

Staff Briefing Papers - Revised

Meeting Date November 17, 2022 Agenda Item 2**

Company All Electric Utilities

Docket No. **E-999/CI-19-704**

In the Matter of an Investigation into Self-Commitment and Self-Scheduling of Large Baseload Generation Facilities

Issues

1. Have the utilities provided adequate information in the March 2022 compliance filings on self-commitment?
2. Should the utilities be required to provide additional information or take additional steps regarding self-commitment at this time?
3. Should the filing requirements for future years be modified?

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 **Relevant Documents**

Date

Reports

Xcel Energy - 2021 Annual Report March 1, 2022

Minnesota Power - Compliance Filing March 1, 2022

Otter Tail Power Company - Annual Compliance Filing March 1, 2022

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The attached materials are work papers of the Commission Staff. They are intended for use by the Public Utilities Commission and are based upon information already in the record unless noted otherwise.

 **Relevant Documents**

Date

Comments

Department of Commerce - Comments	May 2, 2022
Fresh Energy - Comments	May 3, 2022
Minnesota Power - Compliance Filing (Reply Comments)	May 27, 2022
Otter Tail Power Company - Reply Comments	June 1, 2022
Xcel Energy - Reply Comments	June 1, 2022
Department of Commerce - Response to Reply Comments	June 14, 2022
Minnesota Power - Compliance Filing (System Strength Report)	July 22, 2022
Otter Tail Power Company – Letter	September 2, 2022

Prior Orders

PUC – Order – Docket No. E-999/AA-18-373	November 13, 2019
PUC – Order Clarifying Filing Requirements and Schedule	May 4, 2020
PUC – Order Evaluating Self-Commitment and Self-Scheduling Reports	January 11, 2021
PUC – Order Accepting Reports and Setting Additional Requirements	December 1, 2021

Contents

I.	Introduction and Statement of the Issues	2
II.	Background	2
III.	Utility Filings.....	7
	A. Minnesota Power 2021 Compliance Report.....	7
	B. Xcel Energy 2021 Compliance Report.....	9
	C. Otter Tail Power Compliance Filing	11
IV.	Parties' Comments.....	12
	A. Department Initial Comments	12
	B. Fresh Energy Initial Comments	14
	C. Minnesota Power Reply Comments	15
	D. Xcel Energy Reply Comments	15
	E. Otter Tail Reply Comments.....	17
	F. Department Response Comments.....	18
V.	Decision Options.....	19

I. Introduction and Statement of the Issues

On November 13, 2019, the Commission ordered Xcel Energy (Xcel), Otter Tail Power (Otter Tail), and Minnesota Power (MP) to annually file reporting on the utilities' use of self-commitment and self-scheduling of its baseload generation plants in the Midcontinent Independent System Operator (MISO) market. Since 2019, all three utilities have made significant changes to their self-commitment practices, with many coal-fired facilities switching to an economic or seasonal-commitment policy for generation in MISO. Questions before the Commission include:

- Are the 2021 annual reports on self-commitment and dispatch by Xcel, Otter Tail, and MP adequate and compliant with Commission Orders?
- Should the Commission make any changes to reporting for 2021 and later?
- Should the Commission order any additional study or reporting relating to the prudence of using self-commitment at the utilities' baseload generation facilities?

II. Background

The MISO markets identify the supply of electric generation available throughout the MISO regions, and the anticipated (and, in the real-time market, the actual) demand for electricity in each area, selecting generators for dispatch in a manner designed to minimize overall costs to the system while meeting reliability requirements.

MISO unit commitment is the process that determines which generators (and other resources) will operate to meet the upcoming need for electricity. MISO scheduling and dispatch sets the hourly output for each committed resource, using simultaneously co-optimized Security Constrained Unit Commitment and Security Constrained Economic Dispatch to clear and dispatch the energy and reserve markets.

Self-commitment and self-scheduling are "commitment" and "dispatch" statuses available to electricity generators participating in the MISO Day Ahead wholesale power market.

Self-commitment allows a market participant to request that MISO commit a particular unit to run, regardless of market price. In MISO, this is referred to as "must run" status. Unless there is a reliability issue, MISO will commit the unit, at a minimum, to that unit's specified "economic" minimum output level. The unit acts as a price taker, accepting whatever the clearing price for that period happens to be. This may be below the unit's cost to generate. Depending on reliability needs and market prices, MISO may also commit the unit to production above economic minimum.

Self-scheduling enables participants to submit hourly generation schedules to MISO. Self-scheduling does not guarantee dispatch but does predetermine minimum output levels. Units are price takers up to the self-scheduled generation amount but may be dispatched at higher levels up to the unit's economic maximum, depending on market pricing and reliability needs.

In its February 7, 2019, ORDER ACCEPTING 2016-2017 REPORTS AND SETTING ADDITIONAL REQUIREMENTS¹ the Commission discussed self-commitment and self-scheduling as follows:

MISO markets identify the supply of electric generation available throughout the MISO regions, and the anticipated (and, in real time, the actual) demand for electricity in each area, selecting generators for dispatch in a manner designed to minimize overall costs to the system while meeting reliability requirements. MISO unit commitment is the process that determines which generators (and other resources) will operate to meet the upcoming need. MISO scheduling and dispatch sets the hourly output for each committed resource, using simultaneously co-optimized Security Constrained Unit Commitment and Security Constrained Economic Dispatch to clear and dispatch the energy and reserve markets. A market participant—that is, anyone registered for participation in MISO markets—can specify the production cost of its generator, and MISO will refrain from dispatching the resource until market prices meet or exceed that level, again, subject to reliability requirements. But under some circumstances a participant will prefer to commit its generator to be available for MISO dispatch (“self-commit”), and unilaterally set the generator's output level (“self-schedule”), accepting whatever market price results rather than awaiting economic dispatch by MISO.

Renewable sources of generation have the advantage of incurring no fuel costs, which tends to reduce their operating costs and make them attractive options for MISO dispatch. However, self-committed and self-scheduled generators may displace these resources—even if, at any given moment, the renewable resource had lower operating costs.

The Commission directed Minnesota Power, Otter Tail, and Xcel Energy to make compliance filings containing initial analysis of the impacts of self-committing and self-scheduling their generators, including the annual difference between production costs and corresponding prevailing market prices. In response to information requests from parties, the utilities also provided hourly and monthly data.

At the Commission's October 10, 2019, electric Annual Automatic Adjustment (AAA) agenda meeting, the parties requested, and the Commission agreed, that the issues surrounding self-commitment and self-scheduling be moved to a separate docket to provide a more focused forum for these issues. Thus, the Commission opened an investigation in this docket to require

¹ In the Matter of the Review of the 2016-2017 Annual Automatic Adjustment Reports for All Electric Utilities, Docket No. E-999/AA-17-492, and In the Matter of the Review of the 2017-2018 Annual Automatic Adjustment Reports for All Electric Utilities, Docket No. E-999/AA-18-373

Minnesota Power, Otter Tail, and Xcel Energy to report their future self-commitment and self-scheduling analyses using a consistent methodology by including fuel cost and variable Operations and Maintenance (O&M) costs.

In its November 13, 2019 ORDER ACCEPTING 2017-2018 ELECTRIC REPORTS AND SETTING ADDITIONAL REQUIREMENTS (November 13, 2019 Order),² the Commission:

8. Directed Minnesota Power, Otter Tail, and Xcel Energy to submit “an annual compliance filing analyzing the potential options for seasonal dispatch generally, and potential options and strategies for utilizing “economic” commitments for specific coal-fired generating plants. The utilities shall include a specific explanation of barriers or limitations to each of these potential options, including but not limited to technical limits of the units and contract requirements (shared ownership, steam offtake contracts, minimum fuel supply requirements, (shared ownership, steam offtake contracts, minimum fuel supply requirements, etc.) as relevant, on March 1, 2020, and each year thereafter.”
9. The Commission opened the investigation in this docket and required Minnesota Power, Otter Tail, and Xcel Energy to report their future self-commitment and self-scheduling analyses. The Commission ordered the utilities to use a consistent methodology by including fuel cost and variable O&M costs, matching the offer curve submitted to MISO energy markets.
10. Directed Minnesota Power, Otter Tail, and Xcel Energy to provide stakeholders the underlying data used to complete their analyses, in a live Excel spreadsheet, including, at a minimum, the data points listed below for each generating unit, with the understanding that this may include protected data.

Hourly data for all units:

- a) Date and hour
- b) Commit status (Null / Economic / Emergency / Must Run / Outage / Not Participating)
- c) Dispatch Status for Energy (Null / Economic / Self Schedule)
- d) Cleared MW
- e) Day ahead locational marginal price at unit node
- f) Real time MW adjustment
- g) Real time locational marginal price at unit node
- h) Day ahead dispatch minimum
- i) Real time dispatch minimum
- j) Fuel cost (\$/MWh)
- k) Variable operations and maintenance costs (\$/MWh)

² In the Matter of the Review of the 2017-2018 Annual Automatic Adjustment Report for All Electric Utilities, Docket No. E-999/AA-18-373

- l) Day ahead locational marginal price representative of utility load zone
- m) Real time locational marginal price representative of utility load zone
- n) Whether Day Ahead Cleared = Day Ahead Dispatch Minimum (0 or 1)
- o) Actual production in MWh (for all 8,760 hours of the year)
- p) Day ahead MISO payment
- q) Real time MISO payment
- r) Net MISO energy payment
- s) Production costs $((J+K) * O)$
- t) Net cost or benefit (R-S)

Monthly or annual data for all units:

- u) Revenue from ancillary services (monthly)
- v) Fixed operations and maintenance costs (preferably monthly) or reasonable estimates in approximation thereof
- w) Capital revenue requirements (annual) or reasonable estimates in approximation thereof
- x) Average heat rate at economic minimum
- y) Average heat rate at economic maximum

Docket No. E-999/CI-19-704 was opened to investigate the use of self-commitment and self-scheduling by the regulated electric utilities in Minnesota. On December 13, 2019, the Commission issued its notice requesting procedural comments. On January 10, 2020, the parties filed initial comments on the scope of this investigation, with reply comments filed on January 28, 2020. In those comments, parties raised the question of the period covered by the reporting required in the November 13, 2019 Order, with various parties suggesting different time periods for the first set of comments, which were received on and around March 1, 2020 from Minnesota Power, Xcel Energy, and Otter Tail Power Company (Otter Tail).

The Commission took up this docket on February 29, 2020 and provided clarification on filing requirements and deadlines.³ On January 11, 2021, the Commission Order Evaluating Self-Commitment and Self-Scheduling Reports and Establishing Additional Filing Requirements approved the 2019 reports by Xcel and Otter Tail, required MP to file additional information on its 2019 reports by February 1, 2021 and, in addition to all existing reporting requirements, established additional reporting requirements for the 2020 and later reports:

- Include ancillary services revenues and any other make-whole payments as a separate column in all reporting on revenue from generation.
- Utilities should provide Unit Fuel Costs and Unit Variable Cost as separate line items.

³ ORDER CLARIFYING FILING REQUIREMENTS AND SCHEDULE, In the Matter of the Review of the 2017–2018 Annual Automatic Adjustment Report for All Electric Utilities, Docket No. E-999/AA-18-373, and In the Matter of an Investigation into Self-Commitment and Self-Scheduling of Large Baseload Generation Facilities, Docket No. E-999/CI-19-704 (May 4, 2020)

- If a utility excludes any fuel costs from its MISO offer curves, the utility should also provide an analysis that includes all fuel costs, including those currently treated as fixed costs due to contractual terms.
- Utilities should include all preventative maintenance in O&M costs for reporting purposes.
- Any hours with unavoidable self-commitment should be labeled as such, with a cause listed for the self-commitment in that hour. (Testing, contract, dispatch of co-owned generation, etc.)
- Future analyses of self-commitment and self-scheduling should include all production costs including fuel, variable O&M, and other variable costs associated with the plant.
- To the extent not already provided, utilities should provide the following:
 - i. Length of minimum decommit time for each unit;
 - ii. Number of times in the analysis period that each unit incurred losses over a duration greater than or equal to its minimum decommit time;
 - iii. Of the periods identified in (ii), the number of periods when losses were greater than the relevant startup cost (warm or cold startup cost, depending on the length of the period); and
 - iv. Sum of losses in excess of startup cost that were incurred during periods identified in (iii).
- A complete analysis of the costs and benefits of economic or seasonal dispatch relative to self-scheduling at the following facilities:
 - i. Boswell 3 and Boswell 4 – MP
 - ii. Coyote Station – Otter Tail
 - iii. Sherco 1 and Sherco 3 – Xcel
 - iv. Big Stone – Otter Tail
- Otter Tail shall provide a discussion of the options and costs of changing its current coal contract at Coyote Station and an evaluation of how potential costs of changing the contract compare to Coyote Station’s past and forecast operating losses in Docket No. E-999/CI-19-704.
- Utilities with co-ownership of baseload generating units shall discuss options of economically committing those units within the terms of their partnership in the March 1, 2021 compliance report.
- Minnesota Power, Otter Tail, and Xcel Energy shall evaluate whether reducing minimum operating levels would benefit customers and include that evaluation and discussion in the March 1, 2021 compliance report.

In its Order Accepting Reports and Setting Additional Requirements of December 1, 2021, the Commission accepted the 2020 reports, approved Minnesota Power’s amended 2019 report, and set the following additional requirements for future reports:

- Minnesota Power shall file the system strength study which it has commissioned a consultant to complete in this docket when completed.

- Future reports shall contain the following information:
 - Information on annual carbon dioxide emissions.
 - Reasons for unavoidable self-commit status designations.
 - Plant startup conditions (e.g., cold, warm, or hot).
 - Equivalent Forced Outage Rate information to be tracked over time, and
 - Descriptions of changes to operating procedures and physical modifications to units to ensure plants are becoming more flexible to meet upcoming challenges, as applicable.
- The electric utilities shall develop a methodology, that is consistent to the extent possible, for splitting fuel costs such that one part depends on the megawatt-hour (MWh) production (i.e., variable cost) and the other part is independent of the MWh generated (i.e., fixed cost) and update the reporting template accordingly.
- Utilities shall work together to develop a consistent method for estimating the best-case and worst-case potential for economic commitment for each plant.

III. Utility Filings

A. Minnesota Power 2021 Compliance Report

On March 1, 2022, Minnesota Power filed its 2021 compliance report.

Minnesota Power's 2021 highlights include the transition of Boswell Unit 3 to economic dispatch and reducing the plant's operational minimums from 175 MW to 75 MW, creating more flexibility for the unit in daily dispatch. Reducing operational minimums also benefits ratepayers at times when the units must be self-committed and are operating on a must-run basis.

2021 challenges included the February cold weather event, drought and high temperatures in Summer 2021, concerns over coal supply, and increasing natural gas and power market prices. Gas prices increased about 95%, while market power prices increased over 100%. Due to this, Minnesota Power saw a significant increase in generation at Boswell 3 & 4, even with the transition to economic dispatch.

Due to high gas and market prices, Boswell 3 and 4 operated profitably even when self-committed during 2021. Boswell 4 is co-owned, and isn't yet available for economic commitment, though negotiations are ongoing.

In economic modeling for the January 1, 2022 to December 31, 2024 period, Minnesota Power found that there was no additional economic benefit to switching Boswell 4 to economic commitment.

Boswell 4

MP identified eight general categories of issues required to transition Boswell 4 to Economic Dispatch, and has made progress on several of them.

1. Current commitment processes produce obstacles to economic dispatch of Boswell 4. Due to the relatively large start-up times and cost, Boswell 4 requires 72 hours of commitment to be profitable, which current day ahead rules don't guarantee outside of 'must run'. MISO has improved its tools for long-term forecasting, which improves MP's ability to identify extended stretches (at least 72 hours) that would be profitable for must-run commitment and makes a selective must-run strategy more attractive for the plant. MP is advocating for more flexible mechanisms such as a multi-day commitment mechanism that is financially binding. Boswell 3 was successfully transitioned to Economic Dispatch in 2021 but, due to strong market conditions, was committed by MISO continuously during much 2021.
2. Boswell 4 is a joint venture between WPPI and MP, and the ownership agreement specifies that it is intended to be run. MP is working with WPPI to develop an economic dispatch plan, but is limited by the fact that Boswell 4 appears on the MISO Market as two separate nodes, one 'run' by MP and the other 'run' by WPPI. Economic dispatch, even with matching bids, opens the issue of one 'node' being dispatched with the other not. MP has identified several issues to address, including re-registration as a single node, offer strategies, etc.
3. MP provides reliability services to the transmission system including voltage support and regional voltage stability. As the last remaining baseload units in Northern Minnesota, a significant chunk of the grid relies on at least one Boswell unit running. Without Boswell, this territory would be relying on imported power to stabilize the grid in the area, which creates some management issues. MP has provided, as of July 22, 2022, a system strength report addressing those issues, primarily focused on grid needs following Boswell's future retirement. This report recommended four ongoing actions:
 - a. Continue transient stability studies to identify specific areas of concern.
 - b. Investigate dynamic reactive power solution options.
 - c. Consider 'future-proof' technologies which are relatively immune to changes in short circuit level.
 - d. Pay careful attention to potential weak system impacts and indicators in all future analysis and development of the MP system.
4. In order to operate within permit, Boswell may periodically need to be offered must-run for three to five days to ensure that proper margin-to-emission limits can be maintained for the next shut-down/start-up cycle. MP plans to use Boswell 3 to 'calibrate' such needs but, since the plant has been dispatched consistently since transition to economic dispatch, it has not yet gained the experience needed to quantify this need.
5. Both Boswell 3 and Boswell 4 are designed for base-load use. Cycling the plants as currently designed can lead to damage and reliability issues. Boswell 3 and 4 also are

used to provide heat to the facility, the lack of which itself can cause damage and reliability issues, especially from December to February, when a steam outage of more than 72 hours can result in the plant freezing. Back-up natural gas fired boilers are anticipated to be available for the 2024-2025 heating season. These boilers themselves would come with a cost, including firm gas supply and the incremental cost of additional gas. Intermittent use can also affect boilers and auxiliary equipment negatively.

6. Offering Boswell 4 on economic dispatch is not currently expected to impact planned staffing levels, which need to be predicated on operating both plants simultaneously. Daily decisions on replacement of vacationing or otherwise missing staff may be affected by economic dispatch decisions.
7. MP has coal commitments under contract for a few more years. Volume uncertainty from economic dispatch may result in higher per-ton cost of coal and uncertainty of supply without higher volume commitments that must-run operations entail. Similarly, the need to make binding transport nominations with BNSF can be challenging, with over-commitment resulting in liquidated damages and under-commitment in low coal inventories, possibly resulting in idling and purchasing higher-cost power from the market in replacement. Tariff rate transportation is much higher cost and lower performance certainty and not financially responsible decision for customers. Boswell is a captive customer for BNSF, so alternate shipping options are not available. MP is currently handling these challenges with Boswell 3, and taking Boswell 4 to economic dispatch would exacerbate them.
8. These transport and procurement issues can also lead to volatility in the Fuel Adjustment Clause, due to the same economic challenges noted previously.

Boswell 3 reduced its operational minimums from 175 MW to 75 MW in November 2021, through an approximately \$4 million investment. MP was also able to reduce Boswell 4's emergency minimum from 210 MW to 185 MW, but has not identified any additional projects to reduce minimums, though it will continue to explore opportunities.

Table 1: 2021 Carbon Dioxide Emissions by Unit

Unit	Tons
Boswell 3	2,543,828
Boswell 4	2,636,159

B. Xcel Energy 2021 Compliance Report

On March 1, 2022, Xcel provided its Compliance Report with 2021 data, including all analysis required by the Commission Orders in this docket.

Minimum Operating Levels

Xcel has reduced Minimum Operating Levels at Sherco 1 and 2 from 260 MW to 215 MW. This resulted in \$236,000 in customer benefits during 2021, calculated by comparing MISO day ahead and real time energy margins when the unit was in turndown to the estimated margins had the unit only dispatched to its previous economic minimum. Margins are based on MISO estimated energy settlement less unit production costs.

Changes to Plant Operating Procedures and Physical Modifications

Sherco and King performed testing, boiler tuning, and revised operating procedures to lower the minimum operating load and increase ramp rate within equipment and environmental limits. Additionally, King created a Seasonal Dispatch best practices document to address maintenance, layup, and equipment management during extended shutdowns.

Best & Worst Case Scenario Analysis

Utilities met to implement Order Point 10 of the December 1 Order, which requires utilities to work together to develop a consistent method for estimating the best-case and worst-case potential for economic commitment for each plant. The utilities agreed that best case can be represented by year-round economic-commitment, and worst- case by year-round self-commitment/must-run.

Xcel found that the worst-case scenario provided higher margins for Sherco 3 than the best-case scenario, an unexpected result. Xcel attributes this to limits of the current MISO commitment construct, which considers the next 24 hours to determine whether to commit a unit rather than a multi-day forward looking model. The start costs for Sherco 3 are higher than the other units which means that, in order to bring the unit online, LMPs over the next 24 hours must be higher than for the other coal units. The commitment construct resulted in periods of time where the unit was not committed, although it would have been economic to do so if multiple days were considered.

Analysis of Economic & Seasonal Dispatch at Sherco 1 & 3

Xcel and SMMPA signed an agreement on March 1, 2021, allowing Sherco 3 to be offered into the MISO market as a single asset, and so, as of March 19, 2021, Sherco 3 has been economically dispatched as a single entity on the MISO market. This strategy resulted in a NEGATIVE \$4 million result during the balance of 2021. A self-scheduling strategy would have been more beneficial for ratepayers than economic dispatch during 2021. There were extended periods where the unit was not dispatched under an economic dispatch strategy because MISO margins were less than production costs plus startup costs for a 24-hour time horizon, but running would have been profitable if the unit had been self-dispatched and then continued to run for several days. There were, however, significant carbon savings from economic dispatch relative to self-scheduling.

Xcel temporarily moved to must-run for Sherco 3 during the peak winter season in 2022 but moved back to economic dispatch in March 2022.

Auxiliary Boiler installation has been completed with oil capacity, and Xcel is requesting permitting to increase hours of use. Installation of natural gas capability for the auxiliary boilers should be complete by the end of 2022. At that time, Xcel should be able to reevaluate seasonal dispatch for Sherco 1.

Seasonal Dispatch at King and Sherco 2

During 2021, Xcel switched seasonal operations between Sherco 1 and 2 due to unit outages and steam obligations. When Sherco 1 was in planned outage, MISO capacity obligations were transferred to Sherco 2. Xcel then transferred obligations back to Sherco 1 when the planned outage ended.

PLEXOS modelling found that seasonal operations at King resulted in \$9.9 million in savings, and 2.4 billion pounds of reduced carbon emissions. Economic operations were slightly less successful, resulting in decreased profits of \$484,532, but 95.6 million pounds in carbon reductions.

Sherco 1 & 2 seasonal operations resulted in \$6.6 million in margins, and 950 million pounds of reduced carbon emissions. Economic dispatch was net neutral, as the PLEXOS model did not commit Sherco 1 or 2 during its designated seasonal period, resulting in no profit or CO2 emissions change relative to base case.

On April 29, 2022, Xcel filed an update to its report. In March 2022, the Independent Market Monitor indicated concerns with plans to idle King and Sherco 2 during the Spring 2022 season. Additionally, due to the results of the Planning Rights Auction on April 14, 2022, Xcel is obligated to offer the units economically throughout the 2022-2023 planning year, subject to coal supply sufficiency.

Table 2: 2021 Carbon Dioxide Emissions by Unit

Unit	Tons
King	1,545,215
Sherco 1	3,051,380
Sherco 2	3,898,059
Sherco 3 (Xcel Share)	2,224,536

C. Otter Tail Power Compliance Filing

On March 1, 2022, Otter Tail Power filed its compliance report, analyzing economic dispatch options at Big Stone and Coyote Station.

In April 2020, Otter Tail and its co-owners implemented economic dispatch at Big Stone. Per their agreement, if any of the three co-owners, MISO, or SPP requests self-scheduling in either MISO or SPP, the plant is self-scheduled. Big Stone also self-schedules under certain situations relating to its scrubber technology. Otherwise, it is economically dispatched.

On May 1, 2021, Coyote Station was economically committed for the first time. Coyote is co-owned by Otter Tail (35%), Minnkota Power Cooperative (30%), Montana Dakota Utilities (25%) and Northwestern Energy (10%). 90% of this load is in MISO, while the Northwestern Energy component is in SPP, and MISO and SPP do not coordinate dispatch.

Table 3: 2021 Carbon Emissions by Unit (Total Plant)

Unit	CO2 – Tons
Big Stone	2,066,415
Coyote Station	3,058,364

IV. Parties' Comments

A. Department Initial Comments

The Department filed its initial comments in response to utility reports on May 2, 2022. The Department focused its analysis on the reasonableness of the utilities' actions in, and adaption to circumstances where the generator's variable cost was greater than the generator's Locational Marginal Price (LMP) since this situation can result both in unnecessary cost increases and unnecessary displacement of lower cost renewable resources.⁴

The Department conducted in-depth analysis of each of the coal plants, finding that the nuclear plants are operated in an economic fashion most of the time and thus don't require more in-depth analysis.

An hourly evaluation of Boswell 3 and 4 found that a more detailed analysis wasn't warranted, and that the Commission should take no action regarding the Boswell units.

The Department analysis of the Otter Tail properties notes that the Otter Tail units suffer from disunity among the co-owners, and that the co-owners need to better align their financial incentives to allow more flexible operation of the facility. The Department also noted that one driver of self-commitment at Coyote Station was high prices in SPP which, on average, were 140% higher than MISO prices at the Coyote Station node. The Department appreciated Otter Tail's analysis of OTP Endorsed Self

⁴ Department Comments of May 2, 2022, Page 12.

Commitment (included Trade Secret as Figure 15 in Department Comments)⁵ and recommended that Otter Tail include similar analysis in future filings, adding a third scenario where OTP endorsed self-commitment based on both MISO and SPP market conditions.

As a result of its analysis, the Department recommended that the following be addressed in utility reply comments:

- a. MP should provide a best and worst-case scenario analysis for Boswell 3.
- a. OTP should explain how much of the disagreements between its units' (Big Stone and Coyote Station) commitment among the plant co-owners is due to divergent financial incentives where each co-owner is maximizing their own profit and not the collective profit of all co-owners.
- b. OTP should explain what steps are being taken by OTP to better align financial incentives of the co-owners regarding its unit's (Big Stone and Coyote Station) operation to help maximize benefits to ratepayers of all the co-owners of the plant.
- c. Xcel should explain how it weighs the lost revenue with the environmental benefits of lower emissions at Sherco 3.
- d. Xcel should explain reasons behind the large increase in wind curtailment compared to 2020 (both for its owned and contracted wind facilities) and the contribution of must run power plants for the same.

RECOMMENDATIONS FOR NEXT YEAR'S FILING:

- e. Require the utilities to include avoided carbon dioxide emissions due to economic commitment along with plant level carbon dioxide emissions in subsequent filings, using the Department's recommended method.
- f. OTP include MISO and SPP market conditions in determining its self-commitment endorsement and show net benefit results in addition to the analysis provided by OTP in Tables 6 and 8 of their filing.
- g. Utilities should point out if there were instances when greater economic commitment led to lost revenue. For such instances, the utilities should describe the utility's strategy to weigh those lost revenues with the environmental benefits of lower emissions.

⁵ Department Comments of May 2, 2022, Page 21.

- h. Utilities should meet and come up with a reporting template that will help track EFOR and hot/warm start events plant wise at a monthly level over a sufficient period of time to perform a meaningful risk analysis from greater economic commitment and include it in subsequent annual filings.
- i. Utilities should include energy (MWh) produced and curtailed from utility owned and contracted wind facilities on a monthly basis for each facility in subsequent filings in this docket.

B. Fresh Energy Initial Comments

On May 3, 2022, Fresh Energy filed its initial comments in response to the utility reports. Fresh Energy finds that switching from self-commitment to economic commitment is creating significant benefits for Minnesotans, in reduced production costs of electricity and improved emissions. Fresh Energy noted that, for most plants, 2021 prices were significantly higher than in prior years during the investigation period, especially in the second half of 2021.

Fresh Energy noted that all but one of the coal units in Minnesota are now using economic commitment at least some of the time. Xcel leads in adoption of economic commitment, with Sherco 3 using economic commitment a majority of the time, and Allen King over 35%. Otter Tail still trails, as its plants, though using economic commitment, do so considerably less than 10% of the hours during 2021, primarily, it appears, due to decisions by co-owners. Fresh Energy acknowledged the increased usage of economic commitment and appreciates the effort that has gone into the establishment of economic commitment practices. Fresh Energy encouraged Xcel, MP, and OTP to continue working to resolve or minimize the remaining limitations to economic commitment.

Fresh Energy is encouraged by the progress MP has made toward making Boswell more flexible and is looking forward to seeing Boswell 4 work toward economic commitment, possibly by 2024.

Fresh Energy notes that Otter Tail's primary issue appears to be reaching an agreement with co-owners on economic commitment. In Docket E-017-RP-21-339, *In the Matter of Otter Tail Power Company's Submittal of Its 2022-2036 Integrated Resource Plan*, OTP responded to CEO Information Request 019 describing a Total Plant Offer Optimization Plan and Combined Modeling of MISO Co-Owner Generation Shares Plan which would address these issues (attached to Fresh Energy Comments as Attachment 6). As such **Fresh Energy recommended the Commission require that, in its 2023 and 2024 annual reports, OTP include an update on its progress toward implementing the *Total Plant Offer Optimization Plan* and *Combined Modeling of MISO Co-Owner Generation Shares Plan* at Big Stone Plant and Coyote Station.**

Fresh Energy noted the anomaly related to self-commitment vs. economic commitment at Sherco 3, and asks that Xcel, in reply comments, discuss whether there are additional options for reducing startup costs, or modifying the offer strategy for Sherco 3 to better manage the limitations of the current 24-hour commitment and dispatch process.

C. Minnesota Power Reply Comments

On May 27, 2022 Minnesota Power filed reply comments to the Department and Fresh Energy.

In response to the Department question about best and worst case scenario analysis for Boswell 3, MP provided such an analysis as attachment 1. MP found a small difference between economic and self-dispatch for Boswell 3, based on current forecasts for 2022 and 2023. Due to high demand, there was little difference between must-run and economic dispatch for the forward-looking analysis during the time period.

In response to Department recommendations:

MP is supportive of providing avoided carbon dioxide emissions due to economic commitment based on the Department's recommended methodology.

MP believes the recommendation to compare lost revenue due to Economic Commitment is based on Xcel's analysis, which compares seasonal dispatch to economic dispatch and must run. Since Boswell 3 and 4 are being utilized in the Planning Resource Auction, a seasonal dispatch strategy is not available to these units, and so that analysis isn't relevant to those plants. MP already compares must run and economic dispatch, and so the analysis wouldn't be needed. However, if the Commission deems such an analysis necessary, MP would request the calculation for the added analysis be defined.

MP does not agree with a recommendation for a reporting template to track Electric Force Outage Rate and Plant Start Conditions. MP already provides the plant start conditions and is willing to include an additional tab with the monthly EFOR.

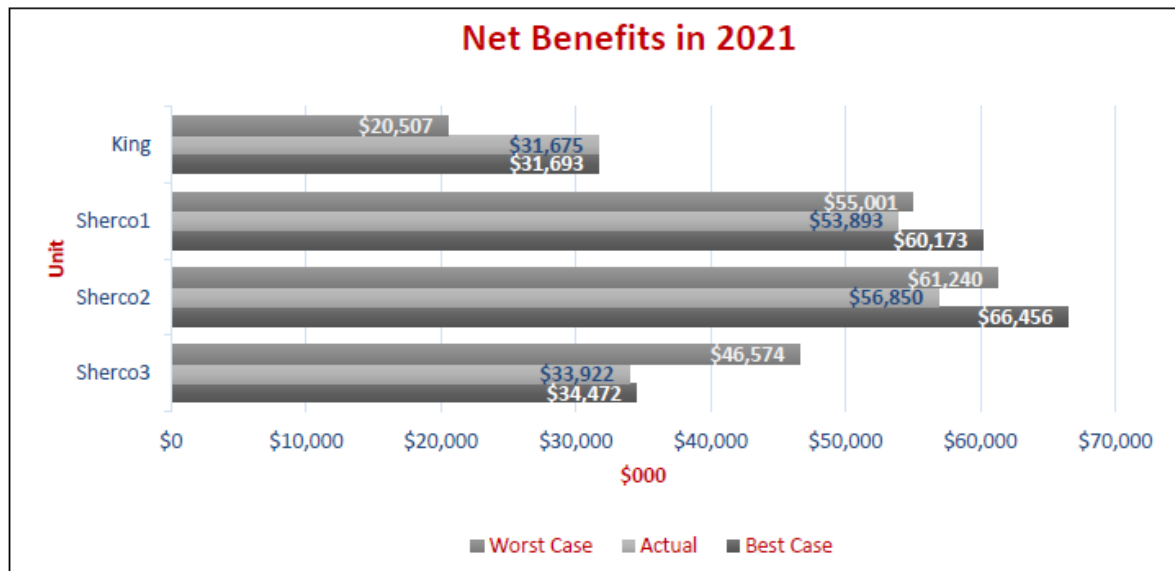
MP supports the recommendation to include energy produced and curtailed from owned and contracted wind facilities on a monthly basis for each facility but notes that such information is already provided to the Commission as part of the automatic adjustment True-Up Report of the Forecasted Fuel and Purchase Energy Rates filed annually on March 1.

D. Xcel Energy Reply Comments

On June 1, 2022, Xcel Energy provided reply comments to answer questions raised by the Department and Fresh Energy.

In response to the Department request for best and worse-case benefits by unit, Xcel simplified and provided best, worst, and actuals for each unit in a single chart, as shown below:

Table 4: 2021 Best Case – Actual-Worst Case Benefits by Unit - Xcel



Xcel recognizes that, in several cases, anomalies occur, such as actuals being outside of the range of best and worst case, or worst case exceeding best case. This reflects the difficulty of comparing modeling scenarios to actual results.

In response to the Department's question about comparing the reduced savings to the carbon savings, Xcel notes that carbon and externality costs are not included in MISO offers. MISO dispatches based on Security Constrained Economic Dispatch, which minimizes production and operating reserve costs subject to reliability constraints. Environmental benefits are considered in the resource planning process, but not in dispatch. The decision to offer Sherco and King on a seasonal basis, however, did consider environmental concerns. The Company continues to advocate for a multiday unit commit in MISO, especially as more market participants begin economically cycling long-lead time units.

Xcel also clarified that, in order to provide steam to Liberty Paper and to provide reliable steam for cold startup for the existing power plant and facility heat, Sherco 2 was must-run during a Sherco 1 outage in March and April 2021.

In response to Fresh Energy's questions about improving the commitment and dispatch process at Sherco 3, Xcel stated that the joint operating agreement with SMMPA informs all offer strategy decisions made for Sherco 3. The agreement coordinates

exchange of costs to effectively manage the unit as a single entity, but it does not give Xcel sole decision-making authority.

Regarding wind curtailments, Xcel stated that a common factor in wind curtailments was an oversubscribed transmission system in the upper Midwest that cannot support all of the wind that has gone into service. There is more wind generation installed in the western subregion of MISO than can be delivered to meet customer demand. It is not dispatch of coal or nuclear units that causes wind curtailments. Xcel noted that curtailments usually occurred at times with positive LMPs – since wind has essentially zero marginal cost, if the wind curtailments were economic and caused by must run dispatch of coal or nuclear facilities, they would only be occurring at zero or negative LMPs.

Xcel is able to provide additional carbon dioxide emissions analysis in future reports.

With respect to the Department recommendation to identify where economic commitment has led to lost revenue, Xcel noted it did so in this report and would do so in future reports, if such a situation is identified.

With respect to EFOR reporting, Xcel notes that five years of annualized EFOR data is provided in the annual fuel forecast on May 1, most recently in Docket No. E-002/AA-22-179. Xcel believes this data is more meaningful than what the Department requests here.

With respect to monthly energy production by wind assets, Xcel noted that this data is provided as part of annual fuel forecast true-ups filed on March 1 annually.

E. Otter Tail Reply Comments

On June 1, 2022, Otter Tail filed comments in reply to Fresh Energy and the Department.

Department Comments

In response to the Department's request for additional best and worst-case scenarios for dispatch, Otter Tail provided two 'best' cases – one for full economic dispatch, and one for full economic dispatch subject to the constraint of unavoidable self-commitment.

In response to the Department's question about individual utility's financial interests, Otter Tail acknowledged that the primary source of disagreement around self-commitment vs economic commitment revolves around dispatch in SPP vs. MISO. Prices in MISO are much lower than in SPP, so it is often profitable to self-commit in SPP when it is not in MISO. Otter Tail is working within the bounds of the operating agreement to optimize financial benefits to ratepayers and is working with other co-

owners to develop and implement economic offer capability when deemed beneficial by all parties. However, Otter Tail cannot do this unilaterally.

Otter Tail does not oppose reporting of avoided carbon dioxide emissions. Otter Tail also does not oppose providing historical hourly LMP day ahead and real time data, which Otter Tail understands would fulfill “The Department recommends OTP include MISO and SPP market conditions in determining its self-commitment endorsement and show Net Benefit results in addition to the analysis provided by OTP in Tables 6 and 8 of their filing.”

Otter Tail opposes the recommendation to identify instances where economic commitment resulted in lost revenues. This would require complex and iterative optimization analysis and would be extremely difficult in the context of Otter Tail’s joint ownership situation and multi-market plant. Otter Tail supports the existing analytical framework of comparing 100% economic dispatch, 100% self-commitment, and actual net benefit to provide reasonable bookends for analysis.

If the Commission does approve the Department recommendation related to identification of economic commitment leading to lost revenues and related emissions impact, Otter Tail asks that the Department provide a defined calculation methodology using the existing data set.

In response to the Department recommendation that utilities develop a reporting template for EFOR and hot/warm start events at a monthly level, Otter Tail noted that hot/warm start events are already in the annual template and does not oppose reporting EFOR data. Otter Tail also does not oppose reporting energy produced and curtailed from utility owned and contracted wind facilities on a monthly basis for each facility in subsequent filings in this docket.

Fresh Energy Comments

In response to Fresh Energy, Otter Tail does not support inclusion of updates on the Total Plant Offer Optimization Plan and Combined Modeling of MISO Co-Owner Generation Shares Plan in this docket. Otter Tail noted that either of these would require significant changes to the operating agreement at its plants, which have been in place for decades. Co-owner groups have shown no interest in pursuing changes. Otter Tail also noted that, at Big Stone, divergence between SPP and MISO is a major issue and is one that is beyond the scope of even a unified ownership to manage, since SPP and MISO have diverging markets and models.

F. Department Response Comments

On June 15, 2022, the Department filed response comments in this docket.

The Department filed the filing recommendations:

- A. Based on the reply comments from the utilities, the Department concludes that there is no need for additional compliance filing in the instant docket for 2021.
- B. Based on the reply comments from the utilities, the Department would like to modify its fourth recommendation (recommendation h above) for next year's filing as follows: The Department recommends utilities include monthly EFOR data for the current reporting year in subsequent annual filings.

V. Decision Options

Xcel Decision Options

1. Find that Xcel Energy's March 1, 2022, filing in this docket is adequate and met the filing requirements. (Department, Xcel, Fresh Energy)

Minnesota Power Decision Options

2. Find that Minnesota Power's March 1, 2022, filing in this docket is adequate and met the filing requirements. (Department, MP, Fresh Energy)

Otter Tail Decision Options

3. Find that Otter Tail's March 1, 2022, filing in this docket is adequate and met the filing requirements. (Department, Otter Tail, Fresh Energy)
4. Require Otter Tail to include MISO and SPP market conditions in determining its self-commitment endorsement and show Net Benefit results in addition to the analysis provided by OTP in Tables 6 and 8 of their 2021 filing. (Department, agreed to by Otter Tail based on its understanding)
5. Require that, in its 2023 and 2024 annual reports, OTP include an update on its progress toward implementing the *Total Plant Offer Optimization Plan* and *Combined Modeling of MISO Co-Owner Generation Shares Plan* at Big Stone Plant and Coyote Station. (Fresh Energy)

Recommendations for Future Compliance Filings by all Utilities in this Docket

6. Require that utilities provide the following in future reports:
 - a. avoided carbon dioxide emissions due to economic commitment along with plant level carbon dioxide emissions in subsequent filings, using the Department's recommended method. (Department, agreed to by utilities)

- b. instances when greater economic commitment led to lost revenue. If there were such instances, the utilities should describe the utility's strategy to weigh those lost revenues with the environmental benefits of lower emissions. (Department, Xcel)
- c. Equivalent Forced Outage Rate (EFOR) information to be tracked over time. (Department, MP, OTP)
- d. energy (MWh) produced and curtailed from utility owned and contracted wind facilities on a monthly basis for each facility in subsequent filings in this docket. (Department)