Michigan Distribution Planning Framework

MPSC STAFF REPORT

September 1, 2018

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Contents

EXECUTIVE SUMMARY

The purpose of this report is to outline the Michigan Public Service Commission Staff's recommended path forward to achieving an open, transparent, and integrated electric distribution system planning process in Michigan. Until recently, electric utilities have had a limited set of tools for addressing distribution grid issues. Traditionally, when faced with distribution grid concerns, electric utilities would make "like for like" replacements of existing assets or upgrade an asset's capacity in order to meet anticipated system loads. Over the last decade, significant advancements in grid technologies have introduced a new suite of tools and options for utilities and customers to consider when addressing grid concerns. With the distribution plant capital investments of Consumers Energy and DTE Electric approaching $900 million annually, the Michigan Public Service Commission (Commission or MPSC) recognized the need to take a long term look at the investment strategies of the utilities to ensure a "no regrets" approach to reviewing and approving distribution investments, by requiring Michigan's two largest electric utilities, DTE Electric and Consumers Energy, to file 5-year distribution investment and maintenance plans. These initial plans were filed in the first quarter of 2018 with the Commission and subsequently reviewed by Staff and stakeholders[1] who were invited to provide written comments. After the comment period Staff held a technical conference to discuss stakeholder concerns at the Commission office on August 7, 2018. As requested by the Commission, Staff reviewed these plans, stakeholder feedback and industry research, to identify best practices for distribution planning and report those findings to the Commission by September 1, 2018.

The following report provides Staff's proposed framework for future electric distribution plans as requested by the Commission. The Commission outlined six overarching objectives for the electric distribution system: safety, reliability, resiliency, cost effectiveness, affordability, and accessibility. Staff's framework attempts to capture these objectives and utility progress towards the Commission's vision for a modern grid. Because the initial plans focus on safety and reliability, future iterations will require additional areas of focus in order to ensure alignment with the Commission objectives. Specific Staff recommendations include:

- The Commission should require a dynamic approach to load forecasting for the purpose of distribution planning which considers multiple scenarios and probabilistic planning to properly accommodate uncertainty around distributed energy resource penetrations.

[1] Stakeholders consist of interested parties in the utility distribution planning process including but not limited to non-government organization representatives, consultants, academic representatives, and industry experts.

- The Commission should require utilities to work with stakeholders to develop a cost-effective approach to providing publicly available hosting capacity information in the near term.
- Utilities with advanced metering infrastructure (AMI) should utilize the *Green Button Download my Data* and *Green Button Connect* standards developed by the Green Button Alliance to provide customers and third-party service providers access to customer usage data.
- Future distribution plans should provide detailed information regarding suitable criteria for non-wires alternatives projects and clear cost information for nontraditional approaches to capacity investments.
- The Commission should require the utility companies to work with Staff and the stakeholders in the development of a common cost-benefit methodology that can be applied in developing future distribution plans.
- The Commission should work with the companies outside of the rate case process to develop replacement/upgrade criteria for aging assets to ensure accountability during electric distribution system infrastructure refresh efforts.
- Future iterations of distributions plans should contain a workforce adequacy and development plan to outline steps being taken to assure the proposed spending plans are feasible.

Many of the recommendations Staff is proposing are based on feedback received directly from stakeholders in written form and verbally at the Staff's technical conference. With over 30 parties represented at the technical conference, it is clear there is robust interest in the development of a transparent, inclusive distribution planning process desired by the Commission. Staff is also recommending the Commission establish a formal stakeholder effort to capture the perspectives of all participants in the refinement and finalization of the framework, and that stakeholders specifically consider the use of performance-based ratemaking to achieve specific performance outcomes related to distribution system planning and spending. The recommended framework represents a measured step towards an open and transparent distribution planning process for a smart and modern grid.

INTRODUCTION

In the first quarter of 2017, the Michigan Public Service Commission issued two rate case orders requiring Michigan's two largest investor-owned electric utilities, Consumers Energy Company (Case No. U-17990)[2] and DTE Electric Company (Case No. U-18014)[3], to each develop and submit a five-year distribution investment and maintenance plan to the Commission. These plans were to include:

1. A detailed description, with supporting data, on distribution system conditions, including age of equipment, useful life, ratings, loadings, and other characteristics
2. System goals and related reliability metrics
3. Local system load forecasts
4. Maintenance and upgrade plans for projects and project categories including drivers, timing, cost estimates, work scope, prioritization and sequencing with other upgrades, analysis of alternatives (including AMI and other emerging technologies), and an explanation of how they will address goals and metrics
5. Benefit/cost analyses considering both capital and O&M cost and benefits.

Plans of this nature were intended to increase visibility into the electric distribution system and its needs, and to facilitate review by the Commission, Commission Staff (Staff), and other interested parties outside of the contested rate case process. The Commission stated that although these plans would not be formally approved for cost recovery, there would be value in all stakeholders having a more thorough understanding of the anticipated needs, priorities, and spending of the utilities beyond the projected test year timeframe typically reviewed in a general rate case.

In the summer of 2017, each utility provided a draft plan and participated in a stakeholder workshop held at the MPSC's office in Lansing, Michigan. During the workshop, both Consumers Energy and DTE Electric provided overviews of their five-year plans as well as their internal planning processes. The workshop provided the utilities and stakeholders the opportunity to discuss best practices and lessons learned regarding distribution system planning both regionally and nationally. Other topics discussed included electric vehicle market growth, demand response activities, distributed energy resources (DER), and emerging grid technologies. Following the workshop, the Commission specifically invited interested persons to comment on the following questions:

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[2] https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t0000001URKlAAO
[3] https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t0000001USEAAA4

1. Does the company's draft distribution planning report provide a transparent review to identify and make cost-effective grid modernization and aging infrastructure investments necessary to support improved reliability, power quality, and future growth? Do the proposed investments provide a clear strategic path to address resiliency, reliability, and grid modernization, consistent with the Commission's stated goals as outlined in recent electric rate case orders?
2. Do the plans identify system upgrades or investment strategies and concrete, measurable performance targets and timeliness in areas such as safety and reliability?
3. Are there longer-term enhancements to the plan or the planning process that the Commission, utilities, and stakeholders should be considering in future rounds?
4. Any other feedback for the Commission's or Commission Staff's consideration.

Based on the review of the draft plans by Staff and the Commission, as well as the comments by stakeholders, the Commission issued an order on October 11, 2017[4] to clarify the expectations and objectives of the first iteration of plans and to provide guidance on the content of the final plans. This order acknowledged the variety of directions the final plans could go, given the litany of near- and long-term issues associated with the electric distribution grid. However, based upon the review of the draft plans, it was apparent that the most pressing concerns in the near term are the risks presented by aging infrastructure and reliability/resiliency issues caused by vegetation and equipment failure. Failure to address these concerns in the near term will inevitably lead to declining service quality, cost escalation through the need for emergency repairs and replacements, and other inefficiencies. There may also be increased safety risks for employees and the public if the Company does not proactively address these known concerns. Therefore, the October 11 order directed the utilities to submit final plans primarily focusing on the following priorities:

1. Defining the scope of work, capital, and O&M investments needed to address aging infrastructure and the risk assessments that drive the prioritization of these investments (i.e., asset class failure rates, long lead time equipment, obsolete equipment, etc.).
2. Identifying known safety concerns on the system and work necessary to address these concerns (i.e., pole failures, third-party facilities coming into contact with electric equipment, and wire down detection, response, and protections, etc.).
3. System maintenance and investment strategies that improve resiliency and mitigate the financial effects and safety issues associated with inclement weather (i.e., strategic

[4] https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t0000001URMSAA4

undergrounding, accelerated vegetation management schedules, enhanced vegetation management standards, tree resistant conductors, etc.).

4. Company objectives and associated performance metrics relevant to utility near-term investment and maintenance plans. In particular, the Commission expects a timeline and investment strategy for meeting the Governor's 2013 reliability goals addressing the frequency and duration of electric outages.

The October 11 order also directed the Commission Staff to convene a stakeholder process after the filing of the final plans to address long-term challenges and opportunities for the electric distribution system, including emerging technologies and other factors outside of the utility's control such as rooftop solar and electric vehicle adoption. After considering the input received by all stakeholders, Staff was directed to create a framework for the development of future electric distribution plans and report its findings to the Commission no later than September 1, 2018. Final versions of the distribution plans were submitted by DTE Electric on January 31, 2018[5] and by Consumers Energy on March 1, 2018[6].

On April 12, 2018, the Commission issued two additional orders pertaining to distribution planning. The first required Indiana Michigan Power (Case No. U-18370)[7] to provide a 5-year investment and maintenance plan that focuses on the Commissions priorities outlined in the Commission's October 12, 2017 Order. The second order opened a new docket, Case No. U-20147[8], to act as a single repository for future distribution plans and also solicited additional comments from interested stakeholders on the distribution plans filed by Consumers Energy and DTE Electric related to "how the information can help inform ratemaking and other regulatory processes, including consideration of performance-based metrics." The Order also required the Commission Staff to convene stakeholder at the Commission's Lansing office for a technical conference to address stakeholder's concerns outlined in comments submitted to the docket. On August 7, 2018, Staff hosted a technical conference to discuss concerns outlined in written comments and to receive additional feedback from stakeholders on the 5-year distribution plans filed by the utilities.

In order to accomplish the objectives, set by the Commission for a modernized utility distribution system, Staff reviewed each utility's filed plans, stakeholder feedback, industry research, best practices and lessons learned, as well as other regulatory proceedings for

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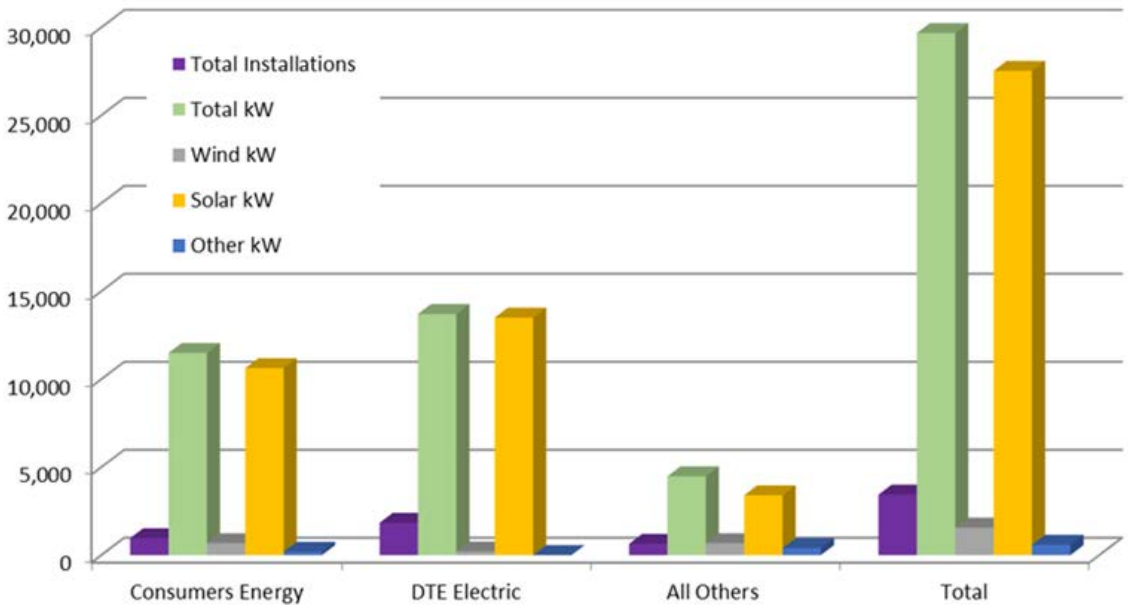
[5] https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t00000022HkRAAU
[6] https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t00000022HkgAAE
[7] https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t00000022H0LAAU
[8] https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t00000022GvfAAE

guidance. The remainder of this report outlines the results of these efforts and Staff's recommendations for improving future long term distribution system planning processes.

MICHIGAN'S DISTRIBUTION SYSTEM OVERVIEW

In the last decade, the United States has experienced a fundamental change in the way that customers are consuming, producing, and thinking about energy. As recognized by the Commission, this trend is creating variability in customer energy consumption and demand and is making forecasting and projecting system needs increasingly difficult. Given the falling prices of many DER technologies, utilities continue to see increases in interconnected distributed generation and net metering customers which impact distribution system needs and operations. Customers are also engaging in energy efficiency programs offered through utilities, with Michigan energy cost savings exceeding $7 billion since 2009.[9] *Figure 1* and *Figure 2*, below, show the current capacity of interconnected DERs and net metering program participation over the past 12 years.

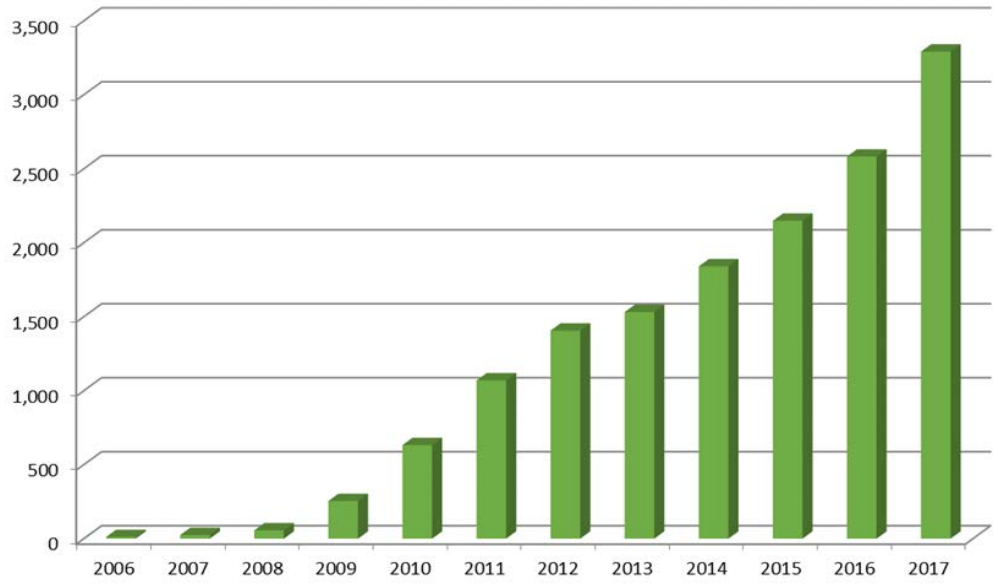
Figure 1: Interconnected DERs Generation in Michigan



Source: 2017 Electric Provider Annual DG Reports Case U-15787

[9] https://www.michigan.gov/mpsc/0,4639,7-159-52495---,00.html

Figure 2: Michigan Net Metering Customers 2006-2017



Source: 2017 Electric Provider Annual DG Reports Case U-15787

This changing energy landscape on the customer side of the meter was has been met with utility investments in innovative technologies such as AMI, outage management software, line sensors, and supervisory control and data acquisition (SCADA) to increase transparency into real time operations and better understand system and customer loads. With this new foundation of technology providing increased visibility into system operations, utility system planners have unprecedented levels of system data to leverage when making investments decisions. At the same time, there is an apparent lack of visibility for interested parties, including the Commission, Staff, and other stakeholders, into utility distribution planning and spending decisions, which served as the impetus for the Commission ordered distribution planning process.

INITIAL DISTRIBUTION PLANS

After reviewing the draft distribution plans submitted by Consumers Energy and DTE Electric in the summer of 2017, the Commission provided further guidance for the final plans in its October 11 order.

"The initial five-year distribution plans from both Consumers Energy Company and DTE Electric Company shall emphasize near-term priorities including defining the scope of work needed to address aging infrastructure and the risk assessments that drive the prioritization of these investments, identifying known safety concerns on the system and work necessary to address these concerns, system maintenance and investment strategies that improve resiliency and mitigate the financial effects and safety issues associated with inclement weather, and company objectives and associated performance metrics relevant to utility near-term investment and maintenance plans. The initial five-year distribution plans shall also include a timeline and investment strategy for meeting the Governor's 2013 reliability goals addressing the frequency and duration of electric outages" (p.18).

As evidenced by both utilities' final 5-year investment plans, many of the distribution assets that currently serve nearly four million customers are approaching or exceeding their anticipated useful life. Each utility provided an excellent presentation of system data regarding asset age and the risk to system reliability and safety presented by this aging infrastructure, and the need for additional investment to mitigate the risk associated with these assets is undeniable. Ensuring these investments are reasonable, prudent, and cost effective is the task of Staff and intervenors in a general rate case. These plans provide an excellent foundation for understanding the concern and beginning to determine the prudency of utility-proposed solutions to aging infrastructure concerns in future rate cases. Being strategic about the utility investments associated with aging infrastructure will remain a priority of Staff in future rate cases. The transparency provided by these reports will undoubtedly aid in the review and improve the efficiency of rate case review of utility programs to address aging infrastructure investments in the near term.

STAFF RECOMMENDATIONS

The Commission directed Staff to convene stakeholders after the filing of the final distribution plans by the utilities to develop a framework for the development of future distribution plans. In an effort to identify the most prudent path forward for the future distribution planning efforts, Staff reviewed each plan, all stakeholder comments, industry research, and regulatory proceedings in other jurisdictions. With a combined $7.2 billion in spending planned over the next five years, it is clear that each utility is anticipating significant costs associated with continued operation of a safe and reliable distribution system. The submitted plans provide a great level of insight into existing risks on the distribution system as well as the utilities' preferred approach to addressing these risks. The clear and present risk to system safety and reliability due to aging infrastructure needs to be addressed in the near term. However, the

plans that have been submitted in this first iteration advocating support for investments in reliability, capacity, and grid modernization could benefit from more openness and transparency for regulators and stakeholders to independently analyze the reasonableness, prudency and cost-effectiveness of the distribution plans. The initial submitted 5-year distribution plans lack proposed investments in customer-facing programs and technologies that provide customers with the information to make informed energy decisions in the near term. Increasing transparency in these spending categories in future planning processes will help ensure an open and effective planning process as desired by the Commission. Staff recommends the following additional components be included in future iterations of the five-year plans to encourage greater openness and transparency, as well as foresight into the near-future distribution system. Inclusion of these components will be crucial to recognizing significant benefits associated with a comprehensive and forward-looking approach to distribution planning, while leveraging greater Commission and stakeholder input.

Dynamic System Load Forecasting

As outlined in the ICF International report on integrated distribution planning prepared for the Minnesota Public Utilities Commission in August 2016[10], an accurate system load forecast is foundational to any distribution planning effort (*Figure 3*). Not only will this forecast influence investment decisions associated with capacity upgrades to the system, it is necessary to properly size assets replaced as part of any aging infrastructure refresh program, as well as reliability-based replacement. Given the localized problems many capacity investments aim to address, an accurate localized load forecast is a key component in verifying the necessity of identified capacity upgrades as well as the cost effectiveness and feasibility of non-wires alternatives (NWA).

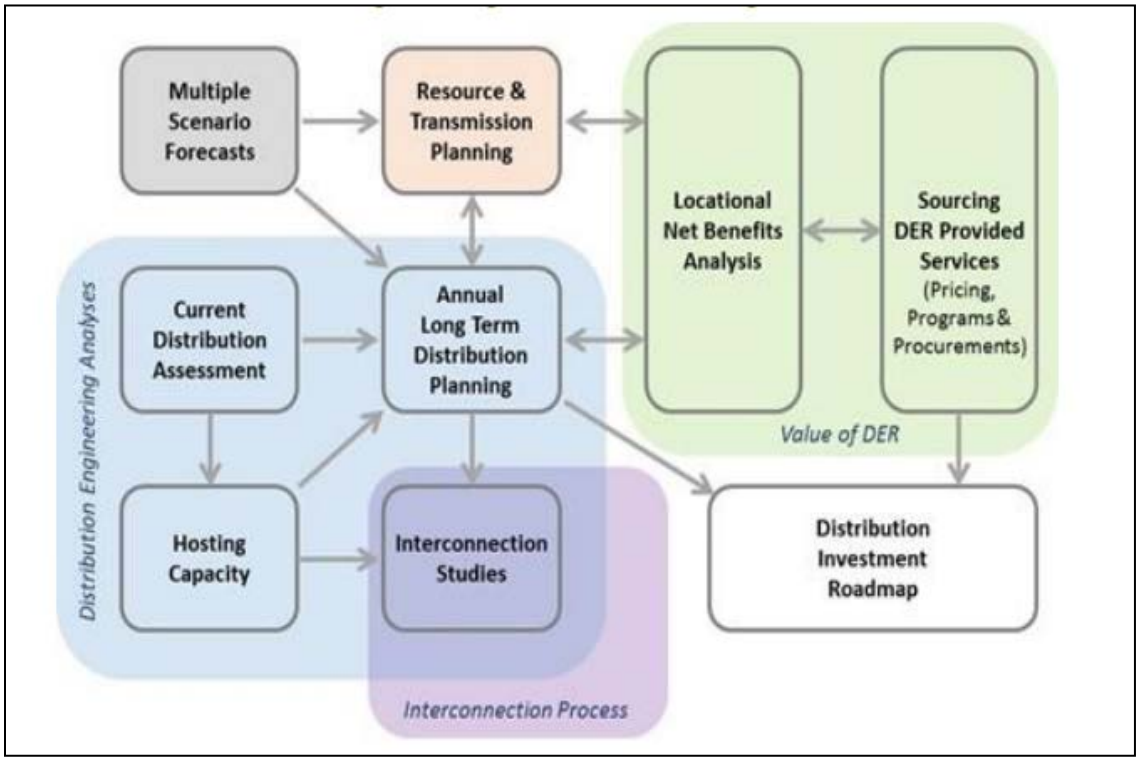
Capacity upgrades constitute nearly $550 million of the Companies' planned spending over the next five years according to the distribution plans that were initially submitted. As both utilities begin campaigns to address aging infrastructure in an accelerated manner across their system, efforts to maximize the useful life of undepreciated assets should be a priority. An open and transparent forecasting process that defines the necessity of short term capacity upgrade needs as well as opportunities for NWA is essential to ensure customers' rates remain reasonable and affordable. A more dynamic approach to forecasting is also important as customer investments in energy efficiency and DER grow and influence customer load profiles and subsequent electricity sales. These customers' decisions are largely outside the Company's control and

[10] https://www.energy.gov/sites/prod/files/2016/09/f33/DOE%20MPUC%20Integrated%20Distribution%20Planning%208312016.pdf

therefore difficult to model, requiring analysis of various scenarios and probabilistic planning of DER penetrations.

Staff recommends that The Commission require a dynamic approach to load forecasting for the purpose of distribution planning which consider multiple scenarios and probabilistic planning to properly accommodate uncertainty around DER penetrations. This type of approach would ensure all stakeholders were aware of future risks and opportunities around system capacity concerns. The assumptions associated with each scenario should be driven by stakeholder input and provided to Staff prior to development of spending plans based upon the modeling outputs.

Figure 3: ICF International Integrated Distribution Planning Schematic



Source: ICF International Integrated Distribution Planning

The Commission's goals include supporting the adoption of advanced technologies like efficient renewable energy resources and energy waste reduction innovations and to provide customers with the opportunity to choose alternative electric providers, which can be interpreted to include the ability for customers to generate their own electricity.[11] As DER costs continue to fall across

[11] https://www.michigan.gov/mpsc/0,4639,7-159--40495--,00.html

the country, it is imperative that customers have access to system interconnection data and personal usage data to understand their individual business cases for DER adoption. "Hosting capacity" is the amount of DER that can be accommodated on the existing system without adversely impacting power quality or reliability. As regulators, it is important to ensure that utilities are good stewards of the distribution grid and provide end users information necessary to make informed energy decisions. Consumers Energy and DTE Electric do not provide hosting capacity information today, and neither utility has indicated an intention to make this interconnection system data available to customers in the near term.

The electric industry has taken steps to alleviate the burden of developing proprietary hosting capacity analysis through the development of software such as EPRI DRIVE™,[12] which is intended to be interoperable with many prominent power-flow software platforms utilized by utilities. Exploring this and other options for making hosting capacity information available could provide significant benefits to customers and third-party DER developers in the near-term. Although this would require incremental investments above what is already planned by the utilities, the near- and long-term benefits of providing customers access to system data that enable customers to make more informed energy decisions could result in significant future grid benefits. **Staff recommends the Commission require utilities to work with stakeholders to develop a cost-effective approach to providing publicly available hosting capacity information in the near term.** This recommendation is in line with the objective to encourage the ability to integrate new technologies in an optimal manner and provide planning tools and information to encourage efficient siting and operations of customer resources, such as distributed generation or energy storage.

Customer Data Access and Enablement

Over the last decade, both Consumers Energy and DTE Electric have upgraded their meter equipment to an advanced metering infrastructure (AMI) at a cost of over $1 billion. This investment has provided both utilities with access to interval usage data for nearly all customers, which the companies are currently utilizing to optimize grid functionality and plan their distribution systems as outlined in the five-year distribution plans.

This data should also be able to be used by customers to help inform their energy decisions, but efforts to standardize and automate the way customers in Michigan can access their data, as well as allowing third parties to access a data with a customer's consent, are still under development. Additional efforts could also be undertaken by utilities in the areas of customer

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12 http://www.cooperindustries.com/content/public/en/power_systems/products/power_engineeringsoftware/der_analysis/cymeepri.html

education/engagement to help customers better understand their usage and potential benefits associated with existing dynamic rate structures and distributed energy resources.

Similar to barriers associated with the lack of hosting capacity data for the distribution system, the lack of standardization in AMI customer usage data and the barriers to easily sharing this data with third-party service providers impinge on the Commission's goal of supporting advanced technologies such as renewable energy resource and energy waste reduction. **Staff recommends that utilities with AMI utilize the *Green Button Download my Data* and *Green Button Connect* standards developed by the Green Button Alliance[13] to provide customers and third-party service providers access to customer usage data**. Based on research by the Ontario Ministry of Energy, the benefit/cost of the implementation of these standards is estimated to be up to 4.1 over a five-year period.[14] Although Staff understands that this approach likely increases future costs not outlined in the current plans, these costs are likely to be offset by benefits within five years.

Non-Wires Alternatives

"Non-wires alternatives" are system investments and operating practices that can defer or replace the need for distribution capacity projects cost effectively. In their distribution plans, both Consumers Energy and DTE Electric mention the concept of non-wires alternatives as a pilot, but it is not clear whether either utility plans on leveraging these alternatives to "poles and wires" extensively in the next five years. Each company's portfolio of energy waste reduction (EWR), demand response, and dynamic rate programs can potentially impact peak loading, as evidenced by numerous pilots conducted by both utilities over the last ten years. Failure to maximize the benefits of these programs through the strategic deployment and incentive structures to address system capacity concerns in a cost- effective manner would be unreasonable. Maximizing the useful life of assets already in service should be a priority in any cost-effective long-term planning strategy. NWA options provide an innovative opportunity for utilities to better leverage existing programs to maximize their benefits. **Staff recommends that future distribution plans provide detailed information regarding suitable criteria for NWA projects and clear cost information for nontraditional approaches to capacity investments.** Clear presentation of data addressing growth and loading of capacity assets as well as program impacts is key to understanding the feasibility of NWA. Staff envisions the presentation to be similar to Consumers Energy's presentation of the Swartz Creek NWA Pilot as shown in *Figure 4*.

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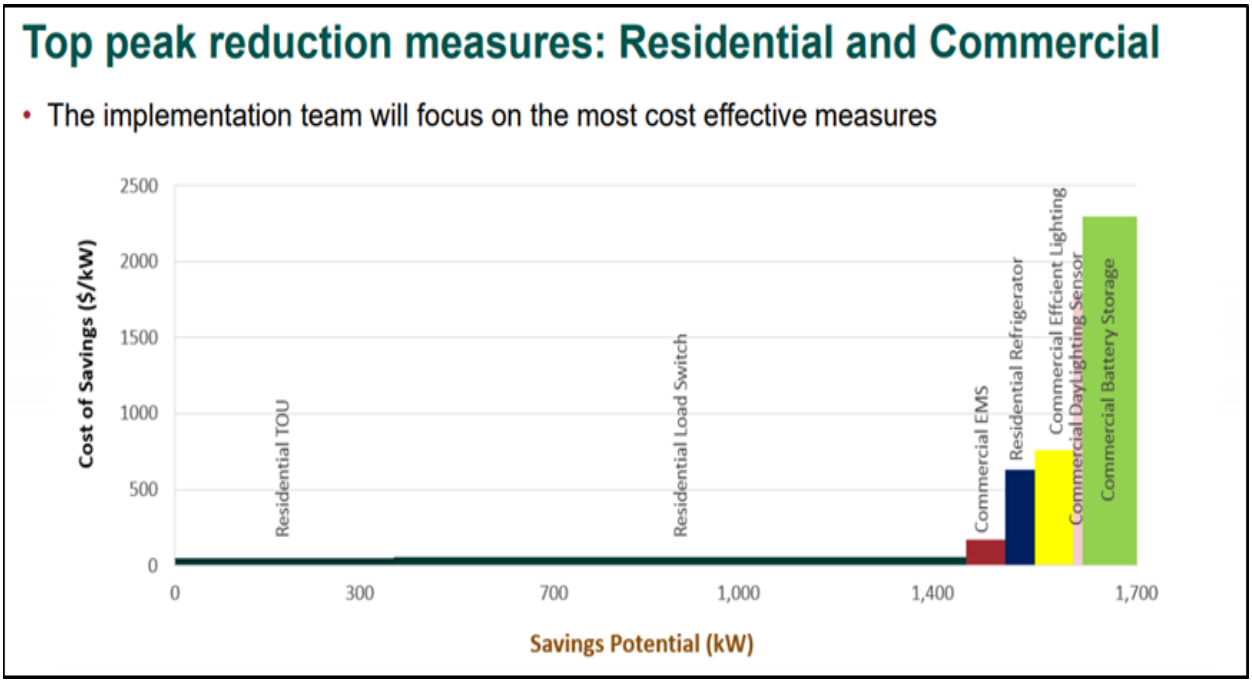
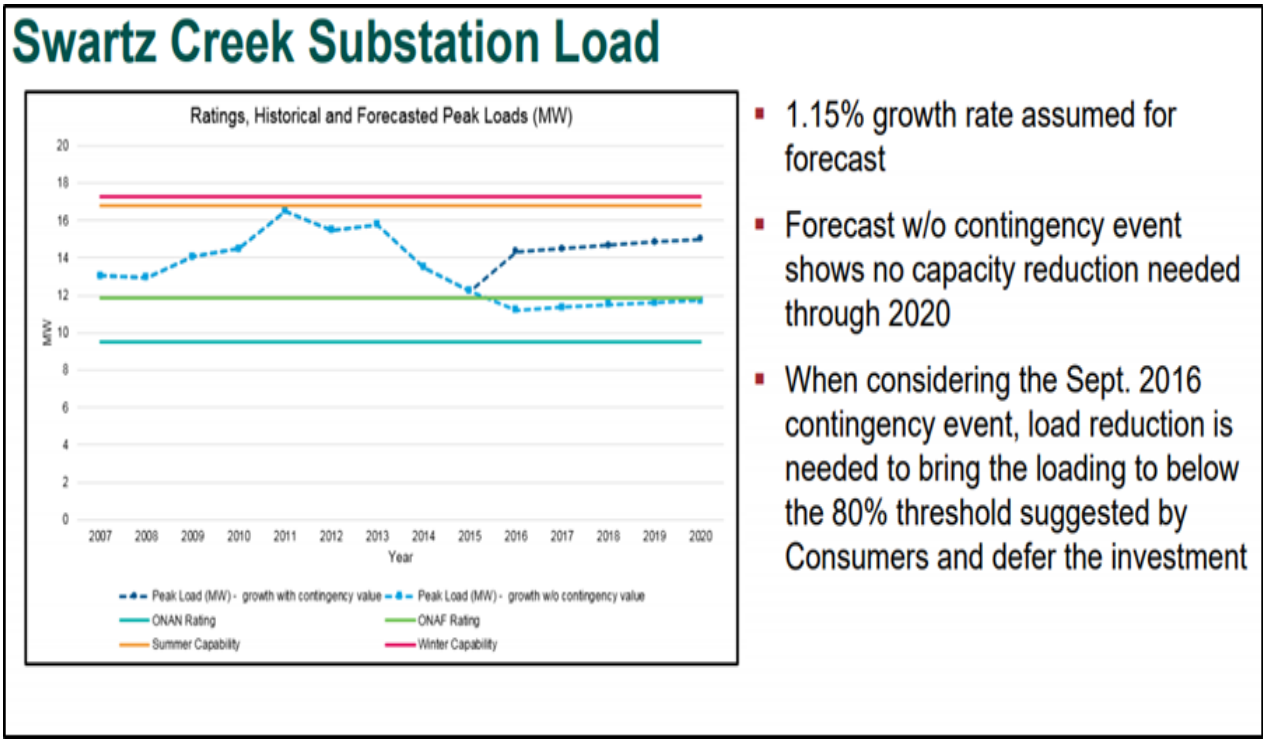
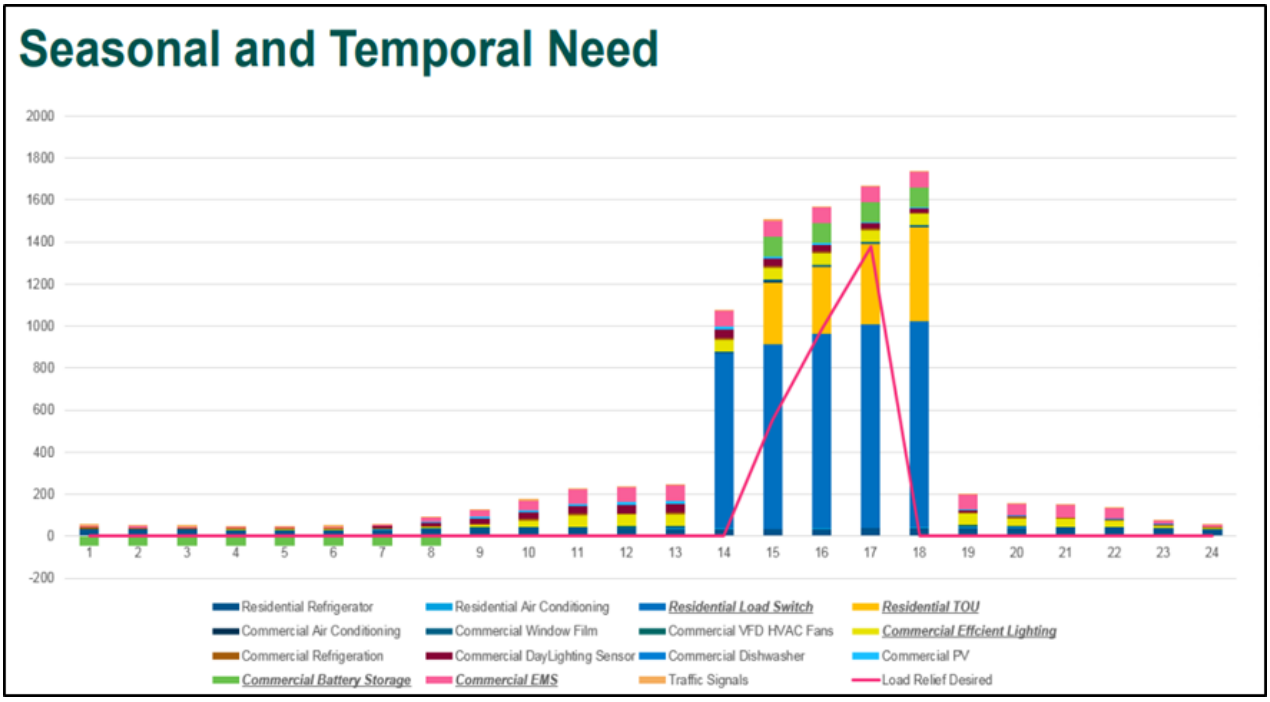
[13] https://www.greenbuttonalliance.org/

[14] https://www.ontarioenergyreport.ca/pdfs/Green%20Button%20Cost-Benefit%20Analysis%20Report%20FINAL.PDF

Figure 4: Consumers Energy Swartz Creek Non-Wires Alternative Project







Source: PLMA Non-Wires Alternatives Lessons and Insights from the Front Lines

Cost-Benefit Analysis

The Commission asked both utilities to include benefit/cost analyses considering both capital and O&M costs and benefits in their five-year distribution plans. In Staff's opinion, the information submitted by both utilities was insufficient to allow Staff and stakeholders to use to analyze alternatives and provide recommendations to the Commission. One goal of the distribution planning process is to provide transparency into the decision-making process around distribution system investments, and the reasonableness and cost-effectiveness of those spending decisions. More specific cost and benefit estimates for various projects under consideration would help to promote a more transparent distribution planning process. **Staff recommends that the Commission require the Companies to work with Staff and the stakeholders in the development of a common cost-benefit methodology that can be applied in developing future distribution plans.**

Replacement/Upgrade Criteria

With both utilities planning significant distribution investments for replacing aging infrastructure in the near-term, it is important that the Commission and intervenors have the ability to measure the reasonableness, prudency, and affordability of these plans prior to inclusion in rates. When using projected test years, this process becomes difficult, as spending plans are approved prior to any replacements being performed. To ensure that utilities are only replacing

the highest risk and most necessary assets, **Staff recommends the Commission work with the companies outside of the rate case process to develop replacement/upgrade criteria for aging assets to ensure accountability during the infrastructure refresh efforts.** Similar to the process utilized for the natural gas pipeline main replacement programs for some Michigan natural gas utilities, identifying replacement criteria will help determine the scope of the entire project and estimate total cost of replacement. Based on the risk associated with these assets, the Company could then determine a prudent timeframe to address these risks without negatively impacting the safety and reliability of the system.

Workforce Adequacy Plans

As both utilities plan to significantly ramp up distribution spending in the coming years, ensuring that an adequate utility workforce is in place is key to accomplishing spending plans in a reasonable and prudent manner. To alleviate concerns around the feasibility of future spending during a time of known workforce attrition, **Staff recommends future iterations contain a workforce adequacy and development plan to outline steps being taken to assure the proposed spending plans are feasible.**

DRAFT FRAMEWORK FOR FUTURE ITERATIONS OF DISTRIBUTION PLANS

The orders outlining the initial distribution planning process required the Companies to file 5-year distribution investment and maintenance plans containing the following information:

- a detailed description, with supporting data, on distribution system conditions, including age of equipment, useful life, ratings, loadings, and other characteristics;
- system goals and related reliability metrics;
- local system load forecasts;
- maintenance and upgrade plans for projects and project categories including drivers, timing, cost estimates, work scope, prioritization and sequencing with other upgrades, analysis of alternatives (including AMI and other emerging technologies), and an explanation of how they will address goals and metrics; and
- benefit/cost analyses considering both capital and O&M costs and benefits.

Although Staff met regularly with each Company to provide clarification as required by the order, many of these meetings occurred concurrently with the drafting of the plans. This created inefficiencies in the drafting process and ultimately lead to two very different filings in terms of presentation and content. To avoid this inefficiency in the future, Staff believes it is appropriate to develop a standardized framework for future plans that are submitted by the utilities. With the knowledge and lessons learned from the distribution planning process and first iteration of the plans, Staff believes that a more prescriptive framework with a technical

focus is appropriate to ensure interested stakeholders are provided all the necessary information to analyze the cost-effectiveness of the proposed plan. The following is a draft framework that outlines Staff's vision for future distribution plans inclusive of the Commission's original requests and Staff incremental components outlined previously in this document.

Table 1: Proposed Distribution Planning Framework

Load Forecast	• System Peak Load Analysis - Multiple Scenarios • Historic DER penetration and locations • Interconnection queue • Local forecast in support of capacity upgrades • Known industrial/commercial customer additions • Hosting Capacity Analysis

Infrastructure Refresh Programs	• Equipment Failure Analysis (by asset and vintage)
	• Inspection and Routine Maintenance Reports
	• Targeted Replacement Programs – By Asset Type
	  o Asset Risk Analysis
	  o Asset Replacement Criteria and Rationale
	  o Goals and Timeframe for Achievement
	  o Benefits Projection and Supporting Evidence

Capacity Upgrades	• Distribution Feeder Capacity Upgrade Criteria
	  o Distribution Feeder Upgrade List
	• Distribution Substation Capacity Upgrade Criteria
	  o Distribution Substation Upgrade List

Reliability Upgrades	• Worst Performing Circuit Analysis
	• Circuit Rebuild Criteria
	  o Circuit Rebuild Upgrade List
	• Circuit Rehabilitation Criteria
	  o Circuit Rehabilitation Upgrade List

Grid Modernization	• System Automation Deployment Scope and Criteria • System Automation Cost/Benefit • IT/Software Investments (Routine Spending/New Programs Spending) • IT/Software Cost/Benefits • System Data Collection Deployment Scope and Criteria (SCADA/DSCADA/Line Sensors) • System Data Collection Cost/Benefit
Resiliency	• NERC/NESC New Compliance Obligations and Timeline for Conforming • NERC/NESC Spending Plans - By Year • Design Standards Updates and incremental costs • Strategic Resiliency Upgrades and Spending Plans (undergrounding, tree wire, etc)
Reactive Spending	• New Business Spending • Reactive Capital Spending • Restoration Events <$1million • Asset Relocation Expenses • Known Future Asset Relocation Projects • Mutual Assistance

Non-Wires Alternatives	• NWA Criteria and Rationale of Approach for Capacity • NWA Criteria for Power Quality Issues • Qualifying Substations, Feeders, Etc. • NWA Procurement Process (competitive bid, auction, etc.)
Workforce	• Current workforce assessment and projected attrition • Workforce needs to complete spending plans and supporting information • Workforce development plan to meet projected needs
Cost Benefit Analysis	• Assumed costs and benefits of all potential grid solutions considered as part of the 5-Year plan. • Cost curves for DER and technologies
O&M	• Tree Trimming • Corrective Maintenance Spend • Community Outreach Plans and Spending • Public Awareness Plans and Spending • Internal/third party Audits and reports • Uncollectable Accounts • Line Losses

Stakeholder Process

As Staff works to refine the framework of distribution planning in Michigan, it will be important that all stakeholder interests are fairly represented within this framework. Although Staff was able to glean much of the stakeholder perspectives from written comments received in the dockets and verbal comments during previous stakeholder meetings, developing a regular opportunity for stakeholders to provide comment can streamline this process and eliminate

potential mischaracterizations of stakeholder perspectives. Staff recommends the Commission establish a formal stakeholder group for discussing and informing Staff's proposed framework. This group can also weigh in on forecasting assumptions and other foundational aspects of utility plans that materially impact the outputs of the spending plans.

Applicability to Rate Case Proceedings

Over the last decade, both Consumers Energy and DTE Electric have filed applications on nearly an annual basis for increases in base electric rates. Many of these applications were primarily based upon the companies' need to recover the prudent forecasted costs associated with maintaining the safety and improving the reliability of the distribution system. Ensuring the safety of the public and utility personnel is a top priority for the Commission when setting utility rates.

The potential safety and reliability threats associated with the aging distribution system is illustrated in both utilities' plans. Staff believes it is in the public interest to consider programs aimed at addressing clearly identified safety and reliability concerns for investment recovery mechanisms (IRMs). Both Consumers Energy and DTE Electric currently have IRMs for the replacement of high risk pipeline identified on their natural gas distribution systems. Staff believes it would be reasonable to consider a similar mechanism for aging electric infrastructure, assuming that each Company could show appropriate work plans, risk ranking, and metrics to ensure achievement of the IRM's objectives.

Staff is also supportive of the utilization of the next iteration of the distribution plan as the basis for multi-year rate plans including performance-based regulation (PBR) applications. The use of PBR provides the Commission with a tool to better appropriate the risk and reward associated with the performance of reliability/resiliency investments between ratepayers and shareholders. PBR mechanisms typically include incentives or disincentives depending on the metrics used to measure successful implementation and the performance achieved. PBR can also provide an opportunity to provide equal financial incentive to both capital and operating expenses to address system issues. The proposed draft framework, along with potential stakeholder input, could provide the necessary transparency to measure the reasonableness of the spending plans of the multi-year rate plan alongside the benefits. This would allow for the Commission to ensure the safety and reliability of the system through annual filings where utility performance would be measured, and profits adjusted to match performance. This approach could reduce annual rate case filings, create efficiencies in utility personnel utilization, and provide regulatory certainty around cost recovery. Staff recommends this concept be considered, as well as potential performance measures and metrics be discussed, as part of the 5-year distribution plan stakeholder process.

Future Iterations Timeframe

In the October 11, 2017 Commission order in U-17990 and U-18014, the Commission recommended that the plans be updated every two years but would seek guidance from this report.

The most important consideration when setting a timeframe for updates is ensuring that the next iteration provides a meaningful and actionable update within the regulatory environment. With this in mind, Staff does not recommend a static timeframe for future plan updates. However, given that both Consumers Energy and DTE Electric are currently in general rate cases in which they are seeking approval of projected distribution expenditures through 2019, and both utilities will have integrated resource plans (IRP) filed before April 2019, it seems reasonable to require that the second iteration be provided in early 2020 (two years) as that timeframe will provide a meaningful and effective update to utility spending plans. As for future iterations, the Commission should consider requiring the distribution plans be submitted alongside future IRP filings. As shown in *Figure 3* of this report, the distribution planning and resource planning are increasingly interdependent activities, as they both aim to project and determine how to serve anticipated customer demand. As the future iterations of distribution plans seek to better understand the customer loads through stakeholder input and multi-scenario forecasting, these forecasts can also help in determining the supply side needs to serve these loads. This type of approach may also help the Commission realize the goal of a more integrated system planning approach that can improve regulatory operations in Michigan.

CONCLUSION

The initial 5-year distribution investment and maintenance plans submitted by Consumers Energy and DTE Electric provided an unprecedented view into the current state of their electric distribution systems. The year-and-a-half process of drafting and reviewing the plans provided great opportunities for Staff, stakeholders, and the Commission to better understand the internal operations of the utilities as well as the perspective and lessons learned from industry experts on distribution planning. Staff believes the draft framework provides a measured step forward in the Commissions goal of providing an open and transparent planning process. Staff expects that the Draft Framework for Future Iterations of Distribution Plans will help inform stakeholders and intervenors of long term utility plans and priorities, likely streamlining future rate case proceedings as desired by the Commission.