MI Power Grid: Phase III Advanced Planning Processes

Feedback from January 31, 2022
Stakeholder Meeting

DTE Electric Comments Regarding Staff's
MI Power Grid– Advanced Planning Phase III
February 9, 2022

On December 15, 2021, Michigan Public Service Commission's Staff prepared initial redlined Integrated Resource Planning (IRP) filing requirements and Michigan IRP Parameters (MIRPP). These were further discussed at the January 31, 2022 meeting.

DTE appreciates the effort of the Michigan Public Service Commission (MPSC), MPSC Staff (Staff) and all parties involved in this integrated planning collaborative.

Staff asked for feedback on the following:

1. Please provide any further feedback on Scenario #1 – Base Case and corresponding sensitivities
2. Do Stakeholders generally agree with a two-part approach to climate change impacts?
3. Staff seeks input about publicly available forecasts and load profiles for electric vehicles and electrification, specific to this region, that could be used to develop energy and demand forecasts in IRPs
4. Staff seeks input about publicly available normal and extreme weather forecasts related to the impacts of climate change that are specific to the region.

DTE Electric Comments Regarding Staff's
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#1a - Please provide any further feedback on Scenario #1 – Base Case

1. This scenario reflects substantial achievement of state and utility announcements. The Base Case incorporates 100% of utility integrated resource plan (IRP) announcements throughout the MISO footprint. Outside of Michigan, state and utility announced goals that are not legislated are applied at 85% of their respective announcements to hedge the uncertainty of meeting these goals and announcements at their proposed respective timelines. Emissions decline as driven by state goals and utility plans throughout the MISO footprint creating a trajectory of 63% reduction in carbon emissions by 2039 from the baseline year of 2005 for the MISO region.
2. This scenario assumes that demand and energy growth are driven by existing economic factors, with modest increases in EV adoption, resulting in an annual energy growth rate of 0.5% outside of Michigan. Utilities may develop their own demand and energy forecasts with description and detail about why and how this forecast would be different from the rest of MISO for the respective utility service area with a particular focus on EV adoption, electrification, and the impacts of climate change.
3. Natural gas prices utilized are consistent with the Reference Case projections from the United States Energy Information Administration's (EIA) most recent Annual Energy Outlook.
4. Moderate EV adoption and customer electrification result in moderate footprint-wide[24] demand and energy growth rates.
5. Within Michigan EV and electrification forecasts should be blended historical sales with reputable EV and electrification forecasts such that after 5 years, Michigan's load and demand increase to reflect the source forecast. Load profiles of EVs as well as any electrification technologies should be clearly delineated and presented such that it is clear how they impact the overall energy and demand forecast
6. Resources outside MI
    a. MISO futures retirements published by MISO should be used when available along with maximum age assumption by resource type as specified by applicable regional transmission organization (RTO). Specific new units are modeled if under construction or with regulatory approval (i.e., Certificate of Necessity (CON), IRP cost pre-approval, or signed generator interconnection agreement (GIA). Generic new units for the MISO wide region should be chosen based upon economics.
7. Resources within MI
    a. Thermal and nuclear generation retirements in the modeling footprint are driven by a maximum age assumption, public announcements, or economics. Specific

Commented [JE1]: DTE comment - Suggest re-writing to something like: "This scenario is aligned with MISO future 1 or most current similar scenario per direction of MPSC staff. Retirements as detailed in MISO future 1 (or similar) outside of Michigan are to be input into the multi zone capacity expansion model, along with input assumptions described below and supported in the Utility's IRP. Within Michigan, announced retirements and approved additions should be included. The remaining new build, if needed, shall be determined through optimization using a capacity expansion tool. The CO2 emissions decline trajectory throughout the MISO footprint should match a trajectory of approx. 63% reduction in carbon emissions by 2039 from the baseline year of 2005 for the MISO region."

Commented [JE2]: DTE comment – newly added wording. How is modest defined? Suggest deleting the word modest

Commented [JE3]: DTE comment – Suggest replacing with "Utilities may develop their own demand and energy forecasts with description and detail about why and how this forecast would be appropriate for the respective utility service area with a particular focus on EV adoption, electrification, and the impacts of climate change."

Commented [ML4]: DTE comment – Request clarification on how #2 and #4 are different?

Commented [JE5]: DTE comment – suggest modifying to "Within Michigan EV and electrification forecasts should be blended with historical sales such that after 5 years, Michigan's load and demand increase reflect the source forecast. Load profiles of EVs as well as any electrification technologies should be clearly delineated and presented such that it is clear how they impact the overall energy and demand forecast

new units are modeled if under construction or with regulatory approval (i.e., CON, IRP cost preapproval, or signed GIA). Generic new resources, market and company-owned resources are assumed consistent with the scenario descriptions and considering anticipated new resources currently in the MISO generation interconnection queue.

8. 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).
9. The optimized build plan must meet current state GHG emission goals and show progress toward federal GHG goals to the extent reasonable. ED2020-10, 2030 GHG Pollution Reduction Target.
10. For all in-state 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.
11. Existing renewable energy and storage production tax credits and renewable energy investment tax credits continue pursuant to current law.
12. Incorporate any distribution or transmission system co-benefits associated with DER's and demand side resources that have been identified as outputs of those respective planning processes. Ensure co benefits are considered when evaluating those resources throughout the IRP process.
13. Long and short duration storage resources are considered. Energy storage resources are modeled using available best practice methodologies to the extent that such guidelines exist. Incorporate any distribution or transmission co-benefit identified and allow for multiple revenue streams where practical.
14. Technology costs for thermal units and wind track with mid-range industry expectations.
15. Technology costs and limits to the amount available for EWR and demand response programs will be determined by the most recent statewide potential studies.
16. Technology costs for solar, storage, and other emerging technologies decline with commercial experience.
17. Existing PURPA contracts are assumed to be renewed.

Commented [JE6]: DTE comment – newly added sentence, suggest deleting. How is this defined? At certain point in queue process? Or is this a more general reference to resources types in the queue?

Commented [JE7]: DTE comment – would like to recognize that federal policy timing could have an implication on modelling

Commented [SDM8]: DTE comment – This is a new sentence. Suggest deleting. Request clarification on what is meant by "outputs of those respective planning processes"? Is this referring to T&D planning or EWR/DER planning or both? The TO would have insight into transmission benefits associated with their planning processes

Commented [JE9]: DTE comment – this is a new sentence. Suggest deleting. How and why are the multiple revenue streams relevant to the IRP modeling? Is it more about capturing the system value associated with storage - potentially helping with distr. issue but also resource capacity need? These "co-benefits" seem like post-modelling, site-specific analyses, not really inputs for base case.

Commented [SDM10]: DTE comment – It is unclear what this should be based on? Request clarification.

#1b - Please provide any further feedback on Scenario #1 – Base Case sensitivities

1. Fuel cost projections

   a. Increase the natural gas fuel price projections from the base projections to at least the high EIA gas price in the most recent EIA Low Oil and Gas Supply forecast natural gas fuel price projections at the end of the study period.
2. Load projections
   a. High load growth: Increase the utility energy and demand growth rates by at least a factor of (2) above the base case energy and demand growth rates. Assume load and demand profiles consistent with increased EV and electrification. If doubling the energy and demand growth rates results in less than a 1.5% annual growth rate, then assume a 1.5% annual growth rate for energy and demand. Due to the increase in load growth, utilities voluntarily raise the DG cap to accommodate the rapid change and increased customer adoption rates.
   b. MISO load growth: A load growth scenario that replaces the utility specific load and demand growth with one that is consistent with the most recent MISO Future 1 that represents a continuation of current trends.
   c. Low load growth: EV adoption and electrification are slower than expected and the demand and load growth stay at historic levels.
3. 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 the next capacity demonstration after the existing 4-year forward demonstration.
4. Ramp up the utility's EWR savings to at least 2.0% of prior year sales over the course of four years. EWR savings remain high throughout the study period.
5. Perform a model run that optimizes the resource build that considers only legislatively mandated carbon goals for the MISO region and does not consider non-legislatively mandated carbon goals for outside if Michigan. Demonstrate a path to Michigan's carbon goals and the impact to energy imports.
6. Out-of-State transmission congestion cost increases due to changing resource mix across the region. This results in a higher cost added for out of state resources. Work collaboratively with the incumbent transmission owner to develop the appropriate cost adder.

#2 - Do Stakeholders generally agree with a two-part approach to climate change impacts?

Commented [JE11]: DTE comment – newly added sentence. Suggest deleting this. Raising the DG tariff would be addressed in a rate case as opposed to the IRP.

Commented [ML12]: DTE comment – newly added sentence. Suggest deleting. Each utility's respective service territory and load shapes are unique.

Commented [SDM13]: DTE comment – What is meant by historic levels? Could be more specific, what is considered historical; 10-yr, 5-yr CAGRs?

Commented [LM14]: DTE comment: request clarification if "remain high" means remain at 2%. If so, suggest wording modification to "Ramp up the utility's EWR savings to at least 2.0% of prior year sales over the course of four years and continue throughout the study period."

Commented [LM15]: DTE comment: Suggest deleting as this doesn't make sense with the suggested re-writes for the base scenario, which don't contemplate Legislative vs. non-legislative carbon goals, rather using a list of MISO retirement assumptions. If not deleted, more clarity and alignment with the rewrite of the scenario is needed.

Commented [ANL16]: DTE comment – Suggest deleting this sensitivity. Request clarification on what this is addressing and how it would be calculated.

No, we do not support a two-part approach to climate change impacts. DTE believes that extreme weather events are unique in nature and recommends that each utility selects one of the approaches listed below with the modifications noted in the comments.

1. ~~Analyze~~ Incorporate the overall effect of climate change on "normal" weather to heating & cooling degree days. This impact can be integrated into the utility load and demand forecasts and profiles ~~as well as the impact to renewable resource generation~~.

~~2.~~1.

2. Analyze the impact of extreme weather ~~.This seems to fit better into a risk assessment where correlated variables tie together in a stochastic model.~~

#3 - Staff seeks input about publicly available forecasts and load profiles for electric vehicles and electrification, specific to this region, that could be used to develop energy and demand forecasts in IRPs

DTE recommends the following sources of publicly available information for Electric Vehicle forecasts for Michigan:

- EIA provide some data for the East North Central region - EIA - Annual Energy Outlook 2021
- BloombergNEF (2020 Electrification Outlook) - BNEF EVO Report 2020 | BloombergNEF | Bloomberg Finance LP

State or utility specific forecasts are often only accessible with a formal subscription service.

DTE recommends the following sources of publicly available information on electric vehicle charging and appliance end-use loadshapes:

- Electric vehicle load shape - Alternative Fuels Data Center: Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite (energy.gov)

- Appliance end-use loadshape database from EPRI - End Use Load Shapes (epri.com)

DTE uses a combination of proprietary data and reports compiled from DTE sponsored or subscribed to services.

Commented [JEL17]: DTE comment – modify wording

Commented [JEL18]: DTE Comment – suggest modifying - The forecasted CDDs and HDDs could be addressed through the load forecasting models as a sensitivity (or multiple sensitivities) to illustrate the impact of climate change on utility load and peak demand forecasts. These could then be used in the IRP expansion tool to establish risk bands in the plan due to climate uncertainty.

Commented [ML19]: DTE comment - Suggest deleting this part of the sentence. Renewable generation performance calculations are more complex than simply the number of cooling and heating degree days.

Commented [JEL20]: DTE comment - Analyze the impact of extreme weather through either risk assessment or resource adequacy study.

Commented [ML21]: DTE comment - Recommend deleting this sentence as it too prescriptive. In addition, it would be extremely difficult to identify correlated variables in a stochastic model

#4 - Staff seeks input about publicly available normal and extreme weather forecasts related to the impacts of climate change that are specific to the region.

DTE recommends two sources of publicly available weather data for Michigan, NOAA and GLISA. Attached are links to reports published on Michigan

- NOAA's report on Michigan - https://statesummaries.ncics.org/chapter/mi/
- GLISA website - GLISA | Great Lakes Integrated Sciences + Assessments (umich.edu)

DTE looks forward to further discussions and collaboration with Staff and industry stakeholders on Michigan's integrated planning process.

DTE Energy

February 9, 2022

VIA E-MAIL at GibbsK2@Michigan.gov

RE: Consumers Energy Comments to Staff on Michigan Integrated Resource Planning Parameters ("MIRPP") and Integrated Resource Plan ("IRP") Filing Requirements

Dear Ms. Gibbs:

The Company appreciates Staff's efforts leading the Advanced Planning Phase III workgroup collaborative discussions on January 31, 2022. The Company thanks Staff for providing the opportunity for discussion and comment.

The Company requests consideration of the following comments in response to Staff prompts:

1. Please provide any further feedback on Scenario #1 – Base Case and corresponding sensitivities.

Note: Company recommendations are below in ***blue***

Scenario 1, Base Case Feedback (this feedback is in addition to scenario and sensitivity comments provided after the December 2021 stakeholder meeting):

- This scenario reflects substantial achievement of state and utility announcements. The Base Case incorporates 100% of utility integrated resource plan (IRP) announcements throughout the MISO footprint. Outside of Michigan, state and utility announced goals that are not legislated are applied at 85% of their respective announcements to hedge the uncertainty of meeting these goals and announcements at their proposed respective timelines. Emissions decline as driven by state goals and utility plans throughout the MISO footprint creating a trajectory of 63% reduction in carbon emissions by 2039 from the baseline year of 2005 for the MISO region.
  - The Company recommends removing all language taken from the MISO Future with regard to "…state and utility announced goals that are not legislated are applied at…." The reason for proposing removing this language is that it added a great deal of confusion, with no added clarification to modeling assumptions.
    - Instead, the Company proposes rewording the scenario description as follows:
      This scenario reflects substantial achievement of state and utility announcements. The Base Case incorporates 100% of utility integrated resource plan (IRP) ***retirement*** *announcements throughout the MISO footprint,* ***as identified in MISO Future 1****. Emissions decline, driven by*

*state goals and utility plans throughout the MISO footprint, **with at least 60%** reduction in carbon emissions by 2039 from the baseline year of 2005 for the MISO region.*

- The Company is unclear as to whether subsequent MISO Future reports will continue to set 2039 as the target date for CO2 reduction or end-of-study-period targets; it was our understanding that 2039 was identified because the MISO Future study started in 2019 and was a 20-year study horizon.

- This scenario assumes that demand and energy growth are driven by existing economic factors, with modest increases in EV adoption, resulting in an annual energy growth rate of 0.5% outside of Michigan. Utilities may develop their own demand and energy forecasts with description and detail about why and how this forecast would be different from the rest of MISO with a particular focus on EV adoption, electrification, and the impacts of climate change.
  - While the Company very much appreciates the wording of the second sentence ("Utilities may develop their own …."), we propose to modify this bullet point by merging it with a below bullet point that has been pulled up here ("Moderate EV adoption…"):
    *This scenario assumes that demand and energy growth are driven by existing economic factors, with **moderate EV adoption and customer electrification, resulting in moderate footprint wide demand and energy growth rates**.* ~~*Modest increases in EV adoption, resulting in an annual energy growth rate of 0.5% outside of Michigan.*~~ *Utilities may develop their own demand and energy forecasts with description and detail about why and how this forecast would be different from the rest of MISO with a particular focus on EV adoption, electrification, and the impacts of climate change.*

    We believe a specific load growth assumption for non-utility, non-Michigan footprints is overly prescriptive, for reasons provided in the Company's feedback in January 2022, as well as the fact that definition of "moderate" adoption of EVs could change over time. While 0.5% load growth attributable to EV adoption is 'moderate' today, it may not be in the years to come, over which these parameters apply.

- Resource assumptions:
  - Resources outside MI – MISO futures retirements published by MISO should be used when available along with maximum age assumption by resource type as specified by applicable regional transmission organization (RTO). Specific new units are modeled if under construction or with regulatory approval (i.e, Certificate of Necessity, IRP cost pre-approval, or signed generator interconnection agreement (GIA)). Generic new units for the MISO wide region should be chosen based upon economics.

◦Resources within MI – Thermal and nuclear generation retirements in the modeling footprint are driven by a maximum age assumption, public announcements, or economics. Specific new units are modeled if under construction or with regulatory approval (i.e., CON, IRP cost pre-approval, or signed GIA). Generic new resources, market and company owned resources are assumed consistent with the scenario descriptions and considering anticipated new resources currently in the MISO generation interconnection queue.

- The Company agrees that the differentiation between "outside / within MI" under "Resource assumptions" is unnecessary. We propose striking the separate bullet points and instead adopting the following, as sufficient to cover both bullet points:
  Resource assumptions:
  MISO Future 1 retirements for thermal and nuclear generation resources should be used when available, along with recent public announcements, or utility-supported economics or utility-supported maximum age assumptions. Specific new units are modeled if under construction or with regulatory approval (i.e. Certificate of Necessity (CON), IRP cost pre-approval, or signed generator interconnection agreement (GIA)). Generic new resources are assumed consistent with the scenario descriptions, considering anticipated new resources currently in the generation interconnection queue, and should be chosen based upon economics.

<u>Scenario 1, Base Case Sensitivities Feedback:</u>

- Load projections:

  High Load Growth (*increase growth rates by at least a factor of 2 above base; should result in at least a 1.5% annual growth rate. Due to growth raise the DG cap to accommodate increased customer adoption)*

  - The Company has previously proposed replacement of this high load growth sensitivity with the following, and will copy the prior feedback here, for convenience:
    The Scenario 1 high load growth sensitivity is proposed to be removed. Instead, a high load growth sensitivity is proposed for Scenario 1 that evaluates the high load growth assumed in Scenario #2. Because Scenario #2 assumes "electrification drives a total energy growth by 2040 that is consistent with the most recent MISO Future 3", which currently results in a 1.71% compounded annual growth rate (CAGR) on energy and a 1.41% CAGR on demand, we believe it is reasonable to reduce the number of load forecasts required, and rely the forecast developed for MIRPP Scenario #2 (based on MISO Future 3) to drive the assumptions for high load growth in this sensitivity (which is approximately 1.5% growth).
  - The Company objects to including a modeling requirement that formally adjusts the cap on distributed generation; this would be requesting a sensitivity that

includes specific assumptions contrary to current law, and also locks in a specific replacement resource instead of allowing the model to the select the resource most appropriate to fill the need from a higher load growth perspective.

MISO Load Growth *(replaces utility specific load growth with one consistent with MISO Future 1)*

- The Company proposes removal of the MISO Load Growth sensitivity because the MISO Future 1 scenario does not develop a **utility specific** load and demand forecast (or corresponding growth rates). The base scenario assumptions will be justified by the utility and will provide one bookend, while a high load growth sensitivity would provide a second bookend. Development and tracking of multiple load forecasts can become cumbersome both for the utility to develop and model, as well as for Staff and intervenors to review with the amount of information in an IRP filing.

Low Load Growth *(demand and load growth stay at historic levels)*

- With current federal and state mandates and carbon reduction targets related to the transportation and energy sectors, the Company believes a low load growth situation is unlikely to occur and proposes striking this sensitivity. The MI Healthy Climate Plan, electric vehicle sales targets by GM and Ford, and clean energy standards proposed by both Michigan and the federal government are just a few examples of current planning efforts that would push for higher levels of electrification and make it very unlikely that any level of historic low load levels would continue.

MISO Carbon Goals *(perform model run that optimizes the resource build considering only legislatively mandated carbon goals for MISO region; does not consider non-legislatively mandated carbon goals outside of Michigan. Demonstrate a path to Michigan's carbon goals and the impact to energy imports).*

- The Company is strongly opposed to this sensitivity, as it requires a significant workload as a sensitivity. This sensitivity would require re-interpretation of the MISO Futures retirement list and likely a re-optimization of the outside world, which then results in this being a different scenario, not just a sensitivity.

Transmission Congestion Costs *(out of state transmission congestion cost increases due to a changing regional resource mix, resulting in higher cost added for out of state resources. Work with transmission owner to develop appropriate cost adder).*

- The Company requests clarification on how Staff recommends modeling the transmission congestion cost sensitivity. The Company generally understands transmission congestion to be a real-time economic constraint. Historically, the Company has only worked with METC/ITC as the primary transmission owner in the Company's service territory. METC/ITC does not own transmission assets outside of the state of Michigan.

- Additionally, the scenario capacity expansion results are likely to influence the cost adder developed from a transmission owner. This is an iterative process that could vary widely for different utility assumptions.

- **Company Comments on proposed additional requirements from METC/ITC:**
  - *For the proposed resource plan, the utility's IRP filing shall include a Local Reliability Requirement (LRR) analysis for LRZ 7 per Section 5.2.2.2 of MISO's Resource Adequacy Business Practice Manual. The LRR analysis shall be performed at five**[1]**year increments for the entire IRP outlook period. The purpose of this calculation will be to estimate the marginal impact of the utility's proposed resource plan on LRZ 7's planning reserve margin, as characterized by the LRR, over the course of the forecast period.*
  - *Section XII of this document describes the Transmission Analysis requirements of the utility's IRP filing. The incumbent Transmission Owner (TO) shall perform LRZ 7 Capacity Import Limit (CIL) calculations for each year the utility performs the LRR calculations assuming the utility's proposed resource plan.*
  - *Estimates of the marginal impact of the utility's proposed resource plan on LRZ 7's LRR and CIL determines the marginal impact on the Zone's Local Reliability Requirement which explicitly identifies the amount of internal unforced capacity needed to meet NERC Reliability Standards of a one day in ten years Loss of Load Expectation (LOLE). Out-year transmission topology assumptions will be limited to current MTEP-approved transmission projects.*

The Company objects to the proposed additional requirements from METC/ITC and they should be rejected by MPSC Staff based on the following:

- The proposal states that the purpose of the LRR is to determine the marginal impact of the utility's resource plan on LRZ 7's planning reserve margin (PRM). However, a PRM for a local resource zone is determined at the RTO level based on the results of the LOLE study that includes the entire RTO footprint. A utility would not have the full LOLE model by which to re-calculate the PRM for the LRZ.
- It is unreasonable given the timing of IRP cycles to perform this type of analysis, particularly due to the iterative nature of the proposed analysis, as well as the requirement for dependency on the transmission owner to perform analyses as part of a utility IRP.
- Instead, a utility could perform an analysis evaluating the extent to which the proposed resource plan results in the potential for loss of load. Any such analysis would be designed and supported by the utility.
- The LOLE and LRR analysis described is a MISO-directed activity. The Company should not be required to replicate a MISO-directed activity in an IRP proceeding. Instead, MISO's LOLE report documenting their analysis could be submitted as part of a utility IRP.

2. ***Do Stakeholders generally agree with a two-part approach to climate change impacts?***

The Company agrees that it is prudent to incorporate the impacts of climate change into long term planning processes such as integrated resource planning. Climate change is expected to continue to cause changes in overall temperatures, as well as precipitation (including, rain, freezing rain, and snow), and will cause impacts in annual averages, seasonal changes, as well as extreme weather events. For this reason, the Company agrees with an evaluation of climate change that incorporates both long-term impacts to input variables included in IRPs, as well as evaluation (where possible) of the potential impacts from more extreme weather events that are of increased frequency and duration.

With regards to analysis of climate change impacts, some key variables that can be evaluated include:

- Changes in load, including annual average and peak weather conditions, seasonal impacts, as well as changes in demand that may result from extreme weather events;
- Changes in generation resource availability, both for baseload resources such as coal or natural gas, as well as intermittent resources such as wind and solar; and
- The availability of import power during widespread extreme conditions.

The Company recommends that the MPSC keep the scope of its climate change analysis focused on topics historically addressed in IRP proceedings – that is, on projected future load changes and corresponding generation needs to meet those loads from a capacity and reliability perspective. Conversely, we do not recommend that the MPSC try to evaluate, in an IRP, questions that have only a tenuous relationship to generation planning. Based on this, we recommend the MPSC specifically exclude from its IRP filing requirements items such as:

- Localized impacts of climate change, or other forms of locational analyses. IRP models are not designed to do localized analyses at regions smaller than a service territory;
- Impacts of climate change on distribution lines business, such as the impact of freezing rain, flooding, or extreme heat on reliability; and
- Impacts of climate change relating to the interface of the electric and gas utility businesses, or other sectors of the economy. While these intersectional analyses are important, we believe they go beyond the scope or purpose of an IRP analyses and so are best suited for a separate analysis. We would, however, welcome a stakeholder discussion, outside of the IRP filing requirement discussions, on this topic. We see value in determining how to best align the different planning processes.

3. ***Staff seeks input about publicly available forecasts and load profiles for electric vehicles and electrification, specific to this region, that could be used to develop energy and demand forecasts in IRPs.***

The Company is not aware of any publicly available, high quality **regional** forecasts or load profiles for electric vehicles or electrification. There are publicly available national forecasts available, but many of these forecasts would not be representative of Michigan or the service territories of Michigan utilities. For example, in the case of electrification, publicly available national or regional forecasts are not likely to be representative of customer adoption levels in Michigan, given the growing recognition that currently available products such as cold climate heat pumps require additional technical breakthroughs to meet customer needs in Michigan electric service territories. Differences in local technology costs and availability, work force capacity for infrastructure, as well as local customer awareness and interest levels are all factors that could influence electric vehicle and electrification growth in Michigan that may not be accounted for in higher level, publicly available regional forecasts.

Given these unknowns, it is most appropriate for utilities to provide their own forecasts for electric vehicle and electrification growth, with supporting data and justification that is both recent and Michigan-specific, as opposed to requiring the use of more generic forecasts which may result in overestimating or underestimating impacts to electric demand and load profiles. Therefore, the Company recommends that IRPs rely on electric vehicle and electrification forecasts developed and provided by the individual utility that support their overall forecasts for energy and demand.

4. ***Staff Seeks input about publicly available normal and extreme weather forecasts related to the impacts of climate change that are specific to the region.***

The Company recommends working with the Great Lakes Integrated Sciences and Assessments (GLISA) organization, which is a group of climate scientists and researchers at the University of Michigan and Michigan State University. This group focuses on evaluating the impacts of climate change on the Great Lakes region, and then using this information to help the broader public prepare for climate change. Consumers Energy has been working with this group over the past several months to better understand the potential impacts of climate change on our operations and customers.

GLISA should be able to provide projected climate impacts on Michigan over time periods like 2040-2060. It may be more difficult, however, to provide data-driven impacts on shorter time frames because climate models focus on the mid-century and end-of-century scenarios more than year-by-year changes in climate. An extrapolation may be necessary to capture time periods like 2025, 2030, 2035, or 2040.

Another potential data limitation is that the Company is not aware of any source that has probabilities associated with projected temperature changes, or other climate-related changes

(e.g., precipitation, wind, freezing rain, etc.) due to climate change. While ranges of possible changes are publicly available, the probabilities of any particular temperature, or temperature range, is more difficult. Such probabilities are difficult to project because there are so many global variables involved in different climate pathways. For example, the rate of climate change in the coming decades depends in large part on the rate of greenhouse gas emissions over the coming decades – which is highly difficult to assign probabilities to. As such, the Company is not aware of publicly available probability data. In addition, there is a concern that assigning probabilities to specific climate effects has the potential to affect the accuracy of stochastic risk assessment of climate change in IRPs, as the probability of certain outcomes can be tied to the ranges of variables evaluated in the stochastic model.

Because of this limitation, the Company recommends that the MPSC consider evaluating the impact of different representative concentration pathways (RCPs) commonly considered in the climate science literature, such as RCP 2.6, 4.5, 6.0, and 8.5. These different RCPs represent different future greenhouse gas emissions scenarios that may occur over the coming decades. Because of their representative nature, they would give utilities and the MPSC a spectrum of potential future temperature changes, and therefore a basis to consider the impacts of climate change on data points relevant to IRPs, such as potential future load projections.

Respectfully submitted,

Consumers Energy Company

From: Houseman, Doug A <doug.houseman@1898andco.com>
Sent: Tuesday, February 8, 2022 9:35 AM
To: Gibbs, Kayla (LARA) <GibbsK2@michigan.gov>
Subject: IRP stakeholder group comment

Dear Ms. Gibbs –

Having read the minutes and presentation from the January Meeting, I do not see the idea of seasonal load and production in the slide set.

We have significant renewable generation mismatch with load in the state. Our likely worst-case scenario will be in the winter as EVs and electric HVAC are implemented, If renewables are going to be the major source of Michigan's electricity.

In the Spring, Solar's profile far exceeds the load for the state wen looked with proper scaling, in the summer, solar does very well in June and July, but may not match the peaks in August. For September and October, there is a reasonable match to load, but as the year moves into November and December, the shortfall is significant. That shortfall continues in the January and February.

I would suggest any modeling effort include a winter peak modeling requirement if renewables are going to be a significant part of the mix.

In the spring, bridging the night is easily done with 6- and 10-hour storage (more 6, and less 10), while in the winter night can exceed 14 hours, and storage then needs a longer daily storage to get through the night. If we only model the summer season, the winter requirements will be ignored.

This will be a problem, as we move to a higher percentage of renewables based on wind and solar.

If a winter or seasonal modeling is not currently in the discussions, it should be for the safety of the citizens of Michigan. I remind you of the Polar Vortex in Mid-west a few years ago, and the issues in Texas last year. While our wind turbines are better equipped than the ones in Texas were to handle cold weather, in 2014 the wind turbines in MISO became a 214MW load for almost 36 hours because of the very calm wind and the need to keep them from freezing.

Thank you for your consideration.

Doug Houseman
Citizen of the State of Michigan

From: Wu, Fang <FWu@a2gov.org>
Sent: Tuesday, February 8, 2022 5:11 PM
To: Gibbs, Kayla (LARA) <GibbsK2@michigan.gov>
Cc: Stults, Missy <mstults@a2gov.org>
Subject: IRP Phase III Meeting #2 Feedback

Dear Naomi and Kayla,

The following is the feedback on the topics discussed at the Phase III workshop on Jan 31, 2022.

1. **Please provide any further feedback on Scenario #1 – Base Case and corresponding sensitivities.**

It is not clear if the carbon price is considered in the sensitivities of the Base case scenario. We recommend adding the carbon price as one sensitivity in the Base scenario as It can show the impact of carbon policy on resource planning, the additional costs to ratepayers if any, and extra carbon emission reduction achieved due to the change.

2. **Do Stakeholders generally agree with a two-part approach to climate change impacts?**

We are supportive of the MPSC staff proposed two-part approach representing a reasonable approach to integrating the impacts of climate change into the IRP. The impact of climate change is multifold. The rising average temperature may have an impact on annual cooling degree days and heating degree days. Therefore, the normalized weather used for electricity load and peak projection may need revision to capture the climate change effects. Secondly, we have seen more extreme weathers such as extreme heat and cold which lead to more equipment failures, generation outages, etc. The risk assessment of electricity load demand under extreme weather conditions (within MI and outside MI) could help utilities, ISOs, and public agencies to understand the potential risk and prepare mitigation strategies.

3. **Staff seeks input about publicly available forecasts and load profiles for electric vehicles and electrification, specific to this region, that could be used to develop energy and demand forecasts in IRPs.**

Other than MISO Futures (MISO Futures), I recommend a couple of reports on EV and electrification projections. 1) The "Plug-in Electric Vehicle Market Projections: Scenarios and Impacts" (EPRI (2017) provided three market adoption scenarios at the national level. 2) "U.S. National Electrification Assessment" (EPRI (2018)) provides additional electric load demand due to customer adoption of electric end-use technologies under various scenarios. 3) Another two reports developed by M.J. Bradley & Associates: "Electric Vehicle market Status-Update": Projected EV sales, projected battery pack costs, and projected date of EV "price parity" with internal combustion engine (ICE) vehicles. The report also addresses the effects of the COVID-19 pandemic on EV sales. (EV market update 2021); "Plug-in Electric Vehicle Cost-Benefit Analysis: Michigan" (Michigan Report 2017) The report estimated costs and benefits of moderate and high PEV penetration scenarios. We hope that whatever EV scenarios are

adopted, EVs are just viewed as a vulnerable and driver of electric demand, but also as a flexible tool that help manage the grid.

4. **Staff seeks input about publicly available normal and extreme weather forecasts related to the impacts of climate change that are specific to the region**.

We are supportive of providing more clarification on the normal and extreme weather forecasts. Specifically, we recommended that the Commission consider the big data approach and probabilistic model described in detail in Tao Hong's 2014 paper titled "Long Term Probabilistic Load Forecasting and Normalization with Hourly Information." (Paper Link) Tao suggests using the hourly load and temperature data to create more accurate forecasts incorporating predictive modeling, scenario analysis, and weather normalization. His approach has been deployed across many U.S. utilities.

Here are a few information sources on extreme weather events that we would like to recommend. 1) NOAA's CHaMP Tool https://champ.rcc-acis.org/, they have definitions for excessive heat, strong wind events, etc. They also provide projections of extreme heat under various carbon emission scenarios. 2) NOAA's Storm Event Database, is where the CHaMP tool data is sourced from. 3) IPCC's 2021 Summary for Policy Makers (or the full report). We strongly recommend reaching out to the Great Lakes Integrated Sciences and Assessment (GLISA), a NOAA RISA located at the University of Michigan, to get the most up-to-date historic, current, and future climate projections.

Hope these help. Thank you for the opportunity to provide feedback.

Best regards,

Fang

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From: Laura Sherman <laura@mieibc.org>
Sent: Friday, February 4, 2022 5:22 PM
To: Gibbs, Kayla (LARA) <GibbsK2@michigan.gov>
Cc: Simpson, Naomi (LARA) <SimpsonN3@michigan.gov>; Harlow, Jesse (LARA) <HarlowJ@michigan.gov>; Charlie Beauregard <charlie@mieibc.org>; Ryan Katofsky <rkatofsky@aee.net>; Michael Weiss <mweiss@aee.net>
Subject: Comments on MI IRP Discussion from Jan 31

Hi all,

Advanced Energy Economy (AEE) and the Michigan Energy Innovation Business Council (Michigan EIBC) (collectively "Michigan EIBC/AEE") appreciate the opportunity to provide feedback in response to the discussion in MI Power Grid's Advanced Planning Processes Phase III stakeholder meeting on Monday, January 31, 2022. Michigan EIBC/AEE have been active participants in many MI Power Grid workshops since the initiative's launch and appreciate Staff's time, effort, and willingness to receive robust stakeholder feedback throughout these proceedings. Michigan EIBC/AEE most recently provided written comments on Staff's draft updates to the Michigan Integrated Resource Planning Process (MIRPP) and the filing requirements. This email serves as our feedback on Staff's most recent questions regarding the base case scenario and sensitivities, the proposed two-part approach to climate change, regional load forecasts for electric vehicles and electrification, and forecasts related to normal and extreme weather forecasts.

We believe that our original comments, submitted on January 5, adequately convey our general support for the draft updates made to the MIRPP and the filing requirements. We encourage the Commission to refer to our original comments regarding the base case scenario and sensitivities. Particularly, we appreciate the Staff's recognition of our recommendations for best practices for modeling of energy storage resources. Recognizing that other stakeholders submitted comments seeking more insights on storage modeling best practices, we encourage the Commission to incorporate our recommendations for the modeling of long- and short- duration storage resources throughout IRP modeling.

In our original comments, we recommended that Staff incorporate a sensitivity that reflects weather in an atypical year. Without this sensitivity, the IRP is unlikely to identify a portfolio that remains least cost under the range of the weather conditions that are likely to occur. Recognizing the need to evaluate normal and extreme weather forecasts will be critical to preparing for the future grid. The Commission has already spent significant resources evaluating the challenges posed by extreme weather in Case No. U-21122 and in the Commission's two technical conferences that took place this fall. We encourage Staff to review comments in both settings to inform their approach to climate change and potential

forecasts. In particular, we highlight our comments in U-21122, in which we encouraged the Commission to direct utilities to consider using the Department of Energy's Argonne National Lab (ANL) Regional Climate Model. ANL's Regional Climate Model can provide a spatial resolution down to the neighborhood level to estimate future weather in a region. This model is currently used in planning processes for utilities in New York and California. We believe that a tool such as the ANL Regional Climate Model could allow Michigan utilities to make informed decisions about grid investments amid a changing climate in Michigan.

Finally, Michigan EIBC/AEE are not aware of any recent Michigan-specific and/or regional electrification and EV load forecasts. With that said, there was a 2017 report produced by M.J. Bradley & Associates titled "Electric Vehicle Cost-Benefit Analysis: Michigan" that evaluates the costs and benefits of increased penetration of electric vehicles (available here: https://mjbradley.com/sites/default/files/MI_PEV_CB_Analysis_FINAL_03aug17.pdf). Although possibly outdated, we believe it be helpful because it evaluates a moderate and high penetration scenario. In the absence of any Michigan-specific forecasts, we encourage Staff to consider general goals outlined by the Council on Climate Solutions, including the recommendation to build the infrastructure to support 2 million electric vehicles on Michigan roads by 2030. In addition, the intent of automobile manufacturers, such as General Motors, Ford, and Stellantis, to phase out internal combustion engines and replace them with electric vehicles signifies a major transition in EV load.

Michigan EIBC/AEE thank Commission staff for the opportunity to comment. If you have any further questions, please do not hesitate to reach out.

Best,
Laura

****

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michigan EIBC

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

The Michigan Public Service Commission ("Commission") issued an Order on September 24, 2021 directing Commission Staff to begin Advanced Planning Phase III of the Integration of Resource, Distribution, and Transmission Planning workgroup. Specifically, this phase is to revisit the Michigan Integrated Resource Planning Parameters ("MIRPP"), integrated resource plan ("IRP") filing requirements, and Demand Response ("DR") and Energy Efficiency Studies which are required to be evaluated every five years under MCL 460.6t(1).

The Commission directed Staff to create a redline version of the MIRPP published on November 21, 2017, that reflects the recommendations developed through the Integration of Resource, Distribution, and Transmission Planning workgroup to date, as well as feedback from stakeholders and the directives for building a carbon-neutral Michigan pursuant to Executive Directive 2020-10. Pursuant to this direction Staff conducted a workgroup on January 31, 2021 and solicited feedback on certain questions as set out below. Pursuant to that solicitation the Association of Businesses Advocating Tariff Equity ("ABATE") provides the following comments below.

II. COMMENTS

1. Please provide any further feedback on Scenario #1 – Base Case and corresponding sensitivities.

   ABATE continues to be generally supportive of the Base Case assumptions. If the base case assumptions require some level of carbon taxes ABATE would request that an optimized portfolio be presented for a sensitivity run in which there are no carbon taxes.

2. Do Stakeholders generally agree with a two-part approach to climate change impacts?

   ABATE generally agrees with this approach.

3. Staff seeks input about publicly available forecasts and load profiles for electric vehicles and electrification, specific to this region, that could be used to develop energy and demand forecasts in IRPs.

   ABATE is unaware of such forecasts.

4. Staff seeks input about publicly available normal and extreme weather forecasts related to the impacts of climate change that are specific to the region.

   ABATE is unaware of such forecasts.

III. CONCLUSION

Pursuant to Staff's solicitation of feedback ABATE recommends Staff consider and incorporate the comments set out above.

Respectfully submitted,

CLARK HILL PLC

By: */s/ Stephen A. Campbell*
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Date: February 9, 2021

INDIANA MICHIGAN POWER
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February 10, 2022

To: Kayla Gibbs, Michigan Public Service Commission

Re: Integrated Resource Plan (MIRPP-Filing Requirements)

Indiana Michigan Power Company (I&M or Company) submits these comments on the Michigan Public Service Commission (MPSC) Staff's January 31, 2022 presentation.

I. Introduction

I&M is a multi-jurisdictional public utility that is regulated in the States of Michigan and Indiana. I&M serves approximately 130,000 retail customers in Michigan, located in predominantly rural areas of southwest Michigan. I&M's Michigan retail customers comprise approximately 15% of the total generation load served by I&M. The remaining customers are wholesale or Indiana retail. Importantly, I&M operates within the PJM Interconnection, L.L.C. (PJM) Regional Transmission Organization (RTO), while most Indiana and Michigan utilities operate in the Midcontinent Independent System Operator, Inc. (MISO) RTO.

II. Comments

Slide 42: Scenario #1-Base Case

I&M appreciates the acknowledgement that the "Scenario #1-Base Case" is applicable to utilities located in the Michigan portion of MISO Zone 2 and 7, and encouragement that multi-state utilities utilize this scenario. I&M is committed to conducting IRP's consistent with the expectations and guidelines provided by the Commission. However, as Staff has acknowledged, this scenario is aligned with "MISO Futures 1". At this time, it is not clear to I&M if MISO Future 1 is a scenario that is representative of a multi-state utility operating in PJM. While the requirement MPSC Staff is proposing does not require I&M to run such a

scenario, I&M has performed a preliminary review of the proposed scenario requirements and participated in discussions on how it may be able to utilize the framework being proposed for potential consideration in I&M's future IRP model. Please note that I&M's concern about the applicability of the "MISO Future 1" scenario applies to several bulleted inputs under this scenario.

As an initial matter, I&M recommends that the scenario name be retitled to reflect alignment with "MISO Future 1". A utility IRP base case scenario should be reflective of the most expected future scenario using utility base forecast assumptions. It is appropriate for the base case scenario to be developed by the utility with input from stakeholders.

Slide 42 Bullet #2: This scenario reflects substantial achievement of state and utility announcements. The Base Case incorporates 100% of utility integrated resource plan (IRP) announcements throughout the MISO footprint. Outside of Michigan, state and utility announced goals that are not legislated are applied at 85% of their respective announcements to hedge the uncertainty of meeting these goals and announcements at their proposed respective timelines. Emissions decline as driven by state goals and utility plans throughout the MISO footprint creating a trajectory of 63% reduction in carbon emissions by 2039 from the baseline year of 2005 for the MISO region.

- I&M Comment: The requirement to incorporate utility IRP announcements or state "announced" goals, which are not legislated, is concerning to I&M as these types of announcements are not a confirmed future state of the world. As such, using announcements and goals presents risk that the announcements will not be interpreted and used in the same way amongst utilities filing an IRP in a similar time frame. I&M supports IRP filing rules that allow for consistent adoption and application. In addition, I&M has concerns around the administrative burden of tracking "announcements" and "goals" and how these announcements and goals can be open to different

interpretations. As such, IRP rules should be crafted in such a way to be applied and interpreted consistently. The MISO Future 1 scenario requires utilities to assume that IRP's are approved and implemented over 20 years. Instead, it is commonly understood that an IRP is not a commitment to a specific course of action and changes will occur, especially in today's energy world where the future is highly uncertain and already experiencing rapid change. Using the MISO Future 1 assumption to include all utility IRP announcements would pre-determine capacity expansions that might not be implemented. Using announced goals is speculative in nature and not appropriate for IRP modeling.

- I&M Comment: For I&M purposes, if the Staff would like I&M to consider modeling this Scenario #1, I&M suggests consideration to provide the parameters to include in the model rather than the specific outcomes of the model. Additionally, the specific information to model such as existing unit retirements and any new unit additions along with expected model inputs should be provided by Staff, recognizing that as these are defined for consistency, less variations in model outputs should be anticipated.
- I&M Comment: While I&M is still learning about the MISO Future 1, it appears that the identified emissions reduction is an output from the MISO futures 1 modeling. As the MISO report states, "Consistent with Futures assumptions, CER trajectories reflected 100% of IRPs and 85% of other announced goals for Future 1". The identified carbon reduction (63%) in MISO Futures 1 is a result of many utility assumptions and optimization of resources that may or may not be implemented. I&M is concerned that

imposing this on I&M modeling would in effect, predetermine the outcome and diminish or possibly negate the benefit for running a scenario. An alternative could be to define parameters that would influence the selection of new resources such that carbon emissions would be reduced.

Slide 42 Bullet 3: This scenario assumes that demand and energy growth are driven by existing economic factors, with modest increases in EV adoption, resulting in an annual energy growth rate of 0.5% outside of Michigan. Utilities may develop their own demand and energy forecasts with description and detail about why and how this forecast would be different from the rest of MISO with a particular focus on EV adoption, electrification, and the impacts of climate change.

- I&M Comment: The statement "resulting in an annual energy growth rate of 0.5% outside of Michigan" is concern as this appears to be an output from the Futures 1 modeling. Prescribing this would require a biasing of the modeling results. It is also predicated on the additional assumptions in Future 1 that all utility IRP forecasted resources are actually implemented. I&M recommends that the stakeholders consider a recommendation to retain only the Futures 1 initial assumption as it is stated in the report, "Future 1 assumes that demand and energy growth are driven by existing economic factors, with small increases in EV adoption" and drop the associated results that were returned from Futures 1 modeling (0.5% energy growth CAGR).
- I&M Comment: I&M recommends that the MPSC Staff define the import and export out of MISO. While I&M is not familiar with the MISO Futures 1, it is not clear to I&M how Staff's request aligns with the MISO Futures 1 model results. The MISO Futures 1 scenario appears only to state ""Future 1 assumes that demand and energy

growth are driven by existing economic factors, with small increases in EV adoption". The associated energy growth target suggested in this scenario may need to better recognize the additional assumptions in Future 1 that all utility IRP forecasted resources are actually implemented which concerns I&M as discussed above.

- I&M Comment: I&M requests that the EV adoption requirement provide additional clarity. For example, does this mean the entire customers or just EV customers. Also unclear that this scenario will recognize issues of a declining population growth. While I&M can run this type of model, it is not relevant to I&M's service territory and provides little value for accurate resource planning. I&M is concerned this requirement also does not recognize both sides of the equation. On one side is the expected EV growth impact, on the other side is the EE, DER and DR offset.
- I&M Comment: I&M request the stakeholders and MPSC Staff be open discussion around redefining the requirements to this scenario to include using the retirement assumptions and approved new builds from the MISO Future 1 case. Also include a 63% carbon reduction constraint. Given those constraints, each utility could model the remaining capacity expansion plan for the eastern interconnect using natural gas prices from EIA AEO.

Slide 43. Bullet 2: Moderate EV adoption and customer electrification result in moderate footprint-wide24 demand and energy growth rates.

- I&M Comment: I&M recommends a definition of the term moderate. For example, for some utility service territories, moderate could be negative. I&M is concerned that using moderate could also ignore facts that influence demand and energy growth. In

addition, I&M recommends that consideration be given to EWR and DR which can be a headwind to load growth.

Slide 43. Bullet 3: Within Michigan, EV and electrification forecasts should be blended historical sales with reputable EV and electrification forecasts such that after 5 years, Michigan's load and demand increase to reflect the source forecast. Load profiles of EVs as well as any electrification technologies should be clearly delineated and presented such that it is clear how they impact the overall energy and demand forecast.

- I&M Comment: Define "source forecast"
- I&M Comment: Does not recognize that not each EV is metered separately.

Slide 44. Bullet 1: Resources outside MI – MISO futures retirements published by MISO should be used when available along with maximum age assumption by resource type as specified by applicable regional transmission organization (RTO). Specific new units are modeled if under construction or with regulatory approval (i.e., Certificate of Necessity (CON), IRP cost pre-approval, or signed generator interconnection agreement (GIA). Generic new units for the MISO wide region should be chosen based upon economics.

Slide 44. Bullet 2: Resources within MI –Thermal and nuclear generation retirements in the modeling footprint are driven by a maximum age assumption, public announcements, or economics. Specific new units are modeled if under construction or with regulatory approval (i.e., CON, IRP cost pre-approval, or signed GIA). Generic new resources, market and company-owned resources are assumed consistent with the scenario descriptions and considering anticipated new resources currently in the MISO generation interconnection queue.

- I&M Comment: As noted in I&M's opening comments, a multistate utility operating in PJM should not use a MISO scenario for resource planning purposes. In addition, as discussed above, it is not clear to I&M if MISO Future 1 is a scenario that is representative of a multi-state utility operating in PJM.

Slide 45. Bullet 3:

- I&M Comment: I&M recommends the following requirement and re-wording be considered:

For all in-state electric utilities that are eligible to receive the financial incentive mechanism for exceeding an energy saving target of 1% per year, EWR should be based upon realistic achievable potential and its cost of MWh saved. The model should include an annual EWR supply cost curve to project future program expenditures up to maximum achievable potential.

Slide 45. Bullet 2: The optimized build plan must meet current state GHG emission goals and show progress toward federal GHG goals to the extent reasonable. ED2020-10, 2030 GHG Pollution Reduction Target.

- I&M Comment: I&M is concerned that using goals that are not required by law to establish a base line for modeling purposes may skew results.

Slide 45. Bullet 5: Incorporate any distribution or transmission system co-benefits associated with DER's and demand-side resources that have been identified as outputs of those respective planning processes. Ensure co-benefits are considered when evaluating those resources throughout the IRP process.

- I&M Comment: I&M recommends adding "Incorporate any **identified system level** distribution…" The concern is the IRP is not location specific. Need further definition on what co-benefits are and how they are to be valued. Much, if not all, of what is modeled is not location specific, so to incorporate co-benefits would require further stakeholder discussion and input.

Slide 46

- Long and short duration storage resources are considered. Energy storage resources are modeled using available best practice methodologies to the extent that such guidelines exist. Incorporate any distribution or transmission co-benefit identified and allow for multiple revenue streams where practical.
- Technology costs for thermal units and wind track with mid-range industry expectations.
- Technology costs and limits to the amount available for EWR and demand response programs will be determined by the most recent state-wide potential studies.
- Technology costs for solar, storage, and other emerging technologies decline with commercial experience.
- Existing PURPA contracts are assumed to be renewed.

- I&M Comment: For bullet 1, I&M recommends simplifying this to only include a consideration of long and short duration storage resources. Furthermore, I&M requests staff to define what would be considered short and long duration. Additionally, I&M is concerned that incorporating any distribution and possibly transmission co-benefits in an IRP modeling effort would presume a level of locational precision in the modeling that IRP's do not address and recommends deleting this as a requirement or more precisely articulate the specific expectations to consider.
- I&M Comment: For bullets 2, I&M recommends the IRP rules specify it be based on the utility's determination of the costs, with the utility to support the cost inputs.
- I&M Comment: For bullet 3, I&M recommends using the utility's most recent EWR and DR potential studies
- I&M Comment: Limiting the EWR to a most recent statewide potential study would negate a utility specific MPS or at the very least, require modeling that would not serve to benefit the utility as the statewide potential study is typically not specific to the Utility footprint.
- I&M Comment: Bullet 4 presumes only a future where renewables cost will continue to decline. While this is generally anticipated, Staff is encouraged to further define its intentions for this statement relative to all other resources. .

Slide 47 Scenario #1, Sensitivities

1. Fuel cost projections
   - Increase the natural gas fuel price projections from the base projections to at least the high EIA gas price in the most recent EIA Low Oil and Gas Supply forecast natural gas fuel price projections at the end of the study period.

I&M Comment: I&M recommends additional stakeholder discussion around Item 1, Fuel Cost Projections. A preliminary concern is that this is a potentially extreme scenario and implies very limited supply availability as well as high prices.

2. Load projections
   - High load growth: Increase the utility energy and demand growth rates by at least a factor of (2) above the base case energy and demand growth rates. Assume load and demand profiles consistent with increased EV and electrification. If doubling the energy and demand growth rates results in less than a 1.5% annual growth rate, then assume a 1.5% annual growth rate for energy and demand. Due to the increase in load growth, utilities voluntarily raise the DG cap to accommodate the rapid change and increased customer adoption rates.
   - MISO load growth: A load growth scenario that replaces the utility specific load and demand growth with one that is consistent with the most recent MISO Future 1 that represents a continuation of current trends.
   - Low load growth: EV adoption and electrification are slower than expected and the demand and load growth stay at historic levels.

   - I&M Comment: This 1.5% energy and demand growth constraint is not representative for service territories with negative population growth. A compromise would be to assume 1.5% growth in usage per customer which would capture the electrification considerations without ignoring the reality of a declining population growth for parts of the state. In addition, assuming that load growth stays at historic levels is not a Low load growth assumption. Given the increased adoption of energy efficient technologies, company sponsored EWR programs, declining population trends (and fewer persons per household), and the increased adoption of Distributed Generation resources, a low load growth scenario should produce results that are lower than historic levels. For the MISO load growth from MISO Future 1, at this time, it is not clear to I&M if MISO Future 1 is a scenario that is representative of a multi-state utility operating in PJM.

3. 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 the next capacity demonstration after the existing 4-year forward demonstration.

Slide 48 Scenario #1, Sensitivities

4. Ramp up the utility's EWR savings to at least 2.0% of prior year sales over the course of four years. EWR savings remain high throughout the study period.

- I&M Comment: Item #4. I&M is unclear of the objectives and insights to this sensitivity. In particular, is it to inform the Staff of supply side resource deferrals or another objective? If Staff and other stakeholder are interested in retaining in some form, Staff is requested to add more clarity to what is intended with "EWR savings remain high throughout the study period". This is a vague requirement that does not provide any method to quantify savings that reach the 2% over four years would meet this requirement. In addition, additional direction should be provided with alternatives if the EWR savings after year 4 can not be sustained at the levels deemed as "remaining high" I&M recommends consideration be given to restating Item #4 as follows:

  > Ramp up the utility's EWR savings to the utility's most recent market potential study maximum achievable potential at its associated annual cost level over the course of four years. EWR savings remain at maximum achievable potential savings and cost throughout the study period.

5. Perform a model run that optimizes the resource build that considers only legislatively mandated carbon goals for the MISO region and does not consider non-legislatively mandated carbon goals for outside if Michigan. Demonstrate a path to Michigan's carbon goals and the impact to energy imports.

- I&M Comment: I&M request clarification on if the expectation to Michigan's carbon goals are assumed to be economy wide or with a benchmark to a previous year utility

benchmark? In addition, I&M suggests the model run description be simplified to include a reference to a carbon goal for the utility relative to a previous year carbon benchmark of that same Utility.

6. Out-of-State transmission congestion cost increases due to changing resource mix across the region. This results in a higher cost added for out of state resources. Work collaboratively with the incumbent transmission owner to develop the appropriate cost adder.

- I&M Comment: At this time, it is not clear to I&M if MISO Future 1 is a scenario that is representative of a multi-state utility operating in PJM. Furthermore, as the Futures 1 scenario assumes all filed IRP resource additions are implement across the region, it is presumed to result in a small variation in the regional resource mix bringing to question, the assumed results as stated. Staff is requested to further review the assumptions and intentions for this item with stakeholders.