

April 5, 2024

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101-2147

RE: **Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Minnesota Power's 2023 Integrated Distribution Plan
Docket No. E015/M-23-258

Dear Mr. Seuffert:

Attached are the comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

In the Matter of Minnesota Power's 2023 Integrated Distribution Plan

Minnesota Power's Integrated Distribution Plan (IDP) was filed on October 16, 2023 by Jess McCullough, Public Policy Advisor II for Minnesota Power.

The Department makes recommendations and requests below and is available to answer any questions the Minnesota Public Utilities Commission may have.

Sincerely,

/s/ Dr. Sydnie Lieb
Assistant Commissioner of Regulatory Affairs

DT/ar
Attachment



Before the Minnesota Public Utilities Commission

Comments of the Minnesota Department of Commerce Division of Energy Resources

Docket No. E015/M-23-258

I. INTRODUCTION

The Department provides the following comments on Minnesota Power's (MP) Integrated Distribution Plan (IDP). Through these comments, the Department responds to the Notice of Comment (Notice) issued by the Commission on November 15, 2023.¹

The IDP allows for greater transparency into the distribution system planning process used by utilities. Distribution plans cover utility infrastructure from the substation to the meter, as well as customer offerings in these areas. The need for distribution system planning is a consequence of the increasing complexity of the distribution grid created by smart grid technologies, electric vehicles, and other distributed energy resources (DER). Due to the rise in these technologies, ratepayers will have an increasingly interactive role in distribution grid management, which further establishes the need for greater transparency in the distribution grid planning process. The Commission set forth five planning objectives for IDPs, with additional filing requirements to promote transparency in distribution system planning. The Commission's planning objectives for IDPs are to:

1. Maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state's energy policies;
2. Enable greater customer engagement, empowerment, and options for energy services;
3. Move toward the creation of efficient, cost-effective, accessible grid platforms for new products, new services, and opportunities for adoption of new distributed technologies;
4. Ensure optimized utilization of electricity grid assets and resources to minimize total system costs; and
5. Provide the Commission with the information necessary to understand the utility's short-term and long-term distribution-system plans, the costs and benefits of specific investments, and a comprehensive analysis of ratepayer cost and value.

While the Department finds that MP's IDP is largely compliant with filing requirements, the Department also identifies areas in which the IDP could be improved and offers recommendations (in bold, italicized text) for remedying them. The Department will provide a final recommendation regarding whether the Commission should accept MP's IDP in reply comments once the Department reviews additional information from MP and has the opportunity to consider stakeholder input.

¹ Notice of Comment – In the Matter of Minnesota Power's 2023 Integrated Distribution Plan, Docket No. E015/M-23-258 (November 15, 2023). (eDocket No. [202311-200506-01](#)). Hereinafter "Notice."

II. PROCEDURAL HISTORY

On December 8, 2022, the Minnesota Public Utilities Commission (Commission) issued its Order in Docket Nos. E015/M-21-390, E999/CI-17-879 (December 8, 2022 Order).² The December 8, 2022 Order revised the filing requirements for electric utility IDPs and Transportation Electrification Plans (TEP) and approved combining IDPs and TEPs. The December 8, 2022 Order also required each investor-owned utility to file its TEP in its next IDP, due November 1, 2023, and biennially thereafter.

In May 2023, the Minnesota Legislature established requirements for utility TEPs in 2023 Minn. Laws. ch. 60, art. 12, sec. 12, codified at Minn. Stat. § 216B.1615.³ Minn. Stat. § 216B.1615 requires electric utilities to file TEPs, established certain content requirements, granted the Commission authority to approve, modify or reject TEPs, and established evaluation criteria.

On October 16, 2023, Minnesota Power (MP or the Company) filed its IDP and TEP in Docket No. E015/M-23-258.⁴ This is the first time that MP has filed its TEP as part of its IDP.⁵

On November 15, 2023, the Commission issued its Notice on the issues of whether the Commission should accept or reject Minnesota Power's 2023 IDP and TEP.⁶ The Notice included the following topics open for comment:

2023 Minnesota Power Integrated Distribution System Plan

1. Should the Commission accept or reject Minnesota Power's IDP?
2. Did Minnesota Power adequately address the Commission's IDP filing requirements and prior Orders, as outlined in Attachment A to this notice? Is additional information necessary for improved clarity?
3. Feedback, comments, and recommendations on the following areas of Minnesota Power's IDP:
 - a. Non-wires alternatives analysis and potential pilot project
 - b. Planned grid modernization initiatives
 - c. Forecasted distribution budget
 - d. Distributed Energy Resource (DER) scenarios and forecasts, including electric vehicle forecasts

² Order, *In the Matter of a Commission Inquiry into Electric Vehicle Charging and Infrastructure; In the Matter of Xcel Energy's 2021 Integrated Distribution System Plan; In the Matter of Minnesota Power's 2021 Integrated Distribution System Plan; In the Matter of Distribution System Planning for Otter Tail Power Company*, Docket Nos. E-99/CI-17-879, E-002/M-21-694, E-015/M-21-390, E-017/M-21-612 (December 8, 2022). (eDocket No. [202212-191192-03](#)). Hereinafter "December 8, 2022 Order."

³ Minn. Stat. § 216B.1615. <https://www.revisor.mn.gov/statutes/cite/216B.1615>

⁴ 2023 Integrated Distribution System Plan, *Minnesota Power*, Docket No. E015/M-23-258 (October 16, 2023) (eDocket No. [202310-199614-01](#)). Hereinafter "IDP."

⁵ IDP Appendix E.

⁶ The comment period was extended on January 19, 2024. *Notice of Extended Comment Period – In the Matter of Minnesota Power's 2023 Integrated Distribution Plan*, Docket No. E015/M-23-258 (January 19, 2024). (eDocket No. [20241-202350-01](#)).

4. Are there any aspects of Minnesota Power's non-wires alternative analysis or its conclusions the Commission should address? Was the analysis conducted appropriate and were the conclusions reasonable?
5. Has Minnesota Power appropriately discussed its plans to maximize the benefits of the Inflation Reduction Act (IRA) and the IRA's impact on the utility's planning assumptions pursuant to Order Point 1 of the Commission's September 12, 2023 Order in Docket No. E,G-999/CI-22-624?
6. What should the Commission consider or address related to enhancing the resilience of the distribution system within Minnesota Power's IDP?
7. Other areas of Minnesota Power's IDP not listed above, along with any other issues or concerns related to this matter.

2023 Minnesota Power Transportation Electrification Plan (TEP)

8. Should the Commission approve, modify, or reject Minnesota Power's Transportation Electrification Plan (TEP)?
9. Did Minnesota Power adequately address the Commission's TEP filing requirements and prior Orders, as outlined in Attachment A to this notice? Is additional information necessary for improved clarity?
10. How should the Commission consider modifications or supplements to Minnesota Power's Transportation Electrification Plan?
11. Should the Commission establish any procedural or filing requirements for future TEPs under Minn. Stat. 216B.1615?
12. Are there gaps in Minnesota Power's transportation electrification programs the Commission should address to ensure equitable customer outcomes?
13. Are there other issues or concerns related to this matter?

III. DEPARTMENT ANALYSIS

The initial comments provided by the Department address MP's IDP and TEP and the Commission's Notice Topics 1 through 13. Recommendations are offered in the corresponding sections and are summarized at the conclusion of this filing.

For reasons of organization and clarity, these comments do not perfectly follow the sequence of topics in the Notice. The order of these comments is presented below:

- A. IDP Compliance with Filing Requirements and Recommendations Concerning Acceptance (Notice Topics 1 and 2)*
- B. Non-Wires Alternatives Analysis (Notice Topics 3.A and 4)*
- C. Planned Grid Modernization Initiatives (Notice Topic 3.B)*
- D. Forecasted Distribution Budget (Notice Topic 3.C)*
- E. Distributed Energy Resource (DER) Scenarios and Forecasts (Notice Topic 3.D)*
- F. The Inflation Reduction Act and Utility Planning and Benefits (Notice Topic 5)*
- G. Distribution System Resilience (Notice Topic 6)*

H. Other Areas of MP's IDP (Notice Topic 7)

I. TEP Compliance with Filing Requirements and Recommendations Concerning Acceptance (Notice Topics 8 and 9)

J. Other TEP Topics (Notice Topics 10, 11, 12, and 13)

A. IDP COMPLIANCE WITH FILING REQUIREMENTS AND RECOMMENDATIONS CONCERNING ACCEPTANCE

Notice Topic 1: Should the Commission Accept or Reject Minnesota Power's IDP?

Notice Topic 2: Did Minnesota Power Adequately Address the Commission's IDP Filing Requirements and Prior Orders, as Outlined in Attachment A to This Notice? Is Additional Information Necessary for Improved Clarity?

MP has provided a compliance matrix as an attachment to its IDP with the requirements imposed on MP's 2023 IDP by previous Commission Orders and statutes and the location within the IDP where information related to those requirements can be found.⁷

The Department's review of MP's IDP begins at a threshold question: did MP provide information and analyses required by the Commission's IDP filing requirements and previous Commission Orders? The Department reviewed MP's compliance matrix and determined that the references provided to the contents within the IDP are appropriate. Further, at first pass, it appears that MP has mostly addressed each of the IDP filing requirements, Commission Orders, and statutes. The Department provides its assessment of MP's compliance with filing requirements with these comments as Attachment A.

Moreover, as required by the Notice, where MP did not include the required information, the Company generally provided an explanation of why that information was not included in the filing. However, in several instances, the information provided by MP did not fully address the filing requirement or prior Commission Order. Specific examples are indicated throughout the Department's comments.

On March 12th, the Department submitted a series of Information Requests (IRs). The majority of these requests were received within the 10 day filing period, ending on March 22nd, however several IRs were not received in time to incorporate into the Department's initial comments. MP responses to Department IRs are included with these comments as Attachment B.

Throughout these comments the Department has also identified topics and Order Points where additional information would improve the ability to meaningfully analyze the IDP.

⁷ IDP Appendix A.

The Department will provide a final recommendation regarding whether the Commission should accept MP's 2023 IDP in reply comments once the Department reviews additional information from MP and has had the opportunity to review stakeholder input.

B. NON-WIRES ALTERNATIVES ANALYSIS

Notice Topic 3.A: Feedback, Comments, and Recommendations on Non-Wires Alternative Analysis and Potential Pilot Project.

Notice Topic 4: Are There Any Aspects of Minnesota Power's Non-Wires Alternative Analysis or its Conclusions the Commission Should Address? Was the Analysis Conducted Appropriate and Were the Conclusions Reasonable?

MP conducted a Non-Wires Alternatives (NWA) analysis of four different projects. The Company hired a contractor, Black & Veatch, to conduct its NWA analyses. The Department analyzes MP's NWA starting with a discussion of IDP filing requirements and order points, then discusses the NWA screening process and Benefit Cost Analysis (BCA) assumptions, and concludes with a discussion of the four projects that were analyzed by the contractor.

1. Overview of Filing Requirements and Order Points

There are two primary IDP requirements pertaining to NWAs. First, IDP Filing Requirement 3.E.1 requires MP to "provide a detailed discussion of all distribution system projects in the filing year and the subsequent 5 years that are anticipated to have a total cost of greater than two million dollars. For any forthcoming project or project in the filing year, which cost two million dollars or more, provide an analysis on how non-wires alternatives compare in terms of viability, price, and long-term value."⁸

Second, IDP Filing Requirement 3.E.2 sets forth the requirements for the information MP must provide related to NWA analysis, which includes:

- a. Project types that would lend themselves to non-traditional solutions (i.e. load relief or reliability)
- b. A timeline that is needed to consider alternatives to any project types that would lend themselves to non-traditional solutions (allowing time for potential request for proposal, response, review, contracting and implementation)
- c. Cost threshold of any project type that would need to be met to have a nontraditional solution reviewed
- d. A discussion of a proposed screening process to be used internally to determine that nontraditional alternatives are considered prior to distribution system investments are made.⁹

⁸ IDP Filing Requirement 3.E.1 from December 8, 2022 Order.

⁹ IDP Filing Requirement 3.E.2 from December 8, 2022 Order.

In addition to the IDP filing requirements, there are several Order Points from the Commission's January 9, 2023 Order¹⁰ in MP's prior Integrated Resource Plan (IRP) that pertain to NWA analysis as follows:

- Order Point 9.d requires MP to "Improve non-wires alternatives analysis, including market solicitations for deferral opportunities to make sure Minnesota Power can take advantage of distributed energy resources to address discrete distribution system costs."¹¹
- Order Point 13 requires MP to "...file the results from its consultant led non-wires alternative study in the next IDP docket. In next IDP, Minnesota Power will begin a discussion on how to integrate NWS into all the company's planning practices, including its next IRP and IDP."¹²

2. Areas of Non-Compliance With IDP Filing Requirements and Order Points

MP's NWA discussion generally lacks details needed to fulfill the NWA filing requirements and Order Points. MP defines conditions that must be met in order to pursue an NWA solution—such as the asset not being at end of life—and that the operational characteristics need to match the need met by the NWA solution, such as a battery solution being able to supply the required amount of power for the required amount of time. While this discussion meets Filing Requirement 3.E.2.a, it does not fulfill Filing Requirement 3.E.2.d, which requires MP to discuss its NWA screening process. The issues arise in part because MP did not have the in-house resources to conduct its own NWA analyses, and instead hired a contractor to perform the NWA analysis required by IDP filing requirements and relevant Order Points. However, the need to hire a contractor does not negate the IDP filing requirements. MP further has not complied with the January 9, 2023 Order, which requires MP to begin a discussion on how to integrate NWA into all of the company's planning practices, as well as provide a discussion of how to improve NWA analysis and better address costs. Finally, while MP does briefly describe the steps that must be taken to conduct an NWA, the Company does not define any specific timeline to conduct NWA analyses, obtain quotes, complete contracting, or set any goals for an in-service date. A lack of a defined process leaves open the possibility to ignore or delay NWA implementation, and thus the Department additionally concludes that MP has not properly addressed Filing Requirement 3.E.2.b.

The Department requests MP to present an NWA process, which includes the project screening process, the NWA analysis scope of work, cost estimation, and the Engineering, Procurement, and Construction (EPC) process, timeline and goals in its next IDP.

3. Project Types Considered for NWAs

MP considers NWA analysis for capacity and reliability projects. Without any description of restrictions on these processes, the Department concludes that capacity and reliability projects that do not have

¹⁰ Order, *In the Matter of Minnesota Power's 2021-2035 Integrated Resource Plan*, Docket No. E0015/RP-21-33 (January 9, 2023) (eDocket No. [20231-191970-01](#)). Hereinafter "January 9, 2023 Order."

¹¹ January 9, 2023 Order at Order Point 9.d.

¹² January 9, 2023 Order at Order at 13.

an age-related component are sufficient project types for NWA analysis. However, on page 64 of MP's IDP, the company states that it does not consider demand response or energy efficiency as NWA solutions because they are addressed in other areas of MP's IDP. Further, MP does not consider renewable generation as part of either a standalone or coupled energy storage NWA solution, which were both considered by Xcel and the Dakota Electric Association in their IDP filings.¹³ The Department notes that MP is not proposing any capacity projects that are potentially better suited for renewable generation projects, however MP will be required to install 3% of its total retail electric sales from distributed solar generation by 2030,¹⁴ which opens up the opportunity to potentially pair distributed solar with future NWA solutions.

The Department recommends that the Commission require MP to consider demand response, energy efficiency, and renewable generation as part of its future NWA process in its next IDP.

4. Benefit Categories

MP also reported on the following benefit categories that are harder to monetize. These benefits include:

- Avoided Capital Costs
- Avoided Generation Capacity
- Generation Capacity Revenue
- Avoided Energy Costs
- Avoided Lost Sales Revenue
- Reduced/Avoided Ancillary Services Costs
- Reduced/Avoided Transmission & Distribution System Losses
- Avoided Customer Fuel Costs
- Avoided Restoration Costs

MP also studied a smaller number of more abstract benefits, which are not easily operationalized into monetary benefits. These benefits include:

- Customer Outage Reduction value
- Compliance Risk
- Power Quality Consequences
- Improved Customer Satisfaction

¹³ See Docket Nos. E002/M-23-452 and E111/M-23-420.

¹⁴ Minn Stat. 216B.1691 Subd. 2h. <https://www.revisor.mn.gov/statutes/cite/216B.1691#stat.216B.1691.2h>

MP also noted that it did not calculate societal benefits for the following categories:

- Avoided Outage Costs;
- DER Enablement;
- Increased Customer Flexibility and Choice;
- Environmental Benefits; and
- Improved Safety.

Benefit categories were not calculated based on the different Minnesota Test Cases that are typically used by utilities for BCA. The test cases include the Utility Test, Ratepayer Impact Test, Societal Test, and Minnesota Test, and are meant to illustrate project benefits from different perspectives and value systems.

The Department requests that MP include calculated benefits for all Minnesota Test Cases, and to the extent practicable, present the results in reply comments.

MP attempted to quantify the affects of negative consumer benefits, also referred to as disbenefits, in difficult categories such as “Compliance Risk,” “Power Quality Consequences,” and “Improved Customer Satisfaction,” relying on the probability and cost of a lawsuit. The Department submitted information requests to MP asking for its Benefit Cost Analysis (BCA) calculation files and an explanation of its BCA assumptions, but these responses were not received in time to include in this filing. MP does not provide an explanation of how these benefit categories are used. The Department expects these project disbenefits are only calculated based on a no-build solution that contains reliability risks, which would accrue in the absence of a reliability intervention. An NWA solution itself should provide close to the same reliability benefits as a traditional wired solution, and thus disbenefits should generally be relevant for the no-build cases. Further, MP also use the Interruption Cost Estimate (ICE) Calculator¹⁵ to estimate the “Customer Outage Reduction Value,” which uses a customer’s willingness to pay to avoid an outage. Attempting to quantify ratepayer costs as well as attempting to quantify compensation for “Power Quality Consequences” and “Improved Customer Satisfaction” may be a double counting of benefits, as spending money locally to improve power quality should reduce the need to file a lawsuit against the Company. In addition, MP does not state how it estimates legal compliance costs, which do not appear to conform to a standardized methodology. The “Compliance Risk” disbenefit is the only category that can reference specific fines and penalties for non-compliance.

The Department recommends that MP calculate future NWA ratepayer disbenefit categories based on the ratepayer cost of outages rather than in the calculated categories of “Compliance Risk,” “Power Quality Consequences,” and “Improved Customer Satisfaction.”

MP did not quantify environmental benefits. The proposed energy storage and grid reliability solutions do not appear to have environmental benefits, and therefore the calculation of environmental benefits

¹⁵ See <https://www.icecalculator.com/home>

is not necessary. However, if MP were to propose a renewable energy system as part of any of its NWA analyses, the consideration of environmental benefits should be included in a future NWA. If the 3% distributed solar mandate¹⁶ is used as part of an NWA solution, the environmental benefits should not be included as part of the NWA because the benefits of the installations would not be incremental to the status quo or a traditional wired solution.

5. Key Assumptions

MP provides a description of their key assumptions for the calculation of benefits on pages 6 to 12 of Appendix F. The descriptions outlined in this section provide an overview of the general process used to calculate benefits, but the document does not outline all major assumptions. For example, the “Compliance Risk,” “Power Quality Consequences,” and “Improved Customer Satisfaction,” based sections list the severity of disruption or outage events from “Minimal” to “Catastrophic,” listing litigation cost ranges for each event. The document does not outline how the specific litigation costs are assumed for each disbenefit severity category. The Department submitted information requests to MP asking for its BCA calculation files and an explanation of its BCA assumptions, but these responses were not received in time to include in this filing.

The Department finds that the calculation of the “Avoided Capital Costs” benefit category should be modified for future NWA analyses. MP states on page 6 of Appendix F that avoided capital costs are “...included in year 10 as a one-year benefit.” The Department asked in its Information Requests for clarification about this assumption but was not able to provide a response in time to include in this filing. Without further information, the Department concludes that the 10-year benefit for avoided capital costs is incorrect. The BCA should assume construction costs for the NWA solution at the beginning of the BCA period of analysis. The benefit of avoided construction of a wired solution should be realized in the first year that the wired solution is deferred, and not at year 10. The Lawrence Berkeley National Laboratory¹⁷ has provided an example for calculating the deferral value of an NWA solution, which is shown below in Figure 1. The Lawrence Berkeley National Laboratory states “A one-year deferral value equals the difference between the present value of the distribution expansion plan and the present value of the same plan deferred by one year, adjusted for inflation and technological progress.” Therefore, avoided distribution costs are calculated dynamically for each year that the investment is deferred, and the marginal increase in the deferral value decreases each year due to the increasing discount value for each subsequent year. Calculating a year 10 benefit has the effect of discounting the value of the NWA solution because benefits at year 10 are significantly lower than benefits at year one.

¹⁶ Minn Stat. 216B.1691 Subd. 2h. <https://www.revisor.mn.gov/statutes/cite/216B.1691#stat.216B.1691.2h>

¹⁷ Lawrence Berkeley National Laboratory. *Locational Value of Distributed Energy Resources*. March 9, 2021 at 17. Accessed at https://eta-publications.lbl.gov/sites/default/files/lbnl_locational_value_20210309_final.pdf

Department Figure 1: Present Worth (PW) Method for Calculating the Value of Deferring a Distribution Investment.¹⁸

$$PW \text{ Deferral Value} = \sum_{t=1}^n \frac{K_t}{(1+r)^t} \left[1 - \left(\frac{1+i}{1+r} \right)^{\Delta t} \right]$$

where:
 n = finite planning horizon in years,
 K_t = distribution investment in year t ,
 i = inflation rate net of technological progress,
 r = a utility's cost of capital (discount rate),
 Δt = deferral time = peak load reduction divided by annual load growth.

Source: Lawrence Berkeley National Laboratory.¹⁹

The Department requests that MP recalculate its BCA benefits starting with an “Avoided Capital Cost” benefit at the beginning of the BCA period of analysis and present the results in reply comments.

6. NWA Studies Conducted

MP lists all projects with a budget over \$2 million in IDP Table 4 (Department Table 1 below). There are 12 projects listed in total, and 10 of these projects are listed as “Asset Renewals,” which MP states are not suitable for NWA solutions. The Canosia Road (Esko) and Mahtowa projects included in the “Cloquet Area 34 kV Expansion” are the only two projects on MP’s list that would have a potential for NWA analysis.

¹⁸ Note that Δt references a peak load reduction because the example provided by the Lawrence Berkeley National Laboratory is to defer distribution line capacity upgrades with DERs, however the concept deferral time is still applicable regardless of the purpose of the deferral.

¹⁹ Lawrence Berkeley National Laboratory. *Locational Value of Distributed Energy Resources*. March 9, 2021 at 17. Accessed at https://eta-publications.lbl.gov/sites/default/files/lbnl_locational_value_20210309_final.pdf

Department Table 1: Distribution Projects Over \$2 Million

Project Name	Preliminary Cost Est.	Anticipated ISD	Project Area
Switchgear Replacement Program (Asset Renewal)	\$8.0M	2026	<i>Anticipated Substations*:</i> Haines Road (Hermantown) Colbyville (Duluth) <i>*subject to change based on asset renewal project prioritization</i>
	\$4.2M	2028	
Substation Modernization Program (Asset Renewal)	\$10.4M	2024	<i>Anticipated Substations*:</i> Long Prairie, Winton, Maturi (Chisholm), Ridgeview (Duluth), Hibbing, Verndale, Cloquet, Little Falls <i>*subject to change based on asset renewal project prioritization</i>
	\$6.0M	2025	
	\$7.4M	2025	
	\$9.9M	2026	
	\$8.8M	2026	
	\$6.9M	2027	
	\$6.7M	2027	
Cloquet Area 34 kV Expansion	\$10.9M	2027	
	\$2.2M	2023	Canosia Road (Esko), Mahtowa
	\$6.6M	2025	

Source: IDP Table 4 at 47.

MP lists four projects that were studied for NWA analysis. The first project is the Kerrick Project. This project was generated due to decreasing reliability of an existing backup feeder line that could supply energy in the event of a failure on the main line. The backup line is also expected to be disconnected in the future from the backup source entirely, which would result in the line having no backup power solutions. MP proposed a battery storage with Fault Location, Isolation, and Service Restoration (FLISR) solution, which is stated to have a benefit cost ratio (BCR) of 1.88, making the project a good alternative solution. The second project is the Wrenshall Project. This project would install a battery storage and FLISR solution to provide backup power to two existing feeders and help with an optimization of a 1 MW solar garden. The project has a BCR of 0.85, and MP states that it is exploring traditional reliability solutions to compare to or expand upon the proposed NWA solution. The third project is the Silver Bay Project. This project involves switching from an old substation to a new substation in a different location, but the town only has a single source of power. The project would install a battery storage and FLISR solution. The analysis finds a BCR of 0.75, and thus MP is exploring traditional solutions to compare or expand upon the proposed NWA solution. None of these projects are listed under IDP Table 4 as projects over \$2 million.

The fourth solution presented is the Cloquet NWA solution. This is the only project that potentially includes a budget allocation in IDP Table 4. MP states that the project was considered just for a FLISR solution in the Cloquet Area. MP states that the project has a BCR of 6.95 to 9.39. MP provides a technical analysis of the study area in Appendix F, but do not discuss the project in their “Benefit Cost Analysis (BCA) Framework Report.”

The Department requests MP to present the full BCA for each NWA project studied by Black & Veatch in reply comments.

MP presents its costs in Appendix Table 5, listed in Appendix F of MP's IDP.²⁰ Kerrick and Askov are combined into one project, listed as the Kerrick Project, with a total installed cost of \$4,634,972. However, MP presents a Benefit Cost Ratio (BCR) of 1.88 for the project with a Net Present Value (NPV) of \$5,001,190. If all costs are undiscounted, the BCR of 1.88 would imply a cost of \$5,683,170, which does not match the cost presented in Table 5 of Appendix F. Given this mismatch, the cost for the Kerrick and Askov Project is unclear.

Overall, the benefit and cost information provided has not been sufficiently presented for the Department to determine the proposed impacts of each NWA project, or how each project was compared to a traditional solution's costs and benefits as well as a no-build solution, where applicable. It is unclear how costs and benefits were allocated to each project.

The Department requests that MP discuss in reply comments planned 2023 to 2027 budget allocations for the Kerrick, Wrenshall, Silver Bay, and Cloquet NWA projects, including any budget dedicated to NWA solutions.

The Department presents its analysis in an effort to inform MP as it develops its future NWA program. The NWA process should be transparent, easily understandable, and should follow an established framework to evaluate the cost effectiveness of NWA projects. Establishing these principles early on in the NWA process will ensure that ratepayers will receive the maximum benefits of future NWA solutions.

C. PLANNED GRID MODERNIZATION INITIATIVES

Notice Topic 3.B: Feedback, Comments, and Recommendations on Planned Grid Modernization Initiatives.

1. Grid Modernization Scope and Analysis

Grid modernization can cover a whole suite of grid enhancements and is not clearly defined to explicitly include or exclude every technology proposed by a utility. Minnesota Statute §216B.2425, Subd.2(e) provides an overview of the goals of grid modernization, where a utility operating under a multi-year rate plan shall:

[I]dentify investments that it considers necessary to modernize the transmission and distribution system by enhancing reliability, improving security against cyber and physical threats, and by increasing energy

²⁰ IDP Appendix F at 14.

conservation opportunities by facilitating communication between the utility and its customers through the use of two-way meters, control technologies, energy storage and microgrids, technologies to enable demand response, and other innovative technologies.

The Department proceeds with its analysis of grid modernization proposals based on IDP Filing Requirements 3.D. The following filing requirements are emphasized for the Department's analysis:

- 1.a: Overview of investment plan: scope, timing, and cost recovery mechanism;
- 1.c: Alternatives analysis of investment proposal: objectives intended with a project, general grid modernization investments considered, alternative cost and functionality analysis (both for the utility and the customer), implementation order options, and considerations made in pursuit of short-term investments. The analysis should be sufficient enough to justify and explain the investment;
- 1.g: Customer anticipated benefit and cost;
- 1.i: Plans to manage rate or bill impacts, if any;
- 1.j: Impacts to net present value of system costs (in net present value revenue requirements/megawatt/hour or megawatt); and
- 1.k for each grid modernization project in its 5-year Action Plan, Minnesota Power should provide a cost-benefit analysis based on the best information it has at the time and include a discussion of non-quantifiable benefits. Minnesota Power shall provide all information to support its analysis.

To the extent practicable, the Department expects a discussion of the overall investment plan (Filing Requirement 3.D.1.a) and a discussion of customer anticipated benefit and cost (Filing Requirement 3.D.1.g). For projects over \$2 million, the Department expects a discussion of the above, as well as a discussion of alternative investments that were analyzed (Filing Requirement 3.D.1.c), a discussion of a plan to mitigate bill impacts (Filing Requirement 3.D.1.i), a presentation of the net present value of system costs (Filing Requirement 3.D.1.j), and a cost-benefit analysis of the project (Filing Requirement 3.D.1.k).

2. Overview of MP Grid Modernization Projects

MP presents a number of grid modernization projects that are in various stages of deployment. The various technologies discussed by MP that are understood by the Department to fall under the definition of Grid Modernization, which are outlined below in Table 2. The budget spans three budget categories, including "Metering," "Grid Modernization and Pilot Projects," and "Other." The respective five-year budgets for each category are \$19.7 million (5.5 percent of total) for "Metering," \$22.0 million (6.1 percent of total) for "Grid Modernization and Pilot Projects," and \$3.0 million for "Other." These three budget categories total \$44.7 million, which represents 12.4 percent of the total budget, but they include expenditures that may not be considered to fall under grid modernization by the Company.

Department Table 2: Summary of Grid Modernization Projects by Budget Category

Grid Mod Technology	Budget Category	2023 – 2027 Cost
Advanced Metering Infrastructure (AMI)	G - Metering	\$0
Fault Location, Isolation, and Service Restoration (FLISR)	E – Grid Modernization and Pilot Projects	\$15,125,000
Smart Sensors	E – Grid Modernization and Pilot Projects	\$351,900
Outage Management System (OMS)	O – Other	Not Listed
Geographic Information System (GIS)	O – Other	Not Listed
Customer Information System (CIS) / Customer to Meter (C2M)	O – Other	Not Listed
Meter Data Management System (MDM)	O – Other	Not Listed
Advanced Distribution Management System (ADMS)	Not Listed	Not Listed
Distributed Energy Resource Management System (DERMS)	Not Listed	Not Listed
Energy Management System (EMS)	Not Listed	Not Listed

3. *Advanced Metering Infrastructure*

The AMI Program replaces the first-generation Automated Meter Reading (AMR) system with 2-way smart meters at all of for all of MP’s customers. The system consists of three main components, which all support each other to enable the full functionality of the system. The first component is the smart meter. MP states that it will have installed 147,164 smart meters that cover 99.7% of all meters by the end of 2023. The second component is a Field Area Network (FAN), which uses wireless radio frequencies to transmit data back to MP. MP does not discuss its new or existing FAN network, but it is a required component of the AMI system. The third component is a Meter Data Management System (MDM), which is an MP data repository and control system, which allows MP to process and use the data it collects. The deployment of these three components allowed MP to implement its full AMI rollout. The AMI Program is also linked to the Customer Information System (CIS) or Customer to Meter (C2M) program.

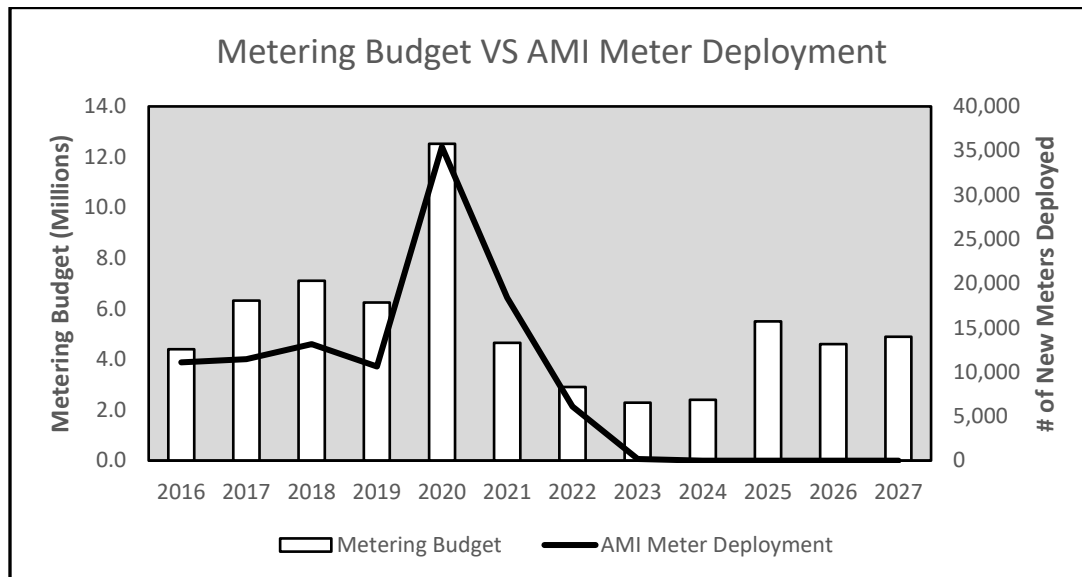
MP states several benefits from the AMI program. The rollout of the program will allow MP to transition all its customers to a Time-of-Day (TOD) rate for all of its customers, which has variable pricing for customers based on the time of day. Rates are most expensive when electricity costs are higher, and thus the implementation of a TOD rate can shift energy use to less expensive times of day

and will enable rate payers to save money by shifting their energy use. The TOD rate is anticipated to save approximately 20 MW of peak demand by 2027,²¹ after full implementation of the program, which is equivalent to 15 percent of on-peak energy use. The program provides electricity interval use data to customers to track their interval data and additional information collected by the meters in their Customer Information Center (CIS), which enhances transparency and provides new services for ratepayers. The meters also feed into the Outage Management System (OMS), which gives MP greater resolution on the extent of outages. The meters can also be used to pro-actively identify transformers or other parts of the grid that are in need of replacement before an event occurs. Finally, the AMI meters can be used for remote reconnections, which reduces the need for truck rolls and saves ratepayers money.

The AMI program has rolled out slowly, with 55,080 meters (37 percent) deployed before 2016, and the remaining sixty three percent deployed between 2016 and 2023. The budget during the 2016 to 2022 AMI rollout ranged from a low of \$2.9 million in 2022 with the deployment of 6,109 meters to a high of \$12.5 million in 2020 with the deployment of 35,427 meters. In 2025, the budget is then expected to stabilize around \$4.4 million per year, which is nearly double the cost of the 2023 to 2024 budget level of \$2.3 to \$2.4 million, respectively. These costs and deployment numbers are plotted out in Figure 2. The initial impression of looking at Figure 2 suggests that the annual metering budget should stabilize at \$2.3 - \$2.4 million, after the successful deployment of near 100% of meters. Most Minnesota utilities' proposed AMI budgets have a sharp spike, and then decline rapidly, which is not observed for MP's metering budget. At an average cost of approximately \$450 / meter,²² the budget in 2025 and later would replace approximately 9,778 meters per year, which indicates a meter lifespan of approximately 15 years. The rebound in the metering budget in 2025 suggests that MP is expecting to replace some of the first AMI meters deployed and expects to continuously replace meters each year thereafter. Therefore, the \$4.4 million annual metering cost represents a continuous cost in the MP Metering Budget Category G.

²¹ IDP Table 11 at 88.

²² This is the average cost of meter deployment between 2016 to 2022 assuming no other metering costs.

Department Figure 2: Comparison of IDP Metering Budget to AMI Rollout

Sources: 2023 IDP at 52, 2021 IDP at 22²³, DOC IR 002.07²⁴

Finally, as the AMI, MDM, and CIS programs have already been approved by the Commission and deployment has reached completion, further discussion about the costs and benefits of the program are not warranted.

4. *Fault Location, Isolation, and Service Restoration*

The Fault Location, Isolation, and Service Restoration (FLISR) program installs a series of smart switches, regulators, capacitor banks and other equipment that can automatically restore power during a fault event. MP proposes to connect its FLISR system to a fiber optic network to establish reliable communication with MP control systems. MP provides little information about its FLISR program in its IDP.

The main benefit of the FLISR program is automatic service restoration and enhanced reliability of distribution system performance. Deploying FLISR provides a direct benefit to ratepayers, as the technology directly impacts available power service areas of the distribution system that are not impacted by fault events.

MP proposes a budget of \$15,125,000 in its 2023 to 2027 budget. MP has already deployed 50 FLISR systems, with a 4 percent overall coverage. Actual spending for the program is \$3,945,306 in the

²³ *Integrated Distribution Plan, In the Matter of Minnesota Power's 2021 Integrated Distribution Plan, Docket No. E015/M-21-390* (October 25, 2021) (eDocket No. [202110-179112-01](#)). Hereinafter "2021 IDP."

²⁴ MP Response to Department IR 2, Attachment DOC IR 002.07.

budget period between 2018 and 2022. The proposed spending would add approximately 27 percent more coverage,²⁵ and based on these costs, the estimated budget to deploy the remaining FLISR program is \$54 million.

MP has not fulfilled several filing requirements. MP does not:

- Discuss the cost recovery mechanism (Filing Requirement 3.D.1.a)
- Present an analysis of alternative investments (Filing Requirement 3.D.1.c)
- Present a discussion of customer anticipated benefit (Filing Requirement 3.D.1.g)
- Discuss a plan to manage rate bill impacts (Filing Requirement 3.D.1.i)
- Present the net present value of system costs (Filing Requirement 3.D.1.j)
- Present a cost-benefit analysis, if available (Filing Requirement 3.D.1.k)

The Department requests that MP present in reply comments additional information about its FLISR program, which includes a discussion of the cost recovery mechanism, an analysis of alternative investments, a discussion of customer anticipated benefits, a discussion to manage bill impacts, a presentation of the impact to the net present value of system costs, and a cost-benefit analysis, if available.

5. Smart Sensors

Smart Sensors are used to monitor distribution system performance, as an alternative to MP's Supervisory Control and Data Acquisition (SCADA) system and its AMI Program, all of which provide grid visibility data. Smart sensors are installed on feeders that do not have a SCADA system installed, and instead monitor voltage at the feeder breaker and store data locally. As of 2022, smart sensors were installed at 40 percent of feeders, while SCADA is installed at 50 percent of feeders.²⁶

The primary benefit of smart sensors is to avoid manual data reading, as well as to reduce manual reading of equipment. Smart sensors can also be used for fault location.

MP has installed 417 smart sensors as of 2022, which meets 55 percent of the Company's deployment goal. Actual spending from 2018 to 2022 is \$718,000. Forecasted spending in the 2023 to 2027 budget period is \$351,900.²⁷

The Department finds that MP has presented a sufficient presentation of its Smart Sensor Program but notes several deficiencies pertaining to additional filing requirements.

²⁵ MP Response to Department IR 23. Deployment percentages were re-calculated for the 2023 – 2027 budget period based on the average deployment rates and costs per year.

²⁶ IDP at 50.

²⁷ MP Response to Department IR 23.

The Department requests that MP present in reply comments additional information about its Smart Sensor program, which includes a discussion of the cost recovery mechanism, an analysis of alternative investments, a discussion of customer anticipated benefits, a discussion to manage bill impacts, a presentation of the impact to the net present value of system costs, and a cost-benefit analysis, if available.

6. Outage Management System and Geographic Information System

The Outage Management System (OMS) is used to detect, locate, isolate, repair and restore fault events. The system links with SCADA and AMI to locate outages and communicates outage events to customers. The OMS interacts with the Geographic Information System (GIS) to map out distribution system assets that feed locational information of system assets into the OMS system. The customer outage map is generated from the GIS system as well.

The primary benefit of each system is to assist MP in its work flow to map the status of its distribution system assets and deploy company assets where necessary to mitigate outages. The customer's primary interaction with these systems is the outage map, however MP interacts with the systems through project management and data system integration, which direct company activities to best allocate staff time and resources.

The OMS system is reaching its end of life and the GIS is going to be replaced to allow more real time mapping, which will save staff resources and better integrate the two systems. The OMS system is planned for replacement in 2024, and MP does not state a timeline for the replacement of the GIS system.

The Department finds that MP has not provided sufficient information to evaluate the OMS and GIS programs. Both programs are included in the "Other" budget category, which is scheduled to spend \$3 million between 2023 and 2027.

The Department requests that MP present in reply comments additional information about its OMS and GIS programs, which includes a discussion of the proposed budget, deployment plan, cost recovery mechanism, an analysis of alternative investments, a discussion of customer anticipated benefits, a discussion to manage bill impacts, a presentation of the impact to the net present value of system costs, and a cost-benefit analysis, if available.

7. Management Systems

MP mentions three management systems that it intends to use in the future. Currently, MP is using its Energy Management System (EMS). MP states that its EMS program has been in operation for 40 years,²⁸ with various upgrades throughout this time to enhance the capabilities of the system. MP does

²⁸ IDP at 19.

not state how its EMS is used, but the system is assumed to be used for system monitoring as well as to deploy control systems such as demand response. MP states that it is updating its EMS with an operational date in the fourth quarter of 2023.²⁹ MP further mentions the possibility of a Distributed Energy Resource Management System (DERMS) and an Advanced Distribution Management System (ADMS), both of which would offer advanced controls to grid operators at MP. The status or planning for such systems, including any planned budgeting, has not been discussed.

The Department requests MP to provide in reply comments a status update of any plans and budgets to deploy its EMS upgrade, a DERMS, or ADMS in its 2023 to 2027 budget.

D. FORECASTED DISTRIBUTION BUDGET

Notice Topic 3.C: Feedback, Comments, and Recommendations on Forecasted Distribution Budget.

MP's 2021 IDP projected total distribution spending of approximately \$221.12 million between 2022 and 2026.³⁰ MP's 2023 IDP increased that projection to \$394.73 million between 2024 and 2028.³¹

Table 3, below, provides a high-level overview of the projected spending levels MP provided in its 2021 and 2023 IDPs, organized by the IDP Budget Categories required by IDP Filing Requirement 3.A.29. IDP Filing Requirement 3.A.29 requires MP to provide information on "[p]lanned distribution capital projects, including drivers for the project, timeline for improvement, summary of anticipated changes in historic spending"³² and contains eight IDP Budget Categories, which are listed in the table below. The Department notes that while the IDP Filing Requirements have now incorporated Electric Vehicle Programs as a budget category, MP has continued to provide spending for EVs separately in its TEP.

²⁹ *Ibid.*

³⁰ 2021 IDP at 32.

³¹ IDP at 37.

³² IDP Filing Requirement 3.A.29.

Department Table 3. Comparison of MP Distribution System Spending Projections: 2021 and 2023 IDP

	<i>Spending (Millions)</i>		
IDP Budget Category	2021 IDP (2022 - 2026)	2023 IDP (2024 - 2028)	Change
<i>Age-Related Replacements and Asset Renewal</i>	\$112.75	\$186.15	\$73.40
<i>System Expansion or Upgrades for Capacity</i>	\$5.22	\$22.95	\$17.73
<i>System Expansion or Upgrades for Reliability and Power Quality</i>	\$39.97	\$49.25	\$9.28
<i>New Customer Projects and New Revenue</i>	\$21.29	\$78.00	\$56.71
<i>Grid Modernization and Pilot Programs</i>	\$18.90	\$23.00	\$4.10
<i>Projects related to Local (or other) Government Requirements</i>	\$3.75	\$11.10	\$7.35
<i>Metering</i>	\$13.65	\$21.30	\$7.65
<i>Other</i>	\$5.60	\$2.98	-\$2.63
Total Spending	\$221.12	\$394.73	\$173.60

For each IDP Budget Category and overall, this table calculates the difference in projected spending between the 2021 IDP and the 2023 IDP. These filings were made two years apart from one another (on October 25, 2021 and October 16, 2023), and overall distribution system spending projections increased from \$221.12 million to \$394.73 million over that time period, a 79 percent increase. The IDP Budget Categories of Age-Related Replacements and Asset Renewal, System Expansion or Upgrades for Capacity, and New Customer Projects and New Revenue are the main drivers of the increase, accounting for increases of \$73.40 million (65 percent), \$17.73 million (340 percent), and \$56.71 million (266 percent), respectively.

It is important to note that this is not an apples-to-apples comparison given the periods analyzed in each filing (e.g., the 2021 IDP period covers years 2022 through 2026, whereas the 2023 IDP period covers years 2024 through 2028).

To obtain a better apples-to-apples comparison between each filing, the Department reviewed the annual spending projections provided in each filing and was able to compare projected spending between the 2024 through 2026 period. Table 4 below provides such a comparison.

Department Table 4. Comparison of MP's Distribution System Spending Projections for the 2024 – 2026 Period: 2021 and 2023 IDP

	<i>Spending (Millions)</i>		
IDP Budget Category	<i>2021 IDP (2024 - 2026)</i>	<i>2023 IDP (2024 - 2026)</i>	Change
<i>Age-Related Replacements and Asset Renewal</i>	\$69.21	\$96.28	\$27.07
<i>System Expansion or Upgrades for Capacity</i>	\$1.88	\$8.05	\$6.17
<i>System Expansion or Upgrades for Reliability and Power Quality</i>	\$25.95	\$31.65	\$5.71
<i>New Customer Projects and New Revenue</i>	\$12.77	\$50.00	\$37.23
<i>Grid Modernization and Pilot Programs</i>	\$14.20	\$14.00	-\$0.20
<i>Projects related to Local (or other) Government Requirements</i>	\$2.10	\$6.40	\$4.30
<i>Metering</i>	\$5.85	\$12.50	\$6.65
<i>Other</i>	\$2.24	\$2.18	-\$0.07
Total Spending	\$134.20	\$221.06	\$86.86

This table calculates the difference in spending reported in the 2023 IDP for each IDP Budget Category and overall, as compared to the 2021 IDP for the 2024 through 2026 period. MP's total planned distribution system spending over these three years increased by \$86.86 million (65 percent). While total spending for this three-year period is relatively similar in certain categories, the increase in total spending is primarily driven by Age-Related Replacements and Asset Renewal and New Customer Projects and New Revenue, with increases of \$27.07 million (39 percent) and \$37.23 million (292 percent), respectively.

Finally, the Department reviewed the 2023 IDP's provision of information related to MP's historical actual distribution system spending from the 2019 to 2023 period³³ and compared that spending to MP's projected distribution system spending from the 2024 to 2028 period. This high-level overview of financial data in MP's 2023 IDP is summarized in the table below.

Department Table 5. Comparison of Distribution System Spending Reported in MP's 2023 IDP, Historical Actual (2019 – 2023) vs. Budgeted (2024 – 2028)

	Historical Actual (2019 - 2023)		Budgeted (2024 - 2028)		Change	
IDP Budget Category	Spending (Millions)	% of Total Spend	Spending (Millions)	% of Total Spend	(Millions)	%
<i>Age-Related Replacements and Asset Renewal</i>	\$90.79	41.84%	\$186.15	47.16%	\$95.36	105%
<i>System Expansion or Upgrades for Capacity</i>	\$5.12	2.36%	\$22.95	5.81%	\$17.83	348%
<i>System Expansion or Upgrades for Reliability and Power Quality</i>	\$26.02	11.99%	\$49.25	12.48%	\$23.23	89%
<i>New Customer Projects and New Revenue</i>	\$35.01	16.13%	\$78.00	19.76%	\$42.99	123%
<i>Grid Modernization and Pilot Programs</i>	\$6.54	3.01%	\$23.00	5.83%	\$16.46	252%
<i>Projects related to Local (or other) Government Requirements</i>	\$12.47	5.75%	\$11.10	2.81%	-\$1.37	-11%
<i>Metering</i>	\$30.30	13.97%	\$21.30	5.40%	-\$9.00	-30%
<i>Other</i>	\$10.73	4.95%	\$2.98	0.75%	-\$7.76	-72%
Total Spending	\$216.98		\$394.73		\$177.75	82%

MP's total budgeted distribution system spending is projected to be \$394.73 for the 2024 through 2028 period compared to the historical actual distribution system spending of \$216.98 for the 2019 through 2023 period, an increase of 82 percent. The main drivers of the increase are the categories of

³³ MP excluded 2023 from both its historical and planned distribution spending in its IDP. MP provided 2023 actual spend in response to Department IR 12, which the Department incorporated into Table 5 to provide a comparison across contiguous periods.

Age-Related Replacement and Asset Renewal, System Expansion or Upgrades for Reliability and Power Quality, and New Customer Projects and New Revenue, with increases of \$95.36 million (105 percent), \$23.23 million (89 percent), and \$42.99 million (123 percent), respectively. Together these categories account for 79.4% of total planned distribution investment over the coming five years.

MP's increase in projected spending on Age-Related Replacement and Asset Renewal projects in the 2023 IDP is in keeping with the Company's general trend of increasing its budget for the replacement of aging equipment over the coming decade. MP states that some age-related replacements and asset renewal projects are planned in advance and implemented proactively as engineers identify and prioritize age- and condition-based replacements or areas prone to failure based on reliability metrics and feedback from field crews. Other age-related replacements and asset renewal projects are implemented in response to unanticipated failures.³⁴ MP further explains that it has identified and prioritized proactive asset renewal modernization projects at the transmission-to-distribution substation level where failures are more broadly impactful, costly, and have longer lead times to fix.³⁵ In some cases, system upgrades for capacity or reliability and power quality will be integrated with Asset Renewal or Grid Modernization projects to more efficiently and holistically address the needs for the area.³⁶ MP notes that, starting in 2021 and going forward, the Company increased its investments above depreciation level spending to accelerate asset renewal, modernization and reliability projects as discussed in Section IV of its IDP.³⁷

E. DISTRIBUTED ENERGY RESOURCE (DER) SCENARIOS AND FORECASTS

Notice Topic 3.D: Feedback, Comments, and Recommendations on Distributed Energy Resources (DER) Scenarios and Forecasts, Including Electric Vehicle Forecasts.

Section IV.C of the IDP covers distribution forecasting, including DERs. The IDP explains that MP accounts for DERs using two methods, which are:

1. Some DERs are part of the load forecast and reduce forecasted demand.
2. Other DERs accredited as a capacity resource, are registered as capacity at MISO thus increasing supply; however, such DERs are not in the forecast.

The Department agrees that MP's two method approach is generally consistent with MISO's reliability construct and is sufficient to capture DER impacts in resource planning and forecasting going forward. Therefore, MP's method of accounting for DERs in two ways is reasonable. The Department notes that DERs treated as supply-side resources, in a 15-year resource plan, will be visible and any forecasted changes in supply-side DERs will be visible to parties. However, DERs treated as demand-side resources will be embedded in the forecast data and thus changes in demand-side DERs will not be visible.

³⁴ IDP at 37-38.

³⁵ IDP at 38.

³⁶ *Ibid.*

³⁷ IDP at 25.

Visibility is only one factor to consider when treating DERs on the supply-side or demand side and is not determinative of how all DERs should be treated.

Section IV.C of the IDP also explains how MP developed three scenarios around DERs. The Department has no comment on these scenarios at this time.

Finally, Section IV.C of the IDP explains how each DER component, electric vehicles (EV), distributed generation solar (DG Solar), time-of-day rates (TOD Rates), and direct current fast chargers (DCFC), is treated.

First, regarding DG Solar, MP explains that:

The energy sales and peak demand forecasts are only adjusted for new installs (i.e. installations expected to come online in the forecast timeframe). The effects of currently installed arrays are presumed to be embedded in the forecast.

This “two track” approach could present a potential problem in that it leaves MP open to double counting the impact of new DG Solar installations. For a simplified example assume the historical data has 4 years of DG solar as follows: 1 MW in year 1, 2 MW in year 2, 3 MW in year 3, and 4 MW in year 4. From that data it would be reasonable to expect that some growth in DG Solar would be in the forecast outputs for future years—meaning new installations. However, MP proceeds to add the new installations separately. Thus, some of the new installations will have been effectively counted twice, once as the result of the growth in DG Solar embedded in the forecast data and a second time as a separate addition. The Department recommends that MP consider this issue when developing future DG Solar forecasts.

Second, regarding EVs, MP explains:

The energy and demand requirements of EVs adopted in the forecast timeframe (2023-2035) are added to the energy sales and peak demand outlooks. The effects of currently owned EVs are presumed to be embedded in the econometric forecast.

This is the same approach as MP took for DG solar discussed above and is also open to double counting. The Department recommends that MP consider the potential double counting issue when developing future EV forecasts.

Third, regarding DCFCs, the Department briefly reviewed the forecasting process used by MP and does not have any further comments at this time.

Fourth, regarding TOD Rates, MP explains that the Company used an elasticity analysis to determine the impact of TOD Rates. The Department agrees with MP that an elasticity analysis is an appropriate

method for determining the impact of TOD rates on the forecast. Based upon data from a pilot program, MP estimates a price elasticity of about -0.35 but will re-evaluate price elasticity with updated data. The -0.35 price elasticity indicates greater responsiveness to price changes than the Department has seen elsewhere. However, MP's statement that the Company will re-evaluate price elasticity with updated data addresses any concerns the Department has with MP's current price elasticity estimate.

F. THE INFLATION REDUCTION ACT AND UTILITY PLANNING AND BENEFITS

Notice Topic 5: Has Minnesota Power Appropriately Discussed its Plans to Maximize the Benefits of the Inflation Reduction Act (IRA) and the IRA's Impact on the Utility's Planning Assumptions Pursuant to Order Point 1 of the Commission's September 12, 2023 Order in Docket No. E,G-999/CI-22-624?

1. Overview of IRA Discussion

Order Point 1 of the Commission's September 12, 2023, Order in Docket No. E,G999/CI-22-624 states in part:

The utilities shall maximize the benefits of the Inflation Reduction Act in [...] integrated distribution plans [...]. In such filings, utilities shall discuss how they plan to capture and maximize the benefits from the Act, and how the Act has impacted planning assumptions including (but not limited to) the predicted cost of assets and projects and the adoption rates of electric vehicles, distributed energy resources, and other electrification measures.³⁸

MP does not specifically reference the IRA in its IDP and only provides limited references to federal tax incentives. For example, MP discusses its SolarSense rebate program to support customer-sited solar systems, which until 2020 supported 80 percent of all solar interconnections in MP's service territory.³⁹ However, the majority of interconnections installed did not receive a SolarSense rebate in 2022, and MP attributes this shift, in part, to the availability of funding sources such as federal tax credits.

The Department acknowledges the short time period from the September 12, 2023, Order to the filing of the IDP on October 16, 2023. The Department anticipates that future IDPs, as well as the other filings required to comply with Order Point 1 of the September 12, 2023 Order, will likely become more comprehensive in response to the requirements.

The Department notes that IRA incentives will impact the adoption rates of multiple technologies relevant for distribution system planning, including electric vehicles, DER, and other electrification measures, which are included in the requirements in the September 12, 2023 Order. Specifically, incentives for battery storage, heat pump air conditioner/heaters, heat pump water heaters, electric

³⁸ *Order Setting Requirements Related to Inflation Reduction Act, In the Matter of a Joint Investigation into the Impacts of the Federal Inflation Reduction Act, Docket No. E,G999/CI-22-624* (September 12, 2023). (eDocket No. [20239-198869-01](#)). Hereinafter "September 12, 2023, Order."

³⁹ IDP at 31.

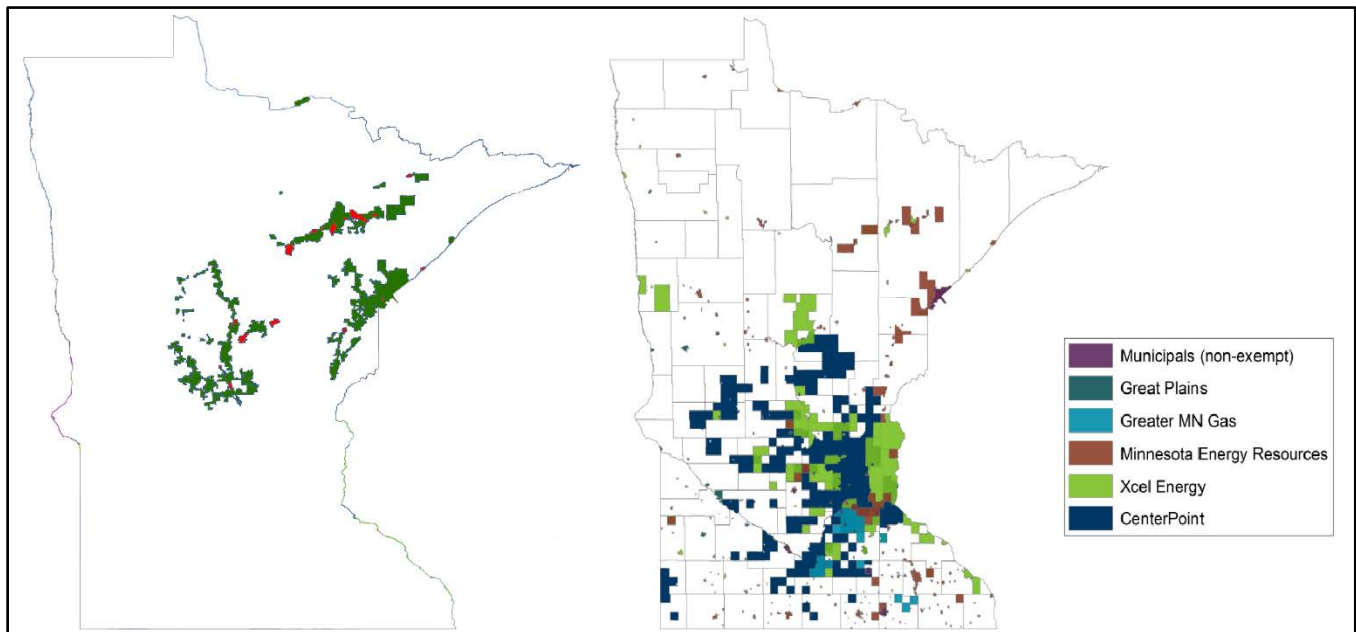
wiring and electric panel upgrades that facilitate electrification, among others, are relevant aspects of the IRA to include in a discussion of planning assumptions.

The Department requests that MP include in reply comments a description of how its distribution system planning will evolve with the incorporation of additional impacts from the IRA.

2. Beneficial Electrification

The Department found that a discussion about beneficial electrification, specifically various heat pump technologies, is absent in MP's IDP. Beneficial electrification is consistent with the state's Climate Action Framework,⁴⁰ which sets a goal to reach carbon neutrality by 2050. As MP is required to supply 100% carbon free electricity by 2040,⁴¹ beneficial electrification aligns with the state's full decarbonization goal, to the extent that beneficial electrification technologies are able to offset a fossil fuel-based heat source. Further, MP is in a position of relative advantage compared to other utilities, with its lower electricity prices, dual fuel rates and a significant portion of its service area that appears to rely on expensive heating sources that are not natural gas. Figure 3, below, shows that some of MP's service area does not overlap with natural gas utility service areas.

Department Figure 3: Comparison of MP Service Area (Green) and Overlapping Municipal Service Areas (Red)⁴² on Left to Natural Gas Utility Service Areas on Right



⁴⁰ State of Minnesota. *Minnesota Climate Action Framework Report*. N.D. Accessed at

<https://climate.state.mn.us/sites/climate-action/files/Climate%20Action%20Framework.pdf>

⁴¹ Minn. Stat. § 216B.1691, subd. 2g. <https://www.revisor.mn.gov/statutes/cite/216B.1691#stat.216B.1691.2g>

⁴² Figure adapted to remove other electric utility service areas from *Minnesota Energy Efficiency Potential Study: 2020-2029*. Center for Energy and Environment, et al. (2018). *Minnesota Energy Efficiency Potential Study: 2020 - 2029*. Retrieved from: <https://mn.gov/commerce-stat/pdfs/mn-energy-efficiency-potential-study.pdf>

Source: Minnesota Energy Efficiency Potential Study: 2020-2029⁴³

By population, a significant portion of MP's customers are within the City of Duluth, with a population of 86,697.⁴⁴ With 150,000 customers, Duluth likely represents around a third to half of MP's customers. The city has a high rate of natural gas use, with 73.0 percent of its residents on natural gas, 16.3 percent of its customers on electric heat, and 10.7% of its customers on other heating fuels. MP provides service to an additional 14 small municipalities, many of which are served by natural gas utilities, but MP also serves the surrounding areas of these municipalities which are less likely to have natural gas service. Therefore, the Department expects that there are a significant number of MP customers that rely on expensive heating fuels other than natural gas for heating.

The Department requests that MP provide data on the fraction of its customers that rely on the primary heating sources of natural gas, electric resistance heat, or all other heat sources.

The high percentage of homes in MP's service area that do not use natural gas for heating presents a significant opportunity to add value to MP's electric ratepayers. Typical fossil-fuel based heating systems are limited to a maximum efficiency that cannot exceed 100 percent, and in practice, most high-efficiency models are around 95 percent efficient. Electric resistance heat is 100 percent efficient. Heat pumps, rather than generating heat, instead move heat from one place to another, which allows them to reach efficiencies higher than 100 percent. Heat pump performance is sometimes measured by its Coefficient of Performance (COP), which is measured as the ratio of input electricity to the equivalent output electricity. For example, at a COP of 2.0, this would mean a heat pump would generate 2 kWh equivalent of heat for every 1 kWh that is used by the heat pump, and thus a higher COP means the heat pump is more efficient.

Table 6 below shows a comparison cost table of heating costs by fuel source and by heat pump efficiency. Natural gas costs \$8.84 / MMBtu, while propane costs \$21.64 / MMBtu, fuel oil costs \$21.66 / MMBtu, and electric resistance heat costs \$26.67 / MMBtu. Natural gas is significantly cheaper than propane (59.1 percent), fuel oil (59.2 percent) and electric resistance heat (66.9 percent). Many of the homes in MP's service area may not have the option to switch to natural gas, which leaves heat pumps as an attractive, if not cheaper solution than even natural gas. Heat pump water heater COPs were found in a real world application to have a COP range of 1.82 – 2.32.⁴⁵ Energy Star requires that certified cold climate heat pumps achieve a COP of at least 1.75 at 5 degrees,⁴⁶ while several models can achieve a COP well above 2.0 at 5 degrees.⁴⁷ While Air Source Heat Pump (ASHP) performance declines with temperature, a COP of 2.0 at 5 degrees on the Dual Fuel Standard or Dual Fuel Plus tariff is close to the economic break even point compared to natural gas. This means that cold climate ASHPs will be cheaper to run than natural gas for a significant portion of the heating season if the ratepayer is

⁴³ *Ibid.*

⁴⁴ US Census Bureau. (n.d.). Profiles. Retrieved from: <https://data.census.gov/profile?t=Population%20Total>

⁴⁵ Shapiro and Puttagunta. (February 2016). *Field Performance of Heat Pump Water Heaters in the Northeast*. US Department of Energy. <https://www.nrel.gov/docs/fy16osti/64904.pdf>

⁴⁶ See https://www.energystar.gov/products/heat_pump_water_heaters/key-product-criteria

⁴⁷ See https://ashp.neep.org/#/product_list/

on a dual fuel tariff.⁴⁸ The dual fuel tariffs would require the installation of a second meter and monthly metering fee, which could cost thousands of dollars in addition to the cost of the heat pump, which may make installation financially infeasible, but the rate does offer an option for natural gas customers to save money on heating costs after the installation of a heat pump. When compared to propane and fuel oil, a heat pump with a COP of 2.0 on the future standard Time of Use (TOU) tariff offers a 38.4 percent savings, with an additional opportunity to save money by shifting load away from peak hours. For any home that can switch from electric resistance heat, the savings would be 50 percent, while warmer temperatures offer even higher levels of savings, with COPs reaching as high as 3.5 at 47 degrees. Homes on propane or fuel oil would have an opportunity for even more fuel savings if they switch to the Dual Fuel Std or Dual Fuel Plus tariffs, which require a backup heat source when the electric heat source is interrupted by MP. Additional dual fuel tariff use would also expand MP's demand response capabilities.

⁴⁸ Note that the Dual Fuel Standard tariff requires that the meter be allowed to be interrupted for up to 300 hours per year, or 12.5 days, and the Dual Fuel Plus tariff requires that the meter be allowed to be interrupted for 1,000 hours per year, or 41.7 days.

Department Table 6: Comparison of Heating Cost by Fuel and Heat Pump Coefficient of Performance (COP)

Heat Source	MP Rate	Fuel Cost	Normalized Fuel Cost (\$ / MMBtu)	Heating Cost (\$ / MMBtu)
Natural Gas (95% Efficiency)	-	\$8.72 / MCF ⁴⁹	\$8.40 / MMBtu	\$8.84 / MMBtu
Propane (95% Efficiency)	-	\$1.88 / Gallon ⁵⁰	\$20.56 / MMBtu	\$21.64 / MMBtu
Fuel Oil (95% Efficiency)	-	\$2.85 / Gallon ⁵¹	\$20.58 / MMBtu	\$21.66 / MMBtu
Electric Resistance - COP 1.0	TOU	\$0.091 / kWh ⁵²	\$26.67 / MMBtu	\$26.67 / MMBtu
Heat Pump - COP 2.0	TOU	\$0.091 / kWh	\$26.67 / MMBtu	\$13.33 / MMBtu
Heat Pump - COP 2.0	Dual Fuel Std	\$0.069 / kWh	\$20.22 / MMBtu	\$10.11 / MMBtu
Heat Pump - COP 2.0	Dual Fuel Plus	\$0.047 / kWh	\$13.77 / MMBtu	\$6.89 / MMBtu

The average Minnesota home uses 59.3 MMBtu for space heating, 15.2 MMBtu for water heating, and 3.5 MMBtu for air conditioning.⁵³ A fully natural gas heated home is estimated to spend \$659 annually, whereas a fully propane heated home is estimated to spend \$1,532 annually and a fully electric resistance heated home is estimated to spend \$1,987 annually. Compared to a full heat pump home with a heat pump space and water heater that average a COP of 2.0, the average annual cost would be \$993, with a savings potential of \$539 for propane and \$993 for electric resistance heat. Note that most, if not all, cold climate heat pumps currently on the market cannot serve 100% of a Minnesota home's heating load,⁵⁴ and will likely be able to fuel switch economically from natural gas to meet 20 – 80 percent of a home's heating load, based on the Duluth climate.⁵⁵ Heat pumps will remain economical compared to electric resistance heat, propane, and fuel oil for close to the entire load they are able to serve.

⁴⁹ 10 year average price of residential natural gas for December – February heating season: 2013 – 2022. Source: <https://www.eia.gov/dnav/ng/hist/n3010mn3m.htm>

⁵⁰ 10 year average price of residential propane for December – February heating season: 2013 – 2022. Source: https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=W_EPLLPA_PRS_SMN_DPG&f=W

⁵¹ ⁵¹ 10 year average price of residential propane for December – February heating season: 2013 – 2022. Source: https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=W_EPD2F_PRS_SMN_DPG&f=W

⁵² Based on the cost of 24/7 use on MP's residential TOU rate. See <https://www.mnpower.com/Content/Documents/Customerservice/residential-electric-service.pdf>

⁵³ US Energy Information Administration. Residential Energy Consumption Survey (RECS) Dashboard. Source: <https://experience.arcgis.com/experience/cbf6875974554a74823232f84f563253>

⁵⁴ ASHP performance (COP) and output decline with decreasing temperature. Many Energy Star certified cold climate heat pumps have a similar rated output at 47 degrees to their output at 5 degrees, but output declines further at lower temperatures, and likely cannot meet 100% of building heating load without a backup heat source such as fossil fuels or electric resistance heat.

⁵⁵ A heat pump that can supply 100% of the heating load at 5 degrees will supply approximately 80% of a home's heating load in Duluth. See *Minnesota Energy Efficiency Potential Study: 2020-2029* at 104-105.

MP does not provide a forecast for the adoption of heat pumps in its service territory. MP does, however, present the estimated number of heat pump incentives it expects to deliver in its 2024 to 2026 Energy Conservation and Optimization (ECO) filing.⁵⁶ MP expects to deliver 551 space-heating heat pump incentives annually and 57 water-heating heat pump incentives annually, which translates to 2,755 new space-heating heat pumps and 285 new water-heating heat pumps installed in the budget forecast period between 2023 and 2027. MP states that it has just over 150,000 customers and 147,606 meters in Minnesota.⁵⁷ Based on 150,000 customers / buildings, the Department estimates an adoption rate of MP's planned heat pump incentives corresponds to a heat pump adoption rate of 1.8 percent for space-heating heat pumps heating and 0.2 percent for water-heating heat pumps between 2023 and 2027. When annualized to 2050, MP would be on track to install space-heating heat pumps at 10.0 percent of buildings by 2050 and water-heating heat pumps at 1.0 percent of buildings by 2050, which likely leaves a significant number of high heating cost homes still reliant on expensive heating fuels in 2050.

These projected deployment numbers do not appear to take IRA incentives into consideration. As part of MP's ECO program, MP offers up to \$1,000 - \$1,200 to install a cold climate ASHP⁵⁸ and \$300 to install a heat pump water heater.⁵⁹ The IRA tax credit offers up to \$2,000 for 30 percent of the cost to install an ASHP.⁶⁰ As an example, a 3 ton ducted ASHP that costs \$7,000 would be eligible for a \$5,120 incentive, which would cover 46 percent of the installation cost. The State of Minnesota has received over \$148 million for home energy efficiency and home electrification⁶¹ which can fund rebates up to \$8,000 towards the installation of a heat pump for households at or below 80% of the Area Median Income, and \$4,000 for households at or below 150% of the Area Median Income.⁶² Further, the state is planning on offering a program to fund up to \$4,000 for the installation of a heat pump for applicants of these programs.⁶³ Some of these programs can also potentially fund heat pump water heaters and clothes dryers.

Despite the unprecedented opportunities created by the IRA to install free or heavily discounted heat pumps, MP has not presented any discussion about the topic. Many of these programs are scheduled for implementation in 2025, which means that MP will be behind if it does not start planning for these new programs now. The rebate programs will require energy audits to first be performed that establish the need for heat pumps alongside other energy saving measures, such as insulation and air sealing. The implementation of these programs will require State Government and contracting partner coordination with MP, at minimum, and at best, a proactive attempt by MP to identify and enroll high

⁵⁶ *Energy Conservation and Optimization Plan, In the Matter of Minnesota Power's 2024-2026 Triennial Energy Conservation and Optimization Program Proposal*, Docket No. E015/CIP-23-93 (June 30, 2023) (eDocket No. [20236-197124-01](#)).

⁵⁷ IDP at 62.

⁵⁸ See <https://www.mnpower.com/ProgramsRebates/ASHPrebates>

⁵⁹ See <https://www.mnpower.com/ProgramsRebates/WaterHeaterRebate>

⁶⁰ See <https://www.irs.gov/credits-deductions/energy-efficient-home-improvement-credit>

⁶¹ See [https://www.energy.gov/sites/default/files/2023-](https://www.energy.gov/sites/default/files/2023-07/IRA%2050121%20%26%2050122%20Home%20Energy%20Rebates%20State%20Allocations.pdf)

[07/IRA%2050121%20%26%2050122%20Home%20Energy%20Rebates%20State%20Allocations.pdf](https://www.energy.gov/sites/default/files/2023-07/IRA%2050121%20%26%2050122%20Home%20Energy%20Rebates%20State%20Allocations.pdf)

⁶² See <https://mn.gov/commerce/energy/consumer/energy-programs/home-energy-rebates.jsp>

⁶³ See <https://mn.gov/commerce/energy/consumer/energy-programs/heat-pump.jsp>

heating cost homes into the many programs available for beneficial electrification. Further, while switching from electric resistance heat to heat pumps will reduce electric loads, fuel switching from other fuels will increase loads. These homes are more likely to be located on long rural feeders that do not have access to natural gas, and beneficial electrification will create new stresses on the distribution grid that must be appropriately planned for, especially when combined with electric vehicles.

The Department recommends the Commission order MP to file a supplemental filing that proposes a plan to accelerate beneficial electrification for its customers, including a discussion of how to incentivize dual fuel adoption, and provide forecasts of expected grid impacts of the same.

G. DISTRIBUTION SYSTEM RESILIENCE

Notice Topic 6: What should the Commission Consider or Address Related to Enhancing the Resilience of the Distribution System Within Minnesota Power's IDP?

IDP Planning Objective 1 establishes that the purpose of the IDP is to “maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state’s energy policies.”⁶⁴ MP presents a robust discussion of its approach to distribution system resilience in its IDP. MP explicitly highlights resilience as a key theme of its IDP as it relates to its focus on community impacts: “Planning for a reliable and resilient power supply to communities as they experience increased extreme weather events is a critical part of Minnesota Power’s distribution planning process.”⁶⁵ MP notes its approach to enhancing system resilience includes asset renewal investments, strategic undergrounding, and grid modernization efforts.

Asset renewal investments are a key component of MP’s approach to system resilience and are discussed throughout its IDP. MP notes the increased focus on asset renewal to address its aging system and its strategic approach to target key assets to improve reliability and resilience.⁶⁶ Asset renewal investments represent the most significant and growing portion of MP’s planned distribution spending in its IDP, growing from \$18 million in 2024 to \$52 million in 2028.⁶⁷ The Department discusses MP’s distribution spending in further detail in Section III.D above.

As part of MP’s discussion of its planned investments, it highlights a number of initiatives which can contribute to improving system resilience. MP’s planned upgrades to its Outage Management System (“OMS”) and Geographic Information System (“GIS”) will support an enhanced understanding of the distribution system in real-time and improve accuracy regarding system outages.⁶⁸ With this improved visibility, MP should be better positioned to strategically target investments to improve resilience. In addition, MP discusses its groundline inspection program to extend the life of distribution system poles

⁶⁴ IDP Planning Objective 1.

⁶⁵ IDP at 13.

⁶⁶ IDP at 19-20.

⁶⁷ IDP at 37.

⁶⁸ IDP at 41-44.

with the application of a chemical treatment and identify candidates for replacement.⁶⁹ MP anticipates pole life is expected to increase 10 to 12 years after treatment.⁷⁰

MP also highlighted its strategic undergrounding initiative to replace overhead lines, particularly for areas likely to be impacted by vegetation, to improve reliability and system resilience.⁷¹ MP began the program in 2020, and it plans to continue to grow investment in this area:

Department Table 7: Strategic Undergrounding Budget

Year	Annual Budget
2020	\$705,815
2021	\$311,854
2022	\$308,871
2023	\$4,187,070
2024	\$5,750,000
2025	\$6,000,000
2026	\$6,000,000
2027	\$6,000,000
2028	\$6,000,000
Total	\$35,263,610

Source: MP Response to Department IR 25.

MP notes the variability associated with underground replacement projects, limiting its ability to project how many miles of lines will be converted each year.⁷² Using MP's range of estimates of \$250,000 to \$750,000 per mile, MP's annual budget would be sufficient to convert between eight and 24 miles each year. For context, MP notes that its distribution system currently consists of 4,473 miles of above ground lines and 1,650 miles underground.⁷³

The Department appreciates MP's discussion of initiatives to improve both reliability and resilience throughout its IDP. However, the Department observes an opportunity to track and report system resilience as a distinct concept from reliability to ensure that investments are appropriately targeted. Identifying the specific benefits derived from investments described in the IDP remains a challenge, and the development of resilience metrics to assess performance over time could provide additional insight and inform Commission and stakeholder understanding of how MP's IDP aligns with IDP Planning Objective 1. Given MP's significant and growing levels of investment for the stated objective,

⁶⁹ IDP at 45-46.

⁷⁰ MP Response to Department IR 19.

⁷¹ IDP at 61.

⁷² MP Response to Department IR 25.c.

⁷³ IDP at 61.

among others, to improve system resilience, the Department believes that resilience performance metrics can assist with the evaluation of investments.

MP reports various metrics in its annual Minnesota Safety, Reliability, and Service Quality (“SRSQ”) Standards Report, which includes standardized reporting metrics including System Average Interruption Duration Index (“SAIDI”), Customer Average Interruption Duration Index (“CAIDI”), Momentary Average Interruption Frequency Index (“MAIFI”), among others.⁷⁴ The reporting requirements for MP’s SRSQ Report include metrics using both weather-normalized and non-normalized data. Reliability reporting uses normalized data to exclude Major Event Days (“MEDs”),⁷⁵ consistent with standardized reporting requirements and appropriate given that reliability “typically deals with routine, shorter-time events.”⁷⁶

In contrast, resilience “typically focuses on low-probability, high-consequence events [...] and affect a significant number of customers, often spanning a wide geographic extent.”⁷⁷ Thus, the likelihood and scope of the impact of the event are relevant to assess resilience. MP reports non-weather-normalized versions of metrics, including MEDs, in its SRSQ Report and could provide the basis for the development of resiliency reporting metrics. The Department notes that other jurisdictions track SAIDI and SAIFI with MEDs as measures of resilience.⁷⁸

The Department recommends the Commission direct MP to develop a suite of metrics to track resiliency, including SAIDI and SAIFI, MEDs, and other metrics to the extent warranted.

For reference in developing a suite of metrics, the Department offers reports published by Pacific Northwest National Laboratory and Sandia National Laboratories,^{79,80} which provide a comprehensive discussion of resilience metrics. The Department encourages MP to establish metrics and track performance across different customer groups and geographies, to the extent practicable, to gain insight into how major outage events affect different groups.

⁷⁴ 2023 SRSQ Report, *In the Matter of Minnesota Power’s 2023 Safety, Reliability and Service Quality Standards Report in Accordance with Minn. Rule 7826*, Minnesota Power, Docket No. E015/M-24-29 (April 1, 2024) (eDocket No. [20244-204890-01](#)). Hereinafter “SRSQ Report.”

⁷⁵ MP Response to Department IR 18.b.

⁷⁶ National Renewable Energy Laboratory (NREL). *Measuring and Valuing Resilience: A Literature Review for the Power Sector*, August 2023 at 2. Hereinafter “NREL Report.” Accessed at <https://www.nrel.gov/docs/fy23osti/87053.pdf>

⁷⁷ *Ibid.*

⁷⁸ See <https://www.nationalgridus.com/media/pdfs/our-company/massachusetts-grid-modernization/future-grid-full-plan-sept2023.pdf>

⁷⁹ Pacific Northwest National Laboratory and Sandia National Laboratories. *Resilient Electric Grid: Defining, Measuring, and Integrating Resilience into Electricity Sector Policy and Planning*. September 2023. Accessed at <https://www.pnnl.gov/sites/default/files/media/file/MOD-Plan%20Resilience%20Paper%20Final.pdf>

⁸⁰ Sandia National Laboratories. *Performance Metrics to Evaluate Utility Resilience Investments*. May 2021. Accessed at <https://www.osti.gov/biblio/1821803/>

H. OTHER AREAS OF MP'S IDP

Notice Topic 7: Other Areas of Minnesota Power's IDP Not Listed Above, Along With Any Other Issues or Concerns Related to This Matter.

The Department identifies two issues raised in its March 4, 2024 initial comments⁸¹ filed in the ongoing Xcel Energy IDP proceeding which pertain to MP's IDP, as well.

1. IDP-Specific Budget Categories

In Section III.B.iii of the Department's initial comments in the Xcel IDP proceeding, the Department responded to Xcel's request to revise IDP filing requirements by removing the requirement that financial information be reported in IDP-specific budget categories.⁸² Xcel's request was prompted by its observation regarding the manual work required to convert its internal budget categories to the IDP-specific budget categories and a desire from stakeholders to facilitate comparison of budget information across utility proceedings.⁸³ The Department expressed support for the alignment of the IDP process with other dockets, including cost recovery proceedings, which the removal of IDP-specific budget categories could facilitate. The Department also recommended the Commission consider implementing similar revisions with other utilities' IDP filings.

The Department continues to believe that the consistent presentation of budget information across utility proceedings could benefit the regulatory process, particularly with alignment with cost recovery proceedings. The Department requested feedback from MP regarding its budget categories, and MP's response indicates that its internal budget categories are consistent with the IDP: "The budget categories listed in the IDP are the same as Minnesota Power's internal distribution budget categories. This alignment ensures that Minnesota Power is consistently speaking the same language across any reporting, internally or externally."⁸⁴ Thus, the IDP filing requirements provide stakeholders budget information in a consistent manner across MP's proceedings and do not require modification.

2. On the Timing and Synchronization of IDPs With Other Proceedings

In Section III.K of the Department's initial comments in the Xcel IDP proceeding discussed the issue of timing misalignment between the IDP and other proceedings. The Department provides its discussion here for clarity:

⁸¹ *Comments of the Minnesota Department of Commerce, In the Matter of Xcel Energy's 2023 Integrated Distribution Plan*, Docket No. E002/M-23-452 (March 4, 2024) (eDocket No. [20243-204037-04](#)). Hereinafter "March 4, 2024 Comments."

⁸² March 4, 2024 Comments at 16.

⁸³ *2023 Integrated Distribution System Plan, Northern States Power Company dba Xcel Energy*, Docket No. E002/M-23-452 (November 1, 2023) (eDocket No. [202311-200132-09](#)). Xcel IDP Main Report at 27.

⁸⁴ MP Response to Department IR 6.

The Department provides the following observation regarding timing of the IDP and integration with other processes such as rate cases and the Integrated Resource Plan. The IDP and the IRP are currently separate processes, but are not wholly unrelated. Currently all IDPs, including Xcel's IDP, are filed simultaneously on a schedule that is unrelated to other Commission proceedings. As such, there is no reason to assume that the inputs to Xcel's IDP analysis will be the same or similar to the inputs to Xcel's IRP—the difference in timing alone creates the potential for significant differences. In addition, due to the timing of Xcel's IDP, there is no reason to assume that the outputs from Xcel's IDP could be used as inputs to Xcel's IRP or any other proceeding. In essence, the current filing schedule leaves the IDP process as a standalone proceeding whose inputs and outputs are not easily integrated into any other Commission proceeding.

Finding an approach that integrates these processes and addresses the timing of these filings would be beneficial. For example, one approach would be to have Xcel's IRP and IDP filed on the same schedule so that they share a common set of inputs. Another approach would be to sequence the dockets so that the IDP is completed first and the IDP outputs can then be used as inputs to the IRP. The Department is interested in working with Xcel and other parties to address these concerns.

The Department requests feedback from Xcel and other parties on how to schedule the IDP filing to better integrate the IDP's inputs and outputs with other Commission processes in reply comments.⁸⁵

The Department notes that the same concerns apply to MP's IDP and its other proceedings.

The Department requests feedback from MP and other parties on how to schedule the IDP filing to better integrate the IDP's inputs and outputs with other Commission proceedings in reply comments.

⁸⁵ March 4, 2024 Comments at 58.

I. TEP COMPLIANCE WITH FILING REQUIREMENTS AND RECOMMENDATIONS CONCERNING ACCEPTANCE

Notice Topic 8: Should the Commission Approve, Modify, or Reject Minnesota Power's Transportation Electrification Plan (TEP)?

Notice Topic 9: Did Minnesota Power Adequately Address the Commission's TEP Filing Requirements and Prior Orders, as Outlined in Attachment A to This Notice? Is Additional Information Necessary for Improved Clarity?

The Department analyzes MP's TEP⁸⁶ and offers recommendations both to promote transportation electrification consistent with the public interest and to ensure that the Commission is presented with the resources to make an informed decision. The Department looks to relevant statute and Commission Orders to define the boundaries and parameters of the public interest in this venue. Some of those constituent goals of the public interest include expansion of transportation electrification, optimizing EV benefits, overcoming barriers to adoption, and clarifying the role of utilities in transportation electrification.

The Department's review of MP's TEP begins at a threshold question: did MP provide information and analyses required by the Commission's TEP filing requirements and previous Commission Orders? The Commission's December 8, 2022 Order approved combining IDPs and TEPs, and the current filing is MP's first time submitting its TEP as a component of its IDP. The December 8, 2022 Order also incorporated TEP filing requirements into the IDP filing requirements as Section 3.F.

The Department notes that MP provided a compliance matrix with its IDP as Appendix A,⁸⁷ which indicated the location in its filing for each of the IDP filing requirements from the Commission's December 8, 2022 Order. MP's compliance matrix did not specify the location within the TEP for each of the filing requirements within Section 3.F,⁸⁸ but MP's TEP is structured to directly address each of the filing requirements in Section 3.F. The Department includes each of the filing requirements within Section 3.F in its assessment of MP's compliance with IDP filing requirements included with these comments as Attachment A. The Department reviewed MP's filing in its entirety and concludes that MP has sufficiently addressed each of the TEP filing requirements and Commission Orders.

In addition, the Department analyzes MP's TEP under the relevant statute, Minn. Stat. § 216B.1615.⁸⁹ Subdivision 3 of the relevant statute gives authority to the Commission to approve, modify, or reject a TEP and the rubric under which that decision is to be made.

⁸⁶ IDP Appendix E.

⁸⁷ IDP Appendix A.

⁸⁸ IDP Appendix A at 12-14.

⁸⁹ Minn. Stat. § 216B.1615. <https://www.revisor.mn.gov/statutes/cite/216B.1615>

The Department additionally recognizes the importance of electrifying Minnesota's transportation sector consistent with both the Commission's February 1, 2019 Order in Docket No. E999/CI-17-879 (EV Inquiry Order)⁹⁰ and subsequent Orders in similar proceedings.

1. Minnesota Power's TEP

Minnesota Power presents its TEP to provide an overview of its transportation electrification initiatives and responds directly to each of the IDP filing requirements in Section 3.F. Other IDP filing requirements corresponding to electric vehicles, including requirements in Sections 3.A and 3.C, are provided in the IDP main report. In its TEP, MP describes its guiding principles for transportation electrification: education, accessibility, optimization, environment, simplicity, and security.⁹¹

Transportation electrification in MP's service territory is currently at a relatively nascent stage. In its discussion of EV penetration in the IDP main report, MP notes that customer adoption lags the overall trend in the country by six years and estimates 500 total EVs in its service territory.⁹² MP also provides an assessment of the current levels of public charging infrastructure, which includes 61 EV charging stations with 87 Level 2 ports and 53 Level 3, or Direct Current Fast Charging ("DCFC") ports.⁹³ MP identifies nine public DCFC stations and one DCFC station which provides charging to a public transportation fleet.⁹⁴ MP estimates a total of 42 medium-duty ("MD") and 12 heavy-duty ("HD") EVs in its territory.⁹⁵

MP's TEP describes its existing transportation electrification initiatives, as well as its current plans for additional offerings to promote residential charging, public charging, and public education and outreach efforts. MP is not requesting approval of any specific initiatives in its TEP. MP presents its planned roadmap for transportation electrification through 2025, which the Department provides here for clarity:

⁹⁰ *Order Making Findings and Requiring Filings, In the Matter of a Commission Inquiry into Electric Vehicle Charging and Infrastructure, Docket No. E-999/CI-17-879* (February 1, 2019). (eDocket No. [20192-149933-01](#)). Hereinafter "EV Inquiry Order."

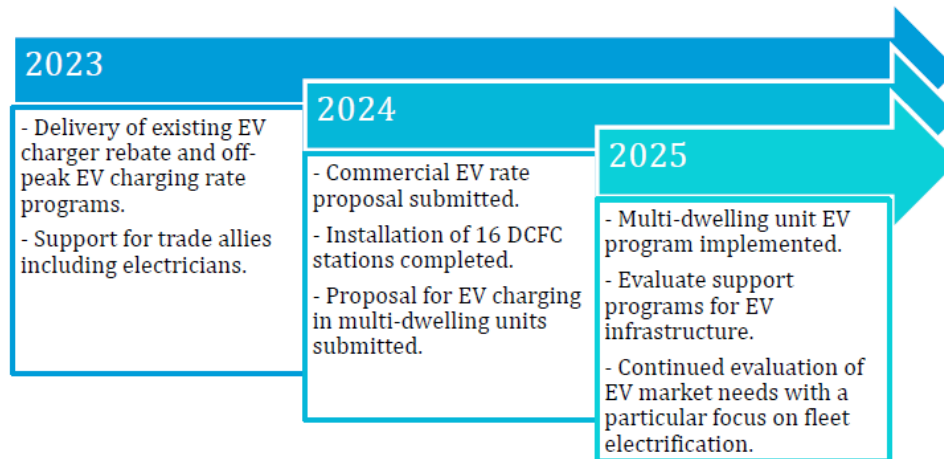
⁹¹ TEP at 7.

⁹² IDP at 82-83.

⁹³ IDP at 28.

⁹⁴ TEP at 13.

⁹⁵ IDP at 82.

Department Figure 4: EV Initiatives Implementation Timeline

Source: TEP Figure 2 at 9.

MP promotes residential EV charging through multiple channels, including rates and rebates. First, MP offers a Residential Off-Peak EV Service tariff to promote EV adoption and home charging with a reduced off-peak rate.⁹⁶ MP reports that 27 customers are enrolled in the rate and that the need for installation of a second meter limits participation despite customer interest.⁹⁷ Second, while not an initiative specific to transportation electrification, MP's Residential Time-of-Day ("TOD") rate offers an alternative route to discounted off-peak charging rates without requiring installation of a second meter.⁹⁸ MP is transitioning the Residential TOD rate to a default customer rate, with a phase-in process anticipated through 2027.⁹⁹ Third, MP offers two residential charging rebates to address cost barriers to home EV charging. The EV Second Service Rebate offers \$500 for costs associated with installation of the second meter required for the Residential EV tariff.¹⁰⁰ The Level 2 Smart Charger Rebate offers \$500 for the purchase of a smart charger. MP provided 25 total rebates¹⁰¹ during the last year, and the rebates can be combined for a total of \$1,000 per customer.¹⁰² MP had also previously received approval to offer a Residential EV Charging Rewards Program, allowing customers to charge throughout MP's service territory and earn rewards for off-peak charging, but the program was subsequently cancelled after the proposed vendor discontinued its service.¹⁰³ MP does not intend to propose a similar program.¹⁰⁴

⁹⁶ TEP at 9-10.⁹⁷ TEP at 10.⁹⁸ TEP at 14-15.⁹⁹ IDP at 58.¹⁰⁰ TEP at 10.¹⁰¹ TEP at 10-11.¹⁰² TEP at 15.¹⁰³ *Letter, In the Matter of the Petition for Approval of Minnesota Power's Portfolio of Electric Vehicle Programs*, Docket No. E015/M-20-638 (April 25, 2022) (eDocket No. [20224-185069-01](#)).¹⁰⁴ MP Response to Department IR 8.

MP plans to expand its residential charging offerings targeting multifamily dwellings later in 2024.¹⁰⁵ MP has not yet determined the terms of its proposal but is evaluating approaches including rebates, make ready programs, services, and potential rates and plans to solicit stakeholder input to inform its offering.¹⁰⁶

MP promotes public charging with the direct provision of public charging infrastructure and a rate targeted to facilitate public EV charging. First, MP will install and own 16 public DCFC stations throughout its territory.¹⁰⁷ The project was delayed due to issues with the original vendor, but MP anticipates completing installation of the 16 stations in 2024. Second, MP discusses its Commercial EV Charging Rate pilot for commercial and industrial customers, which is designed to address the high demand charges associated with fleet and public EV charging.¹⁰⁸ The rate provides a 30 percent cap on demand charges and foregoes demand charges during off-peak and super off-peak hours.¹⁰⁹ Nine customers with a total of 14 sites utilize the rate,¹¹⁰ which covers all but one of the DCFC stations in MP's territory.¹¹¹

MP's TEP notes that it is required to file a permanent replacement for the Commercial EV rate by January 31, 2024.¹¹² The permanent replacement is proposed as part of MP's recent rate case filing.¹¹³ The proposal in the rate case is to separate the rate into two offerings, one for commercial customers providing public charging and one for fleet customer charging, and modifies the demand charge and energy charge components of the rate.¹¹⁴

MP's TEP also outlines its public education and outreach efforts to promote EVs, EV charging, and programs available through the utility. MP promotes EV charging on its website and through public events and campaigns.¹¹⁵ It also works to increase the visibility of its managed charging programs through engagement with car dealers, electricians, equipment providers, and advocacy organizations.¹¹⁶ MP's promotional activities include attending local auto shows, EV specific events, community festivals, public meetings, and conferences.¹¹⁷ MP also has specific outreach funding for supporting fleet customers with electrification.¹¹⁸

¹⁰⁵ TEP at 8.

¹⁰⁶ MP Response to Department IR 39.

¹⁰⁷ TEP at 12.

¹⁰⁸ TEP at 11.

¹⁰⁹ *Ibid.*

¹¹⁰ *Ibid.*

¹¹¹ TEP at 13.

¹¹² TEP at 15.

¹¹³ *EV Commercial Charging Rate Pilot Compliance Filing, In the Matter of Minnesota Power's Petition for Approval of its Electric Vehicle Commercial Charging Rate Pilot*, Docket No. E015/M-19-337 (January 31, 2024) (eDocket No. [20242-202978-01](#)).

¹¹⁴ *Direct Testimony and Schedule – Leah N. Peterson, In the Matter of the Application of Minnesota Power for Authority to Increase Rates for Electric Utility Service in Minnesota*, Docket No. E015/GR-23-155 (November 1, 2023) (eDocket No. [202311-200093-03](#)). Testimony at 20-23.

¹¹⁵ TEP at 13.

¹¹⁶ TEP at 17.

¹¹⁷ TEP Table 1 at 19.

¹¹⁸ TEP at 16.

2. Statutory Criteria

As noted above, the Department analyzes MP's TEP using the public interest criteria established in Minn. Stat. § 216B.1615, Subd. 3. Subdivision 3 gives authority to the Commission to approve, modify, or reject a TEP based on an evaluation of whether the TEP's programs, investments, and expenditures "are reasonable and in the public interest, and are reasonably expected to:

- 1) improve the operation of the electric grid;
- 2) increase access to the use of electricity as a transportation fuel for all customers, including those in low- and moderate-income communities, rural communities, and communities most affected by air emissions from the transportation sector;
- 3) increase access to publicly available electric vehicle charging for all types of electric vehicles;
- 4) support the electrification of medium-duty and heavy-duty vehicles and associated charging infrastructure;
- 5) reduce statewide greenhouse gas emissions, as defined in section 216H.01, and emissions of other air pollutants that impair the environment and public health;
- 6) stimulate nonutility investment and the creation of high-quality jobs for local workers;
- 7) educate the public about the benefits of electric vehicles and related infrastructure;
- 8) be transparent and incorporate reasonable public reporting of program activities, consistent with existing technology and data capabilities, to inform program design and commission policy with respect to electric vehicles;
- 9) reasonably balance the benefits of ratepayer funded investments in transportation electrification and impacts on utility rates; and
- 10) appropriately balance the participation of public utilities and private enterprise in the market for transportation electrification and related services."¹¹⁹

Accordingly, the Department evaluates MP's TEP under each of the ten criteria established in Minn. Stat. § 216B.1615, Subd. 3.

¹¹⁹ Minn. Stat. § 216B.1615, Subd. 3. <https://www.revisor.mn.gov/statutes/cite/216B.1615#stat.216B.1615.3>

- i. *Whether the TEP's programs, investments, and expenditures are reasonably expected to "improve the operation of the electric grid." Minn. Stat. § 216B.1615, Subd. 3(1).*

The Commission's EV Inquiry Order established that transportation electrification "can further the public interest in affordable, economic electric utility service by improving utility system utilization/efficiency and placing downward pressure on utility rates through increased utility revenues and better grid utilization."¹²⁰ The Commission also established that optimized EV integration includes charging during periods of low demand and high renewable energy generation and promoting load management.¹²¹

MP's TEP describes multiple approaches to promote transportation electrification in a manner which improves the operations of the electric grid. MP promotes off-peak charging with its multiple residential off-peak rates and the Commercial EV tariff. In addition, MP requires home charging rebate recipients to utilize a time-based rate.¹²² MP also provides rebates to promote the use of smart chargers to more effectively manage the load associated with home EV charging.¹²³

The Department notes that MP customers utilizing its Residential EV tariff is relatively modest, with 27 customers enrolled,¹²⁴ compared to the 500 EVs in its service territory. MP recognizes the required installation of a second meter to utilize the Residential EV tariff presents an upfront cost barrier and limits enrollment and provides an alternative that foregoes the requirement for a second meter, its Residential Time-of-Day rate.

The Department requests that Minnesota Power discuss in reply comments its strategy to increase off-peak charging among EV owners in its service territory, including its assessment of the effectiveness of the Residential Time-of-Day rate to promote off-peak charging.

The Department appreciates MP's efforts to promote transportation electrification in a manner that improves the operation of the electric grid and believes continued focus on increasing participation in off-peak charging programs among EV owners is warranted.

¹²⁰ EV Inquiry Order at Order Point 1.a.

¹²¹ EV Inquiry Order at Order Point 3.

¹²² TEP at 17.

¹²³ IDP at 93.

¹²⁴ TEP at 10.

- ii. *Whether the TEP's programs, investments, and expenditures are reasonably expected to "increase access to the use of electricity as a transportation fuel for all customers, including those in low- and moderate-income communities, rural communities, and communities most affected by air emissions from the transportation sector." Minn. Stat. § 216B.1615, Subd. 3(2).*

As discussed above, MP's TEP describes its residential transportation electrification efforts. MP supports home EV charging with rebates to address upfront cost barriers with home charging infrastructure, as well as time-based rates to reduce operating costs for EV owners. MP identifies a significant increase to the quantity of rebates it plans to provide for home chargers. MP had identified 25 total rebates provided for the year ending April 2023,¹²⁵ yet its future spending reflects more than 100 rebates provided annually.¹²⁶

The Department requests that Minnesota Power discuss in reply comments how it plans to increase utilization of its home charger rebates.

MP also notes that it plans to rollout an offering to promote EV adoption among residents of multifamily dwellings by the end of 2024.¹²⁷ As noted above, MP is considering various approaches to address EV adoption for these customers and will work with stakeholders to inform this offering.¹²⁸ The Department supports this approach to ensure that MP's proposal is well-targeted to address the unique challenges of EV charging at multifamily dwellings and promote EV adoption among its residents.

MP's installation of DCFC stations also supports transportation electrification throughout its service territory. MP's network will improve access to EV charging stations by filling in gaps in the existing charging public charging network, including rural areas of its territory with gaps in existing infrastructure.¹²⁹ The Department concludes that MP's TEP is consistent with this criterion.

¹²⁵ TEP at 10-11.

¹²⁶ MP Response to Department IR 41.a. MP's rebate budget is \$53,042 per year, which corresponds to approximately 106 rebates provided at the maximum rebate level of \$500.

¹²⁷ TEP at 15.

¹²⁸ MP Response to Department IR 39.

¹²⁹ TEP at 12, 13.

- iii. *Whether the TEP's programs, investments, and expenditures are reasonably expected to "increase access to publicly available electric vehicle charging for all types of electric vehicles." Minn. Stat. § 216B.1615, Subd. 3(3).*

As discussed previously, MP's DCFC project represents its most significant investment in public charging infrastructure. In addition, MP notes that it previously donated 20 Level 2 chargers to expand public charging availability throughout its service territory.¹³⁰ MP also emphasizes the role of its education efforts to increase awareness of public charging among its customers.¹³¹

MP notes that it tracks the availability of state and federal funding opportunities to support public charging infrastructure in its territory and states that it "will continue to monitor charging infrastructure within its territory and evaluate if more EV infrastructure programs and offerings are needed to support current and future EV adoption."¹³² Elsewhere, MP notes both EV chargers and make-ready infrastructure as part of its assessment of EV infrastructure in its territory.¹³³ The Department encourages MP to proceed with its evaluation of how to support public charging infrastructure and consider how it can leverage publicly available funding while minimizing ratepayer investments.

The Department believes that MP's TEP is consistent with this criterion.

- iv. *Whether the TEP's programs, investments, and expenditures are reasonably expected to "support the electrification of medium-duty and heavy-duty vehicles and associated charging infrastructure." Minn. Stat. § 216B.1615, Subd. 3(4).*

MP primarily address the electrification of MD and HD EVs through its support of fleet electrification. MP's implementation timeline, provided above in Figure 4, notes its planned focus on fleet electrification moving forward. MP offers a Commercial EV tariff pilot designed to address the potential of high demand charges for fleet customers¹³⁴ and has proposed a permanent version. In addition, MP provides fleet electrification assessments to customers seeking support with understanding how electrification will impact their operations and expenses.¹³⁵ MP previously received approval to assist fleet operators with electrification with online tools and analytics and, thus far, MP has provided two assessments.¹³⁶ MP also notes its goal to transition 25% of its own MD and HD fleet to plug-in options by 2030.¹³⁷

¹³⁰ TEP at 12.

¹³¹ TEP at 13.

¹³² *Ibid.*

¹³³ TEP at 8.

¹³⁴ TEP at 11.

¹³⁵ TEP at 16.

¹³⁶ *Ibid.*

¹³⁷ *Ibid.*

As noted previously, MP estimates that currently there are 42 MD and 12 HD EVs in its service territory.¹³⁸ Due to the limited adoption, MP did not include MD and HD EVs in its base case DER forecast¹³⁹ and has limited information regarding trends in these sectors.¹⁴⁰ The Department appreciates the nascent stage of EV adoption for these sectors, but the Department finds the discussion of electric school buses noticeably absent given the sizeable federal and state funding available to promote adoption.¹⁴¹ The Department encourages MP to incorporate a discussion of electric school bus electrification into its support for fleet electrification.

Given the early stages of MD and HD EV adoption in its territory, the Department believes that MP's TEP is consistent with this criterion.

- v. *Whether the TEP's programs, investments, and expenditures are reasonably expected to "reduce statewide greenhouse gas emissions, as defined in section 216H.01, and emissions of other air pollutants that impair the environment and public health." Minn. Stat. § 216B.1615, Subd. 3(5).*

The Commission established in its EV Inquiry Order that transportation electrification can further the public interest in renewable energy use by increasing electricity demand during hours when renewable energy is most prevalent and promotes clean energy by reducing statewide greenhouse gas (GHG) and environmentally harmful emissions.¹⁴² As discussed above, MP's transportation electrification initiatives promote EV adoption for passenger vehicles through home charger rebates and reduced rates for off-peak charging.

As discussed above under the criterion established in Subd. 3(1), however, the Department identifies the need for increased utilization of off-peak charging to ensure that home EV charging is conducted in a manner expected to reduce GHG emissions. In addition, the Department notes that customers on the Residential EV tariff have not enrolled in MP's Renewable Source green tariff program.¹⁴³ Taken together, the Department encourages MP to evolve its strategy to promote EV charging that maximizes the reduction of GHG emissions.

With the overall approach to support transportation electrification described in its TEP, the Department concludes MP's TEP is consistent with this criterion.

¹³⁸ IDP at 82.

¹³⁹ IDP at 83.

¹⁴⁰ MP Response to Department IR 35.

¹⁴¹ See <https://www.epa.gov/cleanschoolbus> and <https://mn.gov/commerce/energy/consumer/energy-programs/electric-school-bus-grants.jsp>

¹⁴² EV Inquiry Order at Order Point 1.

¹⁴³ *Minnesota Power's 2022/2023 Annual Electric Vehicle Report, In the Matter of Minnesota Power's Petition for Approval of Residential Off-Peak Electric Vehicle Service Tariff; In the Matter of Minnesota Power's Petition for Approval of its Electric Vehicle Commercial Charging Rate Pilot; In the Matter of the Petition for Approval of Minnesota Power's Portfolio of Electric Vehicle Programs; In the Matter of Minnesota Power's Electric Vehicle Charging Infrastructure Investment*, Docket Nos. E015/M-15-120, M-19-337, M-20-638, M-21-257 (June 1, 2023) (eDocket No. [20236-196340-02](#)). Hereinafter "2022/2023 Annual EV Report" at 8.

- vi. *Whether the TEP's programs, investments, and expenditures are reasonably expected to "stimulate nonutility investment and the creation of high-quality jobs for local workers." Minn. Stat. § 216B.1615, Subd. 3(6).*

MP's TEP provides limited discussion of how its transportation electrification initiatives can stimulate nonutility investment and the creation of local jobs. As discussed above in response to the criterion established in Subd. 3(3), the Department noted MP's preliminary evaluation of support for public charging infrastructure in its territory, including the potential provision of make-ready infrastructure. Make-ready infrastructure support could stimulate private investment in public charging infrastructure and benefits utility ratepayers by limiting ratepayer funded investments. The Department looks forward to continued discussion from MP regarding how its programs can facilitate additional investment.

The Department also notes MP's support for home charging equipment installation with Level 2 charger rebates and off-peak charging rates. Home installation of Level 2 charger requires utilizing the services of qualified electricians, which increases the demand for electrical contractors in the area. The Department concludes that MP's TEP is consistent with this criterion.

- vii. *Whether the TEP's programs, investments, and expenditures are reasonably expected to "educate the public about the benefits of electric vehicles and related infrastructure." Minn. Stat. § 216B.1615, Subd. 3(7).*

MP discusses its educational efforts related to transportation electrification throughout its TEP. MP participates in various promotional activities throughout the community, including auto shows, EV specific events, community festivals, public meetings, and conferences.¹⁴⁴ MP raises awareness of EV charging through its website and public events and campaigns.¹⁴⁵ MP is also working with relevant parties, including dealerships, electricians, equipment providers, and advocacy organizations, to raise awareness of managed charging programs.¹⁴⁶ As described above in response to the criterion established under Subd. 3(4), MP also has dedicated outreach funding for supporting fleet customers with electrification.¹⁴⁷

MP's DCFC project also provides educational benefits by increasing the visibility of public charging stations, as MP's 16 additional stations will nearly triple the number of public DCFC stations in its service territory. Finally, MP supports the fleet electrification of the Duluth Transit Authority, providing electrified public transit to the community.¹⁴⁸ The Department concludes that MP's TEP is consistent with this criterion.

¹⁴⁴ TEP Table 1 at 19.

¹⁴⁵ TEP at 13.

¹⁴⁶ TEP at 17.

¹⁴⁷ TEP at 16.

¹⁴⁸ TEP at 11.

- viii. *Whether the TEP's programs, investments, and expenditures are reasonably expected to "be transparent and incorporate reasonable public reporting of program activities, consistent with existing technology and data capabilities, to inform program design and commission policy with respect to electric vehicles." Minn. Stat. § 216B.1615, Subd. 3(8).*

MP's TEP provides limited information regarding the public reporting of its program activities, as the corresponding dockets include the requisite reporting.¹⁴⁹ MP also files an annual EV report to comply with the reporting requirements for each of its existing offerings, including its Residential EV tariff, Commercial EV tariff, charging rebates, and its DCFC project.¹⁵⁰ Through its reporting requirements in its EV-related dockets and annual EV reports, MP provides reasonable public reporting of its program activities. Accordingly, the Department concludes that MP's TEP is consistent with this criterion.

- ix. *Whether the TEP's programs, investments, and expenditures are reasonably expected to "reasonably balance the benefits of ratepayer funded investments in transportation electrification and impacts on utility rates." Minn. Stat. § 216B.1615, Subd. 3(9).*

MP's TEP presented limited information regarding its total spending on transportation electrification initiatives. MP provided its historical spending in TEP Table 2, in compliance with IDP Filing Requirement 3.F.10,¹⁵¹ and its spending for the upcoming five years in compliance with IDP Filing Requirement 3.F.11.¹⁵² The Department provides MP's tables here, for clarity.

Department Table 8: Transportation Electrification Historical Spending

Budget Category	Capital	O&M	Marketing & Communications	Other*
Customer Programs			\$10,808.24	\$524,089.98

*Other expenses include rebate incentives and labor

Source: TEP Table 2 at 20.

Department Table 9: Transportation Electrification Five-Year Future Spending

Budget Category	Capital	O&M	Marketing & Communications	Other*
Distribution	\$2,602,161.00	\$549,838		
Customer Programs			\$275,000.00	\$1,424,724.00

*Other expenses include rebate incentives and labor.

Source: TEP at 21.

¹⁴⁹ TEP at 20.

¹⁵⁰ 2022/2023 Annual EV Report.

¹⁵¹ TEP Table 2 at 20.

¹⁵² TEP at 21. The Department notes that MP did not label the table in its TEP.

While the combined spending tables provide insight into the totality of MP's transportation electrification initiatives, the absence of budgetary information for specific initiatives elsewhere in the TEP limits insight into how ratepayer-funded investments are addressing transportation electrification holistically in MP's service territory. For example, as shown above in Department Table 8, the spending category "Other" represents nearly all of MP's historical spending. The Department requested additional detail in information requests to differentiate the identified spending between rebates and labor costs. The Department provides MP's response here in Table 10:

Department Table 10: Transportation Electrification Historical Spending Detail

Budget Category	2019	2020	2021	2022	2023	Total
Labor & Overhead	\$9,563	\$41,810	\$81,632	\$93,079	\$79,360	\$305,444
Program Expenses¹	\$97,897	\$10,904	\$79,117	\$24,685	\$16,853	\$229,456
Total	\$107,460	\$52,713	\$160,749	\$117,764	\$96,213	\$534,900

1 Program expenses include all non-labor expenses (rebates, expenses, materials, etc.).

Source: MP response to Department IR 40.b.

MP also identified a total of \$20,988 for its Level 2 Smart Charger and Second Service rebates,¹⁵³ which are included in the line item for Program Expenses in Table 10.

Similarly for MP's future spending on transportation electrification initiatives, the Department sought additional detail to understand the spending above in Table 9. MP provided further granularity of its future spending, which the Department presents here as Table 11.

¹⁵³ MP Response to Department IR 40.C.

Department Table 11: Transportation Electrification Future Spending Detail

Budget Category	2024	2025	2026	2027	2028	Total
Capital	\$2,602,161					\$2,602,161
O&M¹	\$109,968	\$109,968	\$109,968	\$109,968	\$109,968	\$549,840
Rebates	\$53,042	\$53,042	\$53,042	\$53,042	\$53,042	\$265,210
Education & Outreach	\$55,000	\$55,000	\$55,000	\$55,000	\$55,000	\$275,000
Labor	\$218,400	\$224,952	\$231,701	\$238,652	\$245,811	\$1,159,516
Total	\$3,038,571	\$442,962	\$449,711	\$456,662	\$463,821	\$4,851,727

1 Anticipated O&M expenses for the DCFC project were evenly distributed over 5 years for purposes of this table.

Source: MP Response to Department IR 41.A.

MP further clarified that the entirety of its spending on capital and O&M relates to its DCFC project.¹⁵⁴

The Department appreciates MP providing additional detail on its historical and future spending to provide valuable insight into its transportation electrification initiatives. With the exception of MP's DCFC project, spending overall remains relatively modest during the five-year forecast period. However, the Department notes increased spending from historical levels in the categories of rebates, education and outreach, and labor. As noted above in the Department's discussion of Minn. Stat. § 216B.1615, Subd. 3(2), the Department requests MP discuss its strategy to increase uptake of rebates for home charging. Similarly, the Department is interested in hearing from MP how its additional spending for labor costs will serve its transportation electrification initiatives.

The Department requests that Minnesota Power discuss in reply comments how its planned increased spending for labor costs will be utilized to further transportation electrification.

MP also makes efforts to ensure that ratepayer funded investments in transportation electrification provide ratepayer benefits. As an example, MP notes that home charging rebate recipients must enroll in a time-based rate, incentivizing off-peak charging and the associated grid benefits.¹⁵⁵ Along with the relatively modest overall spending on its transportation electrification initiatives, the Department concludes that MP's TEP is consistent with the criterion established under Subd. 3(9).

¹⁵⁴ MP Response to Department IR 41.B.

¹⁵⁵ TEP at 17.

- x. *Whether the TEP's programs, investments, and expenditures are reasonably expected to "appropriately balance the participation of public utilities and private enterprise in the market for transportation electrification and related services." Minn. Stat. § 216B.1615, Subd. 3(10).*

This statutory criterion primarily implicates public charging infrastructure, with the risks associated with investor-owned utility investments in this market, up to and including utility ownership of EV charging stations. As discussed previously, MP is currently proceeding with the installation of 16 DCFC stations that it will own and that will be completed in 2024. To ensure MP's participation in the competitive charging market does not negatively impact the participation of private providers, the Commission ordered MP discuss possible divestment strategies for its charging stations in subsequent TEP filings.¹⁵⁶ In its TEP, MP provides a limited discussion of its possible divestment options due to the ongoing status of the pilot and the still pending charger installations.¹⁵⁷ MP states it "will investigate any and all possible divestment strategies at the conclusion of this pilot, including the sale of EV charging infrastructure to site hosts or third-party charging companies."¹⁵⁸ As the Department discussed above in response to the criterion established under Subd. 3(3), MP notes it will continue to evaluate its support for charging infrastructure. The Department looks forward to a more robust discussion from MP in the future regarding how its transportation electrification efforts can support charging infrastructure and appropriately balance its participation with that of the private sector, including its potential divestment strategy for its DCFC stations. The Department believes that MP's TEP is consistent with this criterion.

In totality using the criteria established in Minn. Stat. § 216B.1615, Subd. 3, as a preliminary matter the Department finds that MP's TEP is reasonable and in the public interest. However, the Department will make a final recommendation regarding whether the Commission should approve, modify, or reject MP's TEP after reviewing party and MP reply comments.

J. *OTHER TEP TOPICS*

NOTICE TOPIC 10: HOW SHOULD THE COMMISSION CONSIDER MODIFICATIONS OR SUPPLEMENTS TO MINNESOTA POWER'S TRANSPORTATION ELECTRIFICATION PLAN?

The Department does not make any recommendations at this time.

NOTICE TOPIC 11: SHOULD THE COMMISSION ESTABLISH ANY PROCEDURAL OR FILING REQUIREMENTS FOR FUTURE TEPs UNDER MINN. STAT. 216B.1615?

The Department does not make any recommendations at this time.

¹⁵⁶ IDP Filing Requirement 3.F.5.

¹⁵⁷ TEP at 17.

¹⁵⁸ *Ibid.*

NOTICE TOPIC 12: ARE THERE GAPS IN MINNESOTA POWER'S TRANSPORTATION ELECTRIFICATION PROGRAMS THE COMMISSION SHOULD ADDRESS TO ENSURE EQUITABLE CUSTOMER OUTCOMES?

The Department does not make any recommendations at this time.

NOTICE TOPIC 13: ARE THERE OTHER ISSUES OR CONCERNS RELATED TO THIS MATTER?

The Department has no other concerns related to this matter.

IV. RECOMMENDATIONS

The Department appreciates the opportunity to comment on MP's 2023 IDP and TEP and looks forward to the review of other stakeholder comments. The Department requests that MP provide the following information:

- *The Department requests MP to present an NWA process, which includes the project screening process, the NWA analysis scope of work, cost estimation, and the Engineering, Procurement, and Construction (EPC) process, timeline and goals in its next IDP.*
- *The Department requests that MP include calculated benefits for all Minnesota Test Cases, and to the extent practicable, present the results in reply comments.*
- *The Department requests that MP recalculate its BCA benefits starting with an "Avoided Capital Cost" benefit at the beginning of the BCA period of analysis and present the results in reply comments.*
- *The Department requests MP to present the full BCA for each NWA project studied by Black & Veatch in reply comments.*
- *The Department requests that MP discuss in reply comments planned 2023 to 2027 budget allocations for the Kerrick, Wrenshall, Silver Bay, and Cloquet NWA projects, including any budget dedicated to NWA solutions.*
- *The Department requests that MP present in reply comments additional information about its FLISR program, which includes a discussion of the cost recovery mechanism, an analysis of alternative investments, a discussion of customer anticipated benefits, a discussion to manage bill impacts, a presentation of the impact to the net present value of system costs, and a cost-benefit analysis, if available.*
- *The Department requests that MP present in reply comments additional information about its Smart Sensor program, which includes a discussion of the cost recovery mechanism, an analysis of alternative investments, a discussion of customer anticipated benefits, a discussion*

to manage bill impacts, a presentation of the impact to the net present value of system costs, and a cost-benefit analysis, if available.

- ***The Department requests that MP present in reply comments additional information about its OMS and GIS programs, which includes a discussion of the proposed budget, deployment plan, cost recovery mechanism, an analysis of alternative investments, a discussion of customer anticipated benefits, a discussion to manage bill impacts, a presentation of the impact to the net present value of system costs, and a cost-benefit analysis, if available.***
- ***The Department requests MP to provide in reply comments a status update of any plans and budgets to deploy its EMS upgrade, a DERMS, or ADMS in its 2023 to 2027 budget.***
- ***The Department requests that MP include in reply comments a description of how its distribution system planning will evolve with the incorporation of additional impacts from the IRA.***
- ***The Department requests that MP provide data on the fraction of its customers that rely on the primary heating sources of natural gas, electric resistance heat, or all other heat sources.***
- ***The Department requests feedback from MP and other parties on how to schedule the IDP filing to better integrate the IDP's inputs and outputs with other Commission proceedings in reply comments.***
- ***The Department requests that Minnesota Power discuss in reply comments its strategy to increase off-peak charging among EV owners in its service territory, including its assessment of the effectiveness of the Residential Time-of-Day rate to promote off-peak charging.***
- ***The Department requests that Minnesota Power discuss in reply comments how it plans to increase utilization of its home charger rebates.***
- ***The Department requests that Minnesota Power discuss in reply comments how its planned increased spending for labor costs will be utilized to further transportation electrification.***

The Department makes the following initial recommendations:

- ***The Department recommends that the Commission require MP to consider demand response, energy efficiency, and renewable generation as part of its future NWA process in its next IDP.***
- ***The Department recommends that MP calculate future NWA ratepayer disbenefit categories based on the ratepayer cost of outages rather than in the calculated categories of "Compliance Risk," "Power Quality Consequences," and "Improved Customer Satisfaction."***

- ***The Department recommends the Commission order MP to file a supplemental filing that proposes a plan to accelerate beneficial electrification for its customers, including a discussion of how to incentivize dual fuel adoption, and provide forecasts of expected grid impacts of the same.***
- ***The Department recommends the Commission direct MP to develop a suite of metrics to track resiliency, including SAIDI and SAIFI, MEDs, and other metrics to the extent warranted.***

V. GLOSSARY

ADMS	Advanced Distribution Management System	ICE	Interruption Cost Estimate
AMI	Advanced Metering Infrastructure	IDP	Integrated Distribution Plan
AMR	Automated Meter Reading	IRA	Inflation Reduction Act
ASHP	Air Source Heat Pump	IRP	Integrated Resource Plan
BCA	Benefit-Cost Analysis	kW/kWh	Kilowatt/Kilowatt-Hour
BCR	Benefit-Cost Ratio	MAIFI	Momentary Average Interruption Frequency Index
C2M	Customer to Meter	MD	Medium Duty
CAIDI	Customer Average Interruption Duration Index	MDM	Meter Data Management System
CIS	Customer Information System	MED	Major Event Day
COP	Coefficient of Performance	Minn. Stat.	Minnesota Statute
DCFC	Direct Current Fast Charger	MMBtu	Million British Thermal Units
DER	Distributed Energy Resources	MW/MWh	Megawatt/Megawatt-Hour
DERMS	Distributed Energy Resource Management System	NPV	Net Present Value
DG	Distributed Generation	NWA	Non-Wires Alternative
DMS	Distribution Management System	O&M	Operations and Maintenance
ECO/CIP	Energy Conservation and Optimization/Conservation Improvement Program	OMS	Outage Management System
EMS	Energy Management System	PW	Present Worth
EPC	Engineering, Procurement, and Construction	SAIDI	System Average Interruption Duration Index
EV	Electric Vehicle	SAIFI	System Average Interruption Frequency Index
FAN	Field Area Network	SCADA	Supervisory Control and Data Acquisition
FLISR	Fault Location, Isolation, and Service Restoration	SRSQ	Safety, Reliability, & Service Quality
GHG	Greenhouse Gas	TEP	Transportation Electrification Plan
GIS	Geographic Information System	TOD	Time of Day
HD	Heavy Duty	TOU	Time of Use

Filing Requirement	Heading	Description	Filing Section	Comments
3.A.1	Baseline Distribution System Data	Modeling software currently used and planned software deployments	1.E, 2.C, 2.D, 2.G, 4.A, 4.B	Addressed
3.A.2	Baseline Distribution System Data	Percentage of substations and feeders with monitoring and control capabilities, planned additions	2.G	Addressed
3.A.3	Baseline Distribution System Data	A summary of existing system visibility and measurement (feeder-level and time interval) and planned visibility improvements; include information on percentage of system with each level of visibility (ex. max/min, daytime/nighttime, monthly/daily reads, automated/manual)	2.G	Addressed
3.A.4	Baseline Distribution System Data	Number of customer meters with AMI/smart meters and those without, planned AMI investments, and overview of functionality available	2.G	Addressed
3.A.5	Baseline Distribution System Data	Discussion of how the distribution system planning is coordinated with the integrated resource plan (including how it informs and is informed by the IRP), and planned modifications or planned changes to the existing process to improve coordination and integration between the two plans	1.B.1, 3.B, 4.C	Addressed
3.A.6	Baseline Distribution System Data	Discussion of how DER is considered in load forecasting and any expected changes in load forecasting methodology	4.C	Addressed
3.A.7	Baseline Distribution System Data	Discussion if and how IEEE Std. 1547-2018 5 impacts distribution system planning considerations (e.g. opportunities and constraints related to interoperability and advanced inverter functionality). IEEE Standard 1547-2018, published April 6, 2018.	4.C.6	Addressed
3.A.8	Baseline Distribution System Data	Distribution system annual loss percentage for the prior year (average of 12 monthly loss percentages)	Appendix D, 1.C	Addressed
3.A.9	Baseline Distribution System Data	The maximum hourly coincident load (kW) for the distribution system as measured at the interface between the transmission and distribution system. This may be calculated using SCADA data or interval metered data or other non-billing metering / monitoring systems	4.D	Addressed
3.A.10	Baseline Distribution System Data	Total distribution substation capacity in kVA	Appendix C	Addressed
3.A.11	Baseline Distribution System Data	Total distribution transformer capacity in kVA, if different from total distribution substation capacity and the reason for the difference	Appendix C	Addressed
3.A.12	Baseline Distribution System Data	Total miles of overhead distribution wire	3.A.4	Addressed
3.A.13	Baseline Distribution System Data	Total miles of underground distribution wire	3.A.4	Addressed
3.A.14	Baseline Distribution System Data	Total number of distribution customers	1.B	Addressed
3.A.15	Baseline Distribution System Data	Total costs spent on DER generation installation in the prior year. These costs should be broken down by category (including application review, responding to inquiries, metering, testing, make ready, etc)	2.A	Addressed
3.A.16	Baseline Distribution System Data	Total charges to customers/member installers for DER generation installations, in the prior year. These costs should be broken down by category in which they were incurred (including application, fees, metering, make ready, etc.)	2.A	Addressed
3.A.17	Baseline Distribution System Data	Total nameplate kW of DER generation system which completed interconnection to the system in the prior year, broken down by DER technology type (e.g. solar, combined solar/storage, storage, etc.)	2.A	Addressed
3.A.18	Baseline Distribution System Data	Total number of DER generation systems which completed interconnection to the system in the prior year, broken down by DER technology type (e.g. solar, combined solar/storage, storage, etc.)	2.A	Addressed
3.A.19	Baseline Distribution System Data	Total number and nameplate kW of existing DER systems interconnected to the distribution grid as of time of filing, broken down by DER technology type (e.g. solar, combined solar/storage, storage, etc.)	2.A.1, Figure 7	Addressed
3.A.20	Baseline Distribution System Data	Total number and nameplate kW of queued DER systems as of time of filing, broken down by DER technology type (e.g. solar, combined solar/storage, storage, etc.)	Appendix C	Addressed
3.A.21	Baseline Distribution System Data	Total number of electric vehicles in service territory, by type where possible (e.g. light duty, transit, medium duty, heavy duty). In the Matter of a Commission Inquiry into Electric Vehicle Charging and Infrastructure, Docket No. E-999/Ci-17-879, Order Accepting Filings and Establishing Requirements for Additional Filings (December 12, 2019), Ordering Para. 8.a. In the Matter of a Commission Inquiry into Electric Vehicle Charging and Infrastructure, Docket No. E-999/Ci-17-879, Order Accepting Filings and Establishing Requirements for Additional Filings (December 12, 2019), Ordering Para. 8.a.	2.A.3, Appendix E	Addressed
3.A.22	Baseline Distribution System Data	Total number and capacity of public access electric vehicle charging stations, broken out by: a. Number and capacity of known public access Level 2 Charging Stations b. Number and capacity of Level 2 Charging Stations enrolled in a utility program, broken out by program c. Number and capacity of known public access direct current fast charging (DCFC) stations d. Number and capacity of DCFC installed through a utility EV program, broken out by program e. All other known EV charging stations (by type, ex DCFC, Level 2). December 12, 2019 Order (17-879), Ordering Para. 8.e 8 December 12, 2019 Order (17-879), Ordering Para. 8.e 9 December 12, 2019 Order (17-879), Ordering Para. 8.f 10 December 12, 2019 Order (17-879), Ordering Para. 8.f	2.A, Appendix E	Addressed
3.A.23	Baseline Distribution System Data	Number of units and MW/MWh ratings of battery storage	2.B.3, Figure 7, 3.A.5, 4.B.5	Addressed
3.A.24	Baseline Distribution System Data	MWh saving and peak demand reductions from EE program spending in previous year	2, Table 1	Addressed
3.A.25	Baseline Distribution System Data	Amount of controllable demand (in both MW and as a percentage of system peak)	2.A.2	Addressed

Filing Requirement	Heading	Description	Filing Section	Comments
3.A.26	Baseline Distribution Financial Data	Historical distribution system spending for the past 5-years, in each category: a. Age-Related Replacements and Asset Renewal b. System Expansion or Upgrades for Capacity c. System Expansion or Upgrades for Reliability and Power Quality d. New Customer Projects and New Revenue e. Grid Modernization and Pilot Projects f. Projects related to local (or other) government-requirements g. Metering h. Other i. Electric Vehicle Programs 1) Capital Costs 2) O&M Costs 3) Marketing and Communications 4) Other (provide explanation of what is in "other") In the Matter of a Commission Inquiry into Electric Vehicle Charging and Infrastructure, Docket No. E-999/CI-17- 879, Order Accepting 2020 Transportation Electrification Plans, Adopting Additional Informational Requirements, and Establishing Biennial Filing Requirement (April 16, 2021), Ordering Para. 3.a.	2, Table 2, Figure 6	Addressed
3.A.27	Baseline Distribution Financial Data	All non-Minnesota Power investments in distribution system upgrades (e.g. those required as a condition of interconnection) by subset (e.g. CSG, customer-sited, PPA, and other) and location (i.e. feeder or substation).	2.A.4	Addressed
3.A.28	Baseline Distribution Financial Data	Projected distribution system spending for 5-years into the future for the categories listed above, itemizing any non-traditional distribution projects	2.E, Figure 9, Table 5	Addressed
3.A.29	Baseline Distribution Financial Data	Planned distribution capital projects, including drivers for the project, timeline for improvement, and summary of anticipated changes in historic spending. Driver categories should include: a. Age-Related Replacements and Asset Renewal b. System Expansion or Upgrades for Capacity c. System Expansion or Upgrades for Reliability and Power Quality d. New Customer Projects and New Revenue e. Grid Modernization and Pilot Projects f. Projects related to local (or other) government-requirements g. Metering h. Other i. Electric Vehicle Programs 12 1) Capital Costs 2) O&M Costs 3) Marketing and Communications 4) Other (provide explanation of what is in "other"). April 16, 2021 Order (17-879), Ordering Para. 3.a.	2.G	Addressed
3.A.30	Baseline Distribution Financial Data	Provide any available cost benefit analysis in which the company evaluated a non traditional distribution system solution to either a capital or operating upgrade or replacement	3.C	Addressed
3.A.31	Baseline Distribution Data (DER Deployment)	Current DER deployment by type, size, and geographic dispersion (as useful for planning purposes; such as, by planning areas, service/work center areas, cities, etc.)	2.A.1, 4.C.6	Addressed
3.A.32	Baseline Distribution Data (DER Deployment)	Information on areas of existing or forecasted high DER penetration. Include definition and rationale for what the Company considers "high" DER penetration.	4.C	Addressed
3.A.33	Baseline Distribution Data (DER Deployment)	Information on areas with existing or forecasted abnormal voltage or frequency issues that may benefit from the utilization of advanced inverter technology; provide information describing experiences where DER installations have caused operational challenges: such as, power quality, voltage or system overload issues.	4.E.2	Addressed
3.A.34	Baseline Distribution Data (Electric Vehicles)	Electric Vehicles: A summary table with the following information for each Electric Vehicle (EV) rate offering or program during the reporting period: a. Number of customers and/or vehicles enrolled at the end of the reporting period b. Energy consumed (MWh) during the reporting period c. Peak demand (MW) during the reporting period and the time at which it occurred. December 12, 2019 Order (17-879), Ordering Para. 8b, 8c, and 8d	App E	Addressed
3.A.35	Baseline Distribution Data (Electric Vehicles)	Electric Vehicles: 35. Any system upgrades performed to accommodate EV charging, total costs paid by utility and by customer, and average cost per upgrade. Cost should be reported separately for the following customer groups: Residential, Government Fleet, Private Fleet, Public Charging, Other (specify). December 12, 2019 Order (17-879), Ordering Para. 8g; April 16, 2021 Order (17-879), Ordering Para. 3.b.	2.A.3, App E	Addressed

Filing Requirement	Heading	Description	Filing Section	Comments
3.B.1	Preliminary Hosting Capacity Data	Provide an excel spreadsheet (or other equivalent format) by feeder of either daytime minimum load (daily, if available) or, if daytime minimum load is not available, peak load (time granularity should be specified)	4.D, App H	Appendix H contains proposal process.
3.C.1	Distributed Energy Resource Scenario Analysis	In order to understand the potential impacts of faster-than-anticipated DER adoption, define and develop conceptual base-case, medium, and high scenarios regarding increased DER deployment on the distribution system. Scenarios should reflect a reasonable mix of individual DER adoption and aggregated or bundled DER service types, dispersed geographically across the Minnesota Power distribution system in the locations Minnesota Power would reasonably anticipate seeing DER growth take place first. For electric vehicle forecasts scenarios, Minnesota Power shall provide base-case, medium, and high adoption, capacity, and energy forecasts by sector (light duty, medium duty, and heavy duty). December 12, 2019 Order (17-879), Ordering Para. 8h and 8i.	4.C	Addressed
3.C.2	Distributed Energy Resource Scenario Analysis	Include information on methodologies used to develop the low, medium, and high scenarios, including the DER adoption rates (if different from the minimum 10% and 25% levels), geographic deployment assumptions, expected DER load profiles (for both individual and bundled installations), and any other relevant assumptions factored into the scenario discussion. Indicate whether or not these methodologies and inputs are consistent with Integrated Resource Plan inputs.	4.C	Addressed
3.C.3	Distributed Energy Resource Scenario Analysis	Provide a discussion of the processes and tools that would be necessary to accommodate the specified levels of DER integration, including whether existing processes and tools would be sufficient. Provide a discussion of the system impacts and benefits that may arise from increased DER adoption, potential barriers to DER integration, and the types of system upgrades that may be necessary to accommodate the DER at the listed penetration levels.	4.C.5	Addressed
3.C.4	Distributed Energy Resource Scenario Analysis	Include information on anticipated impacts from FERC Order 84116 (Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators) and a discussion of potential impacts from the related FERC Docket RM18-9-000 (Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators). Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, 162 FERC ¶61,127 (February 28, 2018) 17 Modified by September 9, 2020 Order (19-693), Ordering Para.	4.E.4	Addressed
3.D.1	Long-Term Distribution System Modernization and Infrastructure Investment Plan	distribution system developments and investments in grid modernization based on internal business plans and considering the insights gained from the DER futures scenarios, hosting capacity/daytime minimum load data, and non-wires alternatives analysis. The 5-year Action Plan should include a detailed discussion of the underlying assumptions (including load growth assumptions) and the costs of distribution system investments planned for the next 5-years (topics and categories listed above). Minnesota Power should include specifics of the 5-year Action Plan investments. Topics that should be discussed, as appropriate, include at a minimum: a. Overview of investment plan: scope, timing, and cost recovery mechanism. b. Grid Architecture: Description of steps planned to modernize the utility's grid and tools to help understand the complex interactions that exist in the present and possible future grid scenarios and what utility and customer benefits that could or will arise. c. Alternatives analysis of investment proposal: objectives intended with a project, general grid modernization investments considered, alternative cost and functionality analysis (both for the utility and the customer), implementation order options, and considerations made in pursuit of short-term investments. The analysis should be sufficient enough to justify and explain the investment. d. System interoperability and communications strategy e. Costs and plans associated with obtaining system data (EE load shapes, photovoltaic output profiles with and without battery storage, capacity impacts of demand response combined with EE, EV charging profiles, etc.) f. Interplay of investment with other utility programs (effects on existing utility programs such as demand response, efficiency projects, etc.) g. Customer anticipated benefit and cost h. Customer data and grid data management plan (how it is planned to be used and/or shared with customers and/or third parties) i. Plans to manage rate or bill impacts, if any j. Impacts to net present value of system costs (in net present value revenue requirements/megawatt/hour or megawatt)	2.E	See Department Comments Section III.C.4
3.D.2	Long-Term Distribution System Modernization and Infrastructure Investment Plan	In addition to the 5-year Action Plan, Minnesota Power shall provide a discussion of its vision for the planning, development, and use of the distribution system over the next 10 years. The 10- year Long-Term Plan discussion should address long-term assumptions (including load growth assumptions), the long-term impact of the 5-year Action Plan investments, what changes are necessary to incorporate DER into future planning processes based on the DER futures analysis, and any other types of changes that may need to take place in the tools and processes Minnesota Power is currently using.	1.A-D	Addressed
3.E.1	Non-Wires (Non-Traditional) Alternatives Analysis	Minnesota Power shall provide a detailed discussion of all distribution system projects in the filing year and the subsequent five years that are anticipated to have a total cost of greater than two million dollars. For any forthcoming project or project in the filing year, which cost two million dollars or more, provide an analysis on how non-wires alternatives compare in terms of viability, price, and long-term value.	2.F, Table 4	Addressed
3.E.2	Non-Wires (Non-Traditional) Alternatives Analysis	Minnesota Power shall provide information on the following: a. Project types that would lend themselves to non-traditional solutions (i.e. load relief or reliability) b. A timeline that is needed to consider alternatives to any project types that would lend themselves to non-traditional solutions (allowing time for potential request for proposal, response, review, contracting and implementation) c. Cost threshold of any project type that would need to be met to have a non traditional solution reviewed d. A discussion of a proposed screening process to be used internally to determine that non-traditional alternatives are considered prior to distribution system investments are made.	3.B-C	See Department Comments Section III.B

Filing Requirement	Heading	Description	Filing Section	Comments
3.F.1	Transportation Electrification Plan	Minnesota Power shall provide a summary of the utility's ongoing transportation electrification efforts, including existing programs and projects in development over at least the next 2 years. December 12, 2019 Order (17-879), Ordering Para. 8j.	App. E, Section III.1	Addressed
3.F.2	Transportation Electrification Plan	Minnesota Power shall provide a discussion of how it plans to facilitate: a. availability and awareness of public charging infrastructure, including an assessment of the private sector fast charging marketplace for the utility's service territory; b. availability of residential charging options for both single family and multiple unit dwellings; c. programs or tariffs in development to address flexible load or reduce metering and data costs; and d. fleet electrification. December 12, 2019 Order (17-879), Ordering Para. 8k.	App. E, Section III.2.a-2.d	Addressed
3.F.3	Transportation Electrification Plan	Minnesota Power shall provide a discussion of how it plans to optimize EV benefits, including a discussion of how to align charging with periods of lower customer demand and higher renewable energy production and by improving grid management and overall system utilization/efficiency. December 12, 2019 Order (17-879), Ordering Para. 8m.	App. E, Section III.3	Addressed
3.F.4	Transportation Electrification Plan	Minnesota Power shall include a discussion of how it plans to encourage more customers with electric vehicles to participate in managed charging. In the Matter of a Commission Inquiry into Electric Vehicle Charging and Infrastructure, Docket No. E-999/Ci-17- 879, Order Accepting 2021 Transportation Electrification Plans and Adopting Additional Informational Requirements (May 17, 2022), Ordering Para. 4.	App. E, Section III.4	Addressed
3.F.5	Transportation Electrification Plan	Minnesota Power shall provide a discussion that addresses divestment issues and identifies possible divestment strategies for its DCFC Network approved in Docket 21-257 at the conclusion of the pilot program. In the Matter of Minnesota Power's Electric Vehicle Charging Infrastructure Investment, Docket No. E-015/M-21-257, Order Approving Proposal as Modified, Authorizing Deferred Accounting, and Requiring Reporting (October 22, 2021), Ordering Para. 4.	App. E, Section III.5	Addressed
3.F.6	Transportation Electrification Plan	Minnesota Power shall provide evaluations of non-pilot EV programs that examine the cost effectiveness of the programs as currently designed and potential changes that could improve their cost-effectiveness. In the Matter of a Commission Inquiry into Electric Vehicle Charging and Infrastructure, Docket No. E-999/Ci-17- 879, Order Accepting 2020 Transportation Electrification Plans, Adopting Additional Informational Requirements, and Establishing Biennial Filing Requirement (Apr 16, 2021), Ordering Para. 3.c.	App. E, Section III.6	Addressed
3.F.7	Transportation Electrification Plan	Minnesota Power shall provide a summary of customer EV education initiatives. The Company does not need to provide specific examples of outreach materials. December 12, 2019 Order (17-879), Ordering Para. 8l.	App. E, Section III.7	Addressed
3.F.8	Transportation Electrification Plan	Minnesota Powershall provide summaries of any proposals or pilots, including links to full reports, submitted to other regulatory agencies or jurisdictions (for example, proposals submitted under Conservation Improvement Programs or pilots run in other states). December 12, 2019 Order (17-879), Ordering Para. 8n.	App. E, Section III.8	Addressed
3.F.9	Transportation Electrification Plan	Minnesota Power shall provide attachments or links to the most recent reports for any ongoing EV pilots or programs. December 12, 2019 Order (17-879), Ordering Para. 8o.	App. E, Section III.9	Addressed
3.F.10	Transportation Electrification Plan	Minnesota Power shall provide historical spending for the past 5-years on all transportation electrification initiatives, broken down across the sections of its budget. Budget sections: Budget Category (ex, distribution, IT, transmission, etc.); Capital; O&M; Marketing and Communications; Other (provide explanation of what is in "other")	App. E, Section III.10	Addressed
3.F.11	Transportation Electrification Plan	Minnesota Power shall provide future spending for the next 5-years on all transportation electrification initiatives, broken down across the sections of its budget. Budget sections: Budget Category (ex, distribution, IT, transmission, etc.); Capital; O&M; Marketing and Communications; Other (provide explanation of what is in "other")	App. E, Section III.11	Addressed
January 9, 2023 Order (E015/RP-21-33)	Order Point 9	In its next Integrated Distribution Plan (IDP), Minnesota Power must provide information on how it could implement the following steps to better align distribution and resource planning: a. Set the forecasts for distributed energy resources consistently in its resource plan and its IDP. b. Conduct advanced forecasting to better project the levels of distributed energy resource deployment at a feeder level. c. Proactively plan investments in hosting capacity and other necessary system capacity to allow distributed generation and electric vehicle additions consistent with the forecast for distributed energy resources. d. Improve non-wires alternatives analysis, including market solicitations for deferral opportunities to make sure Minnesota Power can take advantage of distributed energy resources to address discrete distribution system costs. e. Plan for aggregated distributed energy resources to provide system value including energy/capacity during peak hours.	1.C, 3.B, 3.C	See Department Comments Section III.B & III.E
January 9, 2023 Order (E015/RP-21-33)	Order Point 13	Minnesota Power must file the results from its consultant led non-wires alternative study in the next IDP docket. In next IDP, Minnesota Power will begin a discussion on how to integrate NWS into all the company's planning practices, including its next IRP and IDP.	3.C, App. F	See Department Comments Section III.B
September 12, 2023 Order (E,G999/Ci-22-624)	Order Point 1: IRA Impacts	The utilities shall maximize the benefits of the Inflation Reduction Act in [...] integrated distribution plans [...]. In such filings, utilities shall discuss how they plan to capture and maximize the benefits from the Act, and how the Act has impacted planning assumptions including (but not limited to) the predicted cost of assets and projects and the adoption rates of electric vehicles, distributed energy resources, and other electrification measures.		See Department Comments Section III.G



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

SEND RESPONSE VIA EMAIL TO: Utility.Discovery@state.mn.us as well as the assigned analyst(s).

Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

Each response must be submitted as a text searchable PDF, unless otherwise directed. Please include the docket number, request number, and respondent name and title on the answers. If your response contains Trade Secret data, please include a public copy.

Request Number: 1
Topic: Information Requests
Reference(s): 2023 IDP

Request:

Please provide the Department a copy of MP's past, present, and future responses to other parties' information requests in this proceeding.

Response:

As of March 19, 2024, Minnesota Power has received only one information request pertaining to Docket No. E015/M-23-258 from the Minnesota Office of the Attorney General ("OAG").

The OAG's information request of December 4, 2023 was also a request that Minnesota Power provide responses to all other parties' information requests.

Minnesota Power will provide responses to any future party's formal or informal information requests to the Department of Commerce, and likewise will provide copies of its responses to the Department of Commerce's March 12, 2024 Information Requests 001-045 to the OAG as per their request.

To be completed by responder

Response Date: 3/22/2024

Response by: Jess McCullough – Policy Advisor II

Email Address: jmccullough@mnpower.com

Phone Number: 218-355-3178



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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Request Number: 2
Topic: Information Requests
Reference(s): 2023 IDP

Request:

Please provide all underlying working files used to create the figures and tables provided in MP's 2023 IDP main report and Appendix E, Transportation Electrification Plan.

Where applicable, for any and all parts above, please provide the requested data in a Microsoft Excel executable format with all links and formulae intact. If any of these links target an outside file, please provide all such additional files.

Response:

The underlying working files for all relevant figures and tables from Minnesota Power's 2023 IDP and Transportation Electrification Plan are included in the accompanying spreadsheets. Please note that some figures and tables are derived from the same dataset, and such datasets are duplicated across those respective attachments. Some figures, such as maps of Minnesota Power's service territory and other non-calculated figures are not included. The accompanying spreadsheets are listed below.

IDP	Title	File Name
Figure 2	Minnesota Power's Customer Concentration Is Unique	DOC IR 002.01 Attach
Figure 6	Historical Distribution System Spending by Category	DOC IR 002.03 Attach
Figure 7	Current DER Systems	DOC IR 002.04 Attach
Figure 9	Minnesota Power Incentivized DG Installations vs. No Incentive	DOC IR 002.05 Attach

To be completed by responder

Response Date: 3/22/2024

Response by: Jess McCullough – Public Policy Advisor II

Email Address: jmccullough@mnpower.com

Phone Number: 218-355-3178



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Figure 10	Five Year Future Investments by Category	DOC IR 002.06 Attach
Figure 14	Historical vs. Future Spending	DOC IR 002.07 Attach
Figure 15	Distributed Solar Generation (MWh)	DOC IR 002.08 Attach
Figure 16	Distributed Solar Generation (Summer Peak)	DOC IR 002.09 Attach
Figure 17	Base Case EV Saturation	DOC IR 002.10 Attach
Figure 18	TOD Participation by Scenario	DOC IR 002.11 Attach
Table 1	Average Total Savings	DOC IR 002.12 Attach
Table 2	Historical Distribution Spending	DOC IR 002.13 Attach
Table 3	Five Year Future Investments by Category	DOC IR 002.14 Attach
Table 4	Distribution Projects over \$2 Million	DOC IR 002.15 Attach
Table 5	Deployment Plan for AMI Meters	DOC IR 002.16 Attach
Table 6	Electric Vehicle Adoptions	DOC IR 002.17 Attach
Table 7	Electric Vehicle Energy Consumption	DOC IR 002.18 Attach
Table 8	Electric Vehicle Summer and Winter Peak Impact (MW)	DOC IR 002.19 Attach
Table 9	Projected Annual Energy Consumption	DOC IR 002.20 Attach
Table 10	Current TOD Rates (\$/KWh) and Hours	DOC IR 002.21 Attach
Table 11	Summer Peak Demand Reduction	DOC IR 002.22 Attach
TEP	Title	File Name
Table 2	Historical Spending	DOC IR 002.23 Attach
Table 3	Future 5 Year Spending	DOC IR 002.24 Attach
Table 7 ¹	Total Distributed Generation under three Forecast Scenarios	DOC IR 002.25 Attach

¹ Due to a typo in the IDP document, this table was also mistakenly titled Table 7. It retains that title here for the sake of clarity.

To be completed by responder

Response Date: 3/22/2024

Response by: Jess McCullough – Public Policy Advisor II

Email Address: jmccullough@mnpower.com

Phone Number: 218-355-3178



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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Request Number: 3
Topic: Distribution System Load
Reference(s): 2023 IDP Section I.B.

Request:

On p. 5 of its IDP, MP states "Since most of Minnesota Power's retail energy sales are served via transmission-level voltage, residential customers comprise a relatively large portion of the company's distribution system load." Please quantify the portion of the company's distribution system load serving each of its customers classes.

Response:

The table below quantifies the portion of the Company's distribution system load serving retail customers by class.

Minnesota Power's 2022 Distribution System
Load by Retail Customer Class 1/

	MWh	Percent Energy
Residential	1,123,578	38.6%
General Service	668,799	23.0%
Large Light & Power	1,005,832	34.6%
Large Power	97,099	3.3%
Lighting	12,302	0.4%
Total Retail	2,907,610	100.0%

1/ Below 115kv transmission.

To be completed by responder

Response Date: 3/22/2024

Response by: Leah Peterson - Manager Customer Analytics

Email Address: lpeterson@mnpower.com

Phone Number: 218-355-3014



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

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Request Number: 4
Topic: DERMS
Reference(s): 2023 IDP Section I.E.2

Request:

On p. 19 of its IDP, MP states "Currently, the amount of solar connected to the Company's distribution system does not require a DERMS." Please describe:

- a) MP's understanding of the level of solar adoption the company anticipates would require the use of DERMS,
- b) How the solar adoption rates included in each of the DER forecast scenarios (Base Case, Medium, High) compare to the solar adoption level the company anticipates would require the use of DERMS,
- c) How the requirements of the "3% by 2030" Distributed Solar Energy Standard inform MP's potential planning for DERMS.

Response:

a), b), and c) Minnesota Power does not expect penetration of solar connected to the Company's distribution system to be the sole driver of the need for a DERMS. Rather, the combination of several factors including Minnesota Power's generation mix, policy changes, and resources required to implement new systems will impact the need for and timing of a DERMS implementation. Minnesota Power will continue to evaluate new and anticipated policy changes including the Minnesota Distributed Solar Energy Standard, 100% carbon free by 2040 legislation, and FERC Order 2222 as well as increases in distributed generation on Minnesota Power's distribution system to determine when a DERMS is necessary.

To be completed by responder

Response Date 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

SEND RESPONSE VIA EMAIL TO: Utility.Discovery@state.mn.us as well as the assigned analyst(s).

Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

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Request Number: 5
Topic: Historical Distribution Spending
Reference(s): 2023 IDP Section II

Request:

On p. 25 of its IDP, MP provides its historical distribution spending for the years 2018 through 2022 in Table 2 and Figure 6 at the level of the IDP budget categories. For each of the budget categories, please provide an itemized list of the projects and programs that comprise the total spending for each year.

Response:

Please refer to DOC IR 002.13 for Table 2 historical distribution spending for the years 2018 through 2022 broken down into the budget categories for an itemized list of projects and programs that comprise the total spending for each year.

To be completed by responder

Response Date: 3/22/2024

Response by: Mandi Robarge – Budget Analyst Lead

Email Address: arobarge@mnpower.com

Phone Number: 218-355-2468



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

SEND RESPONSE VIA EMAIL TO: Utility.Discovery@state.mn.us as well as the assigned analyst(s).

Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

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Request Number: 6
Topic: IDP Budget Categories
Reference(s): 2023 IDP

Request:

IDP Filing Requirements 3.26, 3.28, and 3.29 require MP to provide distribution spending data in its IDP in specific budget categories. Please provide a narrative explanation of the process by which MP presents its budget in the categories compliant with the IDP filing requirements, including how those categories correspond to MP's internal budget categories.

Response:

The budget categories listed in the IDP are the same as Minnesota Power's internal distribution budget categories. This alignment ensures that Minnesota Power is consistently speaking the same language across any reporting, internally or externally. These budget categories are:

- Age-Related Replacements and Asset Renewal
- System Expansion or Upgrades for Capacity
- System Expansion or Upgrades for Reliability and Power Quality
- New Customer Projects and New Revenue
- Grid Modernization and Pilot Projects
- Projects Related to local (or other) government requirements
- Metering
- Other

To be completed by responder

Response Date: 3/22/2024

Response by: Eric Clement – Manager T&D Grid Modernization

Email Address: eclement@mnpower.com

Phone Number: 218-471-4009



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
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Request Number: 7
Topic: Electric Vehicles
Reference(s): 2023 IDP Section II.A.3

Request:

On p. 28 of its IDP, MP provides an estimate of light duty EVs in its retail service territory and indicates its estimate is for October 2021. Please provide an explanation of the following:

- a) The timing of MP's updates to its estimate for EVs in its service territory,
- b) MP's process for estimating the number of EVs in its service territory.

Response:

- a) The footnote referenced on page 28 of Minnesota Power's IDP is incorrect and should say "Estimate as of January 2023". The 500 light duty vehicles referenced was sourced from the Minnesota Public Utilities Commission's electric vehicle website.¹
- b) The number of electric vehicles in Minnesota Power's service territory is based on vehicle registration data by utility service territory provided by the Minnesota Public Utilities Commission.

¹ https://mn.gov/puc/assets/Copy%20of%20January%202023%20Corrected_tcm14-590534.xlsx

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye - Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

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Request Number: 8
Topic: Electric Vehicles
Reference(s): 2023 IDP Section II.A.3

Request:

On p. 29 of its IDP, MP states that it “was forced to cancel its EV charging rewards pilot program after the delivery vendor was acquired and discontinued the offering.” Please provide any updates to MP’s plans for pursuing its EV charging rewards pilot program with another vendor or in an alternative form.

Response:

As described in the Company’s April 25, 2022 letter in Docket No. E015/M-20-638, “in December 2021, the vendor Minnesota Power selected to deliver the Residential EV Charging Rewards Pilot Program informed the Company that it was discontinuing the rewards program offering and would no longer be launching new programs. While there are other vendors in the market that provide alternate options, Minnesota Power was not able to identify a vendor that fit the Company’s needs and objectives for this program. Minnesota Power contacted customers that had expressed interest in the Smart Charge Rewards program and notified them that a rewards-based program was delayed indefinitely. The Company advised them of the existing Residential EV Service and upcoming TOD Rate. With customer permission, email addresses were recorded for future communication of new EV programs.”

The Company continues to evaluate the need for additional programs to support residential EV charging but does not currently have plans to propose a new charging rewards program.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye - Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



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Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

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Request Number: 9

Topic: Distributed Generation Standard and Ongoing System Planning

Reference(s): 2023 IDP Section II.B

Request:

On p. 34 of its IDP, MP states it “is beginning to experience a higher volume of interconnections and more interest in larger systems for net metering.” Please quantify the increase in interconnection requests and steps MP has taken or plans to take to accommodate a higher volume of interconnection requests.

Response:

As shown in Figure 9: DG Installations – Incentivized vs. No Incentive on page 32 of the Company’s IDP, Minnesota Power has seen a steady increase in the number of DG installations in recent years. There is also a trend of more systems moving forward without an incentive from the utility, indicating that interconnection requests will likely continue to increase regardless of available incentives.

To accommodate more interconnection requests, Minnesota Power is implementing an online application portal to be launched in 2024. The goal of the online application portal is to streamline and automate the interconnection process where possible and provide greater customer insight to their application status. Minnesota Power also has a monthly meeting for all departments involved in the interconnection process to ensure alignment, discuss trends, and determine if changes are needed to processes and procedures related to DG interconnections. Finally, Minnesota Power is an active member of the Minnesota Public Utilities Commission’s DG Advisory Group which meets regularly to discuss issues related to DG.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



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Request Number:	10
Topic:	Interconnection Software
Reference(s):	2023 IDP Section II.D

Request:

On p. 35 of its IDP, MP indicates that it “expects to implement an online application portal for installers and customers in 2024.” Please provide an update on MP’s plans for its application portal, including the potential timing of implementation, vendor selection, and expected processing time or financial savings that may result from utilizing an application portal.

Response:

Minnesota Power has selected a vendor for the online application portal and expects to launch the first phase of the tool in Q3 of 2024. The first phase will focus on interconnection requests that fall within the “simplified track” of the Minnesota Distributed Energy Resources Interconnection Process (“MnDIP”), while future phases will focus on interconnections that fall within the “fast track” and “study track” processes.

The application portal will streamline the interconnection process and is intended to eliminate as many manual steps from the process as possible, positioning Minnesota Power to handle more interconnection requests while still meeting the requirements of the MnDIP. The Company will monitor resource and financial savings associated with this tool, especially given the anticipated increased volume of interconnection applications.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



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☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Request Number: 11
Topic: Infrastructure 5-Year Investment Plan
Reference(s): 2023 IDP Section II.E

Request:

On p. 37 of its IDP, MP provides its forecasted distribution system spending for the years 2024 through 2028 in Table 3 and Figure 10 at the level of the IDP budget categories. For each of the budget categories, please provide an itemized list of the projects and programs that comprise the total spending for each year.

Response:

As referenced in DOC IR 006, Minnesota Power aligns IDP categories with internal budget categories. This alignment ensures that Minnesota Power is consistent across any reporting, internally or externally. Because future years include budgetary estimates for the defined categories, there is no further breakdown of an itemized list of specific future projects to present.

To be completed by responder

Response Date: 3/22/2024

Response by: Mandi Robarge - Budget Analyst Lead

Email Address: arobarge@mnpower.com

Phone Number: 218-355-2468



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Information Request

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Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

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Date of Request: 3/12/2024

Response Due: 3/22/2024

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Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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Request Number: 12
Topic: 2023 Distribution System Spending
Reference(s): 2023 IDP Section II

Request:

Distribution system spending for 2023 is excluded from the Historical Distribution Spending discussion in Section II, p. 25, and from the 5-Year Investment Plan discussion in Section II.E, p. 37. For 2023 distribution system spending, please provide the total spending for each of the required budget categories and provide an itemized list of the projects and programs that comprise the totals.

Response:

Please refer to DOC IR 012.01 Attach for the total spending for each of the required budget categories, at an itemized level of projects and programs, which comprise the total spend in 2023.

To be completed by responder

Response Date: 3/25/2024

Response by: Mandi Robarge – Budget Analyst Lead

Email Address: arobarge@mnpower.com

Phone Number: 218-355-2468



Minnesota Department of Commerce
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Information Request

Docket Number: E017/M-23-258

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☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Phone Number(s): 651-539-1058, 651-539-1675

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Request Number: 13
Topic: Infrastructure 5-Year Investment Plan
Reference(s): 2023 IDP Section II.E

Request:

On p. 38 of its IDP regarding projects which correspond to more than one budget category, MP states that “many projects provide benefits in all four areas, and identifying the primary category for such projects is not a precise exercise.” Please describe how MP approaches the identification of the primary category for a project, whether all the costs associated with a project are allocated to the primary category identified, and how MP allocates costs across multiple categories, if applicable.

Response:

Minnesota Power assesses each project in the ten-year plan and allocates 100% of the costs to one specific budget category where a majority of the spending aligns with that specific category. The Company does not allocate costs across multiple categories even if the project benefits multiple areas.

To be completed by responder

Response Date: 3/22/2024

Response by: Eric Clement - Manager T&D Grid Modernization

Email Address: eclement@mnpower.com

Phone Number: 218-471-4009



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

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Response Due: 3/22/2024

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Phone Number(s): 651-539-1058, 651-539-1675

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Request Number: 14
Topic: Infrastructure 5-Year Investment Plan
Reference(s): 2023 IDP Section II.E

Request:

On p. 38 of its IDP, MP describes how it has used AMI to preemptively identify areas of the power system with power quality issues. Please provide specific examples of how AMI has been used to deliver value to ratepayers through preemptive issue identification, new tariff structures, or any other benefits MP has observed to date.

Response:

Minnesota Power has hired an assistant engineer to create and review AMI reports. Below are examples of where Minnesota Power has used AMI data/alarming to identify issues that could be fixed before causing service interruption.

- Failing distribution transformers
- Failing voltage regulators
- Failing cutout fuses
- Failing underground conductors
- Failing conductor connections/splices/elbows
- Mis-tapped distribution transformers
- Damaged crossarms
- Hot Sockets

To be completed by responder

Response Date: 3/22/2024

Response by: Robert Ardren – Manager Power Delivery & Asset Management

Email Address: rardren@mnpower.com

Phone Number: 218-355-2420



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

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Date of Request: 3/12/2024

Response Due: 3/22/2024

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Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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The AMI system is also used to provide customer value through the MyAccount customer portal where customers can view usage and trending year over year. In addition, the AMI system is also used to assist with the implementation of the Company's Time of Day rate offering. Because of the deployment of AMI, MP was able to be the first utility in the State of Minnesota to move to a Time of Day residential default rate which is designed to align energy usage to achieve system benefits. Finally, MP is currently in a pilot program utilizing AMI technology to remotely reconnect customers. This pilot allows MP to waive the reconnection fee and reduce the time to reconnect when the customer meets the criteria to be reconnected.

Other benefits the AMI data has provided include:

- Power Takeoff (commercial customer efficiency program (ECO))
- More accurate billing
- Load Research
- Assisting customers with usage inquiries and energy audit

To be completed by responder

Response Date: 3/22/2024

Response by: Robert Ardren – Manager Power Delivery & Asset Management

Email Address: rardren@mnpower.com

Phone Number: 218-355-2420



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Request Number: 15
Topic: Infrastructure 5-Year Investment Plan
Reference(s): 2023 IDP Section II.E

Request:

On p. 39 of its IDP, MP states that grid modernization projects “are identified and selected through analyzing reliability metrics and determining what solution or suite of solutions is best suited to improve reliability on the system.” Please provide MP’s analysis used to identify and select the grid modernization projects for inclusion in the budget presented in the IDP.

Response:

Grid Modernization has historically used input from the planning department, reliability engineering, local senior engineers in each geographic area, and local line workers to analyze each feeder. Additional considerations are also used during the evaluation, including feeder reliability performance, ties to adjacent feeders, age of infrastructure, and location of fiber communication to develop the best grid modernization solution for that feeder’s characteristics. There are a wide range of both rural and urban feeders on Minnesota Power’s system in which each scenario may require a unique solution for improving performance that is determined by a team of planning, reliability, and grid modernization engineers.

To be completed by responder

Response Date: 3/22/2024

Response by: Eric Clement – Manager T&D Grid Modernization

Email Address: eclement@mnpower.com

Phone Number: 218-471-4009



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Phone Number(s): 651-539-1058, 651-539-1675

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Request Number: 16
Topic: Infrastructure 5-Year Investment Plan
Reference(s): 2023 IDP Section II.E

Request:

On p. 41 of its IDP, MP states that up to ten percent of residential customers will have a remote disconnect/reconnect capability, while MP has deployed close to 100% of its expected AMI meters. Please describe:

- a) If MP is estimating ten percent eligibility because of limited pilot enrollment or because of physical meter constraints,
- b) If any deployed AMI meters possess the capability for advanced demand response functionality or other two-way communications.

Response:

- a) Minnesota Power based the targeted 10 percent eligibility based on the trend that roughly 10 to 15 percent of Minnesota Power's residential customers have past due balances and only a portion of those customers advance to physical disconnection as part of the collections process. Minnesota Power targeted 10 percent of the residential population to align with this metric and to allow for a cost benefit analysis through the Reconnect Pilot Program. Savings through the Pilot are generally related to avoided labor and truck rolls for reconnection. Currently, AMI meters with remote-capability have an added premium to the cost of regular AMI meter. Before proceeding with broader deployment at this increased cost, the Company proposed a prudent sample size to be evaluated for process effectiveness and savings, as compared to these incremental cost increases. Limited enrollment and/or physical meter constraints did not play a role in selecting the pilot population size.

To be completed by responder

Response Date: 3/22/2024

Response by: Robert Ardren – Manager Power Delivery & Asset Management

Email Address: rardren@mnpower.com

Phone Number: 218-355-2420



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-
- b) All remote capable AMI meters deployed by Minnesota Power are capable of full load demand response and two-way communications with the AMI system head end. This is accomplished with an internal switch that can open to shed all loads connected to the meter. This switch responds to commands entered into the AMI head end system. Minnesota Power currently utilizes remote capable AMI meters to implement its dual fuel/load shed rate, and as part of the remote reconnect pilot. Minnesota Power's AMI system is only capable of communications between the meters and the AMI head end system. It cannot communicate with connected devices.

To be completed by responder

Response Date: 3/22/2024

Response by: Robert Ardren – Manager Power Delivery & Asset Management

Email Address: rardren@mnpower.com

Phone Number: 218-355-2420



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Request Number: 17
Topic: Outage Management System
Reference(s): 2023 IDP Section II.E.1

Request:

On p. 42 of its IDP, MP indicates it is in the process of replacing its existing OMS (Outage Management System) with an anticipated in-service date of early 2024. MP also states that “a new OMS will also position Minnesota Power to more readily implement a DERMS and/or an ADMS to accommodate widespread use of solar and other distributed generation sources if and when the need arises.” Please provide an update on MP’s implementation of its new OMS and how that informs MP’s potential planning for DERMS and/or an ADMS.

Response:

The new OMS is planned to be placed into service during Q4 of 2024. The new OMS vendor OSI has additional modules that can be purchased and installed into the new OMS that are capable of DERMS and/or ADMS functions.

To be completed by responder

Response Date: 3/22/2024

Response by: Eric Clement – Manager T&D Grid Modernization

Email Address: eclement@mnpower.com

Phone Number: 218-471-4009



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Phone Number(s): 651-539-1058, 651-539-1675

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Request Number: 18
Topic: System Reliability and Budget
Reference(s): 2023 IDP Section II.E

Request:

In Section II.E of its IDP, MP outlines its budgeting process for reliability efforts. MP does not detail any current system reliability metrics and does not present a discussion of how reliability impacts its budget. Please provide the following:

- A) Up to 10 years of system-wide reliability metrics (MAIFI, SAIDI, SAIFI, CAIDI) for the distribution system,
- B) A discussion of how reliability metrics are impacted by system-wide outages, distribution-level outages, and storm vs non-storm related outages
- C) A discussion of how the forecasted budget relates to efforts to improve a) and b) above and any quantifiable benefits in reliability metrics expected from these expenditures.

To be completed by responder

Response Date: 3/22/2024

Response by: Lee Gustafson - Reliability Engineer

Email Address: lgustafson@mnpower.com

Phone Number: 218-355-2399



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85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

SEND RESPONSE VIA EMAIL TO: Utility.Discovery@state.mn.us as well as the assigned analyst(s).

Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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Response:

A) The table below displays all reliability data including major event related outages.

All Reliability Data	SAIDI	SAIFI	MAIFI	CAIDI
2014	126.56	1.12	2.81	113.17
2015	294.46	1.33	3.46	221.35
2016	1435.16	2.38	4.18	603.18
2017	155.10	1.24	3.54	125.15
2018	158.51	1.49	3.20	106.04
2019	164.54	1.53	3.46	107.45
2020	179.43	1.42	4.90	126.13
2021	150.76	1.45	4.42	103.68
2022	496.57	2.05	4.84	242.27
2023	120.54	1.24	3.60	97.60

To be completed by responder

Response Date: 3/22/2024

Response by: Lee Gustafson - Reliability Engineer

Email Address: lgustafson@mnpower.com

Phone Number: 218-355-2399



Minnesota Department of Commerce
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The table below displays all reliability data excluding major events.

Major Event Excluded data	SAIDI	SAIFI	MAIFI	CAIDI
2014	86.18	0.93	2.55	92.49
2015	101.82	1.17	3.36	87.10
2016	122.21	1.28	3.21	95.28
2017	108.06	1.04	3.30	103.90
2018	134.00	1.39	2.92	96.50
2019	144.02	1.35	3.36	106.32
2020	122.51	1.22	4.36	100.50
2021	126.00	1.34	4.07	93.80
2022	112.70	1.12	3.46	100.89
2023	103.60	1.16	3.48	89.33

- B) Nearly all the most common and valuable reliability statistics are based on two criteria: Customer minutes interrupted and the frequency of those interruptions. Definitions for standard reliability terms are shown below.

System Average Interruption Duration Index ("SAIDI"): Provides the total number of minutes of interruption the average customer experiences.

System Average Interruption Frequency Index ("SAIFI"): Provides the frequency of sustained power outages (longer than five minutes) experienced by the average customer.

Customer Average Interruption Duration Index ("CAIDI"): Derived by dividing SAIDI by SAIFI. The statistic generally speaks to the amount of time needed to respond to an outage.

To be completed by responder

Response Date: 3/22/2024

Response by: Lee Gustafson - Reliability Engineer

Email Address: lgustafson@mnpower.com

Phone Number: 218-355-2399



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Momentary Average Interruption Frequency Index ("MAIFI"): Provides a measure of the average number of short outages, an interruption of electrical service Minnesota Power defines as lasting less than five minutes in duration.

A system-wide outage would infer that every customer tied to our system would be affected. For this to occur, the entire generation, transmission, and distribution systems would have to experience a complete outage. To our knowledge there has not been a complete blackout of the entire system.

Minnesota Power defines a distribution-level outage as any outage that affects one or more customer(s) that is connected to the Company's distribution system. The distribution system is considered anything less than 100kv, at MN Power there are 69kv, 34.5kv, 23kv, 13.8kv, 12.47kv, and 4.16kv 3 phase systems. Every distribution level outage event is verified and entered into the Company's reliability database. These events range from an outage that affects a single customer, to an event affecting all customers fed from an entire substation. These outage entries are aggregated and provided in the tables above. The tables show the annual totals for all these outage events.

For storm versus non-storm related outages, Minnesota Power aligns with the IEEE 1366 standard for the exclusion of major event days. A threshold for a Major Event Day ("Tmed") is computed once per year. First, data is assembled for the five most recent years of historical values of daily SAIDI. Any day with a SAIDI value of zero is discarded. Then, the natural log of each SAIDI value is computed and the average ("alpha") and standard deviation ("beta") of the natural logarithms is computed. The major event threshold can then be found by using this equation: $T_{med} = \exp(\alpha + 2.5 \cdot \beta)$. If any event in the next year has SAIDI greater than Tmed, it qualifies as a major event. Note: that a Major Event is not limited to a single day and may span consecutive days, depending on the severity and duration of the event.

As stated earlier, major event normalization is designed to exclude data from rare, major events that may skew the overall data. In the last five years, there was generally an average of one to three Major Events excluded each year as shown in the figure below.

To be completed by responder

Response Date: 3/22/2024

Response by: Lee Gustafson - Reliability Engineer

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Phone Number: 218-355-2399



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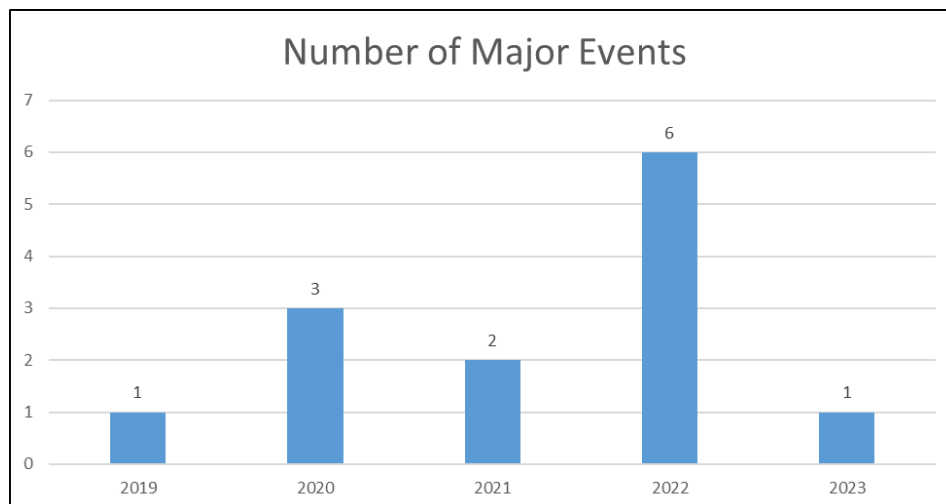
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A comparison of the two tables above shows the impact of major event days.

- C) The Company averages several years of outage and storm-related costs to forecast them for each upcoming budget year. In the annual Safety, Reliability, and Service Quality filings, the Company discusses action plans tied to poor performing feeders. A budgeted review is also performed annually to adjust spending related to outage causes. In recent years, adjustments have been made to increase vegetation management, asset renewal, preventative maintenance, inspections, and grid modernization investments. The tables above show on average an improvement in overall reliability as the Company has increased spending in these targeted areas. It is difficult to quantify reliability metrics based on future budgets due to the unpredictability of weather patterns.

To be completed by responder

Response Date: 3/22/2024

Response by: Lee Gustafson - Reliability Engineer

Email Address: lgustafson@mnpower.com

Phone Number: 218-355-2399



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Request Number: 19
Topic: Groundline Inspection Accounting Shift
Reference(s): 2023 IDP Section II.E.5

Request:

On p. 45 of its IDP, MP indicates it has expanded its groundline inspection program and states: "These expanded inspections result in additional costs compared to the existing inspection program. However, the Company can capitalize the majority of these costs because of the life expectancy increase." Please quantify the cost increase associated with the expanded inspection program, including how the program has been incorporated into the budget presented in the IDP, and quantify the life expectancy increase that results from the treatment.

Response:

Prior to 2022, the average yearly cost of our groundline Inspection was \$160,000 which averaged out to \$8.99 per pole of which 100% of these costs were assigned to the Operations & Maintenance (O&M) budget. Under the newer program, the average yearly cost is \$375,000 or \$24.97 per pole of which 93% of these costs are being capitalized as the treatments are extending the life of the pole. Poles that are treated with the various chemicals are expected to remain in service an additional 10-12 years compared to the older program. In 2023, the groundline inspectors treated 16,442 poles significantly increasing the life expectancy for poles that may have been replaced using the older method. The groundline program costs are incorporated into the Age Related and Asset Renewal budget.

To be completed by responder

Response Date: 3/22/2024

Response by: Hannah Freeman – Supervisor Distribution Asset Management

Email Address: hfreeman@mnpower.com

Phone Number: 218-471-4008



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Information Request

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Request Number:	20
Topic:	Current Distribution Projects
Reference(s):	2023 IDP Section II.F

Request:

In Section II.F of its IDP, MP identifies three projects that are anticipated to have individual total costs greater than \$2 million. Please explain MP's use of a \$2 million threshold for including distribution projects in this discussion and identify how the information provided complies with IDP Filing Requirement 3.A.29 regarding planned distribution capital projects.

Response:

Minnesota Power reported on distribution projects by category level spending in Section II.E in the 2023 IDP filing which aligns with the requirements in 3.A.29. The \$2 million threshold that Minnesota Power uses in section II.F aligns with the threshold used for IDP Filing Requirement 3.E.1 (Non-Wire Alternatives Analysis): "Minnesota Power shall provide a detailed discussion of all distribution system projects in the filing year and the subsequent five years that are anticipated to have a total cost of greater than two million dollars. For any forthcoming project or project in the filing year, which cost two million dollars or more, provide an analysis on how non-wires alternatives compare in terms of viability, price, and long-term value." Minnesota Power used the same \$2 million threshold for including distribution projects in both the 2019 and 2021 IDP filings.

To be completed by responder

Response Date: 3/22/2024

Response by: Eric Clement – Manager T&D Grid Modernization

Email Address: eclement@mnpower.com

Phone Number: 218-471-4009



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Information Request

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Phone Number(s): 651-539-1058, 651-539-1675

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Request Number: 21
Topic: Hosting Capacity Map
Reference(s): 2023 IDP Section II.G.1

Request:

In Section II.G.1 of its IDP, MP describes how it is in the process of switching to Synergi, which will expand the Company's ability to create a hosting capacity map. The Company states that there is not currently a hosting capacity map available. When does MP expect that a hosting capacity map will be available for release to the public?

Response:

Minnesota Power expects to have the capability to provide hosting capacity maps per feeder by request once Synergi is fully implemented. MP is expecting Synergi to be implemented by the end of 2024.

To be completed by responder

Response Date: 3/22/2024

Response by: Nicholas Boldt – Engineer Senior

Email Address: nboldt@mnpower.com

Phone Number: 218-355-2822



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Date of Request: 3/12/2024

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Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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Request Number: 22
Topic: SCADA
Reference(s): 2023 IDP Section II.G.1

Request:

In Section II.G.1 of its IDP, MP indicates that its SCADA system is installed on roughly half of the Company's feeders, and smart sensors are installed on feeders that do not currently have SCADA installed. Please explain any further plans MP has for expanded installation of SCADA on additional feeders, including the timing and cost associated with the expanded installations.

Response:

Minnesota Power does not currently have plans to expand the SCADA system to any other distribution substation. Each distribution substation site tied to a rebuild or new build will be evaluated as needed. Many of the distribution substation sites are in remote areas with limited or no fiber communication available, making a SCADA expansion expensive. The smart sensors and Advanced Metering Infrastructure (AMI) are more cost-effective alternatives that also provide visibility to the distribution system.

To be completed by responder

Response Date: 3/22/2024

Response by: Eric Clement – Manager T&D Grid Modernization

Email Address: eclement@mnpower.com

Phone Number: 218-471-4009



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Request Number: 23
Topic: Grid Modernization Status and Budget
Reference(s): 2023 IDP Section II.G

Request:

In Sections II.G.2 and II.G.3 of its IDP, MP describes several grid modernization efforts including 1) Smart Sensors, 2) Faulted Circuit Indicators, 3) FLISR, and 4) LMR. For each technology, please provide:

- a) Current deployment levels and percent of system coverage, targeted deployment levels and percent of system coverage, and target date for final deployment,
- b) Historical spending for the years 2018 through 2023,
- c) Forecasted spending for the years 2024 through 2028 included in the 5-Year Investment Plan.

Response:

- 1) Smart Sensors –
 - a. 417 currently installed (approximately 55% of planned), 344 are planned for installation between 2024 and 2029; anticipate a small number of installations per year after 2029
 - b. The historical spending on Smart Sensors is \$15,042 for 2018, \$14,552 for 2019, \$442,801 for 2020, \$18,431 for 2021, and \$228,176 for 2023.
 - c. The forecasted spending for Smart Sensors is \$117,300 for each year 2025 through 2027, and \$110,400 for 2028. There is no forecasted spending for Smart Sensors in 2024.
- 2) Faulted Circuit Indicators –

To be completed by responder

Response Date: 3/22/2024

Response by: Beau Pocquette - Supervising Engineer Distribution System Engineering

Email Address: bpocquette@mnpower.com

Phone Number: 218-355-2862



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-
- a. There are currently 289 FCI's installed across the distribution system, 6 are currently being evaluated for 2024 in coordination with planned FLISR applications. MP will continue to evaluate these devices where applicable, including with reclosers in future FLISR applications.
 - b. There is no historical spending on FCI's under Grid Modernization for the years 2018 through 2023.
 - c. There is no forecasted spending on FCI's under Grid Modernization for the years 2024 through 2028.
- 3) FLISR –
- a. There are currently 50 FLISR devices installed providing approximately 4% of system coverage, by the end of 2029 there are plans to have 432 FLISR devices installed providing approximately 40% of system coverage.
 - i. IntelliRupters with fiber communications – There are 50 currently installed, 280 are planned for installation between 2024 and 2029. MP will continue to evaluate metrics after 2029 and determine at what rate the IntelliRupter FLISR program will continue to expand.
 - ii. Reclosers – There are no recloser FLISR schemes currently, 102 reclosers for FLISR schemes are planned for installation between 2024 and 2029. MP will continue to evaluate metrics after 2029 and determine at what rate the recloser FLISR program will continue to expand.
 - iii. Auto-Transfer Schemes – There are currently many auto-transfer schemes, some customer owned, which transfer a larger customer from one feeder to another, but do not offer restoration to any portion of the faulted feeder. These schemes will be evaluated and implemented as customer requests are received.
 - b. The historical spending for FLISR devices is \$259,548 for 2019, \$800,272 for 2020, \$20,172 for 2021, \$74,120 for 2022, and \$2,791,194 for 2023.

To be completed by responder

Response Date: 3/22/2024

Response by: Beau Pocquette - Supervising Engineer Distribution System Engineering

Email Address: bpocquette@mnpower.com

Phone Number: 218-355-2862



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-
- c. The forecasted spending for FLISR devices is \$2,976,500 for 2024, \$4,142,000 for 2025, \$4,130,000 for 2026, \$3,876,500 for 2027, and \$3,943,500 for 2028.
- 4) LMR –
- a. The Land Mobile Radio (LMR) System used for push to talk voice communications is being upgraded due to end of life/end of support hardware. The upgraded system will also support low speed data radios for SCADA applications. The first response is in reference to the LMR system upgrade.
 - i. The current deployment level of the LMR system upgrade is 43%. We are targeting 89% completion by the end of 2024 and completing the project in 2025.
 - ii. The historical spending for the LMR system upgrade is \$236 for 2021, \$821,500 for 2022, and \$318,500 for 2023.
 - iii. The forecasted spend is \$915,000 for 2024 and \$25,000 for 2025.
 - b. Below is the response for LMR based SCADA radios for distribution communications.
 - i. The current deployment level of LMR based SCADA radios is 100%. We currently have 4 radios deployed as a pilot/proof of concept in the Duluth area. If the system meets expectations, we plan to deploy additional radios to provide communications for the planned 102 reclosers.
 - ii. The historical spending for the LMR based SCADA radios is \$107,000 for 2021, \$52,000 for 2022, and \$15,000 for 2023.
 - iii. Up to \$765,000 will be allocated for the 102 reclosers installed from 2024 through 2028.

To be completed by responder

Response Date: 3/22/2024

Response by: Beau Pocquette - Supervising Engineer Distribution System Engineering

Email Address: bpocquette@mnpower.com

Phone Number: 218-355-2862



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Request Number: 24
Topic: SolarSense Low-Income Solar Grant Program
Reference(s): 2023 IDP Section III.A.2

Request:

In Section III.A.2 of its IDP, MP indicates the Low-Income Solar Grant Program received annual grant funding of \$120,000 through 2024, but MP awarded only \$128,616 towards projects in 2021 and 2022. Please provide the awarded amount for 2023. In addition, please provide MP's perspective on the underutilization of grant funds relative to the available funding levels.

Response:

Five projects were approved for grants in 2023, totaling \$103,837. Any funds not used in the program year will roll forward and be added to the available budget in the following year.

Minnesota Power has found that strong community partnerships and a significant level of outreach is needed to move projects funded through the Low-Income Solar Grant program forward. The Company was denied approval of an education and outreach budget for promoting SolarSense programs in the Commission's December 17, 2020 Order Approving Program Extension and Changes with Modifications in Docket No. E015/M-20-607. As a result, outreach is limited to information provided at events, social media posts, and relationships with community partners. As awareness grows, Minnesota Power is confident that demand for the program will increase.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



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Request Number: 25
Topic: Strategic Undergrounding
Reference(s): 2023 IDP Section III.A.4

Request:

In Section III.A.4 of its IDP, MP indicates its strategic undergrounding initiative began in 2020. Please provide the following information regarding this initiative:

- a) Annual costs since 2020,
- b) Annual costs included in the IDP budget for the years 2024 through 2028,
- c) Annual miles that would be converted based on the annual costs budgeted for the years 2024 through 2028.

Response:

- a) The annual costs for our Strategic Undergrounding program since 2020 were \$705,815 for 2020, \$311,854 for 2021, \$308,871 for 2022, and \$4,187,070 for 2023.
- b) The annual costs included in the IDP budget are \$5,750,000 for the year 2024 and \$6,000,000 for each of the years 2025 through 2028.
- c) The annual line miles converted will vary year to year depending on multiple factors of the individual projects including location, cable size, voltage, system complexity, geology, and number of phases installed. For planning purposes, we estimate \$250K per three phase line mile, but have observed costs over \$750K per line mile in congested residential areas with many transformers, switchgear, meters, etc.

To be completed by responder

Response Date: 3/22/2024

Response by: Beau Pocquette - Supervising Engineer Distribution System Engineering

Email Address: bpocquette@mnpower.com

Phone Number: 218-355-2862



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

SEND RESPONSE VIA EMAIL TO: Utility.Discovery@state.mn.us as well as the assigned analyst(s).

Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

Each response must be submitted as a text searchable PDF, unless otherwise directed. Please include the docket number, request number, and respondent name and title on the answers. If your response contains Trade Secret data, please include a public copy.

Request Number: 26
Topic: Municipal Solar Plus Storage System
Reference(s): 2023 IDP Section III.A.5

Request:

In Section III.A.5 of its IDP, MP discusses the Grand Rapids Public Utilities solar plus energy storage system. MP indicates that the project was successful in meeting the goal of monthly peak demand reduction. Please quantify the actual monthly peak demand reduction and battery utilization resulting from the project. Please describe how this compared to expectations prior to the project, and how this informs MP's planning for other solar plus battery storage systems.

Response:

From September 2022 through February 2024, the Grand Rapids Public Utilities (GRPU) solar plus storage project, on average, has reduced GRPU's peak by 0.635 MWs per discharge event (63.5% battery effectiveness). The battery has been discharged 93 times (4.22 times per month) during that span.

Prior to project implementation, an external study was conducted by Sedway Consulting to evaluate battery effectiveness. The consultant's analysis for GRPU's combined solar plus battery project revealed the project could anticipate an approximate 70% battery effectiveness (i.e. a 2.5MWh, 1 MW battery could achieve a 0.7MW of monthly peak reduction on average). MP's load forecasting team had reviewed the analysis and believed the 70% level was generally achievable but felt after factoring in load and solar production forecast variance into the equation, a 50%-60% battery effectiveness metric was considered more feasible for actual performance.

To be completed by responder

Response Date: 3/22/2024

Response by: TJ Otto – Strategic Account Representative

Email Address: totto@mnpower.com

Phone Number: 218-355-3040



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Phone Number(s): 651-539-1058, 651-539-1675

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Evaluating the load forecasting study results, the actual performance of the battery has shown MP that the system is above original expectations (but below the Sedway Consulting study projections), and MP is satisfied with the results.

The GRPU solar plus storage project was designed to reduce a specific customer's monthly peak demand. The sizing of the solar and storage facility was based on the load characteristics and solar generation profile for one customer. When Minnesota Power performs planning analysis, many characteristics are considered, including the total customer demand profile and the wind, solar, hydro, and dispatchable generation within our generation portfolio.

For broader system planning, in Minnesota Power's last IRP the company included solar and several energy storage technologies when developing the preferred plan. This project informs Minnesota Power's planning department by demonstrating the feasibility of the technology, provides information regarding contracting approaches, creates awareness of its operational limitations and integration needs, and helps the company better evaluate the technology.

To be completed by responder

Response Date: 3/22/2024

Response by: TJ Otto – Strategic Account Representative

Email Address: totto@mnpower.com

Phone Number: 218-355-3040



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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Request Number: 27
Topic: Service Territory Population Growth
Reference(s): 2023 IDP Section III.B

Request:

In Section III.B, p. 66, of its IDP, in the context of its non-wires alternatives analysis, MP notes that its service territory is projected to continue to decline in population through 2053. Please describe how the projected population decline impacts MP's distribution system planning and investments beyond the context of non-wires alternatives.

Response:

While the "Non-Wires Alternatives Case Studies from Leading U.S. Projects" report listed high load growth as a contributor to the identification of the need for infrastructure upgrades and non-wires solutions, Minnesota Power does not directly take population growth trends into account while planning distribution investments outside of this context. The distribution system must be built and maintained for peak demand. The planning department studies the distribution system evaluating historical peaks with some load growth (1% per year for 5 years). Investments in our distribution system are also not directly tied to population growth rates. Factors such as reliability, compliance, regulatory and legislative requirements, capacity, and asset health are just a few of the items considered for future investments into our system to maintain safe, reliable, and affordable energy.

To be completed by responder

Response Date: 3/27/2024

Response by: Eric Clement – Manager T&D Grid Modernization

Email Address: eclement@mnpower.com

Phone Number: 218-471-4009



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

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Request Number: 28
Topic: 3% by 2030 & Non-Wires Solutions
Reference(s): 2023 IDP Section III.B

Request:

On p. 74 of its IDP, MP states that the 3% by 2030 Distributed Generation requirement was not included in its forecast scenarios. Please describe how compliance with the 3% by 2030 requirements will inform and be incorporated into MP's future Non-Wires Solutions analysis.

Response:

On September 18, 2023, the Minnesota Public Utilities Commission opened Docket No. E002,E015,E017/CI-23-403 "In the Matter of the Implementation of the New Distributed Solar Energy Standard Pursuant to 2023 Amendments to Minnesota Statutes, Section 216B.1691". Minnesota Power is actively working with stakeholders through this docket and through the Company's planning processes to develop a strategy for meeting the new Distributed Solar Energy Standard. Once that process has been determined, Minnesota Power will work to evaluate what impact it will have on future Non-Wires Solutions analyses.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

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Request Number: 29
Topic: DER Forecast Scenarios
Reference(s): 2023 IDP Section IV

Request:

In Section IV of its IDP, MP presents several forecast scenarios for future DER growth. Please explain how the forecast scenarios correspond to the budgets presented in Sections II.E and IV.A.

Response:

Minnesota Power currently does not include assumptions from the medium and high DER forecast scenarios in its 5-year infrastructure budgets included in this filing. The Company will continue to evaluate how to best align these functions in the future.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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Request Number:	30
Topic:	Battery Energy Storage Systems
Reference(s):	2023 IDP Section IV.B.5

Request:

In Section IV.B.5 of its IDP, MP discusses two potential battery energy storage system pilots. Please provide the following information:

- For the grid scale pilot at Boswell Energy Center, please provide an update on the status of the project, including the timing and expected next steps.
- For the Kerrick pilot, please provide an update on the timing of installation, MP's total project costs, and how costs are reflected in the IDP budget, if at all.

Response:

- Minnesota Power submitted a grid scale energy storage pilot project, proposed at the Boswell Energy Center, into the Department of Energy's Long-Duration Energy Storage Demonstration Funding Opportunity Announcement in March of 2023. The Office of Clean Energy Demonstrations at the Department of Energy notified Minnesota Power in September of 2023 that our application had merit but was not selected at this time. This funding opportunity would have provided significant funding toward implementation and operation of this energy storage pilot project. Minnesota Power is currently evaluating potential pathways forward for this pilot project.
- Minnesota Power has been working to purchase property for the Kerrick battery storage pilot since June 2023. Just over \$8k was spent on this project in 2023 within minimal charges, less than \$1k, in 2024 so far. Once the property is obtained, Minnesota Power will finalize design plans and request project proposals. Upon bid award, the anticipated project in-service date will follow by approximately 18 months. At this time, the anticipated project in-service date is December 2025. Planning level cost estimates for the

To be completed by responder

Response Date: 3/22/2024

Response by: Beau Pocquette - Supervising Engineer Distribution System Engineering

Email Address: bpocquette@mnpower.com

Phone Number: 218-355-2862



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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Kerrick battery storage pilot are \$3M for land acquisition, site preparation, and BESS installation. The Kerrick battery storage pilot is included in the Grid Modernization budget in the IDP.

To be completed by responder

Response Date: 3/22/2024

Response by: Beau Pocquette - Supervising Engineer Distribution System Engineering

Email Address: bpocquette@mnpower.com

Phone Number: 218-355-2862



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Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Phone Number(s): 651-539-1058, 651-539-1675

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Request Number:	31
Topic:	Distribution Forecasting
Reference(s):	2023 IDP Section IV.C

Request:

In Section IV.C of its IDP, MP discusses its base case, Medium DER, and High DER forecast scenarios. Please provide MP's forecast files used to generate each of the scenarios.

Where applicable, for any and all parts above, please provide the requested data in a Microsoft Excel executable format with all links and formulae intact. If any of these links target an outside file, please provide all such additional files.

Response:

The files used to generate Minnesota Power's DER scenario forecasts are included as DOC IR 002.25.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

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Request Number:	32
Topic:	Distribution Forecasting
Reference(s):	2023 IDP Section IV.C

Request:

In Section IV.C of its IDP, MP discusses its base case, Medium DER, and High DER forecast scenarios. Please describe:

- How MP has incorporated the impacts of the Inflation Reduction Act (IRA) into its planning assumptions, if at all, and for which forecast scenarios,
- Which specific aspects of the IRA have been incorporated into the forecast,
- How the incorporated aspects of the IRA have impacted the forecast results,
- How MP plans to incorporate the impacts of the IRA in future forecasts.

Response:

- Minnesota Power did not include any assumptions related to the IRA in its forecast scenarios.
- N/A
- N/A
- The Company is monitoring anticipated impacts from the IRA closely and plans to include the effects based on the economic outlook in the upcoming 2024 AFR to be filed on July 1, 2024. How these impacts will be reflected is still being determined.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Phone Number(s): 651-539-1058, 651-539-1675

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Request Number:	33
Topic:	EV Forecast
Reference(s):	2023 IDP Section IV.C.2

Request:

In Section IV.C.2 of its IDP, MP provides an estimate of the annualized energy consumption and peak demand from light-duty EVs. Please provide MP's working files used to calculate the annual energy consumption and peak demand at current and forecasted levels, and please explain the assumptions relied upon to perform the calculations.

Where applicable, for any and all parts above, please provide the requested data in a Microsoft Excel executable format with all links and formulae intact. If any of these links target an outside file, please provide all such additional files.

Response:

The annualized energy consumption from light-duty EVs referenced in Minnesota Power's IDP was determined by applying 500 EV registrations in MP's service territory¹ by 2.5 MWh². The peak demand impact was determined by calculating the amount of new load on Minnesota Power's system due to EV adoption across all vehicle weight classes. This new load was then used to derive a summer and winter usage impact by adjusting the annual new

¹ EV registrations were provided by the Minnesota Public Utilities Commission (January 2023 Corrected).

<https://mn.gov/puc/activities/economic-analysis/electric-vehicles/>

² "General Motors estimates the annual energy use of the Chevy Volt is about 2,520 kilowatt-hours"

<https://www.energy.gov/eere/electricvehicles/charging-home>

To be completed by responder

Response Date: 3/22/2024

Response by: Cory Erickson – Customer Insights and Forecasting Analyst

Email Address: cmerickson@mnpower.com

Phone Number: 218-355-3014



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Phone Number(s): 651-539-1058, 651-539-1675

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load by the seasonal usage percentages from July and December for summer and winter respectively. Lastly, those seasonal usage values were adjusted by the coincidence factors for July and December to calculate the total peak impacts for summer and winter.

Minnesota Power's working files are included in the attachments DOC IR 002.18 and DOC IR 002.19.

To be completed by responder

Response Date: 3/22/2024

Response by: Cory Erickson – Customer Insights and Forecasting Analyst

Email Address: cmerickson@mnpower.com

Phone Number: 218-355-3014



Minnesota Department of Commerce
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Information Request

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Request Number:	34
Topic:	Medium- and Heavy-Duty EVs
Reference(s):	2023 IDP Section IV.C.2

Request:

In Section IV.C.2 of its IDP, MP states that “fleet vehicles and commercial charging are not addressed in AFR 2023 and therefore are not included in Minnesota Power’s Base case scenario. The Medium and High DER cases both include assumptions for medium- and heavy-duty EV adoption.” Please explain:

- How MP developed its estimates for the number of medium- and heavy-duty EVs in the Medium and High DER scenarios,
- MP’s methodology to develop forecasts for peak demand and energy consumption for medium- and heavy-duty EVs in the Medium and High DER scenarios.

Response:

- To identify the number of medium- and heavy-duty vehicles, Minnesota Power first found the ratio of total medium- and heavy-duty vehicle registrations compared to light-duty vehicle registrations in Minnesota. Those ratios were then used to identify the number of medium- and heavy-duty vehicles in St. Louis County based on the number of St. Louis County light-duty vehicle registrations. The same EV penetration rate for light-duty EVs was then applied to total medium- and heavy-duty vehicles to arrive at the medium- and heavy-duty EV count. As more information is available about medium- and heavy-duty electric vehicle adoption, Minnesota Power will update its methodology for more accurate forecasts.

To be completed by responder

Response Date: 3/22/2024

Response by: Cory Erickson – Customer Insights and Forecasting Analyst

Email Address: cmerickson@mnpower.com

Phone Number: 218-355-3014



Minnesota Department of Commerce
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Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

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-
- b) For energy consumption, Minnesota Power first found the average number of miles driven for medium- and heavy-duty vehicles in a year.¹ Next, the average kWh per mile that a vehicle in its respective weight class would use was identified.² The Company was then able to arrive at the total MWh/Year/EV assumptions for both medium- and heavy-duty vehicles and applied that usage assumption to the amount of forecasted EVs in MP's service territory for total energy consumption.

For the peak forecast, Minnesota Power aggregated the amount of new EVs each year across all weight classes (light-, medium-, and heavy-duty) and applied the light-duty EV peak impact assumptions to the total new load on the system due to EV adoption.

¹ Average Annual Vehicle Miles Traveled by Major Vehicle Category – Alternative Fuels Data Center

<https://afdc.energy.gov/data/10309>

² The Medium- and Heavy-Duty Electric Vehicle Market: Plugging into the Future Part I – Great Plains Institute

<https://betterenergy.org/blog/the-medium-and-heavy-duty-electric-vehicle-market-plugging-into-the-future-part-i/>

To be completed by responder

Response Date: 3/22/2024

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Request Number:	35
Topic:	Medium- and Heavy-Duty EVs
Reference(s):	2023 IDP Section IV.C.2

Request:

In Section IV.C.2 of its IDP, MP states “the Medium DER case forecast for medium- and heavy-duty vehicles matches the Base case light-duty penetration rate forecast. The High DER forecast for medium- and heavy-duty vehicles matches the High DER case light duty penetration rate forecast.” Please explain MP’s rationale for utilizing the High DER light duty penetration rate forecast for developing the High DER medium- and heavy-duty vehicle forecasts.

Response:

Medium- and heavy-duty electric vehicle adoption in Minnesota Power’s service territory is currently very low and there is limited information available related to trends and expectations. Minnesota Power assumed a slower adoption rate in the Medium DER case forecast and a more aggressive adoption rate in the High DER case forecast. Minnesota Power will continue to monitor medium- and heavy-duty EV adoption and will update its forecast assumptions when more information is known.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
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Information Request

Docket Number: E017/M-23-258

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Type of Inquiry: General

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Request Number:	36
Topic:	Public Charging Demand
Reference(s):	2023 IDP Section IV.C.3

Request:

In Section IV.C.3 of its IDP, MP forecasts that its 16 DCFC public charging stations will add 0.04 MW to peak demand in 2024 and 0.43 MW in 2035. Please explain how MP currently forecasts the energy consumption and peak demand impacts for all other EV public charging on its system or how MP plans to incorporate these stations into its future forecasting.

Response:

Minnesota Power currently forecasts energy consumption for the existing 12 DCFC stations by applying the same EV growth rate to actual energy consumption for each charger to 2022 actual energy consumption. For peak demand impacts, the same coincidence factor from the residential EV peak assumptions is applied to the daily energy consumption from the 12 existing DCFCs to model the forecasted peak impact.

To be completed by responder

Response Date: 3/22/2024

Response by: Cory Erickson – Customer Insights and Forecasting Analyst

Email Address: cmerickson@mnpower.com

Phone Number: 218-355-3014



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

SEND RESPONSE VIA EMAIL TO: Utility.Discovery@state.mn.us as well as the assigned analyst(s).

Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

Each response must be submitted as a text searchable PDF, unless otherwise directed. Please include the docket number, request number, and respondent name and title on the answers. If your response contains Trade Secret data, please include a public copy.

Request Number: 37
Topic: High DER Feeders/Substations
Reference(s): 2023 IDP Section IV.C.6

Request:

On p. 91 of its IDP, MP identifies five feeders or substations which have high DER penetration relative to load. Please describe:

- a) Whether MP has had to make any upgrades to its distribution system to accommodate the existing levels of DER, and if so, the associated costs,
- b) Whether any of the feeders or substations identified are currently at maximum hosting capacity, and if so, what upgrades may be needed to expand DER access at these locations and the estimated cost of these upgrades,
- c) What methodology MP uses to determine the maximum hosting capacity of a feeder or substation.

Response:

- a) Minnesota Power reviewed the DER projects associated with the five feeders or substations and no upgrades were needed to accommodate the high DER penetration relative to the load.
- b) Minnesota Power has only studied the feeders and substations identified in the IDP in relation to its current DER penetration amount. MP is not currently tracking maximum hosting capacity in the interconnect studies. The interconnect process studies the system impacts at the request DER capacity provided by the interconnector.
- c) Minnesota Power does not currently determine the maximum hosting capacity for a feeder or substation but evaluates each project submitted through a DER interconnection study.

To be completed by responder

Response Date: 3/22/2024

Response by: Eric Clement – Manager T&D Grid Modernization

Email Address: eclement@mnpower.com

Phone Number: 218-471-4009



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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Request Number:	38
Topic:	Impact of Increased DER Adoption on Planning Processes and Tools
Reference(s):	2023 IDP Section IV.C.5

Request:

In Section IV.C.5 of its IDP, MP discusses the potential impacts of increased DER adoption on MP's management of distributed generation interconnections, including additional administrative and technical work. Please explain whether any of the potential cost impacts of managing additional interconnections are included in the IDP budget and, if so, the amounts, including the extent to which costs are offset by application fees, and the timing.

Response:

Minnesota Power is not yet experiencing significant impacts from DG on its distribution system as described in Section IV.C.5 of the IDP but anticipates that as adoption increases, those impacts will become more prevalent. The Company is implementing an online application portal to streamline the interconnection process, but costs related to that project are not included in the distribution budgets reflected in this IDP. More complex modeling tools and expertise that may be needed to manage increasing levels of DG adoption will be included in future IDPs as the timing and scale of those investments are known.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Phone Number(s): 651-539-1058, 651-539-1675

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Request Number:	39
Topic:	Multifamily Dwellings & EVs
Reference(s):	2023 IDP, Appendix E, Section III.2B

Request:

In Section III.2B of its TEP, MP states it is “currently assessing opportunities to better serve multifamily residents and expects to submit a proposal to facilitate EV charging in multiple-dwelling units by the fourth quarter of 2024.” Please provide additional details regarding MP’s potential proposal, including how it would facilitate EV charging for multifamily residents and the alternatives under consideration.

Response:

Minnesota Power is currently evaluating approaches to supporting EV charging in multifamily dwellings. There are several options ranging from rebates, make ready programs, services, and potential rates that could be considered. The company will engage with stakeholders to gather feedback on what support would be impactful. The Company does not have additional details of how a multifamily EV program would be facilitated at this time. As stated in the TEP, Minnesota Power will submit a detailed proposal by the fourth quarter of 2024.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manage Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

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Request Number: 40

Topic: Transportation Electrification Initiatives Historical Spending

Reference(s): 2023 IDP, Appendix E, Section III.10

Request:

In Table 2 of Section III.10 of its TEP, MP provides historical spending for the past five years on all transportation electrification initiatives. Please provide the following:

- a) Annual amounts for the historical spending,
- b) Identify labor costs separately from rebates, and
- c) Identify the amounts for specific rebate programs.

Response:

a)

	2019	2020	2021	2022	2023 ¹
EV Spending	\$107,460	\$52,713	\$160,749	\$117,764	\$96,213

¹The figures included in the table for 2023 represent a partial year based on the filing date.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

SEND RESPONSE VIA EMAIL TO: Utility.Discovery@state.mn.us as well as the assigned analyst(s).

Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

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- b) Labor and overheads represent \$305,443 of the total historical EV spending included in the TEP. A detailed breakdown is provided below:

	2019	2020	2021	2022	2023 ¹
Labor & Overheads	\$9,563	\$41,810	\$81,632	\$93,079	\$79,360
Program Expenses²	\$97,897	\$10,904	\$79,117	\$24,685	\$16,853
Total	\$107,460	\$52,713	\$160,749	\$117,764	\$96,213

¹The figures included in the table for 2023 represent a partial year based on the filing date.

²Program expenses include all non-labor expenses (rebates, expenses, materials, etc.)

- c) Minnesota Power offered two EV rebates during the reporting period including up to \$500 for level 2 smart chargers and up to \$500 for the installation of a second service. Below is the spending per rebate:

	2022	2023*
L2 Smart Charger	\$4,500	\$7,988
Second Service	\$4,500	\$4,000

*The figures included in 2023 represent a partial year and include only data that was available at the time of filing.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

ADDITIONAL INSTRUCTIONS:

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Request Number: 41
Topic: Transportation Electrification Initiatives Future Spending
Reference(s): 2023 IDP, Appendix E, Section III.11

Request:

In Section III.11 of its TEP, MP provides a table of future spending for next five years on all transportation electrification initiatives. Please provide the following:

- a) Annual amounts for each of the budget categories,
- b) Identify capital and O&M costs by each initiative,
- c) Identify labor costs separately from rebates,
- d) Identify the amounts for specific rebate programs.

Response:

a)

Budget Category	2024	2025	2026	2027	2028
Capital	\$2,602,161				
O&M ¹	\$109,968	\$109,968	\$109,968	\$109,968	\$109,968
Rebates	\$53,042	\$53,042	\$53,042	\$53,042	\$53,042
Education & Outreach	\$55,000	\$55,000	\$55,000	\$55,000	\$55,000
Labor	\$218,400	\$224,952	\$231,701	\$238,652	\$245,811
Total	\$3,038,571	\$442,962	\$449,711	\$456,662	\$463,821

¹Anticipated O&M expenses for the DCFC project were evenly distributed over 5 years for purposes of this table.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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-
- b) All capital and O&M expenses included in the referenced table are related to Minnesota Power's DCFC project as approved in Docket No. E015/M-21-257.
 - c) See above table.
 - d) Minnesota Power included budget assumptions for two rebate programs including up to \$500 for a level 2 smart charger and up to \$500 for the installation of a second service. See above table for total assumed rebate budget.

To be completed by responder

Response Date: 3/22/2024

Response by: Katie Frye – Manager Customer Programs & Services

Email Address: kfrye@mnpower.com

Phone Number: 218-355-3236



Minnesota Department of Commerce
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Information Request

Docket Number: E017/M-23-258

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Type of Inquiry: General

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Date of Request: 3/12/2024

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Request Number:	45
Topic:	BCA Decisions
Reference(s):	2023 IDP, Appendix F, Table 6

Request:

In Table 6 of its BCA Framework Report, Black & Veatch presents multiple technologies with positive and negative NPVs. Please explain which of these technologies MP intends to deploy at each location, and if MP has decided not to pursue a technology deployment with a positive NPV, please explain why this choice was made.

Response:

For the four non-wire alternatives projects listed in Table 6, the Kerrick and Askov Battery Energy Storage System (BESS) was the only project with a positive net benefit NPV. The BESS project provided positive NPV as both an Integrated Volt-Var Control (IVVC) program and a circuit backup program. From the results of the Non-Wire Alternatives study and the BCA report, Minnesota Power is moving forward with a BESS pilot project. More information on this pilot project can be found in Section IV.B.5 of the IDP.

For the Wrenshall and Thompson project in Table 6, Minnesota Power also looked at adding a BESS to provide a redundant source for the town of Wrenshall as well as potentially optimize solar garden operations. Minnesota Power would also install automated FLISR equipment as part of the BESS installation to isolate any faults and serve the load from the BESS while the area is not served from the Wrenshall substation. Even though this project would have provided a positive NPV for the IVVC program and FLISR program, it would have had a greater negative NPV as part of the circuit backup program. This resulted in the overall project having a negative net benefit NPV. Currently MP is not pursuing any projects from the Non-Wire Alternatives study for the Wrenshall area.

To be completed by responder

Response Date: 3/22/2024

Response by: Nicholas Boldt – Engineer Senior

Email Address: nboldt@mnpower.com

Phone Number: 218-355-2822



Minnesota Department of Commerce
85 7th Place East | Suite 280 | St. Paul, MN 55101
Information Request

Docket Number: E017/M-23-258

Requested From: Jess McCullough, Public Policy Advisor II, MP

Type of Inquiry: General

☐ Nonpublic ☒ Public

Date of Request: 3/12/2024

Response Due: 3/22/2024

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Assigned Analyst(s): Daniel Tikk, Ari Zwick

Email Address(es): daniel.tikk@state.mn.us, ari.zwick@state.mn.us

Phone Number(s): 651-539-1058, 651-539-1675

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For the two Silver Bay projects in Table 6, Minnesota Power also looked at adding a BESS to provide a redundant source for the town of Silver Bay. Even though the BESS would have provided a positive NPV as part of a IVVC program it had a greater negative NPV as part of the circuit backup program. This resulted in the overall project having a negative net benefit NPV. Currently MP is not pursuing any projects from the Non-Wire Alternatives study for the Silver Bay area.

To be completed by responder

Response Date: 3/22/2024

Response by: Nicholas Boldt – Engineer Senior

Email Address: nboldt@mnpower.com

Phone Number: 218-355-2822

CERTIFICATE OF SERVICE

I, Sharon Ferguson, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, certified mail, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

Minnesota Department of Commerce
Comments

Docket No. E015/M-23-258

Dated this 5th day of **April 2024**

/s/Sharon Ferguson

[illegible]

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Will	Seuffert	Will.Seuffert@state.mn.us	Public Utilities Commission	121 7th Pl E Ste 350 Saint Paul, MN 55101	Electronic Service	Yes	OFF_SL_23-258_M-23-258