVD circuit(s) and/or substation(s) level. Phase 1 will allow the Company to evaluate through monitoring and controlling the DERs on a small subset of circuits and/or substations.
- Phase 2 would expand the number and diversity of DERs, as well as introduce economic signals into DERMS. Phase 2 would evaluate a DERMS' ability to optimize dispatch for a diverse set of objectives including grid operations, load-leveling, and market participation to maximize economic value of DERs. By the end of Phase 2, the company will begin to integrate DERMS with its Advanced Distribution Management System (ADMS) and Demand Response Management System (DRMS) and will look to enable a wide range of DER-provided distribution grid services including:
 - Distribution capacity deferral services;
 - Voltage and reactive power services;
 - Power quality services; and
 - Reliability services.

Alternative 2 will define, develop and implement a DERMS strategy to:

- Aggregate - DERMS should take the services of many individual DER and present them as a smaller, more manageable number of aggregated virtual resources.

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Grid Modernization
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- Simplify - DERMS should handle the granular details of DER settings and present simple grid-related services.
- Optimize - DERMS should optimize the utilization of DER within various groups to get the desired outcome at minimal cost and maximum power quality.
- Translate - Individual DER may speak different languages, depending on their type and scale. DERMS should handle these diverse languages, and present to the upstream-calling entity in a cohesive way promoting interoperability.

Recommended Alternative

Alternative 2 is recommended to help the company better understand on a small scale the requirements needed for DERs integrated with DERMS prior to selecting and implementing a system for full deployment.

The work covered in this concept is necessary to define, develop, and implement a DERMS solution. Completing Phase 2 of this concept would bring the total cost to \$19 million as discussed in the Grid Modernization Roadmap initiatives. Please review the roadmap initiatives for in depth details about the key sub initiatives, capabilities enabled, and assumptions or risk that have been identified. The cost estimates were developed by internal subject area expertise, Utility benchmarking, and third-party support.

The work 2021 and 2022 will start with understanding emergent requirements and issues with DERMS technologies on one or more local DERs. Phase 2 would continue through the implementation and operationalization of an enterprise DERMS solution that includes the integration of our Advanced Distribution Management System.

Conceptual Estimate by Year:

Year	Capital Cost	O&M One-time/ On-going	Description
2021	\$1,200,000	\$60,000/ \$1,400	Smart Inverter Std., Communications, Planning, Hardware/Software, Services.
2022	\$1,200,000	\$25,000/ \$34,800	Smart Inverter Std., Communications, Hardware/Software, Services

*Cost Assumptions: Includes O&M for IT support, software maintenance, systems planning, and change management

Present Need: On approval, this document authorizes the Grid Modernization team to proceed with the plan development and execution of Phase 1 which may include multiple EGI, IT and Project Management departments to perform work and material acquisitions pending receipt of appropriate budget authorization for year 2021, fully recognizing this project will extend multiple years beyond 2022.

Prepared By: _____ **Grid Modernization Program** **Team Leader:** _____ **Mark Ortiz**

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Approvals:

Manager – Grid Modernization	Mark A. Ortiz	Required
Director – LVD Planning	Donald A. Lynd	Required
Ex Director, System Planning	Richard T. Blumenstock	Required
Vice President, Electric Grid Integration	Timothy J. Sparks	Required
Senior Vice President, Transformation, Engineering & Operations Support	Jean-Francois Brossoit	N/A

Question:

14. Has the Company prepared a cost-benefit analysis of the Company's proposed grid modernization sub-program capital investments? If the answer is anything other than an unequivocal "no", please provide the cost benefit analysis.

Response:

The Company's Grid Modernization Roadmap includes a comprehensive benefit-cost analysis ("BCA") framework. Please refer to discovery response 20963-ST-CE-103. Using this BCA framework, the Company has developed a BCA for the DSCADA, ATR loops, and line sensors investment categories, as well as for CVR and VVO. These investment categories were chosen for this BCA due to their maturity in deployment and data availability. The company will continue to model more Grid Modernization sub programs using the BCA framework as those programs mature. That BCA is provided as CONFIDENTIAL Attachment 1 to this discovery response. This attachment is Confidential and is subject to the Protective Order in Case No. U-20963 and will be provided only to those persons who have signed the nondisclosure certificate pursuant to such Protective Order.

Additionally, the Company has project charters or concept approvals for the regulator controllers; DERMS; Grid Modernization incubator; and Electric Distribution Asset Management investment categories, which are Attachments 2 through 5 to this discovery response, respectively.



RICHARD T. BLUMENSTOCK
May 21, 2021

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of)
CONSUMERS ENERGY COMPANY for authority)
to increase its rates for the generation and distribution of) Case No. U-20963
electricity and for other relief.)
_____)

PROOF OF SERVICE

I hereby certify that a true copy of the foregoing *Direct Testimony and Exhibits of Karl R. Rabago, Direct Testimony and Exhibits of Joseph Daniel, Direct Testimony and Exhibits of William D. Kenworthy* was served by electronic mail upon the following Parties of Record, this 22nd day of June 2021.

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Date: June 22, 2021



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