MI POWER GRID

Making the Most of Michigan's Energy Future

Emissions Reporting Requirements for Utility IRPs

Michigan Public Service Commission Staff Report

MI Power Grid: Integration of Resource/Distribution/Transmission Planning

Filed to the docket for Case No. U-20633 on

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MPSC

Michigan Public Service Commission

Michigan Public Service Commission
MI Power Grid: Advanced Planning Processes – Integration of Resource/Distribution/Transmission Planning

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Executive Summary

On October 17, 2019, the Michigan Public Service Commission (MPSC or Commission), in collaboration with Governor Gretchen Whitmer, launched the MI Power Grid initiative. MI Power Grid is a customer-focused, multi-year stakeholder initiative intended to ensure safe, reliable, affordable, and accessible energy resources for the state's clean energy future. The initiative is designed to maximize the benefits of the transition to clean, distributed energy resources for Michigan residents and businesses. MI Power Grid is divided into three core areas with multiple sub-topics that work groups focus on. One of the three core areas, 'Optimizing Grid Investments and Performance' includes a work group focused on the 'Advanced Planning Processes' necessary to facilitate an integration of the discrete resource (generation, distribution, and transmission) planning processes.

The Commission, through a series of orders, opened multiple dockets to house the activities related to each of the MI Power Grid work areas. In its August 20, 2020 Order in Case No. U-20633, the Commission directed MPSC Staff (Staff) to begin a series of stakeholder outreach sessions to begin research into the 'Integration of Resource/Distribution/Transmission planning' work area, and directed Staff to publish a report of its findings on May 27, 2021.

Beginning in 2019, Governor Whitmer issued a series of executive directives and orders committing Michigan to the U.S. Climate Alliance and directed the Department of Environment, Great Lakes, and Energy to develop an implementation plan to meet the environmental goals established. Governor Whitmer also created a Council on Climate Solutions (Executive Order 2020-182) to act in an advisory role in the development of the MI Healthy Climate plan. Executive Directive 2020-10 (ED 2020-10) initiated the most immediate goal of the Governor's executive actions, which was for Michigan to achieve a 28% reduction to economy-wide carbon emissions, compared to 2005 historical levels.

The Commission responded to ED 2020-10 by issuing its October 29, 2020 Order in Case No. U-20633, instructing Staff to include consideration of how to implement the Governor's emissions reduction goals into its recommendations for updating the utility planning process. The Commission instructed Staff to present a straw proposal to the work group, to solicit alternate proposals from interested parties, to solicit comments from stakeholders on the proposals presented to the group, and to summarize and provide its recommendations for a final proposal for utility IRPs to reflect these emissions goals.

Staff developed its set of recommendations after conducting a series of stakeholder meetings where proposals were presented for consideration by the group, reviewing comments on the various proposals received by stakeholders, and conducting a review of utility planning processes in states that have enacted similar goals. The Commission's Order directed Staff to develop recommendations consideration by the Commission as to how both utilities filing before updates to the Michigan Integrated Resource Planning Parameters (MIRPP) and IRP filing requirements are finalized, and those filing after these updates, may best consider the emissions reduction targets set forth by Governor

Whitmer.[1] This report contains Staff's recommendations for utilities that are filing IRPs prior to finalization of the next MIRPP and IRP filing requirements updates (Near-term filings).[2] Staff is not recommending options for utilities filing after the updates to the MIRPP and IRP filing requirements are approved by the Commission (Long-term filings) at this time. Those proposals will continue to be developed throughout the remainder of Phases II and III of this work group and require a more extensive discussion that includes consideration of how to incorporate these proposals into the utility planning process through updates to the MIRPP and IPR filing requirements, expected to occur in 2022.

Staff recommends the Commission consider the following two options for Near-term filings. The options proposed here are to be considered separate and in addition to existing requirements for utility IRPs provided in the MIRPP and IRP Filing Requirements.[3, 4] Staff also provides its recommendations for multi-state utilities to show how their IRP aligns with, and puts them on a glidepath towards, the carbon reductions outlined in ED 2020-10.

Option 1

Perform one additional IRP modeling run to illustrate a path toward an electrification future and meet the interim goal of 28% carbon reduction by 2025 and continue along a trajectory toward net zero carbon emissions by 2050, as stated in ED 2020-10. This approach will help identify potential risks of this future scenario, such as consideration for resource interconnections and overall system reliability.

- Run the Environmental Policy scenario as defined in the MIRPP[5] and apply the Company's proposed course of action through the 15-year planning horizon, including the following changes in that run. Allow the model to build additional resources as needed.[6]
- Reduce carbon emissions by at least 28% of the utility's 2005 amounts by 2025, accomplished by modeling a hard cap on carbon emissions in 2025. Demonstrate a reasonable path to achieving carbon neutrality in 2050 by continuing to reduce carbon emissions through the end of the planning horizon.
- Apply a high load growth through the study period of 2% annually, up from the required 1.5% sensitivity included in the MIRPP Environmental Policy scenario. The increase in annual load growth will reflect an increase in load due to electrification.
- Include all carbon emissions for owned generation units, power purchase agreements, MISO market energy purchases, and electricity used for the organization. Compare the projected

[1] *C.O.M. Energy Assessment (IRP and Distribution Plan Alignments), 10/29/20 Order, MPSC Case No. U-20633, p 7.*
[2] *Updates to the MIRPP and IRP Filing Requirements are expected to be complete by the end of 2022.*
[3] *In the matter on the Commission's own motion to implement the provisions of Section 6t(1) of 2016 PA 341, 11/21/17 Order, MPSC Case No. U-18418.*
[4] *In the matter on the Commission's own motion to implement the provisions of Section 6t of 2016 PA 341, 12/20/17 Order, MPSC Case No. U-18461.*
[5] *11/21/17 Order, MPSC Case No. U-18418, Exhibit A, pp 20-21.*
[6] *Staff is not recommending that utilities model out to the 2050 carbon neutrality goal timeframe, due to declining certainty in projections over a thirty-year timeframe.*

carbon reduction achieved by the model through the 15-year planning horizon to the 2025 goal of a 28% carbon reduction and illustrate a trendline to the eventual 2050 goal. Given the likelihood of significant carbon emissions reductions occurring in single year intervals coinciding with the retirement of existing high-capacity fossil-fueled generation, this trendline should be levelized to provide the analogous annual emissions reduction rate through the planning horizon and beyond. Supply supporting evidence with necessary testimony and exhibits, including identifying any years in the planning horizon in which the model varies in carbon emissions significantly from the trendline, why this variation is occurring, and any actions planned to ensure the utility will stay on track to meet the 2050 goal.

- Provide exhibits that chart carbon emissions reductions through the 15-year planning horizon and illustrate the continued carbon emissions reduction trajectory necessary to meet the 2050 goal. Include exhibits that provide annual projected emissions for CO2, SOx, NOx, Mercury, and PPM through the 15-year planning horizon for the proposed course of action and each scenario optimized plan, including any additional scenarios developed by the utility. A copy of all exhibits in their native format, with all formulae intact, should be provided in additional documentation that accompanies the IRP filing.
- This additional modeling run would apply to utilities who serve customers in MISO local resource zone 7 (Lower Peninsula) as well as local resource zone 2 (Upper Peninsula). Utilities serving customers in the Upper Peninsula may not have included the Environmental Policy scenario in previous IRPs, as provided for in the MIRPP previously approved by the Commission.[7]

Option 2

Perform one additional IRP modeling run to illustrate a path toward an electrification future and achieve an increased interim goal for the electric sector of a 32% reduction in carbon emissions from 2005 levels by 2025. This option increases the interim 2025 goal beyond the 28% carbon emissions reduction specified in ED 2020-10. This interim goal is responsive to stakeholder feedback and analysis that attempted to calculate the additional near-term carbon reductions the electric power sector would need to make to achieve an economy-wide reduction in carbon emissions of 28% by 2025. This option assumes that historical emissions reduction trends in other sectors will continue.

- Run the MIRPP Environmental Policy scenario[8] and apply the proposed course of action through the 15-year planning horizon, including the following changes in that run. Allow the model to select additional resources as needed.
- Decrease carbon emissions more aggressively by achieving at least a 32% reduction in utility carbon emissions by 2025 from 2005 amounts, modeled as a hard cap on carbon emissions in 2025. Demonstrate a reasonable path to achieving carbon neutrality in 2050 by continuing to reduce carbon emissions through the end of the planning horizon.

[7] *11/21/17 MPSC Order in Case No. U-18418, Exhibit A, pp. 20-23.*
[8] *Id, at pp 20-21.*

- Apply a high load growth through the study period of 2% annually, up from the required 1.5% sensitivity included in the MIRPP Environmental Policy scenario. The increase in annual load growth will reflect an increase in load due to electrification.
- Include all carbon emissions for owned generation units, power purchase agreements, MISO market energy purchases, and electricity used for the organization. Compare the projected carbon emissions reduction achieved by the model through the 15-year planning horizon to the 2025 goal of a 32% carbon emissions reduction and illustrate a trendline to the eventual 2050 goal. Given the likelihood of significant carbon emissions reductions occurring in single year intervals coinciding with the retirement of existing high-capacity fossil-fueled generation, this trendline should be levelized to provide the analogous annual emissions reduction rate through the planning horizon and beyond. Supply supporting evidence with necessary testimony and exhibits, including identifying any years in the planning horizon in which the model varies in carbon emissions significantly from the trendline, why this variation is occurring, and any actions taken to ensure the utility will stay on track to meet the 2050 goal.
- Provide exhibits that chart carbon emissions reduction through the 15-year planning horizon and illustrate the continued carbon emission reduction trajectory necessary to meet the 2050. Include exhibits that provide annual projected emissions for CO2, SOx, NOx, Mercury, and PPM over the 15-year planning horizon, and through 2050 for the preferred plan and each scenario optimized plan including any additional scenarios developed by the utility. All exhibits should be provided in their native format, with all formulae intact, in the workpapers included in the IRP filing.
- This additional modeling run would apply to utilities who serve customers in MISO local resource zone 7 (Lower Peninsula) as well as local resource zone 2 (Upper Peninsula). Utilities serving customers in the Upper Peninsula may not have included the Environmental Policy scenario in previous IRPs, as provided for in the MIRPP previously approved by the Commission.[9]

Multi-state utilities filing before the next update to the MIRPP and IRP Filing Requirements

Staff recommends that the Commission direct multi-state utilities to perform an additional modeling run that shows how its Michigan service territory will meet the carbon emissions reduction goals set forth in ED 2020-10. MCL 460.6t. section 4 requires the Commission to accept an integrated resource plan filed in another state for the purposes of filing in this state. That same section of the statute allows the Commission to "require supplemental information if necessary as part of its evaluation and determination of whether to approve the plan."[10] Staff finds that this additional modeling run is necessary to provide supplemental information to ensure multi-state utilities are on track to meet the carbon emissions goals of ED 2020-10..

The impact on multi-state utilities is different than the impact on utilities whose service territory is fully contained within the Michigan State boundaries. The impact of an electrification future in Michigan

[9] *Id, at pp. 20-23.*
[10] *MCL 460.6t, Section (4).*

would potentially increase the Michigan portion of the total multi-state utility load. The interim carbon goal should be appropriately proportioned to reflect the amount of the utility's Michigan service territory load as a portion of the total utility's system load, while considering anticipated load growth in the rest of the utility's service territory that may not have the same carbon emission reduction goals as Michigan. For example, if the Michigan portion of a multi-state utility's load represents 25% of its total service territory load and a 50% carbon emission reduction is required by a specific year then that utility would be expected to achieve a 12.5% carbon reduction to meet the ED 2020-10 goal for its Michigan service territory, (25%*50%=12.5%).

In the alternative, the Commission could allow multi-state utilities more flexibility to demonstrate compliance with the carbon emission reduction goals. This would require that supporting testimony and exhibits provide clear information from the multi-state utility's existing scenarios that illustrate an electrification and carbon neutral future in its Michigan service territory. This supporting evidence must show the overall impact to load, utility resources, and emissions and demonstrate a path towards the ED 2020-10 carbon emission reductions.

1. Introduction

In the February 7, 2019 Commission Order in Case No. U-20464, the Michigan Public Service Commission (MPSC or Commission) opened a docket to "conduct a review of the state's supply, engineering, and deliverability of natural gas, electricity, and propane," in response to the request made by the Governor on January 31, 2019.[11] This call for a review of the State's energy system was made in response to extreme weather events that occurred in late January 2019 which, among other factors, resulted in unseasonably lower than expected levels of natural gas on the system during a time of high demand. To ensure reliable natural gas delivery throughout its system, Consumers Energy asked its customers to voluntarily reduce their energy usage. The Commission, in its September 11, 2019 Order in Case No. U-20464, accepted and adopted a finalized version of the report, called the Statewide Energy Assessment (SEA). In the SEA, the Commission made a list of recommendations to mitigate risks for the safe and reliable delivery of energy, including:

> [T]he Commission recommends utilities better align electric distribution plans with integrated resource plans to develop a cohesive, holistic plan and optimize investments considering cost, reliability, resilience, and risk. As part of this effort, Staff, utilities, and other stakeholders should identify refinements to IRP modeling parameters related to forecasts of distributed energy resources (e.g., electric vehicles, on-site solar) reliability needs with increased adoption of intermittent resources, and the value of fuel security and diversity of resources in IRPs. A framework should also be developed to evaluate non-wires alternatives such as targeted energy waste reduction and demand response in IRPs and distribution plans;

and:

> MPSC Staff should work with Michigan utilities and stakeholders to propose revisions to the Commission-approved IRP modeling parameters and filing requirements to better accommodate the consideration of transmission alternatives in IRPs. In addition, the Commission observes that MPSC Staff should work with RTOs and stakeholders to ensure non-transmission alternatives are considered in a fair and equitable manner through the RTO transmission planning processes.[12]

The Commission followed up its adoption of the SEA by directing Staff to conduct a series of stakeholder collaboratives on wide-ranging issues and launched the MI Power Grid initiative to provide a foundation for these sessions.

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[11] *In the matter, on the Commission's own motion, to issue a report on the state's supply, engineering, and deliverability of natural gas, electricity, and propane, and contingency planning, as requested by the Governor, 02/07/19 Order, MPSC Case No. U-20464, p 3.*

[12] *In the matter, on the Commission's own motion, to issue a report on the state's supply, engineering, and deliverability of natural gas, electricity, and propane, and contingency planning, as requested by the Governor, 09/11/19 Order, MPSC Case No. U-20464, pp 196-197.*

1.1 MI Power Grid Initiative

The Commission, in partnership with Governor Gretchen Whitmer, established the MI Power Grid initiative in its October 17, 2019 Order in Case No. U-20645. This Order provided a working statement for the initiative as a "focused, multi-year stakeholder initiative to maximize the benefits of the transition to clean, distributed energy resources for Michigan residents and businesses".[13] The Order describes the electric industry as "on the cusp of transformational change" as the electric power supply transitions from "large, central-station power plants to cleaner and more distributed energy resources such as wind and solar energy."[14] However, while new developments in technology "present opportunities to unlock cost savings and other benefits, there are also significant challenges to overcome to maximize value for customers while maintaining safe, reliable electric service."[15]

To help facilitate the goals of the MI Power Grid initiative, ongoing and future discussions were consolidated in three core areas of emphasis: Customer Engagement, Integrating Emerging Technologies, and Optimizing Grid Investments and Performance. To facilitate a focused discussion, each core area was separated into different sub-topics, and Staff-led stakeholder workgroups were formed for each to focus on its individual set of objectives. Detailed descriptions of each core area and the different sub-topics that work groups are formed around can be found on the Commission's website.

2. Background and Executive Actions Taken

Actions to address the effects of climate change are increasingly becoming the focus of Federal, State, and local governments, as its impacts (e.g., higher energy demands due to increasing temperatures, increases in the frequency and intensity of weather events, water and other essential resource concerns for vulnerable populations) become more frequent and wide-spread. In the past decade, there has been action on the Federal level through both the executive branch (e.g., the Clean Power Plan, the Affordable Clean Energy Rule) and the legislature (tax credits for renewable generation) to reduce the impact of the energy sector on the environment. Additional actions have been taken at the State and local level beyond national efforts to mitigate the impacts of climate change, such as statewide renewable energy generation standards or carbon neutrality goals adopted in some cities and municipalities. These actions at the State and local level often impose more stringent requirements for the energy industry to adopt in addition to federal requirements. Beginning in 2019, Michigan Governor Gretchen Whitmer issued a series of executive actions that provide the basis for a statewide policy on addressing climate change, a timeline for economy-wide carbon reduction and eventual neutrality, and established an advisory council to assist the department of state government responsible for implementation of an action plan to address these requirements.

[13] *In the matter, on the Commission's own motion, to establish MI Power Grid, 10/17/19 Order, MPSC Case No. U-20645, p 1.*
[14] *Id, at p 2.*
[15] *Id.*

2.1 Executive Directive 2019-12

On December 12, 2015, 196 state parties adopted the Paris Agreement under the United Nations Framework Convention on Climate Change (Paris Agreement), which is a long-term agreement with the purpose of preventing an increase in average global temperature of 2° C above pre-industrial levels, with a goal of keeping an increase in average global temperature below 1.5° C above pre-industrial levels.[16] Signatories to the Paris Agreement each calculated their own nationally determined contributions (NDC) to the global reduction efforts, and metrics were created for each Country to achieve its determined NDC. On June 1, 2017, United States' (U.S.) President Donald Trump notified the U.N. Secretary-General of the U.S.'s decision to withdraw from the Paris Agreement, effective on November 4, 2020. On that same day, in response to President Trump's public announcement of his plans to withdraw the U.S. from the Paris Agreement, the Governors of the states of California, New York, and Washington announced the formation of the U.S. Climate Alliance. The U.S. Climate Alliance is a coalition of Governors who have committed to upholding their State's NDCs established under the Paris Agreement, and to meet the Paris Agreement's goals of a 26-28% reduction in economy-wide greenhouse gas emissions by 2025.[17]

On February 4, 2019, Governor Gretchen Whitmer issued Executive Directive No. 2019-12 (ED 2019-12) which identified some of the conclusions the Fourth National Climate Assessment issued in November 2018 on the impacts of climate change on the national scale, as well as some regional effects of climate change already being felt in Michigan. In ED 2019-12, Governor Whitmer committed Michigan to the objectives of the U.S. Climate Alliance, specifically:

1. (a.) Implement policies that advance the goals of the Paris Agreement, aiming to reduce greenhouse gas emission[s] by at least 26-28 percent below 2005 levels by 2025.

   (b.) Track and report progress to the global community in appropriate settings, including when the world convenes to take stock of the Paris Agreement.

   (c.) Accelerate new and existing policies to reduce carbon pollution and promote clean energy deployment at the state and federal level.

3. The director of the Department of Environmental Quality [now EGLE] shall coordinate state efforts under this directive, including any recommendations for changes in state policies, procedures, administrative rules, or laws, and can assist departments and agencies with any questions that may arise with implementation of this directive. The director of the Department of Environmental Quality shall regularly report to me on efforts to implement this directive.[18]

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[16] *C.O.M. Energy Assessment (IRP and Distribution Plan Alignments), 10/29/20 Order, MPSC Case No. U-20633, pp 4-5.*

[17] *http://www.usclimatealliance.org/. Retrieved 12/1/20.*

[18] *https://www.michigan.gov/documents/whitmer/Executive_Directive_2019-12_646944_7.pdf. Retrieved 12/1/20.*

2.2 Executive Directive 2020-10

With the issuance of ED 2019-12, Governor Gretchen Whitmer joined the U.S. Climate Alliance, committing the State of Michigan to pursuing the goals established in the Paris Agreement. While ED 2019-12 committed Michigan to pursuing the goals of the Paris Agreement, it did not identify the necessary steps or initiate development of an actionable plan to achieve the goals of the U.S. Climate Alliance. To this end, on September 23, 2020, Governor Whitmer issued Executive Directive No. 2020-10 (ED 2020-10), which established specific metrics to be achieved and called for the creation of an actionable plan to achieve these metrics.

ED 2020-10 addressed the need for Michigan to transition to a carbon-neutral state, for not only the environment and public health, but also to ensure the resilience of the state's economy, citing the vulnerabilities of relying on out-of-state fossil fuel supplies to provide for the state's energy needs as one example. ED 2020-10 cites the challenges of this large-scale transition to a carbon-neutral state, but also the potential benefits it will provide if properly executed in an equitable fashion. To ensure the State is prepared to put into action the necessary measures to support this transition, ED 2020-10 included the following directives:

1. Michigan will aim to achieve economy-wide carbon neutrality no later than 2050, and to maintain net negative greenhouse gas emissions thereafter. To ensure steady progress toward this ultimate statewide goal, and to prevent irreparable harm to our ecosystem, residents, and businesses in the interim, the state will aim to achieve a 28% reduction below 2005 levels in greenhouse gas emissions by 2025.
2. The Department of Environment, Great Lakes, and Energy ("Department"), through its Office of Climate and Energy, must develop and issue the MI Healthy Climate Plan ("Plan"), which will serve as the action plan for this state to reduce greenhouse gas emissions and transition toward economy-wide carbon neutrality. The Plan must provide strategies and recommendations for achieving and tracking progress towards the statewide goals set forth in section 1 of this directive, with a focus on near-term objectives that Michigan can achieve in five years. The Department must submit the Plan to me by December 31, 2021 and must submit a draft of the Plan to me by September 1, 2021. The Department must make these submissions publicly available on its website.[19]

2.3 Executive Order 2020-182

On September 23, 2020, Governor Whitmer issued Executive Order No. 2020-182 (EO 2020-182), which worked in conjunction with ED 2020-10 to provide an avenue for the State to develop and implement an action plan to meet the goals of the U.S. Climate Alliance. ED 2020-10 established the MI Healthy Climate Plan as the action plan for the State to achieve its goals of carbon neutrality, and tasked the Department of Environment, Great Lakes, and Energy (EGLE) with the development and issuance of this

[19] https://www.michigan.gov/whitmer/0,9309,7-387-90499_90704-540278--,00.html. *Retrieved 12/1/20.*

plan. EO 2020-182 established a Council on Climate Solutions (the Council) to provide guidance to support EGLE's development of the MI Healthy Climate Plan.

EO 2020-182 provided specific details on the Council, including its various membership, the charge given to the Council, its expected operations, and guidance on the implementation of the Council's functions. The Council is composed of the directors of several departments of state government (including the chairperson of the Commission), leaders of industry groups, and members of the public. Additional details of the Council pertinent to its work advising the MI Healthy Climate Plan, as provided in EO 2020-182, are specified below:

> **2. Charge to the Council**
>
> (a) The Council must act in an advisory capacity to the governor and the Department, and must do the following:
>
> (1) Advise the Department in formulating and overseeing the implementation of the MI Healthy Climate Plan, which will serve as the action plan for this state to reduce greenhouse gas emissions and transition toward economywide carbon neutrality. This work must include, but is not limited to:
>
> (a) Identifying and recommending opportunities for the development and effective implementation of emissions-reduction strategies.
>
> (b) Identifying solutions to resolve impact disparities across Michigan and recommending targeted solutions for communities disproportionately impacted by the changing climate.[20]

3. Commission's Orders Related to MI Power Grid

In its September 11, 2019 Order in Case No. U-20464, the Commission adopted the finalized version of the SEA, which provided recommendations for further actions to improve the reliability and resiliency of the State's energy system. The Commission's Order acknowledged the significant time and resources that implementing each of the SEA's recommendations would require and encouraged continued stakeholder participation through the appropriate avenues to accomplish these objectives.[21] Additional Commission orders have been filed in multiple dockets opened since the publication of the SEA, in response to both its recommendations and executive actions taken by the Governor. These Commission orders have provided different avenues and guidance for the Staff and other stakeholders to evaluate and implement the directed outcomes of the SEA.

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[20] https://content.govdelivery.com/attachments/MIEOG/2020/09/23/file_attachments/1553297/EO%202020-182%20Climate_Council.pdf. *Retrieved 12/1/20.*

[21] *In the matter, on the Commission's own motion, to issue a report on the state's supply, engineering, and deliverability of natural gas, electricity, and propane, and contingency planning, as requested by the Governor, 09/11/19 Order, MPSC Case No. U-20464, p 5.*

3.1 Commission's Orders Establishing MI Power Grid and Work Groups

On October 17, 2019, the Commission issued an order in Case No. U-20645 (October 17 Order), which opened the docket and provided the "impetus, vision, objectives, process and next steps" for the MI Power Grid initiative, established by the Commission in partnership with Governor Gretchen Whitmer.[22] The Order describes MI Power Grid as a "focused, multi-year stakeholder initiative to maximize the benefits of the transition to clean distributed energy resources for Michigan residents and businesses."[23] The Order acknowledges the rapid advancement in technologies like renewable generation and DERs, and the opportunities these developments present; while also acknowledging that many of these emerging technologies face market and regulatory barriers that could impact the pace and scale of adoption.[24]

To achieve the overarching goals of the initiative, the MI Power Grid initiative is organized into three core areas of emphasis: Customer Engagement, Integrating Emerging Technologies, and Optimizing Grid Investment and Performance. The October 17 Order provided an objective for each and subdivided the core areas into separate work groups focused around on a specific topic. The description of the core area 'Optimizing Grid Investments and Performance' contained the following details:

> **3. Optimizing Grid Investments and Performance**
>
> **Objective:** Integrating transmission, distribution, and resource planning to increase transparency and optimize solutions; enhancement of tools, financial incentives, and regulatory approaches to adapt to technology change and customer preferences.
>
> **Work areas:**
>
> - **Advanced planning processes** for electric investment (resources, transmission, and distribution) will be examined to ensure modeling tools, assumptions, and processes are adapting to technology change, and to better integrate discrete planning activities currently being conducted for new resources (e.g., generation, demand-side options), transmission, and distribution, as detailed in the 2019 Statewide Energy Assessment. Work will also be done to quantify the value of resilience, particularly as it relates to distributed energy resources, as well as the value of diversity in the electric resource mix, in order to ensure proper consideration of both when evaluating proposed investments.[25]

In its August 20, 2020 Order in Case No. U-20633 (August 20 Order), the Commission provided a connection between some of the recommendations that resulted from the SEA, specifically related to gaps in the planning process and valuing generation diversity, and the stated objectives of the

[22] *In the matter, on the Commission's own motion, to establish MI Power Grid, 10/17/19 Order, MPSC Case No. U-20645, p 1.*
[23] *Id.*
[24] *Id, at p 3.*
[25] *Id, at 7.*

'Advanced Planning Processes' work group of the MI Power Grid Initiative. In this order, the Commission opened a docket to house activities related to the 'Integration of Resource, Transmission, and Distribution Planning' portion of MI Power Grid, and directed Staff to begin a series of stakeholder outreach sessions and research best practices for the following areas:

1. Potential ways to align distribution plans with IRPs and examination of best practices from other jurisdictions, including:

a. Methodologies to develop distributed energy resource forecasts over a five and ten-year period;

b. Potential sources or methodologies to forecast electric vehicle (EV) penetration over a five and ten-year period;

c. Methodologies or frameworks to forecast the impact of the expected EV penetration on the load forecast over a five and ten-year period; and

d. Methodologies or frameworks to evaluate non-wires alternatives (NWAs) such as targeted energy waste reduction and demand response in distribution plans and IRPs.

2. Identifying potential revisions to the Commission-approved IRP modeling parameters or the filing requirements to better accommodate transmission alternatives in IRPs in preparation for the next formal review of the Michigan IRP Planning Parameters expected to take place in 2022; and

3. Methodologies to quantify and value generation diversity in IRPs.[26]

The Commission's Order also directed Staff to conduct outreach and stakeholder sessions on the topics outlined, and to provide the Commission with a report that summarizes the findings and any recommendations to be considered, in the Case No. U-20633 docket on or before May 27, 2021.[27] The Commission directed Staff to "coordinate with EGLE on the inclusion of appropriate public health and environmental justice considerations in future IRP cases, and to include a status update and any related recommendations in the May 27, 2021 report."[28]

3.2 Commission's October 29, 2020 Order in Case No. U-20633

On October 29, 2020, the Commission issued an order in Case No. U-20633 (October 29 order), which provided updated guidance for the 'Integration of Resource, Distribution, and Transmission Planning' workgroup of the MI Power Grid initiative, specifically the 'Advanced Planning Processes' work area. In this order, the Commission discussed the current legislation that has created the IRP planning process, and how this process has enabled utilities in the state to be on track to meet current legislative standards related to renewable and other 'clean' generation sources (i.e. the requirement that 35% of

[26] *C.O.M. Energy Assessment (IRP and Distribution Plan Alignments), 08/20/20 Order, MPSC Case No. U-20633, pp 3-4.*
[27] *Id.*
[28] *Id, at p 5.*

generation be sourced from the 'cleanest' resources by 2025.)[29] However, the order also identifies the new economy-wide emissions targets that have been established through the Governor's executive actions. In light of these directives, the Commission "finds that the process of updating utility IRP planning parameters and filing requirements should take into account the goals set by Michigan's utilities and how those goals align with the greenhouse gas emissions targets set by Governor Whitmer."[30] To this end, the Commission "expects that the work of the stakeholder group established in the August 20 order to ultimately feed into the process of updating the IRP planning parameters and filing requirements that are set to be complete in 2022."[31] However, due to multiple utilities having filing dates for their next IRPs set in 2021, "it is imperative that the Staff develop recommendations to be considered by the Commission as to how these three utilities, and other utilities who file IRPs in the future, may best consider the emissions reductions targets set by Governor Whitmer."[32] These three utilities are Indiana Michigan Power Company (I&M), Consumers Energy Company, and Upper Michigan Energy Resources Company.

To accomplish the objectives it set forth in its order, the Commission provided the following specific tasks and dates for the deliverables of this work group:

- Staff is to file, not later than 5:00 p.m. Eastern time on December 15, 2020, a report in Case No. U-20633 (December 15 report). This report should include the following:
    - A summary of a Straw proposal for advancing the objectives detailed in this order;
    - Include other proposals from states with similar greenhouse gas emission objectives or proposals identified in the stakeholder process;
    - Any stakeholder feedback received; and
    - This report should also recommend a proposal to be utilized by utilities filing IRPs before the next update to the IRP planning parameters and filing requirements are finalized in 2022.
- Stakeholders and interested persons may file comments in Case No. U-20633 in response to the December 15 report and recommendations on or before 5:00 p.m. Eastern time on January 12, 2021.[33]

3.3 Advanced Planning Work Group Timeline

The October 29 Order provides several important dates for the work group related to the IRP emissions reporting proposals. This timeline includes dates for presenting various proposals during stakeholder sessions, solicitation of comments on these proposals, and the date that comments must be filed in the

[29] *https://www.michigan.gov/mpsc/0,9535,7-395-93308_93325_93423_93502-500271--,00.html.Retrieved 12/6/20.*
[30] *C.O.M. Energy Assessment (IRP and Distribution Plan Alignments), 10/29/20 Order, MPSC Case No. U-20633, p 6.*
[31] *Id, at p 7.*
[32] *Id.*
[33] *Id.*

Case No. U-20633 docket. A summary of important dates and the activities or deliverables due on those dates was originally presented in the October 21, 2020 workgroup stakeholder meeting, and is provided below:

Table 1. Timeline for work group's activities related to the emissions reporting proposals.

MPG Advanced Planning, Integration of GD&T Planning	
Date	Activity
October 21, 2020	Staff Presents Straw Proposal
November 6, 2020	Stakeholders present alternate proposals for consideration
November 30, 2020	Stakeholder Feedback on all presented proposals due
December 15, 2020	Staff submits report in Case No. U-20633 docket that summarizes the Straw Proposal, any other proposals, stakeholder feedback, and its recommendations
January 12, 2021	Interested persons may file comments in Case No. U-20633 docket in response to December 15, 2020 report filed by Staff

4. Discussion

The following sections provide a summary of the various proposals introduced to the workgroup, any additional proposals from other states considered, and feedback from participants in the workgroup on these proposals, as directed in the October 29 order.

4.1 Staff's Initial Proposal

In the October 21, 2020 stakeholder session, Staff presented its straw proposal for updating the utility IRP process to account for and show a potential future that meets the objectives of ED 2020-10. Staff developed two different sets of proposals, one proposal for utilities filing before the next updates to the Michigan Integrated Resource Planning Parameters (MIRPP) and IRP Filing Requirements are approved by the Commission (Near-term filings), and one for utilities filing after these are approved by the Commission (Long-term filings). Each proposal provided multiple options for stakeholders to consider, with each option varying one or more of the following parameters: updates to the MIRPP (for Long-term filings), need for an optimized run if the preferred plan does not meet compliance, a chart that tracks annual carbon emissions of the Company's preferred plan, and reporting requirements for other greenhouse gas emissions. For example, 'option 1' for utilities filing Long-term filings requires a chart that provides the utilities annual carbon emissions through 2025, while 'options 2 and 3' require the same chart of annual carbon emissions through the 15-year planning horizon. The proposal for utilities filing Near-term filings includes options with similar changes to parameters, however these options do not consider an update to the MIRPP due to time constraints detailed in the Commission's October 29, 2020 order in Case No. U-20633.

After Staff presented its straw proposal in this meeting, it solicited feedback from the work group on its proposal. Staff also provided the opportunity for interested parties to present alternate proposals to

meet the carbon emission reduction goals of ED 2020-10. Please refer to Appendix A.1, Staff's Straw Proposal, for the complete version of Staff's straw proposal.

4.2 Alternate Proposals

Staff presented its straw proposal to the workgroup at the October 21, 2020 stakeholder session. After its proposal was presented, Staff requested that parties communicate their interest in presenting an alternative proposal by October 23, 2020. Stakeholders could then present these alternate proposals at the November 6, 2020 stakeholder session. Two parties responded to Staff's request and presented their alternate proposals at the November 6, 2020 stakeholder meeting. Summaries of the two proposals are provided below. The complete proposal presentations are available in Appendix A.2: Stakeholder Alternate Proposals.

Andrew Williamson presented I&M's proposal, which advocated for continuing the current practice of allowing for a single, utility system-wide IRP to be developed for multi-state utilities filing in Michigan. By keeping this current structure, multi-state utilities would be permitted to file an IRP in Michigan for the Company's entire multi-state territory; while also requiring the Company to provide supplemental information determined necessary by the Commission. I&M also emphasized the importance of dispatchable generation to achieve a carbon-neutral future.

Douglas Jester, representing the groups the Ecology Center, the Natural Resource Defense Council, the Michigan Environmental Council, the Environmental Law and Policy Center, the Union of Concerned Scientists, Sierra Club, and Vote Solar (Joint Commenters), also presented an alternate proposal during the November 6, 2020 stakeholder session. The Joint Commenters' proposal focused on the need for the electric utilities to account for the timing and intensity of carbon emissions reductions from all other sectors of the economy, in order for the state to achieve the interim goal of a 28% reduction in economy-wide carbon emissions from 2005 levels by 2025. The Joint Commenters compared historical emissions trends by economic sector, and found that, while the energy sector has achieved significant reductions in carbon emissions over the last decade, other sectors that comprise a significant portion of the state's annual carbon emissions have not seen a similar reduction. The Joint Commenters analysis concluded that the slower rate of emissions reductions in the other sectors of the economy will make it difficult to achieve the target of a 28% reduction in economy-wide carbon emissions by 2025. With the current expected rates of the electrification of the transportation and building sectors, the Joint Commenters recommend the energy sector reduce its carbon emissions by approximately 36% by 2025 from 2018 levels, to achieve this target while also experiencing significant load growth.

Staff also conducted research into other states which have adopted similar emissions reduction goals, to research best practices in the adoption of these emissions goals into utility resource planning processes. Staff investigated how these emissions goals were incorporated into utility planning processes in the following states: California, Hawaii, Maine, Massachusetts, New York, and Washington. While these states all have adopted similar emissions reduction goals, Staff found significant differences in how these goals were incorporated into utility planning processes. For instance, many states have set a goal for achieving carbon neutrality, however there are differences in when the state plans to achieve it, and in any interim metrics that must be met in the years before achieving carbon neutrality.

Differences in the timing of when these goals were established also effect how developed the implementation process is. Table 2, shown below, details each state's carbon reduction goals, the specific metrics that must be met and when, and when these goals were established.

Table 2. Carbon reduction goals of various states, and their issuance dates.

State	Interim Carbon Goal	Issuance	Final Carbon Goal	Issuance
California	2030 - 40% below 1990 levels	2016	2045 - net zero	2018
Hawaii	-	-	2045 - net zero	2018
Maine	2030 - 45% below 1990 levels	2019	2050 - net zero	2019
Massachusetts	2020 - 25% below 1990 levels	2008	2050 - net zero	2020
Michigan	2025 - 28% below 2005 levels	2019	2050 - net zero	2020
New York	2030 - 40% below 1990 levels	2019	2050 - net zero	2019
Washington	2030 - net zero* 2030 - 45% below 1990 levels	2019* 2020	2045 - no emissions* 2050 - net zero	2019
*Electricity sector only. Other goals are industry-wide.				

Due to the significant differences in both the details of the various states goals, as well as differences in state and local regulations, additional legislative mandates, established utility resource planning parameters, market structures, and other additional metrics, it is difficult to apply solutions and practices from another jurisdiction directly to Michigan. While Staff found significant details on the development of tools and processes to help facilitate the procurement of non-emitting generation resources, there was more limited information included specific to the implementation of these metrics into the utility planning processes. Some states utilized a credit system similar to the renewable energy credit system that has been established in Michigan for the purpose of renewable portfolio accounting. Others instituted an economic tax or penalty for utilization of carbon emitting resources. One commonality between multiple plans, including in Michigan, is the use of a Climate Council to develop a multi-phased implementation plan to achieve these goals (ME, NY, WA). Overall, there was no clear methodology established in another state that Staff found to be applicable for adoption in Michigan IRPs. A summary of Staff's research into each state, as well as links for additional information is provided in Appendix A.4: Update to IRP Process in Other States with Carbon Reduction Goals.

4.3 Stakeholder Feedback

At the November 6, 2020 stakeholder meeting for this workgroup, Staff requested feedback from parties on both its straw proposal, and the alternate proposals presented by I&M and the Joint Commenters. The deadline to provide this feedback to Staff was extended to November 25, 2020 at the request of stakeholders. Staff received comments from seven parties: The Association of Businesses Advocating for Tariff Equity (ABATE), the American Council for an Energy Efficient Economy (ACEEE), Michigan Energy Innovation Business Council (MEIBC), Armada Power, DTE Energy, the Joint Commenters, and Consumers Energy. A complete version of all parties' comments is provided as Appendix A.3: Stakeholder Feedback on Proposals.

Staff received feedback from stakeholders representing a wide variety of interests in the energy sector, including investor-owned utilities, industry groups, technology developers, and advocacy groups. As could be expected from such a wide-ranging set of stakeholders, comments on the different proposals varied widely in content and focus. Generally, stakeholders were appreciative of the scope and depth of topics considered by this workgroup; emphasizing that significant refinement of utility planning processes would be necessary to plan for a carbon free future by 2050. The following is a partial list of topics highlighted by Stakeholders for further consideration: the need for equitable evaluation of non-wires alternatives and other non-traditional technologies, the need for a coordinated generation analysis for all retirement decisions, and the contributions of energy efficiency to building electrification.

Stakeholders varied in their views of Staff's and others' proposals: some commented with general support for options 1 and 2 of Staff's proposal, opposing option 4 as it extends modeling past the legislatively established planning horizon. Some stakeholders generally opposed the Joint Commenters proposal, citing its requirements to account for emissions outside of the Company's control as being too prescriptive and overly burdensome, as well as outside of the scope of an IRP. Other stakeholders supported the idea that utilities should account for the necessary emissions reductions to achieve the economy-wide goals of the Governor's executive actions. Stakeholders had a wide range of views about the effect of electrification on utility load growth. The Joint Commenters also proposed that all the MIRPP scenarios account for these economy-wide carbon reduction goals and the utilities role in achieving them. Several commenters agreed that further updates to the MIRPP or filing requirements to adopt these goals should continue to be discussed and evaluated in future meetings.

5. Recommendations

After consideration of the different proposals presented during the workgroup's stakeholder meetings, stakeholder discussion, examining best practices in other states, and reviewing the written feedback solicited from stakeholders, Staff has developed its final set of recommendations for the Commission to consider. As explained further in Section 5.1, Staff is providing its final recommended proposal for utilities filing before updates to the MIRPP and IRP Filing Requirements are finalized by the Commission, expected by the end of 2022, referred to as the 'Near-term Carbon Reduction Options' proposals, or Near-term filings. Due to the timing of these recommendations, Staff expects significant further development needed to create a proposal for utility IRPs filed after the next update to the MIRPP and IRP Filing Requirements are approved by the Commission, referred to as Long-term filings. Opportunities to develop these additional proposals, and to ensure these changes are reflected in the MIRPP and IRP filing requirements, will occur in later phases of the Advanced Planning Processes workgroup and are expected to be included in the May 27, 2021 Staff report to the Commission.

5.1 Selected Proposal

Near-term Carbon Reduction Options

(effective for IRP's filed before the next updates to the MIRPP and IRP Filing Requirements are approved by the Commission)

Staff recommends the following options in response to the carbon reduction goal stated in ED 2020-10. The Executive Directive identifies the Michigan Department of Environment, Great Lakes and Energy (EGLE) as leading the carbon reduction effort, therefore Staff's recommendations are offered as a near-term approach to illustrating what achieving the goals of ED 2020-10 may look like. Longer term methodologies will continue to be discussed in the context of the Phase II and Phase III Advanced Planning workgroup. Further discussion will integrate guidance available as a result of EO 2020-182 directing "the Department of Environment, Great Lakes, and Energy, through its Office of Climate and Energy, to develop, issue and oversee the implementation of the MI Healthy Climate Plan."[34]

Staff's recommendations take into account stakeholder responses to this topic, while also honoring the tight timelines for those utilities planning Near-term filings by aiming to build upon information that is, to the extent possible, part of the current MIRPP. Staff's overarching recommendation is that all utilities filing a Near-term IRP model one scenario that achieves the goals of ED 2020-10. Staff offers two options that evaluate a slightly different path toward achieving the net zero carbon emissions goal by 2050.

One of Staff's considerations hinged on the interpretation of compliance with ED 2020-10. Of consideration is whether compliance with this directive could be met by instituting requirements to model the stated interim goal of 28% carbon emissions reduction by 2025 from 2005 amounts, or if utilities would be required to consider the carbon emissions of the entire economy in its model. If required to consider the impact of the entire economy on carbon emissions, the assumption of a slower decarbonization transition in other sectors, such as transportation and industrial sectors, necessitates the electric power sector exceed the interim goal for the purpose of making up for the under-achievement in carbon emissions reductions in other sectors. Based upon stakeholder feedback, and without additional guidance from EGLE, Staff applied a separate interim 2025 goal for each option presented: a 28% and 32% reduction for options 1 and 2, respectively. Staff considered the analysis performed by the Joint Commenters when developing option 2's interim goal. Staff developed this goal by accounting for the necessary carbon emissions reduction in the energy sector to achieve an economy-wide reduction in carbon emissions of 28% by 2025, assuming other sectors continue to reduce carbon at historical rates. Staff's analysis is similar to the one performed by the Joint Commenters but differed in its assumption on other sectors continuing to reduce carbon emissions at a rate similar to historical levels.

Another of Staff's consideration was the overall impact of electrification on utility load growth. Staff clearly understands that there are a multitude of variables to consider when evaluating the overall impact of electrification on load growth. Some stakeholders believe that the impact of electrification will result in significant load growth for the utility, while others view electrification as resulting in flat or declining load. Both outcomes bare significant risk to ratepayers. Future MIRPP and filing requirement

[34] *https://www.michigan.gov/whitmer/0,9309,7-387-90499_90705-540277--,00.html#:~:text=Executive%20Order%202020%2D182%3A%20Council%20on%20Climate%20Solutions,-EXECUTIVE%20ORDER&text=The%20science%20is%20clear%2C%20and,largely%20responsible%20for%20this%20change., retrieved 12/4/20.*

updates should include discussion about appropriate load forecast assumptions that allow for full evaluation of the risk associated with an increased need for grid resources with the risk of stranded investments in both existing and new resources.

Staff's near-term options aim to leverage data to build the scenario that simply alters an existing scenario specified as part of the current MIRPP, leveraging information that is already available to utilities. Both options will provide necessary information to the Commission about paths toward carbon neutrality for each of the utilities filing an IRP in the near-term.

Option 1

Perform one additional IRP modeling run to illustrate a path toward an electrification future and meet the interim goal of 28% carbon reduction by 2025 and continue along a trajectory toward net zero carbon emissions by 2050, as stated in ED 2020-10. This approach will help identify potential risks of this future scenario, such as consideration for resource interconnections and overall system reliability.

- Run the Environmental Policy scenario as defined in the MIRPP[35] and apply the Company's proposed course of action through the 15-year planning horizon, including the following changes in that run. Allow the model to build additional resources as needed.[36]
- Reduce carbon emissions by at least 28% of the utility's 2005 amounts by 2025, accomplished by modeling a hard cap on carbon emissions in 2025. Demonstrate a reasonable path to achieving carbon neutrality in 2050 by continuing to reduce carbon emissions through the end of the planning horizon.
- Apply a high load growth through the study period of 2% annually, up from the required 1.5% sensitivity included in the MIRPP Environmental Policy scenario. The increase in annual load growth will reflect an increase in load due to electrification.
- Include all carbon emissions for owned generation units, power purchase agreements, MISO market energy purchases, and electricity used for the organization. Compare the projected carbon reduction achieved by the model through the 15-year planning horizon to the 2025 goal of a 28% carbon reduction and illustrate a trendline to the eventual 2050 goal. Given the likelihood of significant carbon emissions reductions occurring in single year intervals coinciding with the retirement of existing high-capacity fossil-fueled generation, this trendline should be levelized to provide the analogous annual emissions reduction rate through the planning horizon and beyond. Supply supporting evidence with necessary testimony and exhibits, including identifying any years in the planning horizon in which the model varies in carbon emissions significantly from the trendline, why this variation is occurring, and any actions planned to ensure the utility will stay on track to meet the 2050 goal.

[35] *11/21/17 Order, MPSC Case No. U-18418, Exhibit A, pp 20-21.*

[36] *Staff is not recommending that utilities model out to the 2050 carbon neutrality goal timeframe, due to declining certainty in projections over a thirty-year timeframe.*

- Provide exhibits that chart carbon emissions reductions through the 15-year planning horizon and illustrate the continued carbon emissions reduction trajectory necessary to meet the 2050 goal. Include exhibits that provide annual projected emissions for CO2, SOx, NOx, Mercury, and PPM through the 15-year planning horizon for the proposed course of action and each scenario optimized plan, including any additional scenarios developed by the utility. A copy of all exhibits in their native format, with all formulae intact, should be provided in additional documentation that accompanies the IRP filing.
- This additional modeling run would apply to utilities who serve customers in MISO local resource zone 7 (Lower Peninsula) as well as local resource zone 2 (Upper Peninsula). Utilities serving customers in the Upper Peninsula may not have included the Environmental Policy scenario in previous IRPs, as provided for in the MIRPP previously approved by the Commission.[37]

Option 2

Perform one additional IRP modeling run to illustrate a path toward an electrification future and achieve an increased interim goal for the electric sector of a 32% reduction in carbon emissions from 2005 levels by 2025. This option increases the interim 2025 goal beyond the 28% carbon emissions reduction specified in ED 2020-10. This interim goal is responsive to stakeholder feedback and analysis that attempted to calculate the additional near-term carbon reductions the electric power sector would need to make to achieve an economy-wide reduction in carbon emissions of 28% by 2025. This option assumes that historical emissions reduction trends in other sectors will continue.

- Run the MIRPP Environmental Policy scenario [38] and apply the proposed course of action through the 15-year planning horizon, including the following changes in that run. Allow the model to select additional resources as needed.
- Decrease carbon emissions more aggressively by achieving at least a 32% reduction in utility carbon emissions by 2025 from 2005 amounts, modeled as a hard cap on carbon emissions in 2025. Demonstrate a reasonable path to achieving carbon neutrality in 2050 by continuing to reduce carbon emissions through the end of the planning horizon.
- Apply a high load growth through the study period of 2% annually, up from the required 1.5% sensitivity included in the MIRPP Environmental Policy scenario. The increase in annual load growth will reflect an increase in load due to electrification.
- Include all carbon emissions for owned generation units, power purchase agreements, MISO market energy purchases, and electricity used for the organization. Compare the projected carbon emissions reduction achieved by the model through the 15-year planning horizon to the 2025 goal of a 32% carbon emissions reduction and illustrate a trendline to the eventual 2050 goal. Given the likelihood of significant carbon emissions reductions occurring in single year

[37] *11/21/17 MPSC Order in Case No. U-18418, Exhibit A, pp. 20-23.*
[38] *Id, at pp 20-21.*

intervals coinciding with the retirement of existing high-capacity fossil-fueled generation, this trendline should be levelized to provide the analogous annual emissions reduction rate through the planning horizon and beyond. Supply supporting evidence with necessary testimony and exhibits, including identifying any years in the planning horizon in which the model varies in carbon emissions significantly from the trendline, why this variation is occurring, and any actions taken to ensure the utility will stay on track to meet the 2050 goal.

- Provide exhibits that chart carbon emissions reduction through the 15-year planning horizon and illustrate the continued carbon emission reduction trajectory necessary to meet the 2050. Include exhibits that provide annual projected emissions for CO2, SOx, NOx, Mercury, and PPM over the 15-year planning horizon, and through 2050 for the preferred plan and each scenario optimized plan including any additional scenarios developed by the utility. All exhibits should be provided in their native format, with all formulae intact, in the workpapers included in the IRP filing.
- This additional modeling run would apply to utilities who serve customers in MISO local resource zone 7 (Lower Peninsula) as well as local resource zone 2 (Upper Peninsula). Utilities serving customers in the Upper Peninsula may not have included the Environmental Policy scenario in previous IRPs, as provided for in the MIRPP previously approved by the Commission.[39]

Multi-state utilities filing before the next update to the MIRPP and IRP Filing Requirements

Staff recommends that the Commission direct multi-state utilities to perform an additional modeling run that shows how its Michigan service territory will meet the carbon emissions reduction goals set forth in ED 2020-10. MCL 460.6t. section 4 requires the Commission to accept an integrated resource plan filed in another state for the purposes of filing in this state. That same section of the statute allows the Commission to "require supplemental information if necessary as part of its evaluation and determination of whether to approve the plan."[40] Staff finds that this additional modeling run is necessary to provide supplemental information to ensure multi-state utilities are on track to meet the carbon emissions goals of ED 2020-10..

The impact on multi-state utilities is different than the impact on utilities whose service territory is fully contained within the Michigan State boundaries. The impact of an electrification future in Michigan would potentially increase the Michigan portion of the total multi-state utility load. The interim carbon goal should be appropriately proportioned to reflect the amount of the utility's Michigan service territory load as a portion of the total utility's system load, while considering anticipated load growth in the rest of the utility's service territory that may not have the same carbon emission reduction goals as Michigan. For example, if the Michigan portion of a multi-state utility's load represents 25% of its total service territory load and a 50% carbon emission reduction is required by a specific year then that

[39] *Id, at pp. 20-23.*
[40] *MCL 460.6t, Section (4).*

utility would be expected to achieve a 12.5% carbon reduction to meet the ED 2020-10 goal for its Michigan service territory, (25%*50%=12.5%).

In the alternative, the Commission could allow multi-state utilities more flexibility to demonstrate compliance with the carbon emission reduction goals. This would require that supporting testimony and exhibits provide clear information from the multi-state utility's existing scenarios that illustrate an electrification and carbon neutral future in its Michigan service territory. This supporting evidence must show the overall impact to load, utility resources, and emissions and demonstrate a path towards the ED 2020-10 carbon emission reductions.

5.2 Next Steps for Incorporation of Proposal into IRP Planning Process

This report will be filed in the docket for Case No. U-20633 by 5:00 PM (EST) on December 15, 2020. Stakeholders are encouraged to provide comments on the report, to the docket, on or before January 12, 2021 at 5:00 PM (EST). Staff recommends the Commission select one option for utilities filing IRPs before the next updates to the MIRPP and IRP Filing Requirements are finalized, and one option for multi-state utilities to meet the goals of ED 2020-10. As stated in Section 5.1, discussions will continue in Phases II and III of the MI Power Grid Advanced Planning processes work group on the development of a proposal for utilities filing after the next updates to the MIRPP and IRP Filing Requirements are approved by the Commission, expected in 2022. A proposal for the long-term filings will require updates to the MIRPP and IRP filing requirements, and its implementation will include any guidance from EGLE and the Council on Climate Solutions that is available to Staff at that time.

Staff appreciates the robust involvement of the various stakeholders in the workgroup sessions so far. Utility and stakeholder participation have been invaluable to the development of this report. Continued participation is vital to this process as Staff and the Commission consider future updates to the MIRPP and IRP filing requirements necessary to model and plan for the carbon emission reduction goals set forth in the Governor's executive actions.

Appendices

A.1 Staff's Straw Proposal

At the October 21, 2020 stakeholder meeting for the 'Integration of Resource/Distribution/Transmission Planning' workgroup of the MI Power Grid initiative, Staff presented a straw proposal with different reporting options for future utility IRPs to comply with the emissions reductions goals established by the Governors' directives. As directed in the Commission's Order, Staff provided two separate sets of compliance options, one for utilities filing before December 1, 2022, and one for utilities filing after. Table 3 includes the options Staff presented for utilities filing after December 1, 2022, while Table 4 includes the options Staff presented to utilities for filing before this date.

Table 3. Staff's straw proposal for emissions disclosure requirements for utilities filing after December 1, 2022.

<table>
<tr><th>Option 1</th><th>Option 2</th><th>Option 3</th><th>Option 4</th></tr>
<tr><td colspan="2">Requires MIRPP <u>BAU</u> scenario change to include carbon goal of 28% reduction by 2025 as a sensitivity.</td><td>Requires MIRPP change to <u>all</u> scenarios reflecting the Carbon goal of 28% reduction by 2025 as a sensitivity.</td><td>Requires MIRPP change to all scenarios reflecting Carbon Neutrality by 2050 and therefore modeling as a sensitivity.</td></tr>
<tr><td colspan="3">If the utility preferred plan does not comply with the 2025 goal, include an optimized alternative plan that does comply with the 2025 goal and compare to the preferred plan.</td><td>If the utility preferred plan does not comply with the 2050 goal, include an optimized alternative plan that does comply with the 2050 goal and compare to the preferred plan.</td></tr>
<tr><td>Charts Carbon out to 2025.</td><td colspan="2">Charts Carbon out to the 15-year planning horizon to illustrate a path toward 2050.</td><td>Charts Carbon out to 2050 in Exhibit to illustrate goal.</td></tr>
<tr><td colspan="3">Spreadsheet of CO2, SOx, NOx, Mercury, and PPM for each year of the 15-year planning horizon for the utility's preferred plan and each MIRPP scenario optimized plan.</td><td>Spreadsheet of CO2, SOx, NOx, Mercury, and PPM for each year out to 2050 for the utility's preferred plan and each MIRPP scenario optimized plan.</td></tr>
</table>

Table 4. Staff's straw proposal for emissions reporting requirements for utilities filing before December 1, 2022.

Option 1	Option 2
No MIRPP Update but Commission order directing addendum to filing requirements.	
Charts Carbon out to 2025 compared to 28% Carbon reduction.	Charts Carbon out to the 15-year planning horizon to illustrate the path toward 2050 and highlighting when the utility achieves a 28% reduction.
Spreadsheet of CO2, SOx, NOx, Mercury, and PPM for each year of the 15-year planning horizon for the utility's preferred plan and each MIRPP scenario optimized plan.	

A.2 Stakeholder Alternate Proposals

At the November 6, 2020 stakeholder meeting for the 'Integration of Resource/Distribution/Transmission Planning' workgroup of the MI Power Grid initiative, stakeholders presented proposals to updating the emissions disclosure requirements in utility IRPs, as alternatives

to Staff's straw proposal. Two stakeholder groups presented alternate proposals for consideration, Andrew Williamson from Indiana Michigan Power Company, and Douglas Jester representing the Ecology Center, Environmental Law & Policy Center, Natural Resources Defense Council, Michigan Environmental Council, Sierra Club, Union of Concerned Scientists, and Vote Solar (Joint Commenters). The following sections provide the presentations given by these parties at the November 6, 2020 stakeholder meeting.

A.2.1 I&M's Alternate Proposal

INDIANA MICHIGAN POWER
An AEP Company

Overview

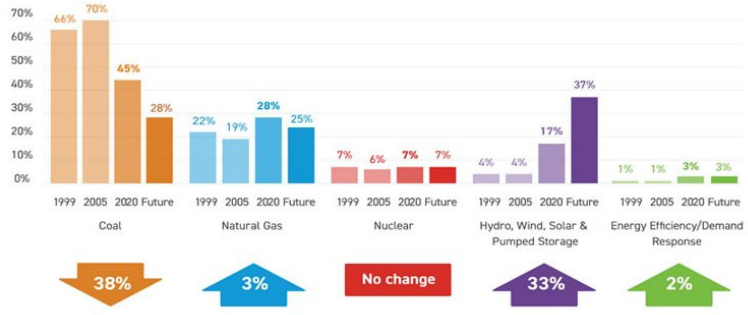
- Fully integrated, multi-jurisdictional utility energy company
- ~ 600,000 retail customers in Michigan and Indiana
  - Indiana: ~472,000
  - Michigan: ~130,000
- ~390 MW of long-term full requirements wholesale contracts
- Part of the American Electric Power system
- Member of PJM Interconnection, LLC (PJM)
- Total-company Integrated Resource Planning process
  - Supports resource transformation, diversity, adequacy, and economies of scale
- 100% carbon-free generation in Michigan

BOUNDLESS ENERGY™

INDIANA MICHIGAN POWER
An AEP Company

AEP Alignment with ED 2020-10

TRANSFORMING OUR GENERATION FLEET— AEP'S GENERATING RESOURCE PORTFOLIO



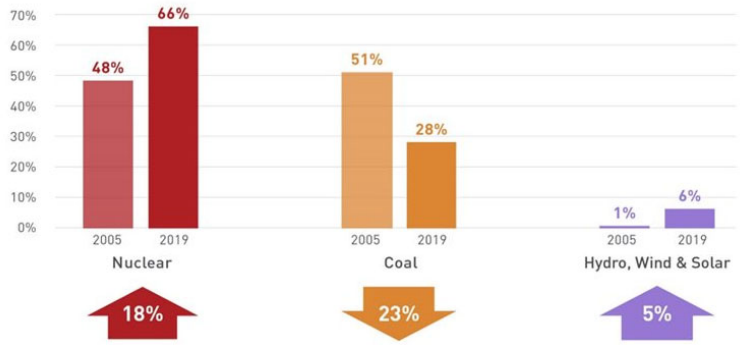
As of March 31, 2020. Future includes IRP forecasted additions and retirements through 2030.
Energy Efficiency/Demand Response represents avoided capacity rather than physical assets.

AEP's Carbon Reduction Goals: 70% by 2030; 80% by 2050

BOUNDLESS ENERGY™

I&M Generation Transformation

I&M's TRANSITIONING GENERATION - MWH ENERGY PRODUCTION



I&M is Undergoing Just Transition of its Generating Resources

BOUNDLESS ENERGY™

4

Key Considerations and Recommendations

- Maintain single IRP for multi-state companies
  - Comprehensive stakeholder process in which ELGE can actively participate
  - Consistent scenarios and planning horizon
  - Opportunity for supplemental information in Michigan filing
- Clarify application of ED 2020-10 to the IRP process
  - Only applicable to in-state resources
  - What if goal is already achieved
- Recognize need for future dispatchable generation
  - IRP conducted every three years
  - Potential for changes in technology and fuel sources

Stakeholder Process Appropriate Forum to Consider Input about Healthy Climate Plan

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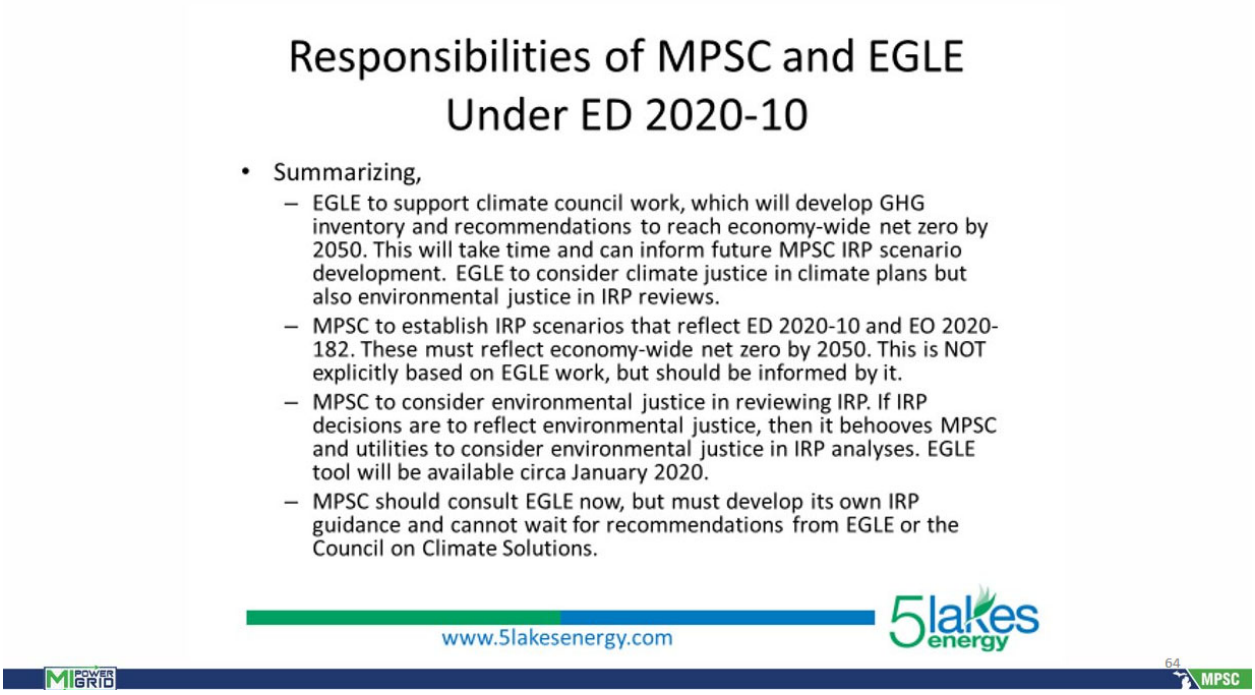
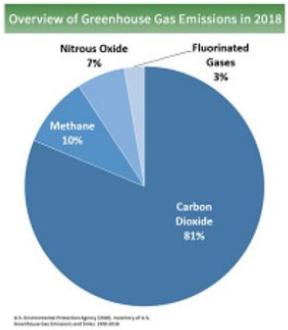
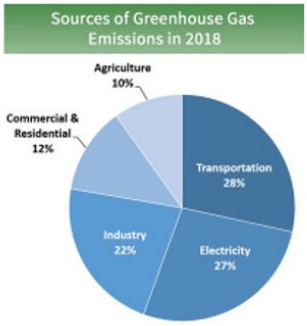
5

A.2.2 Joint Commenters' Alternate Proposal



GHG Emissions are Mostly from Fossil Fuel Combustion for Energy





Emissions of nitrous oxides and methane from agriculture will be particularly challenging to eliminate. Converting methane to carbon dioxide through energy production may be partial solution. Energy transition to eliminate GHG emissions must be comprehensive to reach net zero emissions by 2050.

Emissions Scope for Governor's Directive

- Sustainability programs often discuss emissions scope
  - Scope 1: All Direct Emissions from the activities of an organization or under their control. Including fuel combustion on site such as gas boilers, fleet vehicles and air-conditioning leaks.
  - Scope 2: Indirect Emissions from electricity purchased and used by the organization. Emissions are created during the production of the energy and eventually used by the organization.
  - Scope 3: All Other Indirect Emissions from activities of the organization, occurring from sources that they do not own or control. These are usually the greatest share of the carbon footprint, covering emissions associated with business travel, procurement, waste and water.

Emissions Scope for Governor's Directive

- What should MPSC address?
  - When we approach zero net emissions economy-wide, there are no scope 2 or 3 emissions, so it is sufficient to focus on scope 1 emissions
  - Strategies to eliminate emissions from other energy sources inevitably lead to substantial, perhaps complete, electrification that should be included in electricity demand forecasts
  - Governor's directive addresses Michigan, so in some scenarios there may be imports from outside Michigan that produce scope 2 and 3 emissions
  - Electricity is the only form of energy where the location of emissions can substantially differ from the location of energy use
  - Michigan is trying to lead, not control other jurisdictions and trade is inevitable.
  - As a practical but meaningful approach, **we recommend that MPSC address Scope 1 emissions economy-wide within Michigan and Scope 2 emissions for utility imports of electricity and other energy from outside Michigan.**

What is the role of GHG offsets?

- Offsets have traditionally included emissions reductions outside the scope of regulations or voluntary commitments.
- When we approach zero net emissions economy-wide, there are no out of scope emissions reductions.
- In the long run, potential offsets are limited to carbon sequestration. Potential carbon sequestration using known methods is small relative to carbon emissions and should be reserved for offsetting emissions that are truly difficult to reduce. **We recommend that the Commission not consider carbon offsets for electric power generation in IRPs.**

Michigan Energy-Related CO2 Emissions Baseline

Michigan Carbon Emissions 2005 (million metric tons)	Residential Sector	Commercial Sector	Industrial Sector	Transportation Sector	Electric Power Sector	All Sectors
Coal	0.0	0.3	7.3	0.0	67.8	75.4
Petroleum Products	4.6	0.9	5.8	53.8	0.8	65.9
Natural Gas	19.3	9.4	12.0	1.5	7.0	49.2
Total	23.9	10.6	25.1	55.3	75.6	190.5

Michigan Carbon Emissions 2017 (million metric tons)	Residential Sector	Commercial Sector	Industrial Sector	Transportation Sector	Electric Power Sector	All Sectors
Coal	0.0	0.0	5.0	0.0	42.6	47.6
Petroleum Products	2.3	1.6	3.3	48.4	1.3	56.9
Natural Gas	16.6	9.0	9.7	1.1	11.7	48.1
Total	18.9	10.6	18.0	49.5	55.6	152.7

Michigan Carbon Emissions 2017-2005 (% change)	Residential Sector	Commercial Sector	Industrial Sector	Transportation Sector	Electric Power Sector	All Sectors
Coal		-89%	-32%		-37%	-37%
Petroleum Products	-49%	78%	-43%	-10%	63%	-14%
Natural Gas	-14%	-4%	-19%	-27%	67%	-2%
Total	-21%	0%	-28%	-10%	-26%	-20%
				Further reduction by 2025 (MMT)		-15.5
				% Reduction 2017-2025		-10.2%

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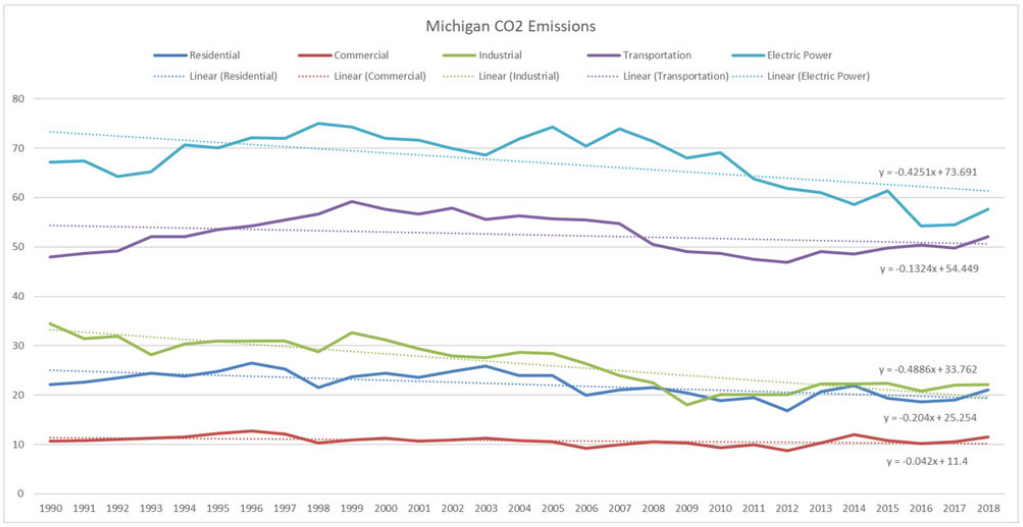
What are the trends?



How do we reach 28% economy-wide CO2 reduction by 2025?

- Although long-term trends are declining CO2 emissions in all sectors, only Electric Power was changing significantly in the last decade.
- Building shell and HVAC equipment, and vehicles are long-lived and turn over slowly, so there is no basis to project significant improvements by 2025 based on new policy.
- If other sectors don't improve over 2018, Electric Power needs to reduce CO2 emissions to about 37 MMT in 2025, a 21 MMT reduction from 2018. If other sectors improve at the rate of long-term trends, Electric Power needs to reduce CO2 emissions to 44.4 MMT, a 13.2 MMT reduction. 2018 Electric Power emissions were 57.6 MMT.*

*These calculations need to be redone, presented and vetted before adoption. There are small differences between data sources that are nonetheless important to resolve.

How do we reach 28% economy-wide CO2 reduction by 2025?*

- Achieving 8 MMT emissions reductions in non-power sectors by 2025 likely includes:
  - 2% gas EWR programs
  - Restoration of CAFÉ standards
  - 8% of vehicle sales are electric by 2025 (we are currently at about 0.8%)
  - 100% electrification of 1% of buildings
- Achieving a 13.2 MMT carbon emissions reduction from the Electric Power sector likely includes retiring Erickson, Campbell 1 and 2, and one Belle River unit before 2025, replacing them with EWR (at about 1.75%), renewables (at about 25%), and load management/demand response.
- Achieving a 21 MMT carbon emissions reduction from the Electric Power sector likely also requires retiring the other Belle River unit, EWR at 2% and pushing renewables to 30% by 2025.

*These calculations need to be redone, presented and vetted before adoption. There are small differences between data sources that are nonetheless important to resolve.

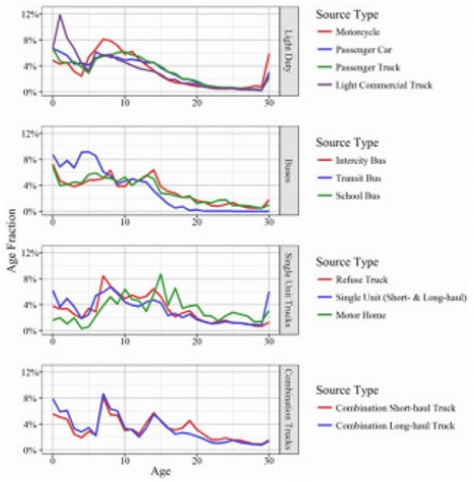
How do we decarbonize power sector by 2050?

- Retire all fossil fuel generation by 2050 and replace with carbon-free resources
  - All generation must be carbon-free by 2050.
  - All fossil assets must be considered for retirement in IRP analyses.
  - Revenue requirements for new fossil-fueled generation options in IRP must assume depreciation by 2050
  - Revenue requirements for maintenance investment in existing fossil-fueled generation must assume depreciation by 2050 or projected retirement, whichever is first. Retirement analyses must reflect this.

How do we decarbonize transportation by 2050?

- Fuel efficiency is not sufficient, carbon-free propulsion energy is necessary
- Biomass-based fuels should not be double-counted and quantitatively are limited to small niches
- Carbon-free propulsion using hydrogen or synthetic liquid fuels will based on electric energy or equivalent solar energy
- Recommendation: Assume electrification of all transportation

How do we decarbonize transportation by 2050?



These are age distributions, but you can approximately infer life distributions. Average scrappage age for Light-Duty Vehicles is 15.6 years, for Buses is 14.7 years, for Single-Unit Trucks is 18.2 years, for Combination Trucks is 20.1 years.

Carbon-free vehicles by 2050 requires either fast ramp-up or stranded costs post 2050. Recommendation: Assume all-electric vehicle sales by 2035 with S-curve ramp-up by then.

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Transportation Electrification Calculations

Motor Gasoline		
Michigan		
Quantity	Units	Notes
96,214,894,000	miles	Michigan non-commercial VMT (MDOT, 2018)
551.6	tBtu	Michigan motor gasoline consumption excluding ethanol (US EIA, 2
120,286	Btu/gallon	Motor gasoline conversion factor (US EIA)
4,419,466,987	gallons	2018 MI motor gasoline (assuming all non-commercial VMT)
2.50	$/gallon	Assumed average gasoline retail price
20.78	$/MMBtu	
11,048,667,343	$	MI annual spending on gasoline
0.115	$/mile	MI average gasoline cost per mile
0.30	kWh/mile	Assumed EV electricity use per mile
		Note: Roughly 85% of EV charging is residential
3.412	MMBtu/MWH	Conversion factor
42.95	$/MWH	MI average electric G&T $/MWH (DTE and CE PSCR data)
12.41	$/MMBtu	MI average electric G&T $/MMBtu
154.67	$/MWH	MI residential $/MWH (US EIA, 2018)
45.35	$/MMBtu	MI residential $/MMBtu
0.01	$/mile	MI EV cost per mile (at G&T unit cost)
0.05	$/mile	MI EV cost per mile (at residential sales per MWH)
1,222,565,125	$	MI annual spending on EV electricity (at average G&T $/MWH)
4,464,365,952	$	MI annual spending on EV electricity (at average residential $/MWH
3.412	MMBtu/MWH	Conversion factor
28,864,468	MWH	MI annual increment of electricity for EVs
98,485,565	MMBtu	MI annual increment of electricity for EVs
111,971,400	MWH	MI annual electricity sales (US EIA, 2018)
0.259		MI EV increment/electricity sales

This is a sample calculation of the kinds that will be needed for each vehicle class and fuel type. This calculation is for complete electrification of gasoline vehicles but in electricity demand forecasts will need to follow the vehicle fleet makeup.

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How do we decarbonize heating by 2050?

18.9 MMT CO2 in 2017

Residential Heating Fuel Usage	Space heating[3]	Water heating	Other[4]
	77%	19%	4%

Efficiency & Electrification

10.6 MMT CO2 in 2017

Commercial Heating Fuel Usage	Space heating	Water heating	Cooking	Other
	78%	12%	8%	2%

Efficiency & Electrification

18.0 MMT CO2 in 2017

Industrial Sector Heating Fuel Usage	Heating Fuel %	Cumulative Heating Fuel %
Ethyl Alcohol	18.7%	18.7%
Iron and Steel Mills and Products	16.1%	34.8%
Food	14.6%	49.3%
Fabricated Metal Products	10.6%	60.0%
Petroleum Refineries	7.4%	67.3%
Paper and Wood Products	5.7%	73.0%
Nonmetallic Mineral Products	4.9%	77.9%
Transportation Equipment	4.1%	82.0%
Machinery	2.7%	84.7%
Plastics and Rubber Products	2.2%	86.9%
Alumina and Aluminum	2.1%	89.0%
Nitrogenous Fertilizers	2.0%	91.1%
Glass	2.0%	93.1%
Building Materials	1.6%	94.7%
Other	5.3%	100.0%

Efficiency, Recycling, Substitution, & Electrification

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How do we decarbonize building heating by 2050?

- Heat pumps are now the technology of choice for electric heating both space and water. Heat pumps can be geothermal, well water, air source, and can be deployed per building or as district heating or district geothermal
- Average HVAC and water heating equipment life is about 15 years, so as with transportation we should assume 100% electric equipment sales by circa 2035
- Adoption from now to 2035 should begin with switching from propane to electric, then progress to switching from gas. Renewable natural gas and hydrogen are alternative delivery methods but in a decarbonized economy will need to be produced from electricity or equivalent solar technologies
- Efficiency measures such as shell improvements that reduce the need for heat will make electrification cheaper but need not be treated as a prerequisite of electrification

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Building Heating Electrification Calculations

Residential Propane		
Michigan		
Quantity	Units	Notes
91,433	Btu/gallon	Propane conversion factor (US EIA)
367,200,000	gallons	MI 2017 residential propane consumption (source: https://www.propanec
33,562,884	MMBtu	MI 2017 residential propane consumption
		Note: assume all residential propane is for heating
0.85		Assumed average furnace efficiency
28,528,451	MMBtu	MI annual heating demand
1.74	$/gallon	Assumed average retail price of propane
19.04	$/MMBtu	Average retail price of propane
638,947,000	$	MI annual spending on residential propane
2.0		Assumed heat pump coefficient of performance (COP)
3.412	MMBtu/MWh	Conversion factor
14,264,226	MMBtu	MI annual heating demand, heat pumps
4,180,605	MWh	MI annual increment of electricity for heat pumps
42.35	$/MWh	MI average electric G&T $/MWh (DTE and CE PSCR data)
12.41	$/MMBtu	MI average electric G&T $/MMBtu
154.87	$/MWh	MI average residential $/MWh (US EIA, 2018)
45.33	$/MMBtu	MI average residential $/MMBtu (US EIA, 2018)
177,068,177	$	MI annual spending on heat pump electricity (at average G&T $/MWH)
646,603,615	$	MI annual spending on heat pump electricity (at average residential $/MWh
0.30		EE Scenario: heating energy savings from building improvements
19,969,916	MMBtu	MI annual heating demand (EE Scenario)
23,494,019	MMBtu	MI residential propane sales (EE Scenario)
447,262,900	$	MI annual spending on residential propane (EE Scenario)
9,984,958	MMBtu	MI annual heating demand, heat pumps (EE Scenario)
2,926,424	MWh	MI annual increment of electricity for heat pumps (EE Scenario)
123,947,724	$	MI annual spending on heat pumps (at average G&T $/MWh; EE Scenario)
452,622,530	$	MI annual spending on heat pumps (at average residential $/MWh; EE Scen
111,571,499	MWh	MI annual electricity sales (US EIA, 2018)
0.037		MI electricity for heat pumps/total electricity sales
0.026		MI electricity for heat pumps/total electricity sales (EE Scenario)

This is a sample calculation of the kinds that will be needed for each heating fuel and heat pump type. This calculation is for complete electrification of residential propane but electricity demand forecasts will need to track projected adoption.

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How do we decarbonize industrial heating by 2050?

- Electrifying transportation will largely eliminate demand for petroleum products and will likely reduce use of ethanol as a transportation fuel
- Ethanol and other biomass processing may replace petroleum as chemical feedstock (which will largely make biomass unavailable for energy products)
- Recycling primary materials can reduce energy requirement
- Equipment life, process substitution to reduce heating requirement or to electrify will vary by industry
- Recommendation: **Develop industry-specific electrification and electricity demand forecasts**

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Summary of Recommendations

- This presentation was only a sketch. IRP scenarios will need vetted calculations and additional details about assumptions, etc.
- Realistically meeting 28% economy-wide carbon emissions reduction from 2025 by 2025 requires power generation to achieve about a 36% carbon emissions reduction from 2018 by 2025.
- Achieving economy-wide net zero GHG emissions by 2050 requires zero-emissions power sector and nearly complete electrification of both transportation and buildings and substantial electrification of industrial heat. Electrification by 2050 requires all-electric equipment sales by about 2035, ramping up to that from 2020.
- MPSC IRP scenarios should incorporate these assumptions about power generation and load growth.

A.3 Stakeholder Feedback on Proposals

A.3.1 Comments from ABATE

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

* * * * *

In the matter, on the Commission's own motion, to commence a collaborative to consider issues related to integrated resource and distribution plans.	Case No. U-20633

COMMENTS OF THE
ASSOCIATION OF BUSINESSES ADVOCATING TARIFF EQUITY

I. INTRODUCTION

At the November 6, 2020 stakeholder session in this proceeding Commission Staff requested feedback regarding the following: (i) Staff's straw proposal and the additional presentations provided concerning compliance with Governor Whitmer's Executive Directive 2020-10; and (ii) the presentations given including those from the Electric Power Research Institute ("EPRI"), Duke Energy, and Dominion Energy regarding the integration and alignment of generation, transmission, and distribution planning. ABATE's general comments on these issues are included below.

II. COMMENTS

A. Generation retirements should be coordinated pursuant to a generation retirement analysis.

Executive Directive 2020-10 directs, among other things, that Michigan "will aim to achieve a 28% reduction below 2005 levels in greenhouse gas emissions by 2025."[1] Staff's straw proposals presented at this workgroup's October 21, 2020 session as well as the presentations

[1] https://www.michigan.gov/whitmer/0,9309,7-387-90499_90704-540278--,00.html

1

provided at the November 6, 2020 session included consideration of generation resource transitioning and, by extension, retirement of coal generation.

In considering such retirements it is important they are coordinated pursuant to a generation retirement analysis and "scorecard" review similar to what other utilities (such as the Northern Indiana Public Service Company ("NIPSCO")[2]) have utilized. Considering retirements based on such analyses will ensure decisions regarding what units need to be retired and when such retirements should occur are reasonable and informed. Such a process will also assist with transparency as well as customer expectations and foresight.

B. Transparency, stakeholder engagement, and probabilistic modeling are key elements of generation, distribution, and transmission system planning.

As ABATE has indicated throughout this proceeding (as well as the distribution system planning workgroup sessions conducted in Docket No. U-20147), it is imperative that planning processes involve transparency, stakeholder engagement and involvement to the greatest extent possible, and probabilistic modeling to properly identify and evaluate risk.

As such, Staff's questions for stakeholder discussion at the November 6, 2020 session regarding externalities are important. Coordinating review of generation, distribution, and transmission system planning through the IRP process and pursuant to the MIRPP Filing Requirements will ensure a reasonable and credible approach to these issues, including the consideration of externalities and the methods for addressing the same. Further, probabilistic modeling and risk assessment is important to appropriately gauge externalities and risks, particularly their likelihood and magnitude. In other words, when considering externalities and

[2] See e.g. NIPSCO's 2018 Integrated Resource Plan at 145, 149-58. NIPSCO's retirement analysis was undertaken to "evaluate the preferred coal retirement strategy over time." https://www.nipsco.com/docs/librariesprovider11/rates-and-tariffs/irp/2018-nipsco-irp.pdf?sfvrsn=15

risk it is necessary to determine the size of the risk being avoided when analyzing the cost of avoidance. This type of conscientious planning can help mitigate the potential for fears and concerns regarding reliability and resilience to result in investments beyond an amount and before a time when such measures may be necessary. In short, such modeling can help determine the risks various parties may be willing to accept or mitigate in alternative methods and can avoid unnecessary cost increases.

III. CONCLUSION

Pursuant to Staff's solicitation of feedback ABATE recommends Staff incorporate consideration of the issues and points raised above into this stakeholder proceeding.

Respectfully submitted,

CLARK HILL PLC

By: Stephen A. Campbell

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Date: November 16, 2020

A.3.2 Comments from ACEEE

ACEEE COMMENTS ON THE NOVEMBER 6, 2020 PRESENTATIONS IN THE ADVANCED PLANNING PROCESS

by

Martin Kushler, Ph.D.

Senior Fellow, ACEEE

ACEEE appreciates the open public process that the MPSC is conducting in this matter, and the opportunity to comment at appropriate times in the process.

Regarding the presentations on November 6th, I just have one comment at this point. That is on the otherwise excellent presentation by Douglas Jester. On slide 31 of the meeting slide deck, there appears the following bullet:

- Efficiency measures such as shell improvements that reduce the need for heat will make electrification cheaper but need not be treated as a prerequisite of electrification.

I am concerned that this statement risks greatly under-valuing the importance of energy efficiency in making building electrification feasible. ACEEE supports beneficial electrification that reduces fossil energy use and greenhouse gas emissions. However, absent substantial building shell efficiency improvement, electrification will not only be overly expensive to the building owner (both in first cost and operational cost of the heat pump equipment and back-up heating sources), but also to the electric utility system which will require much more electric supply. The notion of requiring that buildings achieve some particular level of high efficiency before receiving subsidies to electrify should definitely not be rejected out of hand, and at a minimum, aggressive policies should be in place to incent deep building shell efficiency improvements as a part of any electrification program.

The Center for Energy and Environment (CEE) in Minnesota recently published an analysis of the effects of installing air source heat pumps (ASHP) vs. installing ASHP along with deep efficiency improvements in the building shell.
https://www.mncee.org/blog/october-2020/electrification,-energy-efficiency,-and-peak-deman/

They found that including the deep efficiency improvements not only greatly reduced customer costs, it also greatly reduced annual electricity use as well as both summer and winter peak demand…relative to the impacts of simply installing the ASHP.

More broadly, numerous top experts have highlighted the crucial role that energy efficiency must make in any decarbonization strategy. In the seminal report *Pathways to Deep Decarbonization* (cited below), they identify the "three pillars of energy system transformation" as (1) energy efficiency and conservation; (2) decarbonizing electricity and fuels; and (3) switching energy end-uses to lower-carbon, and eventually zero-carbon energy carriers. They also conclude the following, which has particular relevance for the issue of coupling energy efficiency with ASHP:

> "All pathways incorporate these three pillars in an interactive way. For example, energy efficiency and conservation (pillar 1) reduces potential electricity demand and therefore facilitates the decarbonization of electricity (pillar 2) by limiting the need for deployment of low-carbon generation." (p. 8)

Numerous other top experts have described the essential role that energy efficiency must play in any pathway to decarbonization. I provide four example sources below.

In conclusion, I hope that the MPSC Staff and the Commission will emphasize the essential role of energy efficiency in achieving the objectives laid out in Governor Whitmer's Executive Directive, including the importance of combining aggressive building shell efficiency improvements with any policy to advance building electrification.

Thank-you very much for your attention.

Sincerely,

Martin Kushler, Ph.D.
Senior Fellow
ACEEE

Sources for Deep Decarbonization Analyses

PATHWAYS TO DEEP DECARBONIZATION
Published by the Sustainable Development Solutions Network (SDSN) and the Institute for Sustainable Development and International Relations (IDDRI), December 2015
https://www.iddri.org/en/publications-and-events/report/pathways-deep-decarbonization-2015-synthesis-report

OPTIONALITY, FLEXIBILITY, & INNOVATION: PATHWAYS FOR DEEP DECARBONIZATION IN CALIFORNIA
Energy Futures Initiative, 2019
https://static1.squarespace.com/static/58ec123cb3db2bd94e057628/t/5cadebd04cd61c00017a563b/1554901977873/EFI+California+Summary+DE+PM.pdf

HALFWAY THERE: ENERGY EFFICIENCY CAN CUT ENERGY USE AND GREENHOUSE GAS EMISSIONS IN HALF BY 2050
ACEEE, September 2019
https://www.aceee.org/research-report/u1907

ELECTRIFICATION, ENERGY EFFICIENCY, AND PEAK DEMAND
MNCEE blog Posted by Jenny Edwards October 16, 2020
https://www.mncee.org/blog/october-2020/electrification,-energy-efficiency,-and-peak-deman/

A.3.3 Comments from MEIBC/AEE

Michigan Energy Innovation Business Council
115 W. Allegan, Suite 710
Lansing, MI 48933

Advanced Energy Economy
1010 Vermont Ave NW, Suite 1050
Washington, DC 20005

November 17, 2020

The Michigan Energy Innovation Business Council (Michigan EIBC) and Advanced Energy Economy (AEE) appreciate the opportunity to provide feedback in response to the Staff straw proposal and the alternative proposals presented at the November 6, 2020 Integration of Resource/Distribution/Transmission Planning Workgroup Meeting. We support the Commission's continued attention to these important issues, and view this open, transparent stakeholder collaboration as one of the most important tools for ensuring that planning processes succeed and are aligned with state policy. AEE and Michigan EIBC provide brief initial reactions to the proposals below. We look forward to providing detailed feedback on Staff's forthcoming recommendations to the Commission and to our continued involvement in this workgroup.

Respectfully Submitted,

/S/
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/S/
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Managing Director
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Comments on straw proposals for modifying IRP planning parameters

For IRPs filed before 2023, Michigan EIBC and AEE prefer Option 2 in the Staff straw proposal (Slide 6). This option is consistent with the trajectory outlined in ED 2020-10. It ensures that utility reporting reflects the 2050 goals while also providing visibility into the near-term carbon reduction goals.

AEE and Michigan EIBC support the 5 Lakes Energy analysis and recommend that IRPs reflect its main conclusion that in the near-term, the electricity sector needs to "over-deliver" on GHG reductions to meet the statewide 2025 targets, since other sectors (buildings and transportation) are expected to decarbonize more slowly. 5 Lakes Energy estimated that a 36% reduction in the electricity sector would be required to meet a 28% economy-wide reduction. More generally, the power sector is the linchpin for broader economy-wide decarbonization, and ambitious near-term goals are therefore needed to facilitate decarbonization in other sectors. We encourage the Commission to build upon the 5 Lakes Energy analysis to determine the appropriate 2025 percentage reductions needed for the power sector. These values should then be used as baseline assumptions in the IRP scenario modeling as described below.

Regarding the four options presented by Staff on how to adjust the IRPs filed in 2023 or after (Slide 5), we start from the premise that utilities should be assuming success in achieving at least the greenhouse gas (GHG) reduction goals in ED 2020-10, adjusted as described above. We therefore support the inclusion of both the interim (2025) and long-term (2050) goals as baseline assumptions in all scenarios -- not only in BAU scenarios or as sensitivities. As currently defined, we do not think any of the four options proposed by Staff accomplish this, but Options 3 and 4 come closest. Option 4 has an eye towards 2050 compliance whereas Option 3 is focused on the 2025 goals. We recommend combining these two scenarios such that the detailed IRP modeling would show how interim targets will be met and how the utilities are on a clear trajectory to meeting the 2050 goals, even if the precise resource mix beyond the IRP planning horizon is not fully defined. However, both Options 3 and 4 treat the GHG reduction goals as a sensitivity. For the state to achieve these GHG reductions, they must be treated as baseline assumptions in all the scenarios and cannot be treated as sensitivities. This may necessitate further changes to the scenarios to ensure they are actually different and go beyond the baseline GHG reduction goals.

Additional considerations with respect to IRP planning

Economy-wide decarbonization requires increased building and transportation electrification. Utility planning and forecasting must therefore (i) reflect this expected increase in load and (ii) facilitate utilities playing an active role in decarbonizing the transportation and building sectors through increased electrification and energy efficiency. To adequately prepare for fundamental changes to the energy mix, and to ensure that sufficient clean resources are deployed, these parameters must be considered and reflected in the IRP analyses. It will also become

increasingly important that utilities include load management opportunities in their IRP modeling to help manage the expected increased load from electrification. For example, there are significant opportunities for meeting increased total electricity demand without proportional increases in peak demand. The 5 Lakes Energy analysis provides useful information regarding the expected increase in electricity consumption as buildings and transportation electrify, and the Commission and utilities should build on it.

This fundamental change in how electricity will be used also highlights the timeliness and need for this workgroup, since meeting the GHG reduction goals require fundamental rethinking of how we manufacture energy technologies and how we generate, distribute and use electricity. If utilities can better integrate distribution planning with IRP planning, this will allow them to fully account for load changes, but also will enable utilities to leverage the significant investments that will be made by customers and providers of energy products and services. It is our firm view that this will result in more robust IRPs, lower costs for customers and a more reliable and resilient grid.

A.3.4 Comments from Armada Power

Comments of Armada Power to the Integration of Resource/Distribution/Transmission Planning Workgroup
November 17, 2020

Armada Power submits these comments in response to the presentations and staff straw proposal to include Executive Directive 2020-10 into the Integrated Resource Planning ("IRP") process.

Armada Power is a U.S. based company whose U.S. manufactured device adapts water heater load beyond traditional demand response for use by utilities as a grid asset for DER integration.

Armada's technology can help achieve the use of IRP as a path to zero emissions goals but at a lower cost than traditional battery investments..

In response to Executive Directive 2020-10 for Michigan to achieve carbon neutrality by 2050, the Michigan Public Service Commission Staff issued a straw proposal to incorporate ED 2020-10 into the Integrated Resource Planning process. Traditional Integrated Resource Plans have focused on generation sources and grid improvements at the wires level (circuits, distribution, transmission, etc). In order to balance the costs of traditional carbon reduction methods such as expanded DER interconnection and ultimately achieve a zero carbon goal, the IRP process must also look at alternatives to expensive distribution system upgrades. While the Staff proposal includes expanded DER and other technologies - as pointed out by other parties - a carbon neutral IRP must include options beyond the traditional wires and generation source focus.

As pointed out by Duke and Dominion, the need for a flexible system that meets the needs of customers while allowing for the dynamic load resulting from renewables is a core function of today's utilities. To achieve these new functions utility IRP's must incorporate a non-traditional view.

The Armada technology is an integrated meter and voltage measurement device that also provides down-to-the-second readings and control of any electric water heater. Armada's controller retrofits directly to standard residential electric water heaters offering the ability to control and hold water heater load on a fleet basis for demand response, voltage variation controls and, at the customer level, energy efficiency. The integrated metering functions allow a utility to use water heater load as a battery service to the grid that does not degrade at a faster rate with usage. For example a water heater using Armada can be dispatched hourly, daily, monthly. But, unlike a battery, the frequency of use does not degrade the device or the water heater.

Most existing water heater controllers utilize one-way communication. So the utility would need to measure some kind of renewable generation imbalance and then dispatch the entire fleet with

a one-way signal rather than a specific portion of the grid. This would be a problem if, for example, one circuit had a cloud over it and another adjacent circuit did not - the one size fits the whole could result in over correction causing other issues. Armada allows for a circuit specific solution. Our technology has the ability to locally sense voltage and frequency deviation, so we could react on a local circuit condition automatically. Or have individual zones controlled at the utility level. Many traditional water heater controllers are just simple timers, which obviously would not help in a dynamic situation where renewable generation suddenly increased or decreased. Armada uses smart algorithms that dampen oscillation issues. A "dumb" switch might just turn on and off according to a simple set point, which could cause the grid to oscillate. We have a patent on simulated droop control and the system is continuously re-optimized so that large voltage and frequency deviations receive a faster response while smaller deviations receive a slower response.

Ultimately, an IRP including fleet use of Armada unlike traditional water heater direct load control would allow a utility to value stack demand response, capacity value, voltage response with customer time-of-use and energy efficiency measures.

Finally, our two-way communication and revenue grade metering provide accurate measurement and verification so grid operators can see the contribution of our distributed storage and can use the data for future planning and analysis.

Why is Armada a value-add to an IRP carbon reduction goal in combination with EV and battery storage?

Armada achieves a per-device net reduction of 1 to 6 tons of carbon per year when used to firm the delivery of renewable energy sources. However, it also extends the use of other carbon reducing technologies such as batteries.

Our energy storage capability offers supplemental services which work as an additional resource to batteries for significantly less cost. For most applications, water heater control is five times more cost effective than electrochemical batteries for grid applications. Armada responds just as fast as a battery without any wear or danger of fire and explosion.

Batteries have opportunity costs for charging to grid calls rather than what would be optimal for the battery chemistry. The addition of technology which can reduce the number of grid calls upon a battery will extend the life of the battery while maintaining grid functionality.

Because nearly every customer requires at least one water heater regardless of its potential as a grid asset, Armada's technology can be installed in many more locations for the same initial cost as a single battery in a single location. A utility could use the existing electric water heaters of its customers at a cost of $135 - $150 per device versus multiple batteries. Additionally, batteries have round trip losses which degrade the battery based on use, limiting their lifespan.

Armada's technology increases the lifespan of more expensive batteries by reducing the number of discharge and recharge cycles on them. This combination of cost-effective bulk deployment and reduced lifespan-reducing strain on batteries will allow the IRP budget to stretch further while allowing for battery investment in the most critical areas of the grid.

What value can a water heater as a grid resource provide for voltage regulation?

For existing Volt/VAR, Armada would be complementary. Utilities in a designed grid will need to reduce voltage in certain situations down to minimum without dropping a customer too low. The design of Armada allows for a faster way to get voltage readings from every end point/premise on the circuit where an electric water heater exists. The device has the ability to provide a real-time (down to 1 second intervals) voltage read. We currently redispatch every 2 seconds for PJM Frequency regulation. This provides the utility with another level of insight into areas of their grid that traditional water heater demand response programs and technologies do not.

In addition, Armada has the capability to expand usage and control returns after an outage. For example, if Armada had a solar output signal from the utility we could ramp up and use the excess power on specific grid points without the need for additional circuits. We do this by holding our water heaters at 50% capacity which provide for a 50% band to increase power for consumption. While all of this would be blind to the customer who maintains full hot water access, it provides the utility with another tool for grid control. This type of control also allows for Armada to control the ramp up of water heater usage after an outage. We can bring customers to a specific level of comfortable hot water without fully increasing the usage allowing for a smoother transition to full power.

What value in addition to carbon reduction could the individual residential customer achieve by combining water heater controls like Armada in an IRP?

Attached to these comments is an initial analysis[1] of the DTE time-of-use tariff options for a residential customer which shows that adding Armada to those products could provide between $25-$55 a year in estimated additional savings. If DTE changed its existing water heater program to also include a designed time-of-use option, the savings would increase to a potential of $84 - $142 annually.

It has been noted by all parties in the IRP working group that it will require a mix of grid investment, electrification and energy efficiency to meet the carbon goals. The use of water heaters as a resource in addition to electrification for carbon reduction is another aspect of IRP that should be required. However, how to balance the costs of beneficial electrification for ratepayers and customers becomes a critical question.

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[1] Analysis is based on a basic non-weather adjusted calculation which assumes a flat 30 days monthly billing cycle and a flat 8 kWh/day usage. The High Impact option is not a likely scenario for comfort but is included for illustrative purposes.

Electrification of water heating as noted by 5Lakes is another piece of the total puzzle to achieve zero carbon. However, it does not nor should it require purchasing and replacing all customers' water heaters. A simple bolt-on to existing electric water heaters can be achieved now. In addition, future replacements should not force customers or ratepayers to invest in fully smart or heat pump type water heaters to achieve the carbon goal when less expensive but similar solutions exist. Armada simply installs onto a standard water heater and can achieve the same goals as a smart/heat pump water heater and allow the "dumb" water heater to act as a grid asset for a fraction of the price. Using Armada in combination with an IRP for carbon reduction, would allow for replacement of gas water heaters with standard electric water heaters for less than half the cost of a smart or heat pump style.

Summary:

Traditionally, water heaters have been viewed as a limited source of demand response or an energy efficient appliance. However, new technologies allow for the water heater on a fleet basis to function as a true grid resource. Aggressive carbon goals will take investments that should look beyond traditional DER+Battery options. Battery functionality for water heaters will allow a utility to add an additional and more economic option to their grid planning review and address constraints on their system in non-traditional ways while also providing residential customers with cost reductions.

Thank you for the opportunity to comment. For additional information or questions please contact:

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DTE Time of Day Rate Savings through Armada Power Optimization - Water Heaters Only
No Comfort Impact

		Total Daily Avg kWh	8											
	HE	Wkday Avg % Uncontrolled	Wkday Avg kWh	Summer-energy	Summer-energy-	Winter-energy	Winter-energy-	TOU Controlled	TOU Controlled	Summer-energy-	Winter-energy-	energy delta	energy delta
0:00	1	2%	0.16	$0.1203	$0.02	$0.1182	$0.02	2%	2%	$0.0193	$0.02		
1:00	2	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
2:00	3	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
3:00	4	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
4:00	5	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
5:00	6	2%	0.16	$0.1203	$0.02	$0.1182	$0.02	2%	2%	$0.0193	$0.02		
6:00	7	5%	0.4	$0.1203	$0.05	$0.1182	$0.05	5%	5%	$0.0481	$0.05		
7:00	8	7%	0.56	$0.1203	$0.07	$0.1182	$0.07	7%	7%	$0.0674	$0.07		
8:00	9	6%	0.48	$0.1203	$0.06	$0.1182	$0.06	6%	6%	$0.0578	$0.06		
9:00	10	5%	0.4	$0.1203	$0.05	$0.1182	$0.05	5%	5%	$0.0481	$0.05		
10:00	11	4%	0.32	$0.1203	$0.04	$0.1182	$0.04	6%	6%	$0.0578	$0.06		
11:00	12	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	1%	1%	$0.0182	$0.02	0.16	0.16
12:00	13	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	1%	1%	$0.0182	$0.02	0.16	0.16
13:00	14	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	1%	1%	$0.0182	$0.02	0.16	0.16
14:00	15	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	2%	2%	$0.0363	$0.03	0.08	0.08
15:00	16	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	2%	2%	$0.0363	$0.03	0.08	0.08
16:00	17	4%	0.32	$0.2271	$0.07	$0.2021	$0.06	3%	3%	$0.0545	$0.05	0.08	0.08
17:00	18	5%	0.4	$0.2271	$0.09	$0.2021	$0.08	3%	3%	$0.0545	$0.05	0.10	0.10
18:00	19	5%	0.4	$0.2271	$0.09	$0.2021	$0.08	3%	3%	$0.0545	$0.05	0.16	0.16
19:00	20	6%	0.48	$0.1203	$0.06	$0.1182	$0.06	12%	12%	$0.1155	$0.11		
20:00	21	8%	0.64	$0.1203	$0.08	$0.1182	$0.08	13%	13%	$0.1251	$0.12		
21:00	22	8%	0.64	$0.1203	$0.08	$0.1182	$0.08	8%	8%	$0.0770	$0.08		
22:00	23	8%	0.64	$0.1203	$0.08	$0.1182	$0.08	8%	8%	$0.0770	$0.08		
23:00	24	6%	0.48	$0.1203	$0.06	$0.1182	$0.06	6%	6%	$0.0578	$0.06		
		100%			**$1.21**		**$1.14**	100%	100%	**$1.10**	**$1.05**	1.04	1.04
				Summer Demand		Winter Demand				Summer Demand	Winter Demand		
	peak demand		0.64	$0.00	**$0.00**	$0.00	**$0.00**	3%	3%	**$0.00**	**$0.00**		

Monthly Analysis		Uncontrolled	Uncontrolled	TOU Summer	TOU Winter
# of weekdays in month	22	$26.63	$25.09	$24.18	$23.17
# of weekend in month	8	$7.70	$7.56	$7.70	$7.56
	Demand Cost	$0.00	$0.00	$0.00	$0.00
	Totals	**$34.33**	**$32.65**	**$31.88**	**$30.73**

Summer Cost Differential Control vs		$2.44
Winter Cost Differential Control vs		$1.92
# of Summer Months	5	$12.22
# of Winter Months	7	$13.44
	Annual Savings Total	**$25.66**

	Summer	**Winter**
Months	June 1 - Oct 31	Nov 1 - May 31
On-Peak Time	11 am - 7 pm	11 am - 7 pm
On-Peak Rate	$ 0.2271	$ 0.2021
Off-Peak Rate	$ 0.1203	$ 0.1182

DTE Time of Day Rate Savings through Armada Power Optimization - Water Heaters Only
Low Comfort Impact

	Total Daily Avg kWh		8											
	HE		Wkday Avg % Uncontrolled	Wkday Avg kWh	Summer-energy	Summer-energy-	Winter-energy	Winter-energy-	TOU Controlled	TOU Controlled	Summer-energy-	Winter-energy-	energy delta	energy delta
0:00		1	2%	0.16	$0.1203	$0.02	$0.1182	$0.02	2%	2%	$0.0193	$0.02		
1:00		2	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
2:00		3	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
3:00		4	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
4:00		5	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
5:00		6	2%	0.16	$0.1203	$0.02	$0.1182	$0.02	2%	2%	$0.0193	$0.02		
6:00		7	5%	0.4	$0.1203	$0.05	$0.1182	$0.05	5%	5%	$0.0481	$0.05		
7:00		8	7%	0.56	$0.1203	$0.07	$0.1182	$0.07	7%	7%	$0.0674	$0.07		
8:00		9	6%	0.48	$0.1203	$0.06	$0.1182	$0.06	6%	6%	$0.0578	$0.06		
9:00		10	5%	0.4	$0.1203	$0.05	$0.1182	$0.05	5%	5%	$0.0481	$0.05		
10:00		11	4%	0.32	$0.1203	$0.04	$0.1182	$0.04	6%	6%	$0.0578	$0.06		
11:00		12	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	1%	1%	$0.0182	$0.02	0.16	0.16
12:00		13	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	1%	1%	$0.0182	$0.02	0.16	0.16
13:00		14	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	1%	1%	$0.0182	$0.02	0.16	0.16
14:00		15	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	1%	1%	$0.0182	$0.02	0.16	0.16
15:00		16	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	1%	1%	$0.0182	$0.02	0.16	0.16
16:00		17	4%	0.32	$0.2271	$0.07	$0.2021	$0.06	1%	1%	$0.0182	$0.02	0.24	0.24
17:00		18	5%	0.4	$0.2271	$0.09	$0.2021	$0.08	2%	2%	$0.0363	$0.03	0.24	0.24
18:00		19	5%	0.4	$0.2271	$0.09	$0.2021	$0.08	2%	2%	$0.0363	$0.03	0.24	0.24
19:00		20	6%	0.48	$0.1203	$0.06	$0.1182	$0.06	15%	15%	$0.1444	$0.14		
20:00		21	8%	0.64	$0.1203	$0.08	$0.1182	$0.08	16%	16%	$0.1540	$0.15		
21:00		22	8%	0.64	$0.1203	$0.08	$0.1182	$0.08	8%	8%	$0.0770	$0.08		
22:00		23	8%	0.64	$0.1203	$0.08	$0.1182	$0.08	8%	8%	$0.0770	$0.08		
23:00		24	6%	0.48	$0.1203	$0.06	$0.1182	$0.06	6%	6%	$0.0578	$0.06		
			100%			**$1.21**		**$1.14**	100%	100%	**$1.05**	**$1.01**	1.52	1.52
					Summer Demand		Winter Demand				Summer Demand	Winter Demand		
		peak demand		0.64	$0.00	**$0.00**	$0.00	**$0.00**	2%	2%	**$0.00**	**$0.00**		

Monthly Analysis			Uncontrolled	Uncontrolled	TOU Summer	TOU Winter
# of weekdays in month		22	$26.63	$25.09	$23.06	$22.28
# of weekend in month		8	$7.70	$7.56	$7.70	$7.56
	Demand Cost		$0.00	$0.00	$0.00	$0.00
	Totals		**$34.33**	**$32.65**	**$30.76**	**$29.85**

Summer Cost Differential Control vs		$3.57
Winter Cost Differential Control vs		$2.81
# of Summer Months	5	$17.86
# of Winter Months	7	$19.65
Annual Savings Total		**$37.50**

	Summer	**Winter**
Months	June 1 - Oct 31	Nov 1 - May 31
On-Peak Time	11 am - 7 pm	11 am - 7 pm
On-Peak Rate	$ 0.2271	$ 0.2021
Off-Peak Rate	$ 0.1203	$ 0.1182

DTE Time of Day Rate Savings through Armada Power Optimization - Water Heaters Only
Maximum Savings

	Total Daily Avg kWh		8											
	HE		Wkday Avg % Uncontrolled	Wkday Avg kWh	Summer-energy	Summer-energy-	Winter-energy	Winter-energy-	TOU Controlled	TOU Controlled	Summer-energy-	Winter-energy-	energy delta	energy delta
0:00		1	2%	0.16	$0.1203	$0.02	$0.1182	$0.02	2%	2%	$0.0193	$0.02		
1:00		2	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
2:00		3	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
3:00		4	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
4:00		5	1%	0.08	$0.1203	$0.01	$0.1182	$0.01	1%	1%	$0.0096	$0.01		
5:00		6	2%	0.16	$0.1203	$0.02	$0.1182	$0.02	2%	2%	$0.0193	$0.02		
6:00		7	5%	0.4	$0.1203	$0.05	$0.1182	$0.05	5%	5%	$0.0481	$0.05		
7:00		8	7%	0.56	$0.1203	$0.07	$0.1182	$0.07	7%	7%	$0.0674	$0.07		
8:00		9	6%	0.48	$0.1203	$0.06	$0.1182	$0.06	6%	6%	$0.0578	$0.06		
9:00		10	5%	0.4	$0.1203	$0.05	$0.1182	$0.05	5%	5%	$0.0481	$0.05		
10:00		11	4%	0.32	$0.1203	$0.04	$0.1182	$0.04	6%	6%	$0.0578	$0.06		
11:00		12	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	0%	0%	$0.0000	$0.00	0.24	0.24
12:00		13	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	0%	0%	$0.0000	$0.00	0.24	0.24
13:00		14	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	0%	0%	$0.0000	$0.00	0.24	0.24
14:00		15	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	0%	0%	$0.0000	$0.00	0.24	0.24
15:00		16	3%	0.24	$0.2271	$0.05	$0.2021	$0.05	0%	0%	$0.0000	$0.00	0.24	0.24
16:00		17	4%	0.32	$0.2271	$0.07	$0.2021	$0.06	0%	0%	$0.0000	$0.00	0.32	0.32
17:00		18	5%	0.4	$0.2271	$0.09	$0.2021	$0.08	0%	0%	$0.0000	$0.00	0.4	0.4
18:00		19	5%	0.4	$0.2271	$0.09	$0.2021	$0.08	0%	0%	$0.0000	$0.00	0.4	0.4
19:00		20	6%	0.48	$0.1203	$0.06	$0.1182	$0.06	20%	20%	$0.1925	$0.19		
20:00		21	8%	0.64	$0.1203	$0.08	$0.1182	$0.08	21%	21%	$0.2021	$0.20		
21:00		22	8%	0.64	$0.1203	$0.08	$0.1182	$0.08	8%	8%	$0.0770	$0.08		
22:00		23	8%	0.64	$0.1203	$0.08	$0.1182	$0.08	8%	8%	$0.0770	$0.08		
23:00		24	6%	0.48	$0.1203	$0.06	$0.1182	$0.06	6%	6%	$0.0578	$0.06		
			100%			**$1.21**		**$1.14**	100%	100%	**$0.96**	**$0.95**	2.32	2.32
					Summer Demand		Winter Demand				Summer Demand	Winter Demand		
		peak demand		0.64	$0.00	**$0.00**	$0.00	**$0.00**	0%	0%	**$0.00**	**$0.00**		

Monthly Analysis		Uncontrolled	Uncontrolled	TOU Summer	TOU Winter
# of weekdays in month	22	$26.63	$25.09	$21.18	$20.80
# of weekend in month	8	$7.70	$7.56	$7.70	$7.56
	Demand Cost	$0.00	$0.00	$0.00	$0.00
	Totals	**$34.33**	**$32.65**	**$28.88**	**$28.37**

Summer Cost Differential Control vs		$5.45
Winter Cost Differential Control vs		$4.28
# of Summer Months	5	$27.26
# of Winter Months	7	$29.99
	Annual Savings Total	**$57.24**

	Summer	Winter
Months	June 1 - Oct 31	Nov 1 - May 31
On-Peak Time	11 am - 7 pm	11 am - 7 pm
On-Peak Rate	$ 0.2271	$ 0.2021
Off-Peak Rate	$ 0.1203	$ 0.1182

DTE Dynamic Peak Pricing Rate Savings through Armada Power Optimization - Water Heaters Only
No Comfort Impact

	Total Daily Avg kWh		8											
	HE		Wkday Avg % Uncontrolled	Wkday Avg kWh	Summer-energy	Summer-energy-	Winter-energy	Winter-energy-	TOU Controlled	TOU Controlled	Summer-energy-	Winter-energy-	energy delta	energy delta
0:00		1	2%	0.16	$0.1141	$0.02	$0.1141	$0.02	8%	8%	$0.0730	$0.07		
1:00		2	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
2:00		3	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
3:00		4	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
4:00		5	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
5:00		6	2%	0.16	$0.1141	$0.02	$0.1141	$0.02	2%	2%	$0.0182	$0.02		
6:00		7	5%	0.4	$0.1141	$0.05	$0.1141	$0.05	6%	6%	$0.0547	$0.05		
7:00		8	7%	0.56	$0.1583	$0.09	$0.1583	$0.09	7%	7%	$0.0887	$0.09	0	0
8:00		9	6%	0.48	$0.1583	$0.08	$0.1583	$0.08	6%	6%	$0.0760	$0.08	0	0
9:00		10	5%	0.4	$0.1583	$0.06	$0.1583	$0.06	5%	5%	$0.0633	$0.06	0	0
10:00		11	4%	0.32	$0.1583	$0.05	$0.1583	$0.05	4%	4%	$0.0507	$0.05	0	0
11:00		12	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	3%	3%	$0.0380	$0.04	0	0
12:00		13	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	3%	3%	$0.0380	$0.04	0	0
13:00		14	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	3%	3%	$0.0380	$0.04	0	0
14:00		15	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	3%	3%	$0.0380	$0.04	0	0
15:00		16	3%	0.24	$0.2321	$0.06	$0.2321	$0.06	1%	1%	$0.0186	$0.02	0.16	0.16
16:00		17	4%	0.32	$0.2321	$0.07	$0.2321	$0.07	1%	1%	$0.0186	$0.02	0.24	0.24
17:00		18	5%	0.4	$0.2321	$0.09	$0.2321	$0.09	1%	1%	$0.0186	$0.02	0.32	0.32
18:00		19	5%	0.4	$0.2321	$0.09	$0.2321	$0.09	1%	1%	$0.0186	$0.02	0.32	0.32
19:00		20	6%	0.48	$0.1583	$0.08	$0.1583	$0.08	6%	6%	$0.0760	$0.08	0	0
20:00		21	8%	0.64	$0.1583	$0.10	$0.1583	$0.10	8%	8%	$0.1013	$0.10	0	0
21:00		22	8%	0.64	$0.1583	$0.10	$0.1583	$0.10	8%	8%	$0.1013	$0.10	0	0
22:00		23	8%	0.64	$0.1583	$0.10	$0.1583	$0.10	8%	8%	$0.1013	$0.10	0	0
23:00		24	6%	0.48	$0.1141	$0.05	$0.1141	$0.05	12%	12%	$0.1095	$0.11		
			100%			**$1.30**		**$1.30**	100%	100%	**$1.18**	**$1.18**	1.04	1.04
					Summer Demand		Winter Demand				Summer Demand	Winter Demand		
		peak demand		0.64	$0.00	**$0.00**	$0.00	**$0.00**	3%	3%	**$0.00**	**$0.00**		

Monthly Analysis		Uncontrolled	Uncontrolled	TOU Summer	TOU Winter
# of weekdays in month		22	$28.59	$28.59	$25.89	$25.89
# of weekend in month		8	$7.30	$7.30	$7.30	$7.30
	Demand Cost		$0.00	$0.00	$0.00	$0.00
	Totals		**$35.89**	**$35.89**	**$33.19**	**$33.19**

Summer Cost Differential Control vs		$2.70
Winter Cost Differential Control vs		$2.70
# of Summer Months	5	$13.51
# of Winter Months	7	$18.91
	Annual Savings Total	**$32.42**

DTE Dynamic Peak Pricing Rate Savings through Armada Power Optimization - Water Heaters Only
Low Comfort Impact

	Total Daily Avg kWh		8											
	HE		Wkday Avg % Uncontrolled	Wkday Avg kWh	Summer-energy	Summer-energy-	Winter-energy	Winter-energy-	TOU Controlled	TOU Controlled	Summer-energy-	Winter-energy-	energy delta	energy delta
0:00		1	2%	0.16	$0.1141	$0.02	$0.1141	$0.02	12%	12%	$0.1095	$0.11		
1:00		2	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
2:00		3	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
3:00		4	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
4:00		5	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
5:00		6	2%	0.16	$0.1141	$0.02	$0.1141	$0.02	2%	2%	$0.0182	$0.02		
6:00		7	5%	0.4	$0.1141	$0.05	$0.1141	$0.05	6%	6%	$0.0547	$0.05		
7:00		8	7%	0.56	$0.1583	$0.09	$0.1583	$0.09	7%	7%	$0.0887	$0.09	0	0
8:00		9	6%	0.48	$0.1583	$0.08	$0.1583	$0.08	6%	6%	$0.0760	$0.08	0	0
9:00		10	5%	0.4	$0.1583	$0.06	$0.1583	$0.06	5%	5%	$0.0633	$0.06	0	0
10:00		11	4%	0.32	$0.1583	$0.05	$0.1583	$0.05	4%	4%	$0.0507	$0.05	0	0
11:00		12	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	3%	3%	$0.0380	$0.04	0	0
12:00		13	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	3%	3%	$0.0380	$0.04	0	0
13:00		14	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	2%	2%	$0.0253	$0.03	0.08	0.08
14:00		15	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	2%	2%	$0.0253	$0.03	0.08	0.08
15:00		16	3%	0.24	$0.2321	$0.06	$0.2321	$0.06	0%	0%	$0.0000	$0.00	0.24	0.24
16:00		17	4%	0.32	$0.2321	$0.07	$0.2321	$0.07	0%	0%	$0.0000	$0.00	0.32	0.32
17:00		18	5%	0.4	$0.2321	$0.09	$0.2321	$0.09	0%	0%	$0.0000	$0.00	0.4	0.4
18:00		19	5%	0.4	$0.2321	$0.09	$0.2321	$0.09	0%	0%	$0.0000	$0.00	0.4	0.4
19:00		20	6%	0.48	$0.1583	$0.08	$0.1583	$0.08	6%	6%	$0.0760	$0.08	0	0
20:00		21	8%	0.64	$0.1583	$0.10	$0.1583	$0.10	8%	8%	$0.1013	$0.10	0	0
21:00		22	8%	0.64	$0.1583	$0.10	$0.1583	$0.10	8%	8%	$0.1013	$0.10	0	0
22:00		23	8%	0.64	$0.1583	$0.10	$0.1583	$0.10	8%	8%	$0.1013	$0.10	0	0
23:00		24	6%	0.48	$0.1141	$0.05	$0.1141	$0.05	14%	14%	$0.1277	$0.13		
			100%			**$1.30**		**$1.30**	100%	100%	**$1.13**	**$1.13**	1.52	1.52
					Summer Demand		Winter Demand				Summer Demand	Winter Demand		
		peak demand		0.64	$0.00	**$0.00**	$0.00	**$0.00**	3%	3%	**$0.00**	**$0.00**		

Monthly Analysis		Uncontrolled	Uncontrolled	TOU Summer	TOU Winter
# of weekdays in month	22	$28.59	$28.59	$24.90	$24.90
# of weekend in month	8	$7.30	$7.30	$7.30	$7.30
	Demand Cost	$0.00	$0.00	$0.00	$0.00
	Totals	**$35.89**	**$35.89**	**$32.20**	**$32.20**

Summer Cost Differential Control vs		$3.69
Winter Cost Differential Control vs		$3.69
# of Summer Months	5	$18.44
# of Winter Months	7	$25.82
	Annual Savings Total	**$44.26**

DTE Dynamic Peak Pricing Rate Savings through Armada Power Optimization - Water Heaters Only
High Comfort Impact

	Total Daily Avg kWh		8											
	HE		Wkday Avg % Uncontrolled	Wkday Avg kWh	Summer-energy	Summer-energy-	Winter-energy	Winter-energy-	TOU Controlled	TOU Controlled	Summer-energy-	Winter-energy-	energy delta	energy delta
0:00		1	2%	0.16	$0.1141	$0.02	$0.1141	$0.02	17%	17%	$0.1551	$0.16		
1:00		2	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
2:00		3	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
3:00		4	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
4:00		5	1%	0.08	$0.1141	$0.01	$0.1141	$0.01	1%	1%	$0.0091	$0.01		
5:00		6	2%	0.16	$0.1141	$0.02	$0.1141	$0.02	2%	2%	$0.0182	$0.02		
6:00		7	5%	0.4	$0.1141	$0.05	$0.1141	$0.05	7%	7%	$0.0639	$0.06		
7:00		8	7%	0.56	$0.1583	$0.09	$0.1583	$0.09	6%	6%	$0.0760	$0.08	0.08	0.08
8:00		9	6%	0.48	$0.1583	$0.08	$0.1583	$0.08	5%	5%	$0.0633	$0.06	0.08	0.08
9:00		10	5%	0.4	$0.1583	$0.06	$0.1583	$0.06	4%	4%	$0.0507	$0.05	0.08	0.08
10:00		11	4%	0.32	$0.1583	$0.05	$0.1583	$0.05	3%	3%	$0.0380	$0.04	0.08	0.08
11:00		12	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	2%	2%	$0.0253	$0.03	0.08	0.08
12:00		13	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	2%	2%	$0.0253	$0.03	0.08	0.08
13:00		14	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	1%	1%	$0.0127	$0.01	0.16	0.16
14:00		15	3%	0.24	$0.1583	$0.04	$0.1583	$0.04	1%	1%	$0.0127	$0.01	0.16	0.16
15:00		16	3%	0.24	$0.2321	$0.06	$0.2321	$0.06	0%	0%	$0.0000	$0.00	0.24	0.24
16:00		17	4%	0.32	$0.2321	$0.07	$0.2321	$0.07	0%	0%	$0.0000	$0.00	0.32	0.32
17:00		18	5%	0.4	$0.2321	$0.09	$0.2321	$0.09	0%	0%	$0.0000	$0.00	0.4	0.4
18:00		19	5%	0.4	$0.2321	$0.09	$0.2321	$0.09	0%	0%	$0.0000	$0.00	0.4	0.4
19:00		20	6%	0.48	$0.1583	$0.08	$0.1583	$0.08	5%	5%	$0.0633	$0.06	0.08	0.08
20:00		21	8%	0.64	$0.1583	$0.10	$0.1583	$0.10	7%	7%	$0.0887	$0.09	0.08	0.08
21:00		22	8%	0.64	$0.1583	$0.10	$0.1583	$0.10	7%	7%	$0.0887	$0.09	0.08	0.08
22:00		23	8%	0.64	$0.1583	$0.10	$0.1583	$0.10	7%	7%	$0.0887	$0.09	0.08	0.08
23:00		24	6%	0.48	$0.1141	$0.05	$0.1141	$0.05	20%	20%	$0.1825	$0.18		
			100%			**$1.30**		**$1.30**	100%	100%	**$1.09**	**$1.09**	2.48	2.48
					Summer Demand		Winter Demand				Summer Demand	Winter Demand		
		peak demand		0.64	$0.00	**$0.00**	$0.00	**$0.00**	2%	2%	**$0.00**	**$0.00**		

Monthly Analysis			Uncontrolled	Uncontrolled	TOU Summer	TOU Winter
# of weekdays in month		22	$28.59	$28.59	$23.97	$23.97
# of weekend in month		8	$7.30	$7.30	$7.30	$7.30
	Demand Cost		$0.00	$0.00	$0.00	$0.00
	Totals		**$35.89**	**$35.89**	**$31.27**	**$31.27**

Summer Cost Differential Control vs		$4.62
Winter Cost Differential Control vs		$4.62
# of Summer Months	5	$23.12
# of Winter Months	7	$32.36
	Annual Savings Total	**$55.48**

DTE Residential Electric Service Rate vs. Water Heating Service Rate

Daily Energy Use	8
Residential Rate < 17kWh/day	0.15287
Residential Rate > 17kWh/day	0.17271
Water Heating Rate	0.11604
Water Heating Service Charge	1.95
RR Annual Cost < 17kWh	$446.38
RR Annual Cost > 17kWh	$504.31
WH Rate Annual Cost	$338.84
WH Service Charge	$23.40
Annual Savings Min	**$84.14**
Annual Savings Max	**$142.08**

A.3.5 Comments from DTE

DTE Electric Comments on Proposed Emissions Reporting Options
MI Power Grid– Advanced Planning Phase II
November 17, 2020

Staff's Straw Proposal presented in the October 21 collaborative meeting:

Emissions Reporting Options for IRPs filed in 2023 or After

Four options considered in the Straw Proposal to meet ED 2020-10 for utilities filing IRPs in 2023 or after

<table>
<tr><th>Option 1</th><th>Option 2</th><th>Option 3</th><th>Option 4</th></tr>
<tr><td colspan="2">Requires MIRPP <u>BAU</u> scenario change to include carbon goal of 28% reduction by 2025 as a sensitivity.</td><td>Requires MIRPP change to <u>all</u> scenarios reflecting the Carbon goal of 28% reduction by 2025 as a sensitivity.</td><td>Requires MIRPP change to all scenarios reflecting Carbon Neutrality by 2050 and therefore modeling as a sensitivity.</td></tr>
<tr><td colspan="3">If the utility preferred plan does not comply with the 2025 goal, include an optimized alternative plan that does comply with the 2025 goal and compare to the preferred plan.</td><td>If the utility preferred plan does not comply with the 2050 goal, include an optimized alternative plan that does comply with the 2050 goal and compare to the preferred plan.</td></tr>
<tr><td>Charts Carbon out to 2025</td><td colspan="2">Charts Carbon out to the 15-year planning horizon to illustrate a path toward 2050.</td><td>Charts Carbon out to 2050 in Exhibit to illustrate goal.</td></tr>
<tr><td colspan="3">Spreadsheet of CO2, SOx, Mercury, and PPM for each year of the 15-year planning horizon for the utility's preferred plan and each MIRPP scenario optimized plan.</td><td>Spreadsheet of CO2, SOx, Mercury, and PPM for each year out to 2050 for the utility's preferred plan and each MIRPP scenario optimized plan.</td></tr>
</table>

1 of 3

Emissions Reporting Options for IRPs filed before 2023

Two options considered in the Straw Proposal to meet ED 2020-10 for utilities filing an IRP before 2023

Option 1	Option 2
No MIRPP Update but Commission order directing addendum to filing requirements.	
Charts Carbon out to 2025 compared to 28% Carbon reduction.	Charts Carbon out to the 15-year planning horizon to illustrate a path toward 2050 and highlighting when the utility achieves a 28% reduction.
Spreadsheet of CO2, SOx, Mercury, and PPM for each year of the 15-year planning horizon for the utility's preferred plan and each MIRPP scenario optimized plan.	

Options presented by Joint Commenters[1] (D. Jester):

Joint Commenter Recommendations:

- Realistically meeting 28% economy-wide carbon emissions reduction from 2005 by 2025 requires power generation to achieve about a 36% carbon emissions reduction from 2018 by 2025.
- Achieving economy-wide power sector and nearly complete electrification of both transportation and buildings and substantial electrification of industrial heat. Electrification by 2050 requires all-electric equipment sales by about 2035, ramping up to that from 2020.
- MPSC IRP scenarios should incorporate these assumptions about power generation and load growth.

Options presented by I&M (Andrew Williamson):

Indiana Michigan Power Recommendations:

- Maintain single IRP for multi-state companies
- Clarify application of ED2020-10 to the IRP process
- Recognize need for future dispatchable generation

[1] Environmental Law and Policy Center, National Resources Defense Council, Vote Solar, Union of Concerned Scientists, Ecology Center, Michigan Environmental Council

Overall Comments:

DTE Electric (DTE or Company) appreciates the effort of Michigan Public Service Commission (MPSC), MPSC Staff (Staff) and all parties involved in this Integrated Planning collaborative. DTE will address each of the proposals from the stakeholders below.

Staff Proposal:

DTE is amenable to options 1 and 2 proposed by the MPSC Staff for IRP filings either before or after 2023. It should be noted that the Company expects to meet or exceed the 28% reduction of CO2 by 2025 in its current plan and in future IRPs based on a baseline of 2005. In its 2019 Integrated Resource Plan, DTE communicated its carbon emissions reduction targets and provided details on how the Company plans to meet those targets. DTE is open to Option 3 based on the current MIRPP scenarios as detailed in MPSC Case No. U-18418. At this time, it is unclear what or how many scenarios will be required for IRPs filed in 2023 or after, therefore DTE requests clarification of the definition of all scenarios.

DTE does not agree with Option 4. As noted in MCL 460.6t, Section 3, utilities are required to file an integrated resource plan that provides a 5-year, 10-year, and 15-year projection of the utility's load obligations and a plan to meet those obligations, to meet the utility's requirements to provide generation reliability, including meeting planning reserve margin and local clearing requirements determined by the commission or the appropriate independent system operator, and to meet all applicable state and federal reliability and environmental regulations over the ensuing term of the plan. Option 4 exceeds the time frames set forth in MCL 460.6t.

Joint Commenters Proposal:

DTE does not support requiring utilities to model other sectors in Michigan, besides its own generation plan. As noted above, an IRP is a plan to meet the utility's load obligations and provide generation reliability. This proposal is outside the intent of an IRP.

Indiana Michigan Proposal:

DTE agrees that dispatchable generation will remain very important into the future.

A.3.6 Comments from Joint Commenters

Ms. Danielle Rogers
Ms. Naomi Simpson
Michigan Public Service Commission
7109 W. Saginaw Hwy.
Lansing, MI 48917

November 17, 2020

Re: MPSC Staff Request for Feedback on Staff Straw Proposal and Alternative Proposals Addressing ED 2020-10

Ms. Rogers, Ms. Simpson,

On November 6, 2020, the Integration of Resource/Distribution/Transmission Planning workgroup held its third stakeholder session. At the conclusion of that session, the Staff of the Michigan Public Service Commission requested feedback on Staff's straw proposal and alternative proposals addressing ED 2020-10.

The Environmental Law & Policy Center, the Natural Resources Defense Council, Vote Solar, the Union of Concerned Scientists, the Ecology Center, Sierra Club, and the Michigan Environmental Council (Joint Commenters) respond to Staff's request for feedback below, and in the attached proposed edits to Section VIII of the Michigan Integrated Resource Planning Parameters.

1. **IRP scenarios should reflect the economy-wide nature of the Executive Directive and should extend the planning horizon to 2050.**

Executive Directive 2020-10 provides that "Michigan will aim to achieve economy-wide carbon neutrality no later than 2050." In addition, "the state will aim to achieve a 28% reduction below 2005 levels in greenhouse gas emissions by 2025."[1]

Douglas Jester's presentation[2] to the workgroup on Nov. 6 provided some initial level-setting data points to consider. In 2018, approximately 81% of greenhouse gas emissions were carbon dioxide, while methane made up 10%, nitrous oxide 7%, and fluorinated gases 3%. The major sources of greenhouse gas emissions include transportation (28%), electricity (27%), industry (22%), commercial & residential (12%), and agriculture (10%).

[1] https://www.michigan.gov/whitmer/0,9309,7-387-90499_90704-540278--,00.html
[2] https://www.michigan.gov/documents/mpsc/MPG_Advanced_Planning_11.06.20_707093_7.pdf

For the electricity sector, the path to reducing its own emissions is relatively straightforward: replacing coal and gas plants with carbon-free resources such as wind, solar, and energy efficiency.[3] The carbon intensity of imported electricity should also be considered. Staff's straw proposal sets out guidelines for electric utilities to analyze their emissions, which is a good start.

However, IRP scenarios should also consider the effect that decarbonizing other economic sectors will have on electric utilities. For example, the path toward reducing and eliminating emissions from transportation includes substantial, if not total, electrification of the energy source needed to move people and products. Additionally, buildings in the commercial and residential sector will need to replace propane and gas heating with electrical applications to reduce emissions. The resulting impact on electricity demand can and should be considered in IRPs.

One example from another state is Colorado, which established its statewide greenhouse gas emission reduction goals in 2019. The Colorado Public Utilities Commission is working to incorporate those goals into its integrated resource plan requirements. Under proposed rules for investor-owned utility IRPs, an assessment of the need to acquire resources must address statewide goals to reduce greenhouse gas emissions. This proposal mirrors a requirement finalized earlier this year to address Colorado's statewide goals in IRPs filed by wholesale electric cooperatives. While Colorado's statewide goal is to reduce greenhouse gas emissions 50 percent by 2030, IRPs must include an assessment of reducing carbon dioxide emissions associated with the utility's sales by 80 percent from 2005 levels by 2030.

Additionally, Joint Commenters believe Michigan's filing requirements should be updated to extend the planning horizon out to 2050. Without scenarios that consider the full timeline of the Governor's goals, it is impossible to know if the power sector is on track to meet them.

[3] A note on carbon offsets, which Mr. Jester also addressed in his presentation: Joint Commenters recommend that the MPSC not consider carbon offsets for electric power generation in IRPs. Among other concerns such as inequitable impacts, emission reductions from non-power sectors will increasingly become unavailable as the state approaches net zero economy-wide emissions, and the limited availability of carbon sequestration methods should be reserved for offsetting emissions that are truly difficult to reduce.

2. **For Michigan to meet its 2025 goal, it is likely that the power generation sector would need to achieve a 36% reduction in carbon emissions below 2018 levels.**

Staff's straw proposal does not account for the likelihood that the power generation sector will need to achieve greater than a 28% reduction in CO2 emissions (from 2005 levels) for the state to achieve that level of reductions economy wide. With respect to the 2025 emission reduction goal, Mr. Jester provided preliminary data and modeling results conducted by Joint Commenters exploring how Michigan might achieve a 28% economy-wide CO2 reduction. Although the long-term trends (from 1990 to 2018) show declining CO2 emissions in all sectors, only electric power has changed significantly in the last decade. This is because the decarbonization process for the electricity sector is underway but has not yet begun to any meaningful extent for the transportation, residential, commercial, and industrial sectors.

While policies can be put in place now to stimulate emission reductions in non-electric power sectors, it will take time for the measures to produce results due to the long-lived nature and slow turn over for things like building retrofits, vehicles, and equipment. Thus, for Michigan to meet its 2025 goal, it is likely that the electric power sector will need to drive the bulk of reductions through earlier coal plant retirements and additional expansion of renewable energy resources.[4] To do this, Joint Commenters project that to realistically meet a 28% economy-wide carbon emission reduction goal from 2005 levels by 2025 requires the power generation sector to achieve about a 36% reduction from 2018 levels by 2025.

3. **For Michigan to achieve economy-wide carbon neutrality by 2050, the power sector needs to be zero-emission with transportation and buildings electrified and industrial heat substantially electrified.**

Looking ahead to the 2050 goal, Mr. Jester outlined how achieving economy-wide carbon neutrality requires (1) a zero-emission power sector, (2) nearly complete electrification of both transportation and buildings, and (3) substantial electrification of industrial heat. With respect to the latter two categories, electrification by 2050 requires all-electric equipment sales by about 2035, ramping up to that from 2020. IRP scenarios should incorporate these assumptions about power generation and load growth, and assess how electrified load can be leveraged to integrate further levels of renewables and provide other flexible grid benefits.

[4] The carbon emission modeling conducted by Joint Commenters does assume a small level of ramp-up in vehicle and building electrification: 8% of vehicle sales are electric by 2025 (currently at about 0.8%) and 100% electrification of 1% of buildings.

4. **The Michigan Integrated Resource Planning Parameters' modeling scenarios, sensitivities, and assumptions should be updated to reflect the state's economy-wide carbon goals and electric utilities' role in achieving them.**

Joint Commenters have prepared suggested edits to Section VIII (Modeling Scenarios, Sensitivities and Assumptions) of the Michigan Integrated Resource Planning Parameters, attached to these comments.

We suggest modifying the Business as Usual scenario to reflect the minimum of what is needed from the power sector to achieve the Executive Directive's 2025 and 2050 carbon reduction goals. The Emerging Technologies scenario should then include more aggressive cost reductions for batteries and modeling of earlier coal plant retirements. The Environmental Policy scenario could then be revised to include a 100% carbon-free standard by 2035, among other changes. Joint commenters suggest this change to maintain the original intent of the Environmental Policy scenario, which is to model more rigorous environmental policies that could potentially be required. A key plank of President-elect Biden's climate and energy plan is establishing a standard for a 100% carbon-free power sector by 2035. While it is uncertain when or if this standard would be enacted, Joint Commenters assert that it should be incorporated into the Environmental Policy scenario to help utilities and the state plan for this potential policy outcome.

* * * *

Thank you for your consideration of these comments.

Suggested Updates to IRP Filing Requirements to integrate Michigan's carbon reduction goals:

Scenario 1. Business as Usual

(Applicability: Utilities located in the Michigan portion of MISO Zone 2 and MISO Zone 7)

The existing generation fleet (utility and non-utility owned) is largely unchanged apart from new units planned with firm certainty or under construction. ~~No carbon regulations are modeled, although some reductions are expected due to age-related coal retirements and renewable additions driven by renewable portfolio standards and goals, as well as economics.~~ **Carbon reductions in the power sector sufficient to meet Michigan's new carbon reduction goals are modeled.**

- **Utilities meet a 36% reduction in carbon emissions below 2018 levels by 2025 and retire all fossil generation by 2050.**
    - **Retirements of all coal units in the utility's fleet should be considered, and those coal units owned by the utility that are not explicitly assumed to retire during the study period shall be allowed to retire in the model based upon economics and/or carbon reduction goals. Retirement of older fuel oil-fired and newer gas fired generation should also be considered in this scenario. Units that are not owned by the utility shall not retire during the study period unless affirmative, public statements to that effect are made by the owner of the generation asset.**
- **All new fossil-fuel-related assets and all maintenance, expansion, and pollution control investments in existing fossil-fueled assets must be depreciated by 2050, with those depreciation schedules reflected in revenue requirements.**
- Natural gas prices utilized are consistent with business as usual projections as projected in the United States Energy Information Administration's (EIA) most recent Annual Energy Outlook reference case.[1]
- Footprint-wide[2] demand and energy growth ~~rates remain at low levels with no notable drivers of higher growth; however, as a result of low natural gas prices, industrial production and industrial demand increases~~ **occurs in line with an electric vehicle sale forecast and electric heating appliance sales forecast through 2050**.
- ~~Low natural gas prices and low economic growth reduce the economic viability of other generation technologies.~~
- Resource assumptions:
    - Resources outside MI – Maximum age assumption by resource type as specified by applicable regional transmission organization (RTO).
    - Resources within MI – Thermal and nuclear generation retirements in the modeling footprint are driven by a maximum age assumption, public announcements, or economics.

[1] The natural gas price forecast utilized should be consistent with the EIA's most recent Annual Energy Outlook natural gas spot price at Henry Hub in nominal dollars and also including delivery costs from Henry Hub to the point of delivery.

[2] Footprint refers to the Model Region specified in the Michigan IRP Modeling Input Assumptions and Sources, or the State of Michigan plus the applicable RTO region. Larger footprints or Model Regions, if used by the utility, are acceptable.

- Specific new units are modeled if under construction or with regulatory approval (i.e., Certificate of Necessity (CON) or signed generator interconnection agreement (GIA)).
- Generic new resources (market and company-owned) are assumed consistent with scenario descriptions and considering anticipated new resources currently in the MISO generation interconnection queue.
- Not less than 35% of the state's electric needs should be met through a combination of EWR and renewable energy by 2025, as per MCL 460.1001 (3).
- For all instate electric utilities that are eligible to receive the financial incentive mechanism for exceeding mandated energy saving targets of 1% per year, EWR should be based upon the maximum allowed under the incentive of 1.5% and should be based upon an average cost of MWh saved. The model should include an EWR supply cost curve to project future program expenditures beyond baseline assumptions without any cap.[3]
- For all other electric utilities, EWR should not exceed the mandated targets for electric energy savings of 1% per year and should be based upon an average cost of MWh saved.
- Existing renewable energy production tax credits and renewable energy investment tax credits continue pursuant to current law.
- Technology costs for thermal units and wind track with mid-range industry expectations.
- Technology costs and limits to the total resource amount available for EWR and demand response programs will be determined by their respective potential studies.
- Technology costs for ~~solar~~ **generation and battery storage** ~~and other emerging technologies~~ decline with commercial experience[4] **and are informed by pre-IRP request for proposals**.
- Existing PURPA contracts are assumed to be renewed.

Business as Usual Sensitivities:

1. Fuel cost projections
    a. Increase the natural gas fuel price projections from the base projections to at least 200% of the business as usual natural gas fuel price projections at the end of the study period.[5]
2. Load projections
    a. High load growth: Increase the energy and demand growth rates by at least a factor of two above the business as usual energy and demand growth rates. In the event that doubling the energy and demand growth rates results in less than a 1.5% spread between the business as usual load projection and the high load sensitivity projection, assume a 1.5% increase in the annual growth rate for energy and demand for this sensitivity.

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[3] For EWR cost supply curves, see the appendices in the supplemental potential study for the Lower Peninsula at this link: http://www.michigan.gov/documents/mpsc/MI_Lower_Peninsula_EE_Potential_Study_Final_Report_08.11.17_598053_7.pdf.

[4] **Such trends are perhaps best informed by "Mid Technology Cost" scenario in the National Renewable Energy Laboratory's most recent Annual Technology Baseline report.**

[5] For example, 200% of the most recent EIA AEO reference case natural gas price is $10.14/MMBtu ($2016) in 2040.

b. If the utility has retail choice load in its service territory, model the return of 50% of its retail choice load to the utility's capacity service by 2023.

3. Ramp up the utility's EWR savings to at least 2.5% of prior year sales over the course of four years, using EWR cost supply curves provided in the Appendix G of the 2017 supplemental potential study for more aggressive potential. EWR savings remain high throughout the study period.
4. Sensitivity allowing only natural gas fired simple cycle combustion turbines to be selected by the model.

Scenario 2. Emerging Technologies

(Applicability: Utilities located in the Michigan portion of MISO Zone 2 and MISO Zone 7)

Technological advancement and economies of scale result in a 35% reduction in costs for demand response, EWR programs, **batteries,** and other emerging technologies.[6,7] For example, costs identified in the demand response potential study should be reduced by 35% **by 2030** for demand response resources. **Significant drop in cost of battery storage spurs more vehicle electrification and renewable development (solar plus storage).** ~~No carbon reductions are modeled, but some reductions occur due to coal unit retirements, and higher levels of renewables, demand response, and energy waste reduction.~~ **Carbon reductions in the power sector sufficient to meet Michigan's new carbon reduction goals are modeled.** Load forecasts and fuel price forecasts remain at levels similar to the Business as Usual Scenario.

- **Utilities meet a 36% reduction in carbon emissions below 2018 levels by 2025 and retire all fossil generation by 2050.**
- Technological advancement and economies of scale result in a greater potential for demand response, energy efficiency, and distributed generation as well as lower capital cost for renewables.
- **Technology advancements in battery storage drive significant cost reductions for that technology.**
    - **Declines in battery cost spur more rapid adoption of electric vehicles and greater deployment of solar (solar plus battery storage).**
- Thermal generation retirements in the market are driven by unit age-limits and announced retirements (consistent with business as usual). Company-owned resource retirements may be defined by the utility, however, ~~a meaningful analysis~~ **modeling** of whether coal units should retire ahead of business as usual dates should be performed. ~~Retirements of all coal units except the most efficient~~ **Earlier retirement dates for each coal unit** in the utility's fleet should be ~~considered~~ **modeled**, and those coal units owned by the utility that are not explicitly assumed to retire during the study period shall be allowed to retire in the model based upon economics **and carbon reduction goals**. Retirement of older fuel oil-fired generation **and newer gas-fired**

[6] Emerging technologies includes, but is not limited to large-scale and small-scale battery storage, **and** large-scale and small-scale solar~~, and combined heat and power~~. See Section IX, Michigan IRP Modeling Input Assumptions and Sources in this document for a full list of potential emerging technologies **that** also could be considered to include as resources with reduced costs in this scenario.

[7] **Such trends are perhaps best informed by the "Low Technology Cost" scenario in the most recent National Renewable Energy Laboratory's Annual Technology Baseline.**

generation should also be considered in this scenario. Units that are not owned by the utility shall not retire during the study period unless affirmative, public statements to that effect are made by the owner of the generation asset.

- Specific new generating units are modeled if under construction or with regulatory approval (i.e., CON or signed GIA).
- Generic new resources (market and company-owned) are assumed consistent with scenario optimizations considering the current resources in the MISO generation interconnection queue.
- Prior to and during the modeling process, the utilities shall take into account resources that include, but are not limited to: small qualifying facilities (20 MW and under), renewable energy independent power producers, large combined heat and power plants, and self-generation facilities such as behind-the-meter-generation (btmg) as more fully described in section IX, Michigan IRP Modeling Input Assumptions and Sources.
- Existing renewable energy production tax credits and renewable energy investment tax credits continue pursuant to current law.
- Technology costs for thermal units remain stable and escalate at moderate escalation rates.
- Technology costs for EWR and demand response programs will be reduced 35% from the level determined by their respective potential studies.
- **Technology costs for heat pumps and geothermal for building electrification are reduced.**
- ~~Technology costs for energy storage resources decline over time, particularly battery technologies and others which can enable supply- and demand-side resources.~~
- Existing PURPA contracts are assumed to be renewed.

Emerging Technologies Sensitivities:

1. Fuel cost projections
    a. Increase the natural gas fuel price projections from the base projections to at least 200% of the business as usual natural gas fuel price projections at the end of the study period.[8]
2. Load projections
    a. High load growth: Increase the energy and demand growth rates by at least a factor of two above the business as usual energy and demand growth rates. In the event that doubling the energy and demand growth rates results in less than a 1.5% spread between the base load projection and the high load sensitivity projection, assume a 1.5% increase in the annual growth rate for energy and demand for this sensitivity.
3. Ramp up the utility's EWR savings to at least 2.5% of prior year sales over the course of four years, using EWR cost supply curves provided in Appendix G of the 2017 supplemental potential study for more aggressive potential.[9] EWR savings remain high throughout the study period.

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[8] For example, 200% of the most recent EIA AEO reference case natural gas price is $10.14/MMBtu ($2016) in 2040.

[9] For maximum achievable potential levels and respective EWR supply curves, see the supplemental potential study for the Lower Peninsula, http://www.michigan.gov/documents/mpsc/MI_Lower_Peninsula_EE_Potential_Study_Final_Report_08.11.17_598053_7.pdf;

4. Increase the use of renewable energy in the utility's service territory to at least ~~25~~30% by 202~~5~~30.

Scenario 3. Environmental Policy

(Applicability: Utilities located in MISO Zone 7)

Clean energy goals targeting 100 percent carbon-free power sector by 2035 are enacted.[10] All coal generation is retired by 2030. Rapid increases in adoption of electric vehicles occur due to decreased cost in batteries and adoption of zero emission vehicle goals with all new sales of vehicles being electric by 2035. Increased renewable additions are driven by carbon-free standard, extension of tax credits, and economics. Increases in the electrification of heating and buildings drives energy and demand growth; all new building equipment sales being electric by 2035. ~~Carbon regulations targeting a 30% reduction (by mass for existing and new sources) from 2005 to 2030 across all aggregated unit outputs are enacted, modeled as a hard cap on the amount of carbon emissions, driving some coal retirements and an increase in natural gas reliance. Increased renewable additions are driven by renewable portfolio standards and goals, economics, and business practices to meet carbon regulations.~~

- Demand and energy growth rates are modeled at a level equivalent to a 50/50 forecast and are consistent with the business as usual projections. **Load increases due to increased adoption of electric vehicles and increased electrification of buildings, including replacement of propane and heating oil with heat pumps.**
- Natural gas prices utilized are consistent with business as usual projections as projected in the EIA's most recent Annual Energy Outlook reference case.[11]
- Current demand response, energy efficiency, and utility distributed generation programs remain in place and additional growth in those programs would happen if they are economically selected by the model to help comply with the specified carbon-**free standard** ~~reductions~~ in this scenario.
- Non-nuclear, non-coal generators will be retired ~~in the year the age limit is reached and driven by announced retirements~~ **no later than 2035 based on the carbon-free standard**. Coal units ~~will primarily be retired based upon carbon emissions and secondarily based upon economics~~ **will retire no later than 2030 based on mandate**. Nuclear units are assumed to have license renewals granted and remain online.
- Specific new units are modeled if under construction or with regulatory approval (i.e., CON or signed GIA).
- Generic new resources (market and company-owned) are assumed consistent with scenario descriptions and considering anticipated new resources currently in the MISO generation interconnection queue.

See also supplemental potential study for the Upper Peninsula, http://www.michigan.gov/documents/mpsc/UP_EE_Potential_Study_Final_Report--memorandum_08.09.17_598056_7.docx.

[10] **Carbon-free is defined as non-carbon-emitting electric generation and electricity from renewable resources.**

[11] The natural gas price forecast utilized should be consistent with the EIA's most recent Annual Energy Outlook natural gas spot price at Henry Hub in nominal dollars and also including delivery costs from Henry Hub to the point of delivery.

- Tax credits for renewables continue until 2022 to model existing policy.
- Technology costs for wind, solar and other renewables decline with commercial experience and forecasted at levels ~~35%~~ lower than in the ~~business as usual case~~ **emerging technologies case based on accelerated deployment and learning**.
- Non-carbon dioxide emitting resources will be increased, due to the ~~constraint on allowable carbon emissions in the model~~ **carbon-free standard**.
- Technology costs and limits to the total resource amount available for EWR and demand response programs will be determined by their respective potential studies.
- Existing PURPA contracts are assumed to be renewed.
- ~~Not less than 35% of the state's electric needs should be met through a combination of EWR and renewable energy by 2025, as per MCL 460.1001 (3).~~

Environmental Policy Sensitivities:

1. Fuel cost projections
    a. Increase the natural gas fuel price projections from the base projections to at least 200% of the business as usual natural gas fuel price projections at the end of the study period. 30
2. Load projections
    a. High load growth: Increase the energy and demand growth rates by at least a factor of two above the business as usual energy and demand growth rates. In the event that doubling the energy and demand growth rates results in less than a 1.5% spread between the base load projection and the high load sensitivity projection, assume a 1.5% increase in the annual growth rate for energy and demand for this sensitivity.
3. ~~50% carbon reduction in the utility's service territory, modeled as a hard cap on the amount of carbon emissions, by 2030 as a sensitivity~~.
4. Ramp up the utility's EWR savings to at least 2.5% of prior year sales over the course of four years, using EWR cost supply curves provided in the 2017 supplemental potential study for more aggressive potential.[12] EWR savings remain high throughout the study period.

[12] For maximum achievable potential levels and respective EWR supply curves, see the supplemental potential study for the Lower Peninsula, http://www.michigan.gov/documents/mpsc/MI_Lower_Peninsula_EE_Potential_Study_Final_Report_08.11.17_598053_7.pdf;
See also supplemental potential study for the Upper Peninsula, http://www.michigan.gov/documents/mpsc/UP_EE_Potential_Study_Final_Report--memorandum_08.09.17_598056_7.docx.

A.3.7 Comments from Consumers Energy

November 25, 2020

Dear Ms. Rogers,

Thank you for the opportunity to provide feedback on the Michigan Public Service Commission Staff ("Staff") Strawman Proposal for satisfying Executive Directive ("ED") 2020-10, issued on October 21, 2020, and the alternative proposals presented by 5 Lakes Energy (on behalf of the Ecology Center, Environmental Law and Policy Center ("ELPC"), Michigan Environmental Council, National Resource Defense Council, Sierra Club, Union of Concerned Scientists, and Vote Solar), Indiana Michigan Power, and ELPC (on behalf of the same parties as represented by 5 Lakes Energy) in the Advanced Planning Stakeholder Workgroup sessions.

Staff's Strawman Proposal

Staff proposed multiple options to amend the currently-approved Michigan Integrated Resource Planning Parameters ("MIRPP") and Integrated Resource Plan ("IRP") filing requirements depending upon whether a utility is filing an IRP prior to the year 2023 or after.

For utilities filing IRPs prior to 2023, Staff: (i) proposed no modifications to the current MIRPP, (ii) recommended that an addendum be added to the filing IRP requirements, and (iii) identified two emissions reporting options, Option 1 and Option 2, as shown in Figure 1.

The Company is supportive of not modifying the MIRPP and IRP filing requirements for utilities filing IRPs prior to 2023 because of the lengthy 12-to 18-month IRP development process, which would be further challenged by the timing of any of the new requirements adopted by the Commission in this proceeding.

The Company is supportive of the emissions reporting options shown in Figure 1, as offered by the Staff. Emissions charting is currently included in the IRP filing requirements to some extent, and minor modification is needed to accommodate the below reporting requirements. The Company's position is that the charting of emissions should be applied to the utility's generating fleet to better align with those emissions that are under the direct control of the utility. Utilities should not be required to chart emissions occurring in other sectors, or emissions occurring outside of the utility's direct control. External risk areas that occur in other sectors or occur outside the direct control of the utility, but still impact utility planning of resources, can be handled within the design of scenarios, sensitivities, and risk analysis in order to support utility business decisions within their scope of control or responsibility.

Figure 1

Option 1	Option 2
No MIRPP Update but Commission order directing addendum to filing requirements.	
Charts Carbon out to 2025 compared to 28% Carbon reduction.	Charts Carbon out to the 15-year planning horizon to illustrate the path toward 2050 and highlighting when the utility achieves a 28% reduction.
Spreadsheet of CO2, SOx, NOx, Mercury, and PPM for each year of the 15-year planning horizon for the utility's preferred plan and each MIRPP scenario optimized plan.	

For IRPs filed in or after the year 2023, the Staff identified four different options for incorporating emissions reporting requirements into IRPs, as shown in Figure 2. These options require changes to the MIRPP and IRP filing requirements approved in Case No. U-18418 and U-18461. The Company recommends changes and improvements to these requirements that both address the Governor's ED-2020-10 and enhance the value of a utility's IRP.

Figure 2

Option 1	Option 2	Option 3	Option 4
Requires MIRPP ***BAU*** scenario change to include carbon goal of 28% reduction by 2025 as a sensitivity.		Requires MIRPP change to ***all*** scenarios reflecting the Carbon goal of 28% reduction by 2025 as a sensitivity.	Requires MIRPP change to all scenarios reflecting Carbon Neutrality by 2050 and therefore modeling as a sensitivity.
If the utility preferred plan does not comply with the 2025 goal, include an optimized alternative plan that does comply with the 2025 goal and compare to the preferred plan.			If the utility preferred plan does not comply with the 2050 goal, include an optimized alternative plan that does comply with the 2050 goal and compare to the preferred plan.
Charts Carbon out to 2025.	Charts Carbon out to the 15-year planning horizon to illustrate a path toward 2050.		Charts Carbon out to 2050 in Exhibit to illustrate goal.
Spreadsheet of CO2, SOx, NOx, Mercury, and PPM for each year of the 15-year planning horizon for the utility's preferred plan and each MIRPP scenario optimized plan.			Spreadsheet of CO2, SOx, NOx, Mercury, and PPM for each year out to 2050 for the utility's preferred plan and each MIRPP scenario optimized plan.

The Company supports Staff's Options 1 and 2. The Company recommends that Options 1 and 2 be applied consistently for IRPs filed pre- and post-2023. That is, if Option 1 is recommended for IRPs pre-2023, then Option 1 should be chosen for post-2023 IRPs. The charting of emissions for each of these options should be those emissions in the direct control of the utility, as stated above for pre-2023 IRPs. Option 1 and 2 support ED-2020-10 by applying a carbon reduction sensitivity to the Business as Usual ("BAU") scenario, which is designed to represent the base view of the world and therefore is the most appropriate and valuable scenario in which to apply the sensitivity.

Option 3 asks for the carbon reduction of 28% by 2025 as a sensitivity for all scenarios. The Company is not supportive of running sensitivity analysis across all scenarios in a utility's IRP if it does not give additional insight or value to the IRP process. The design of each scenario is an important factor to consider in determining whether a sensitivity analysis should be conducted or not. It is the Company's position that the current MIRPP scenarios are nearly identical and represent more of a sensitivity analysis versus truly different scenarios. For example, load forecasts are identical in all three scenarios, leaving no ability to incorporate potential changes in load due to electric vehicle growth, behind the meter growth, or other changing market conditions. This results in an over production of information that does not provide value to the utility planning and decision-making process. Singular changes to all scenarios as currently written, such as the carbon reduction analysis proposed in Option 3, would not provide additional insight.

Option 4 requires a nearly 30-year optimization plan be created for forecasts and assumptions that are already increasing in uncertainty by the end of the current 20-year horizon of an IRP. The Company does not support Option 4 and its requirements for modeling, optimized plans, carbon and other emissions tracking to 2050. This requires a significant amount of additional modeling, including formal sensitivity modeling and an alternative optimized plan that achieves carbon neutrality by 2050, potentially using technologies that are in their infancy and are lacking the necessary cost information to appropriately optimize. The Company's position is that modeling carbon neutrality by 2050 yields no additional value given the level of uncertainty. Solving for a future scenario that may trigger up front investments is not prudent and is unreasonable. Indeed, MCL 460.6t requires a utility to provide a 5-year, 10-year, and 15-year projections, and requires a minimum 5-year review of utility IRPs versus a 20- or 30-year projection. The current 20-year optimizations and 5-year reviews, as required by statute and Commission order, are sufficient to provide the necessary information in long-term resource planning, and the objectives of the Governor's ED-2020-10.

To address issues in the current MIRPP while still working to provide a level of analysis in support of the Governor's ED-2020-10 and integrated planning, the Company recommends at a minimum the following changes to the MIRPP for IRPs filed post-2023. The Company also recommends continued discussion to further develop these changes:

1. Retain the BAU case with the addition of a formal carbon sensitivity to achieve the 28% carbon reduction goal by year 2025 for the utilities generating fleet. In addition:
    a. Replace the requirement to use the most recent Energy Information Administrations – Annual Energy Outlook for natural gas prices in all three existing MIRPP scenarios with a more flexible requirement that provides the opportunity for the utility and stakeholders to assess multiple business as usual forecasts offered by various industry sources to determine the most accurate natural gas price forecast. The setting of current requirements has caused duplication of work to ensure accurate results for major decision-making processes that further taxes the already lengthy and complex process of developing an IRP.

    b. The requirement to model the Statewide Potential Studies for Energy Waste Reduction and Demand Response programs in all three scenarios should be modified to require the utility to use these studies to ***inform*** the IRP development, and then give a utility the choice to decide to use the results for its IRP. Determinations in potential levels of savings, and the associated costs to achieve those savings, needs to be specific and tailored to each specific utility's operations and customer base. It remains the responsibility of the utility to provide thorough and reasonable justification for the accuracy and comprehensiveness of their potential study as part of the regulatory case. This modification to utilize a utility's potential study is not intended to reduce transparency to stakeholders. The Company continues to support continued stakeholder engagement through this process and believes the current requirements on stakeholder engagement are sufficient to drive this.

    c. Recommend removal of either the Environmental Policy or Emerging Technologies scenario(s), with the remaining one of these scenarios modified to reflect a potential future that has multiple assumptions different from the BAU scenario. This new scenario should create a narrative assuming advancements in technologies related to electrification (heating and transportation), decarbonization, customer participation in generation such as behind the meter generation, and changes in the levels and shape of demand over the study period. The parameters of this scenario would drive reductions in the level of capital cost for selected resources, as well as other inputs.

    d. Recommend cost reductions for renewables, Energy Waste Reduction, and Demand Response programs (currently 35% cost reductions in the Emerging Technologies scenarios and a slight modification of these levels in the Environmental Policy scenario) be less prescriptive. The Company suggests a

requirement for the non-Business as Usual scenario to stress test capital cost reductions of these resources based upon leading market indicators and technology advancements.

It is the Company's position that requiring two scenarios, with the high-level modifications noted above, will give a broad view of potential risks to a utility's resource plan, and support the cycle of decision making that MCL 460.6t facilitates. This approach provides greater agility to identify changing market and industry conditions that will impact long-term resource plans because a utility will have the ability to design additional scenarios or sensitivities more representative of future market conditions occurring in-between the filing of its IRPs. Continued stakeholder engagement is a valuable avenue to obtain more frequent feedback and thinking into utility IRPs, as opposed to prescriptive requirements defined in MIRPP parameters.

Alternative Proposals from Stakeholders

Finally, there were two alternative proposals presented during the November 6th Advanced Planning Stakeholder Workgroup. Various stakeholder groups, represented by 5 Lakes Energy, presented recommendations that create an assumed scenario with set levels of Energy Waste Reduction, specific accelerated retirements of thermal units, and defined increased penetration of renewables by 2025.

The Company does not support this alternative, as it is too prescriptive. It creates assumptions around specific utility retirements, forecasts, and other areas that are more appropriate for individual utilities to develop and utilize for decision making. It is most appropriate for each utility to define the best way to meet emission reduction targets and carbon neutral goals within the currently-defined IRP process, and to determine which methods and plans of emissions reductions are best for that utility's customer base.

As for incorporating electrification into electricity demand forecasts, this is a continually evolving element with no current formal targets around electrification. Therefore, it is not appropriate to include in base electric demand forecasts for this proposed scenario. The Company supports the recommendation to work to develop industry-specific electrification forecasts for future incorporation in demand forecasts within the utility IRP process, but maintains that it is most appropriate to utilize sensitivity analysis to best determine the effects of electrification in IRP planning, as opposed to inclusion in the base demand forecast.

The alternative scenario also recommends that carbon offsets not be considered. The Company does not support this restriction this early in the transition to carbon neutrality and believes it is best to include a variety of options as utilities continue to drive towards carbon emission reductions targets. In addition, the Governor's goal presupposes the use of offsets, as the goal is for *net*-zero emissions, and not just zero

emissions. For example, the Michigan Department of Natural Resources is in the process of the potential creation of an offset program using state-owned land. Particularly considering that offset programs can be major drivers of improving our State's natural areas and wildlife populations, the Commission should not at this point take this potentially important tool off the table.

With respect to the recommendations made regarding Scope 1, 2, and 3 emissions, the Company supports providing estimated projections of its emissions from its owned units, units under a power purchase agreement (PPA), and Midcontinent Independent System Operator (MISO) purchases. These types of emissions include Scope 1 (from owned units) and Scope 3 (from PPA and MISO units), but not Scope 2.[1] The Commission should, however, limit its use of such data to areas within its jurisdiction in the IRP process, as the Governor's net-zero goal announcement does not change the Commission's jurisdiction and the Commission is not a carbon regulator.

Specifically, the Commission should focus its analysis on the units that produce Scope 1 emissions, as utilities only control or have direct authority over these units. The Company is unable to identify, let alone control, units that produce Scope 3 emissions associated with MISO-related purchases. Rather, the Company purchases from MISO a generic MWh of energy or a MW of capacity, not from a specific unit. Without unit-specific information, accurate calculation of Scope 3 emissions is difficult, particularly over the 10, 15, and 20-year periods considered in utility IRP filings. In addition, no consistent or established method exists in the utility industry for estimating the carbon emissions associated with energy market transactions, as documented by a recent EPRI paper that identified five different methods but was unable to recommend a single best option.[2] As such, while the Company is comfortable providing estimates of Scope 3 emissions associated with its MISO-related purchases, it is inappropriate to use such estimates in decision making. Scope 3 emissions should be considered for informational purposes only, and not for decision making purposes.

In reviewing the overall recommendations provided by 5 Lakes Energy, Staff and the Michigan Public Service Commission ("Commission") should be mindful of the fact that stakeholders will continue to have the opportunity to intervene in future utility IRP proceedings. The Commission should not create new IRP parameters or IRP filing requirements which force utilities to pursue policy objectives for certain stakeholders when those stakeholders will have the opportunity to advance their policy objectives in future utility IRP proceedings.

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[1] Scope 2 includes emissions related to electricity, heat, or steam used by a company that is purchased from another party. For example, if the Company had a service center in DTE Electric's service territory, and purchased the electricity for that facility's use from DTE, then emissions associated with that purchase of electricity would fall under Scope 2. While such emissions exist, they are a very small portion of the Company's overall emissions profile. In addition, they relate to an activity – the use of electricity, rather than its generation – outside of the scope of the MIRPP.

[2] Please see https://ghginstitute.org/wp-content/uploads/2019/04/EPRI-Wholesale-Power-Report-Published-2019.pdf.

The second alternative proposal was made by Indiana Michigan Power. This alternative proposal recommends the inclusion of a comprehensive stakeholder process, maintaining a consistent planning horizon, filing of an IRP every three years, and consideration of future changes in technologies/fuel sources as components of incorporating carbon emission reduction planning into the current process. The Company is in support of these elements as part of a comprehensive integrated resource planning process and has already taken steps to satisfy them by filing an IRP every three years and utilizing an existing comprehensive stakeholder process that is well-positioned to also incorporate carbon emissions reduction discussions and feedback.

Integrated Planning Comments

The Company's position on integrating transmission and distribution planning with IRPs is that the existing requirements suffice in the development of IRPs, with a future goal to continue the journey of integration.

For the technology options and the associated operating characteristics considered in IRPs, value and costs are primary integration points between wires and supply-side planning. The technology options offered in an IRP, whether as a Non-Wires Alternative ("NWA"), a Distributed Energy Resource ("DER"), or transmission-connected resource, will naturally create an integration of wires and supply. The Company is currently well positioned to support a natural integration, with changes to its organizational structure, to create an environment of alignment in planning efforts.

The Company supports the idea of feeding applicable information from a Distribution Plan into the IRP, and vice versa. This can be achieved with a requirement for utilities to consider and incorporate, where applicable, distribution planning information to help inform an IRP. Leaving room for flexibility on these requirements drives an expedient process by minimizing the barriers and constraints that a prescriptive regulatory process creates.

The Company recommends a path forward that distinguishes between near-term actions and planning versus long-term actions and planning. Near-term and long-term each of require a different approach to achieving the ultimate goals of cost-effective, clean, and reliable energy for Michigan. Suggestions or recommendations such as providing a listing of substations, noting optimal locations for the siting of resources, and making changes to investments in the wires system that are beyond the interconnection of supply-side resources are all near-term processes that can continue to be addressed in distribution plans as opposed to the long-term planning of an IRP.

It is too early in the process of integration for specific requirements to be put in place for formal integration of transmission planning and integrated resource planning. Further alignment with existing MISO processes, such as MISO model development, MISO Transmission Expansion Planning (MTEP), and MISO Generator Interconnection and Retirement processes is required before the benefits of formal

integration of transmission planning into integrated resource planning can be fully realized. The present timing cycle of integrated resource planning has not allowed this alignment to take place. In addition, there are still a number of inputs required to perform a transmission or distribution system analysis that are either unknown at the time where assumptions need to be made, such as generator siting assumptions, or outside of utility control, such as resource decisions made by other utilities inside and outside MISO Local Resource Zone (LRZ) 7. Continued alignment with MISO, development of requirements through a robust stakeholder process, and flexibility will result in the most valuable integration of transmission planning and resource planning.

Closing

The Company appreciates the opportunity to provide these comments regarding this important topic. We look forward to continuing to work with the Staff, Commission and other stakeholders on these matters.

Respectfully submitted,

Consumers Energy Company

A.4 Updates to the IRP Process in Other States with Carbon Reduction Goals

The Commission's October 29, 2020 Order in Case No. U-20633 directed Staff to include in its report a review of "other proposals from states with similar greenhouse gas emission objectives."[41] Staff members conducted a review of the following states which have established carbon reduction goals: California, Hawaii, Maine, Massachusetts, New York, and Washington. Staff has summarized each state's carbon reduction goals and how they factor into the utility resource planning process, if this information was found. Staff has also included links to additional resources for further investigation into each state's process.

California:

In 2018, California was the first state to establish a zero-carbon energy resources goal by 2045, by passing SB 100, 'The 100 Percent Clean Energy Act of 2018.' The bill requires that the California

[41] *C.O.M. Energy Assessment (IRP and Distribution Plan Alignments), 10/29/20 Order, MPSC Case No. U-20633, p 7.*

Public utilities Commission (CPUC), the California Energy Commission (CEC), the California Air Resource Board (CARB) and all other state agencies are charged with incorporating the zero-carbon mandate into relevant planning processes along with regular reporting on implementation.[1]

Along with SB 100, Governor Brown also signed Executive Order B-55-19, 'To Achieve Carbon Neutrality' on September 10, 2018, which establishes a new statewide policy to achieve carbon neutrality no later than 2045, and to achieve and maintain net negative greenhouse gas emissions thereafter.[2] The EO charges CARB to address the goal during future scoping plans, which provide strategy for achieving the greenhouse gas reduction plans.[3] Additionally, on September 24, 2020, Governor Newsom released the California Climate Investment Framework.[4]

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[1]: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100
[2]: https://www.insideenergyandenvironment.com/2018/09/governor-jerry-brown-signs-sb-100-and-executive-order-to-achieve-carbon-neutrality-by-2045/
[3]: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2017-scoping-plan-documents
[4]: https://www.gov.ca.gov/2020/09/24/governor-newsom-releases-california-climate-investment-framework/

Hawaii:

The Hawaii State legislature first passed a clean energy standard in House Bill 623, which established a goal of 30% of electricity from renewables by 2020. 70% by 2040, and 100% by 2045.[1] In 2018, The Hawaii Public Utilities Commission (HPUC) established a proceeding to develop a process to integrate generation, transmission, and distribution planning processes, called Integrated Grid Planning (IGP).[2] In Order No. 35569, the HPUC directed utilities to file their IGP workplans by December 14, 2018. The IGP workplans were accepted by the HPUC in Order No. 36218, which also established a 'review point' procedure, where the HPUC will provide a review and guidance of each utilities IGP throughout the process.[3]

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[1]: https://www.capitol.hawaii.gov/Archives/measure_indiv_Archives.aspx?billtype=HB&billnumber=623&year=2015
[2]: https://dms.puc.hawaii.gov/dms/dockets?action=search. (Search: Docket No: 2018-0165)
[3]: https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A19C15A82853H00278

Maine:

In May 2019, the Maine state legislature established clean energy standards, which sets interim (2030) and final (2050) goals for percentage of electricity consumed in-state from renewable resources and percent reduction in gross GHG emissions below 1990 levels.[1] In June 2019, the Governor and Legislature created the Maine Climate Council, and called on it to develop a four-year plan to put Maine on a path to achieve the goals of the state's clean energy standard.[2] The Council published its climate plan, 'Maine Won't Wait,' in December 2020. This is a phased

implementation plan, which provides guidance for major economic sectors to achieve the state's clean energy goals, including the energy sector.[3] This plan was recently issued, and therefore has not been put into action in utility planning processes, although the development process through an executive council is analogous with the Council on Climate Solutions and its MI Healthy Climate Plan in Michigan.

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[1]: https://legislature.maine.gov/legis/bills/bills_129th/billtexts/SP055001.asp.
[2]: https://climatecouncil.maine.gov/about.
[3]: https://www.maine.gov/future/sites/maine.gov.future/files/inline-files/MaineWontWait_December2020.pdf

Massachusetts:

In 2008, Massachusetts signed into law the 'Global Warming Solutions Act,' which allows the state to set emissions reductions limits. At that time, it set a goal of 25% reduction in greenhouse gas (GHG) emissions by 2020 and an 80% reduction by 2050 over 1990 levels.[1] From this legislation, the Office of Energy in MA requires utilities to buy certain types of power through 'Clean Energy Plans' and participate in the Regional Greenhouse Gas Initiative (RGGI), a cap and trade program. This legislation also requires the MA Secretary of Energy and Environmental Affairs to periodically publish an updated 'Clean Energy and Climate Plan,' which sets the GHG emissions reduction targets in the interim years between legislative targets.[2], [3] MA does not have an IRP process, but instead uses many initiatives from the state's energy office to implement scenario and process changes. In 2020, Governor. Baker committed Massachusetts to "achieving an ambitious climate goal: net-zero greenhouse gas emissions by 2050," as part of his State of the Commonwealth address.[4]

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[1]: http://www.malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter298.
[2]: https://www.mass.gov/files/documents/2017/12/06/Clean%20Energy%20and%20Climate%20Plan%20for%202020.pdf.
[3]: https://www.mass.gov/service-details/clean-energy-and-climate-plan-for-2020.
[4]: https://www.mass.gov/news/governor-baker-delivers-2020-state-of-the-commonwealth-address.

New York:

In 2015, the New York Department of Public Service (NYDPS) developed a Clean Energy Standard (CES) to implement the goal of 50% of electricity sourced from renewable generation by 2030, updated to 70% in a 2019 executive order.[1] The NYDPS issued a set of orders in Case No. 15-E-0302, providing its proposal for a phased implementation plan to adopt the goals of the CES into the current utility planning process.[2] This plan provided guidance on how utilities in the state would ensure compliance with the CES. This process includes the procurement of an amount of renewable energy credits (RECs) and zero emission credits (ZECs) for each utility to meet its component of the statewide CES. The New York State Energy Research and Development

Authority (NYSERDA) is responsible for procurement of the necessary number of RECs to ensure the total NY system's load is in line with the CES; LSE's can then track and procure RECs and ZECs for compliance using the New York Generation Attribute Tracking System (NYGATS) tool. The NYGATS tool tracks information on electricity generated, imported, and consumed with New York state.[3] LSE's are required to file a Renewable Energy Standards (RES) compliance report, generated in NYGATS, as part of a filing to NYSERDA to evaluate its compliance with the RES.

[1]: https://climate.ny.gov/.
[2]: https://www.nyserda.ny.gov/-/media/Files/Programs/Clean-Energy-Standard/2017-03-24-Phase-1-Implementation-Plan.pdf.
[3]: https://www.nyserda.ny.gov/All-Programs/Programs/NYGATS/.

Washington:

The State of Washington passed the 'Clean Energy Transformation Act' (CETA) in 2019, establishing goals for utilities in the state to be carbon neutral by 2030 and carbon free by 2045. The Washington Utilities & Transportation Commission (UTC) opened a docket, U-190485, to publish its 'Energy Legislation Implementation Plan,' which aims to incorporate the CETA and other energy legislation into IRPs and other energy proceedings.[1] This initiative is a multi-phased action plan, set to conclude in 2022. Phase 1 includes the opening of a docket, 'Electric IRP Updates Rulemaking Docket UE-190698,' which will provide an avenue for amending the IRP process to reflect the CETA and other legislation (later consolidated with Docket UE-191023). On December 4, 2020, the UTC published its final proposed rules for adoption of the CETA.[2]

[1]: https://www.utc.wa.gov/_layouts/15/CasesPublicWebsite/GetDocument.ashx?docID=83&year=2019&docketNumber=190485
[2]: https://www.utc.wa.gov/_layouts/15/CasesPublicWebsite/GetDocument.ashx?docID=527&year=2019&docketNumber=191023