

**STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION**

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September 24, 2019

**In the Matter of the Review of the Fiscal Year 2017
and 2018 Annual Automatic Adjustment Reports for
Electric Utilities**

**Docket Nos. E999/AA-17-492
and E999/AA-18-373**

COMMENTS OF FRESH ENERGY

Fresh Energy submits these comments in response to Minnesota Power's May 8, 2019 *Compliance Filing* regarding the practice of self-commitment and self-scheduling.¹ On February 7, 2019, the Public Utilities Commission (the Commission) issued an *Order Accepting 2016-2017 Reports and Setting Additional Requirements* (Order).² Minnesota Power filed a *Compliance Filing* (filing) responding to this matter on May 8, 2019. Fresh Energy reviewed Minnesota Power's filing and filed Information Requests (IRs) on May 28, July 24, and September 4 to gather additional relevant data.

Fresh Energy appreciates the Commission's inquiry into Minnesota utilities' use of self-commitment and self-scheduling for their electricity generating units. These features of our wholesale power market have broad implications for affordability and the transition to carbon-free electricity as well as the potential to increase costs to customers today. Importantly, this proceeding is the first extensive study of self-commitment and self-scheduling by a state public utilities commission in our region. We respectfully submit these comments to the Commission presenting findings from our investigation of this issue based on Minnesota Power's initial compliance filing and recommendations for future filings concerning self-scheduling and self-commitment of electric generating units.

¹ Minnesota Power, *Compliance Filing and Attachment I*, May 8, 2019, Dockets E999/AA-17-492 and E999/AA-18-373 ([link](#)).

² Commission, *Order*, February 7, 2019, Dockets E999/AA-17-492 and E999/AA-18-373, page 5 ([link](#)).

Fresh Energy recognizes that over four months have passed since the compliance filing date and apologizes that we were unable to submit these findings earlier. Responses and evaluation of the responses to our Information Requests have proceeded more slowly than usual. Given the volume of information requested and newness of this compliance reporting component, we hope this delay is understandable.

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I. Background

Self-commitment and self-scheduling are “commitment” and “dispatch” statuses available to electricity generators participating in the Midcontinent Independent System Operator (MISO) Day Ahead wholesale power market. As the Commission’s February 7, 2019 Order states under Section III Cost of Self-Commitment and Self-Scheduling:

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.³

Self-commitment enables a participant to request that MISO commit a particular unit regardless of market price.⁴ In the MISO tool set, self-commitment is “must run” status. Unless there is a reliability concern, MISO will commit the unit to at least that unit’s specified minimum output level (often referred to as “economic minimum”). In this situation, the unit is a price taker and revenues from selling into the market may be below the unit’s cost to generate. Depending on market pricing and reliability needs, MISO may also clear the unit above economic minimum.

³ Commission, *Order*, February 7, 2019, Dockets E999/AA-17-492 and E999/AA-18-373, page 4 ([link](#)).

⁴ See MISO Energy and Operating Reserve Markets Business Practices Manual BPM-002-r19 Effective Date: OCT-15-2018, section 4.2.3.4.6 ([link](#)).

Self-scheduling enables participants to submit an hourly generation schedule to MISO.⁵ Self-scheduling does not guarantee dispatch but pre-determines the minimum output level. Units are price takers up to the self-scheduled amount but may be dispatched at a higher level, up to the unit's economic maximum, if market pricing or reliability supports it. Many MISO participants using self-commitment will also use self-scheduling to ensure the unit is dispatched at least at economic minimum.⁶

For example, a 500 MW coal unit may designate 400 MW as its “economic minimum.” If that unit self-schedules for the next day, it would be a price-taker for 400 MW and it would provide an offer price for the remaining 100 MW. In that case, MISO could dispatch the remaining 100 MW if that generation cost is economic. However, that unit's costs for the self-scheduled, or “must run,” 400 MW may often exceed market revenues, resulting in a net loss.

In these comments, we present findings from our investigation of this issue based on Minnesota Power's compliance filing and recommendations for future filings concerning self-scheduling and self-commitment. Section II concerns the data and analysis presented in Minnesota Power's May 8, 2019 filing and Section III concerns our material findings on the costs and benefits of Minnesota Power's use of self-commitment and self-scheduling.

II. Compliance Filing Methodology

The Commission's February 7, 2019 Order asked Minnesota Power, Otter Tail Power, and Xcel to “make compliance filings containing an initial analysis of the consequences of self-commitment and self-scheduling of their generators, including the annual difference between production costs and corresponding prevailing market prices for both FYE17 and FYE18.”⁷ All three utilities calculated this difference by taking net MISO revenues from the Day Ahead and Real Time (DART) markets by hour and subtracting production costs by hour, for relevant hours. However, it appears that the utilities did not agree on which hours of the year are relevant for this analysis and may have used different definitions of “production cost.”

a. Hours included in the analysis

Minnesota Power, Otter Tail, and Xcel each used a different subset of hours to calculate the difference between revenues and costs for self-committed and self-scheduled plants. Minnesota Power focused on hours where a unit was cleared in the day ahead market at

⁵ See MISO Energy and Operating Reserve Markets Business Practices Manual BPM-002-r19 Effective Date: OCT-15-2018, Section 4.2.3.4.7 ([link](#)).

⁶ Participants may also self-commit a unit and self-schedule its output to test unit performance, perform maintenance, and/or accommodate fuel, steam, or operational contract requirements.

⁷ Commission, *Order*, February 7, 2019, Dockets E999/AA-17-492 and E999/AA-18-373, Order Point 4 ([link](#)).

exactly the dispatch minimum set by the utility for that hour (e.g. the self-scheduled level). In their May 8 Filing, Minnesota Power says:

The analysis evaluated only the hours in each year where the unit was committed to its minimum value and compares the cost to operate at the Day Ahead Dispatch Minimums versus the payments Minnesota Power received from the MISO market during these same periods. If the culmination of the times MISO utilized the Boswell unit only at its minimum operating parameter created value for the customer then the self-commit strategy is beneficial for the customer.⁸

These hours are not necessarily the only hours the unit was committed as “must run” or dispatched using a self-schedule, but they are the hours when must run status is “forcing” the market to take the unit’s self-scheduled level of generation. In other words, if market conditions supported dispatch for an economic or reliability reason, in almost all cases we would expect the unit to be dispatched at a level above the self-scheduled minimum.

Xcel states in their compliance filing that they excluded refused derived fuel units from the analysis, and excluded hours when self-commitment was used for testing, maintenance, or contract requirements:

In evaluating instances of self-commit of these units, we also excluded hours when Xcel Energy’s self-commit action in the MISO market was unavoidable (e.g., mandatory generating resource testing, fuel and steam offtake contract requirements, and generating resource maintenance outages).⁹

Otter Tail included all hours of the year in the cost-benefit analysis for Big Stone and Coyote and included all hours for the months in which Hoot Lake was self-committed and self-scheduled. Hoot Lake is only self-scheduled during winter months when one of the units must be committed in order to heat the plant.

b. Costs included in the analysis

As mentioned above, all three utilities calculated the difference in production costs and market pricing by taking net MISO revenues from the Day Ahead and Real Time (DART) markets by hour and subtracting production costs by hour, for relevant hours. To our knowledge, all three utilities used fuel cost, exclusive of other variable costs, to calculate production cost.

⁸ Minnesota Power, *Compliance Filing and Attachment 1*, May 8, 2019, Dockets E999/AA-17-492 and E999/AA-18-373, page 4 ([link](#)).

⁹ Xcel, *Compliance Filing–Self Commitment*, May 8, 2019, Dockets E999/AA-17-492 and E999/AA-18-373, page 2 ([link](#)).

In response to Fresh Energy IR 1 at Part B(a), Minnesota Power clarified that the unit cost provided in its May 8 filing was fuel cost defined as “average cost of inventory on hand for the generating station,”¹⁰ rather than delivered fuel cost. Otter Tail’s filing states: “This analysis compares the market energy revenues received for the time frames the units were self-committed or self-scheduled vs. the fuel costs of each unit” and “the cost of reagents is not included in this analysis because those costs are not currently eligible for fuel clause recovery. Those costs are recovered in base rates.”¹¹ Thus, we understand that Otter Tail’s analysis includes only fuel costs eligible for recovery through the fuel clause. Xcel’s filing says it uses “As-Offered Production Cost.” We did not seek further clarification of this in IRs but based on our analysis of Xcel’s May 8 filing and subsequent IR responses, their calculation appears to include only fuel cost.

c. Data included in compliance filings

The data and supporting calculations provided in the compliance filings submitted by Minnesota Power, Otter Tail, and Xcel vary significantly. Minnesota Power’s filing included hourly data on cost, revenue, and market participation for its two units that utilize self-commitment and self-scheduling, Boswell 3 and Boswell 4. Data of this granularity is essential for conducting any analysis of unit commitment practices and was incredibly helpful to furthering our understanding of how self-commitment and self-scheduling of Boswell 3 and 4 works in practice over the course of a year.

Specifically, Attachment 1 of Minnesota Power’s filing¹² included the following information by unit, for each hour of each fiscal year. Some of these data points are protected data and thus were submitted under the Trade Secret designation.

- a) Date and hour
- b) Cleared MW
- c) Day ahead locational marginal price at unit node
- d) Real time adjustment
- e) Real time locational marginal price at unit node
- f) Day ahead dispatch minimum
- g) Real time dispatch minimum
- h) Unit cost (e.g. fuel cost)
- i) Day ahead locational marginal price at MP.MP

¹⁰ Minnesota Power, *Response To Fresh Energy IR 1*, July 19, 2019, Docket E999/AA-17-492 and E999/AA-18-373, page 2 ([link](#)).

¹¹ Otter Tail Power, *Compliance Filing*, May 8, 2019, Dockets E999/AA-17-492 and E999/AA-18-373, page 3 ([link](#)).

¹² Minnesota Power, *Compliance Filing and Attachment 1*, May 8, 2019, Dockets E999/AA-17-492 and E999/AA-18-373 ([link](#)).

- j) Real time locational marginal price at MP.MP
- k) Whether Day Ahead Cleared = Day Ahead Dispatch Minimum (e.g. $B = F$) (0 or 1)
- l) Actual production in MWh (only supplied for hours when $B = F$)
- m) Day ahead MISO payment
- n) Real time MISO payment
- o) Net MISO payment ($M + N$)
- p) Production costs ($L * H$)
- q) Net cost or benefit ($O - P$)

Through Information Requests, we also requested several other data points from Minnesota Power for each unit:

- Ancillary service revenue
- Make whole payments revenue
- Variable operations and maintenance costs
- Fixed operations and maintenance costs
- Capital revenue requirements
- Average heat rate at economic minimum
- Average heat rate at economic maximum

Minnesota Power declined to provide fixed operations and maintenance costs or capital revenue requirements. The remaining information supplied through these IRs provided important context and significantly advanced our understanding of how self-scheduling and self-commitment fit into the overall performance of these generating units.

III. Findings: Minnesota Power

Fresh Energy evaluated the data provided in compliance filings and subsequent IRs by all three utilities. These comments focus on our findings related to Minnesota Power's filing. We acknowledge that some of these findings are preliminary and may change after clarification from the utility.

Minnesota Power uses self-commitment and self-scheduling for two units, Boswell 3 and 4. Boswell is a coal generating unit based in Cohasset, MN with a nameplate capacity of 965 MW (unit 3: 350.5 MW and unit 4: 585 MW). Minnesota Power owns 100% of unit 3 and has an 80% ownership stake in unit 4. It is Fresh Energy's understanding that Minnesota Power offers both units as "must run" (self-committed) into the MISO market at all times the units are available.

a. Frequency of self-scheduling causing the unit to run

As mentioned above, Minnesota Power’s filing evaluated the difference between DART payments and production costs only for the hours when a unit cleared in the day ahead market at exactly the dispatch minimum set by the utility for that hour (e.g. the self-scheduled, “must-run” level). For ease of reference, the remainder of this comment will term this subset of hours “self-scheduled” hours. The tables below show the percentage of self-scheduled hours per month, e.g. the percent of hours that the units ran as price takers due to must run status. We present this data to provide perspective on how often dispatch is caused by self-commitment.

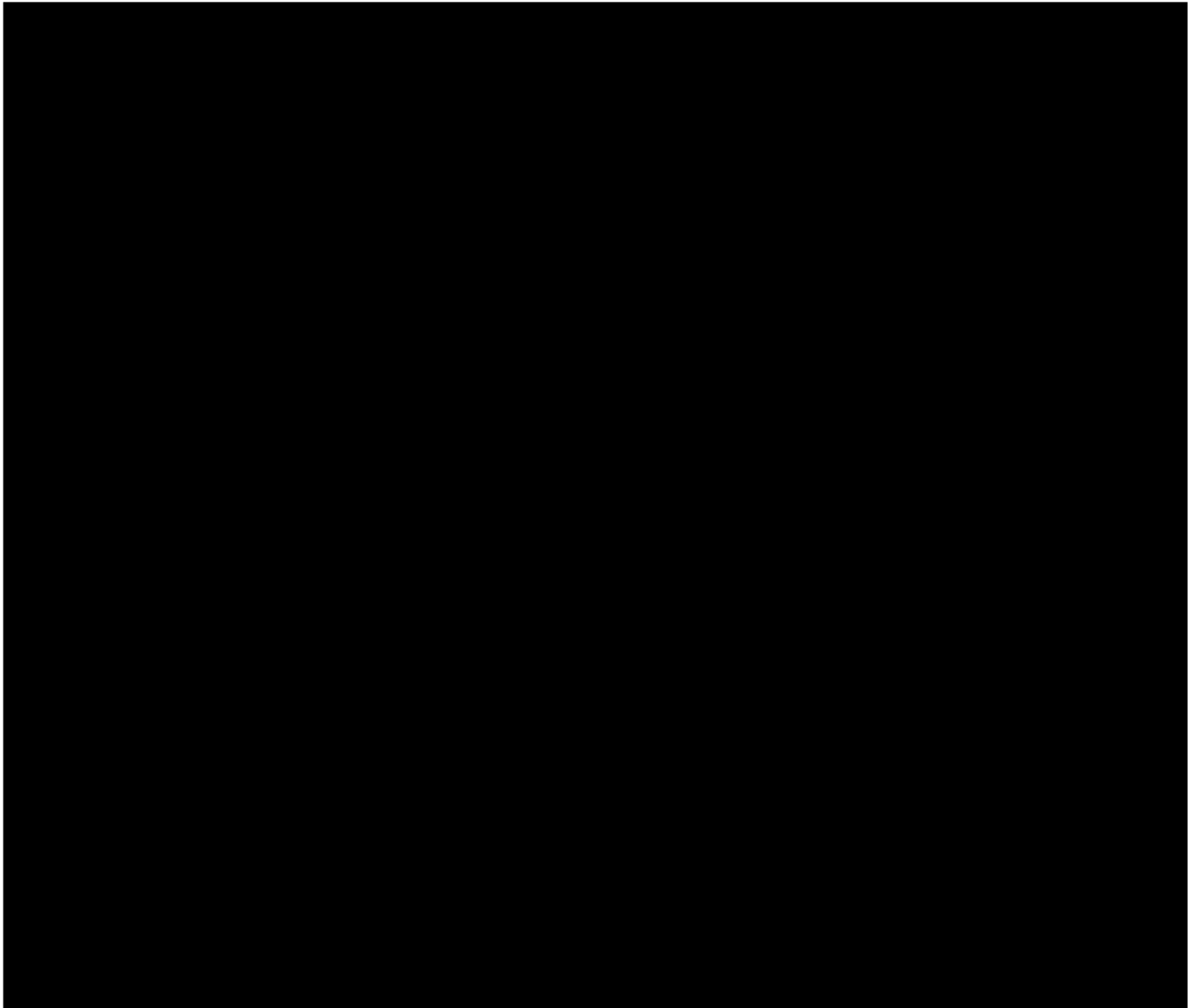
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The frequency with which Boswell 3 and 4 run at their dispatch minimums as price takers varies significantly across months, but is a significant majority of hours. On a fiscal-year basis,¹³ self-scheduled hours account for approximately [REDACTED] of hours for Boswell 3 and [REDACTED] of hours for Boswell 4, but ranges from [Trade Secret Data Begins] [REDACTED] [Trade Secret Data Ends] This same data is presented in graphic form below, by unit.

[Trade Secret Data Begins]



[Trade Secret Data Ends]

¹³ Fresh Energy uses fiscal year (“FY”) and (fiscal year ending) “FYE” interchangeably in this comment. Both phrases refer to the 12-month fiscal year from July 1 to June 30, ending in the year named.

b. Hours when cost exceeded revenue

Public Utilities Commission Information Request 2 (PUC IR 2) requested that Minnesota Power provide data on the number of hours each generating unit's costs exceeded revenues for each of the 12 months during FYE17 and FYE18. The tables below show Minnesota Power's response to PUC IR 2, with columns added for the percentage of hours each month that cost exceeded revenue. Our understanding is that "unit cost" in this calculation, and in the whole of Minnesota Power's filing, is fuel cost defined as "average cost of inventory on hand for the generating station," per Minnesota Power's response to Fresh Energy IR 1 at Part B(a).¹⁴ As we examine in the next section, this is the narrowest "cost" to use in a net revenue analysis.

On an annual basis, Boswell 3 fuel costs exceeded revenues 38%-43% of hours and Boswell 4 fuel costs exceeded revenues 35%-46% of hours. However, there are several months when costs exceeded revenues at least half of the time. These months are shaded in the tables below.

Chart E: MP Hours When Cost Exceeded Revenues in FY 17					
Month	Total Hours in Month	Boswell 3	Boswell 4	Boswell 3 percent of hours	Boswell 4 percent of hours
Jul	744	241	269	32%	36%
Aug	744	298	246	40%	33%
Sep	720	301	401	42%	56%
Oct	744	168	368	23%	49%
Nov	721	483	448	67%	62%
Dec	744	320	321	43%	43%
Jan	744	247	252	33%	34%
Feb	672	367	357	55%	53%
Mar	743	340	355	46%	48%
Apr	720	235	253	33%	35%
May	720	410	396	57%	55%
Jun	744	391	377	53%	51%
Total	8760	3801	4043	43%	46%

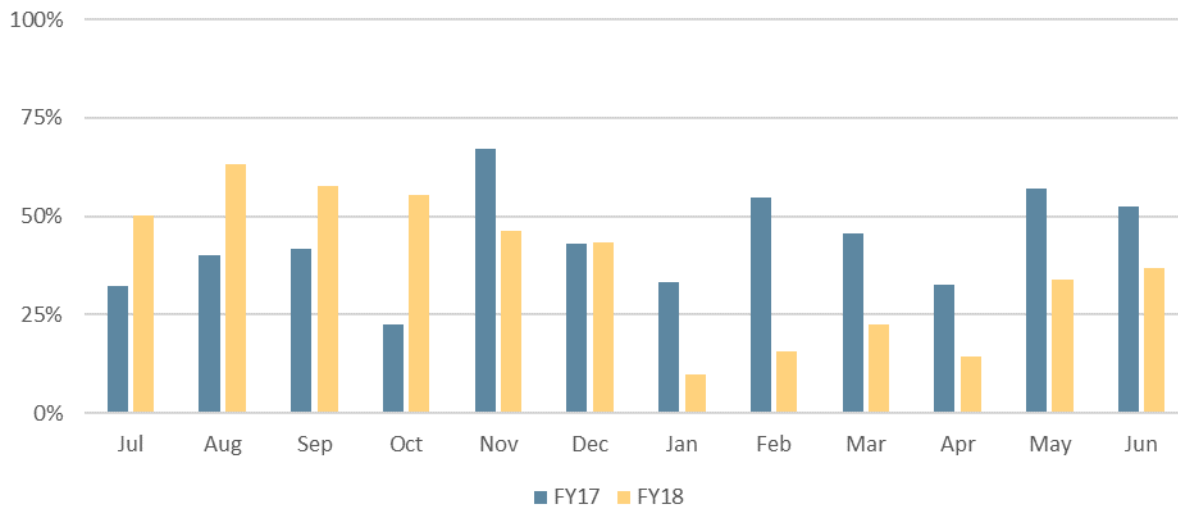
¹⁴ Minnesota Power, *Response To Fresh Energy IR 1*, July 19, 2019, Docket E999/AA-17-492 and E999/AA-18-373, page 2 ([link](#)).

Chart F: MP Hours When Cost Exceeded Revenues in FY 18

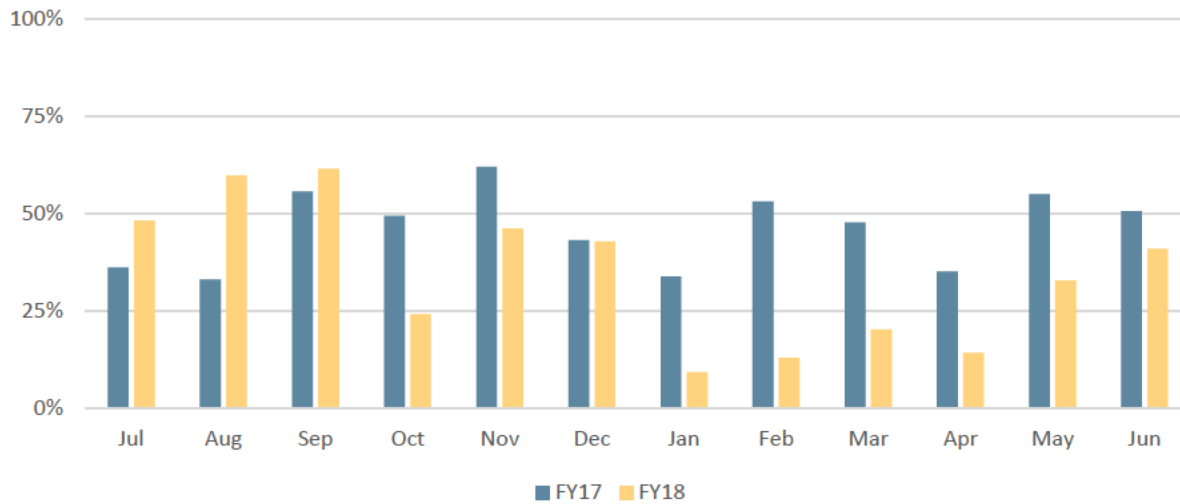
Month	Total Hours in Month	Boswell 3	Boswell 4	Boswell 3 percent of hours	Boswell 4 percent of hours
Jul	744	374	359	50%	48%
Aug	744	471	445	63%	60%
Sep	720	416	443	58%	62%
Oct	744	412	180	55%	24%
Nov	721	333	333	46%	46%
Dec	744	323	319	43%	43%
Jan	744	73	69	10%	9%
Feb	672	105	87	16%	13%
Mar	743	167	150	22%	20%
Apr	720	104	102	14%	14%
May	720	245	236	34%	33%
Jun	744	273	305	37%	41%
Total	8760	3296	3028	38%	35%

This same data is presented in graphic form below, by unit.

Graph G: Boswell 3 Hours Cost > Revenue



Graph H: Boswell 4 Hours Cost > Revenue



c. Evaluation of net cost or benefit

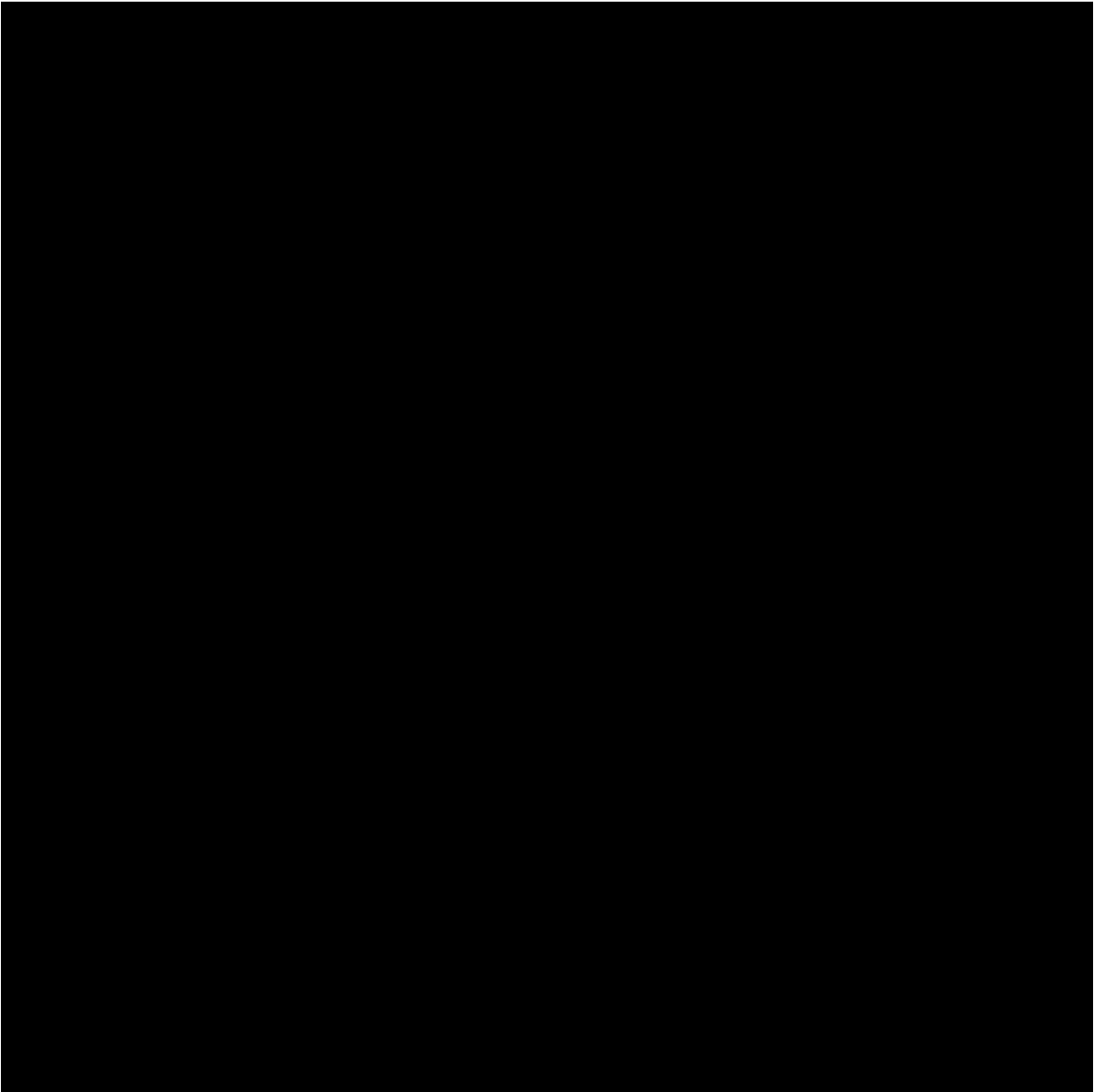
As discussed above, all of the compliance filings examined the difference between production cost and DART revenues for each unit and fiscal year. Minnesota Power calls this the “net cost or benefit” of self-scheduling. The following section examines the annual net cost or benefit in several ways:

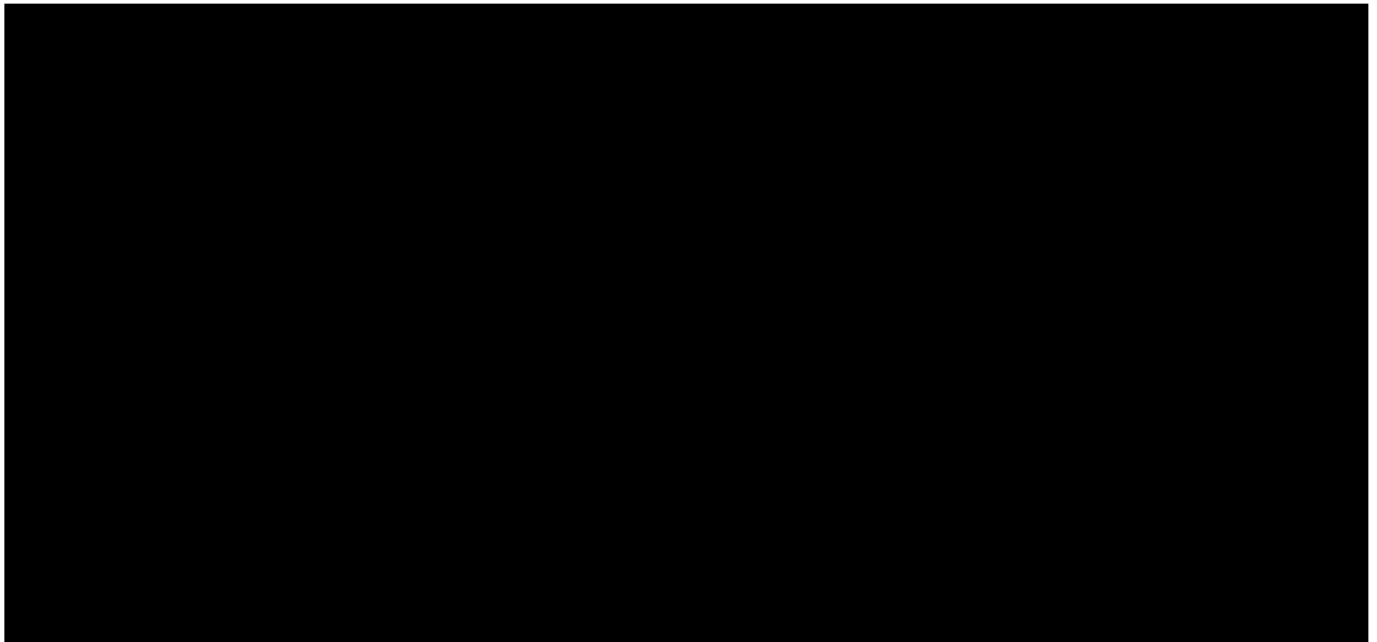
- As Minnesota Power performed the analysis, using only fuel cost and hours when cleared power was equal to the day ahead dispatch minimum (“self-scheduled” hours).
- For all hours of the year, using only fuel cost
- For all hours of the year, using variable operations and maintenance cost as well as fuel cost
- For “self-scheduled” hours using variable operations and maintenance cost as well as fuel cost
- For all hours of the year, using the variable production cost reported on FERC Form 1

i. Self-scheduled hours, fuel costs only

The chart and graphs below illustrate the results of Minnesota Power’s self-scheduled hours analysis for each unit by month. As discussed in Section III(a), this includes [Trade Secret Data Begins] [REDACTED] [Trade Secret Data Ends] of hours of the year. Months showing a net loss are shaded in the chart.

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Fresh Energy points out that there is an imperfect but real seasonal trend to the net cost or benefit seen in the graphs above. [Trade Secret Data Begins]

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Ends] As we might expect, this pattern is stronger within a fiscal year than it is for a specific unit, likely due to weather conditions, market prices, and other market conditions playing a role.

ii. All hours, fuel cost only

When looking at all 8760 hours of the year, not just the self-scheduled hours when Boswell units ran at exactly their dispatch level analyzed above, we find fewer months with a net loss, as we would expect. Because self-scheduled hours are those where MISO did not dispatch the units above the minimum level due to a market need, they are likely to incur higher losses. In other words, whenever MISO is dispatching the Boswell units above their self-scheduled minimum, it is because of relatively higher market prices. Therefore, including hours when Boswell units ran above this minimum includes hours with higher revenue.

However, a seasonal trend is still apparent, particularly in [Trade Secret Data Begins]

[Redacted text block] [Trade Secret Data Ends].

[Trade Secret Data Begins]



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This pattern is even more clear in Graphs N and O below, which compares the net revenue across all hours when using fuel cost *and* variable operations and maintenance costs.

iii. All hours, variable O&M plus fuel costs

While Minnesota Power did not include variable operations and maintenance (O&M) in their calculation of unit cost in the May 8 filing, these costs are included in the offer curve submitted to the MISO energy market. Minnesota Power's Response to Fresh Energy IR 1 Part B included the following discussion of variable costs:

Variable operations and maintenance (O&M) costs are not included in the unit cost provided in Attachment 1 column J. However, variable O&M is defined by Minnesota Power as the changes in reagents, fuel handling equipment wear-and-tear, and ash handling costs. Below are the variable O&M cost in \$/MWh we use in our offer into the MISO energy market for economic unit dispatch. Variable O&M costs are reviewed at least annually and the adders are developed based on historical and forecasted spend.¹⁵

The table showing annual variable O&M rates is reproduced below.

¹⁵ Minnesota Power, *Response To Fresh Energy IR 1*, July 19, 2019, Docket E999/AA-17-492 and E999/AA-18-373, page 2 ([link](#)).

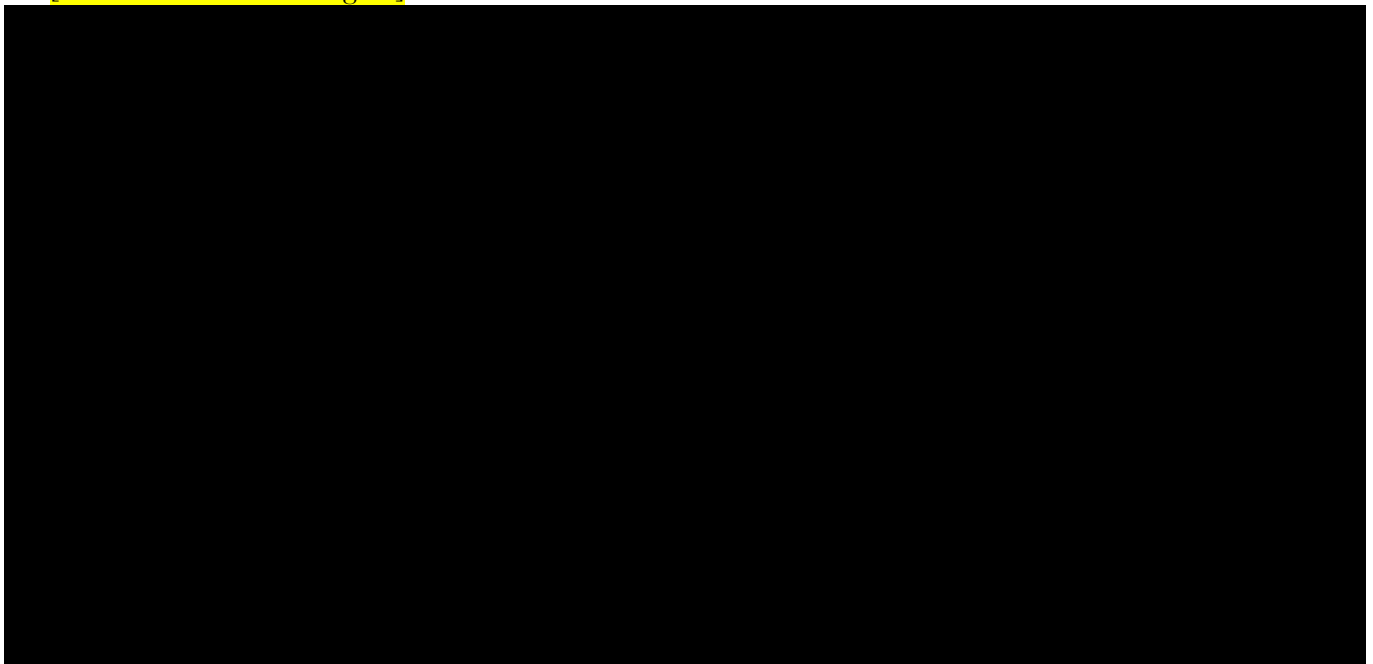
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For this reason, we felt it was important to evaluate the net cost and benefit of self-scheduling when including variable O&M as well as fuel cost. The chart below shows results of all hours, when including variable O&M. Again, shaded areas are when costs exceed revenues.

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The graphs below show the net cost and benefit calculated across all hours of each fiscal year, comparing results of just fuel costs versus results including fuel *and* variable O&M costs.

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[Redacted]

[Trade Secret Data Ends]

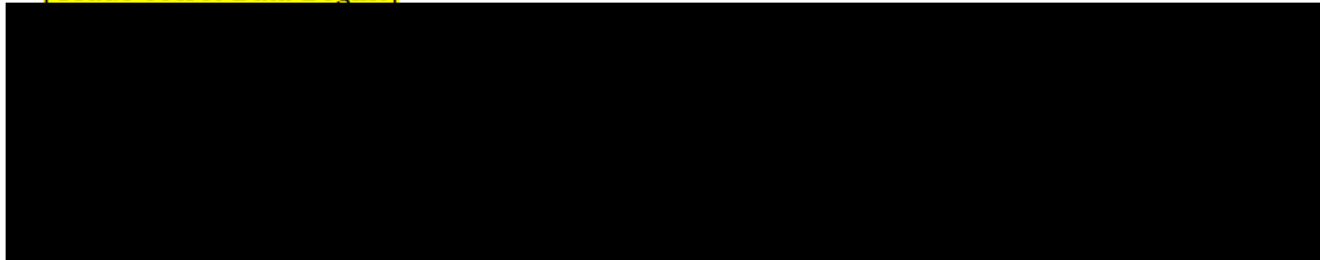
Including variable O&M does not change the overall pattern substantially, however, for Boswell 4, [Trade Secret Data Begins] [Redacted]

[Redacted]

[Redacted] [Trade Secret Data Ends]

Overall, including variable O&M lowers monthly net revenue by a substantial margin, and reduces annual net revenue by [Trade Secret Data Begins] [REDACTED] [Trade Secret Data Ends] dependent on the unit and year, as shown in the table below.

[Trade Secret Data Begins]

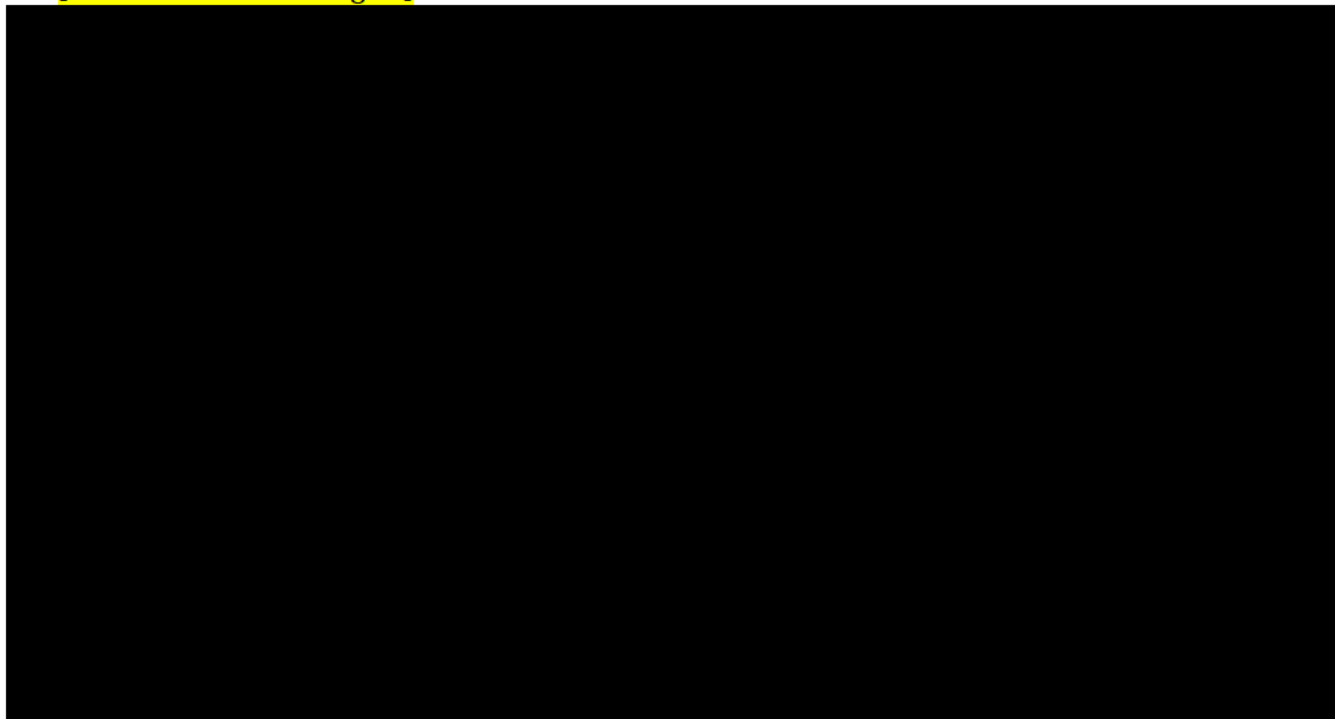
A large rectangular area of the document is completely redacted with a solid black fill, obscuring the table content.

[Trade Secret Data Ends]

iv. Self-scheduled hours, variable O&M and fuel costs

For comparison, we also evaluated the net cost and benefit for self-scheduled hours of each fiscal year when *including* variable O&M costs in the calculation of production cost. In other words, this is Minnesota Power's analysis, but includes variable O&M rather than just fuel costs. The chart below shows the results of that calculation by month. Months showing a loss are highlighted.

[Trade Secret Data Begins]



[REDACTED]

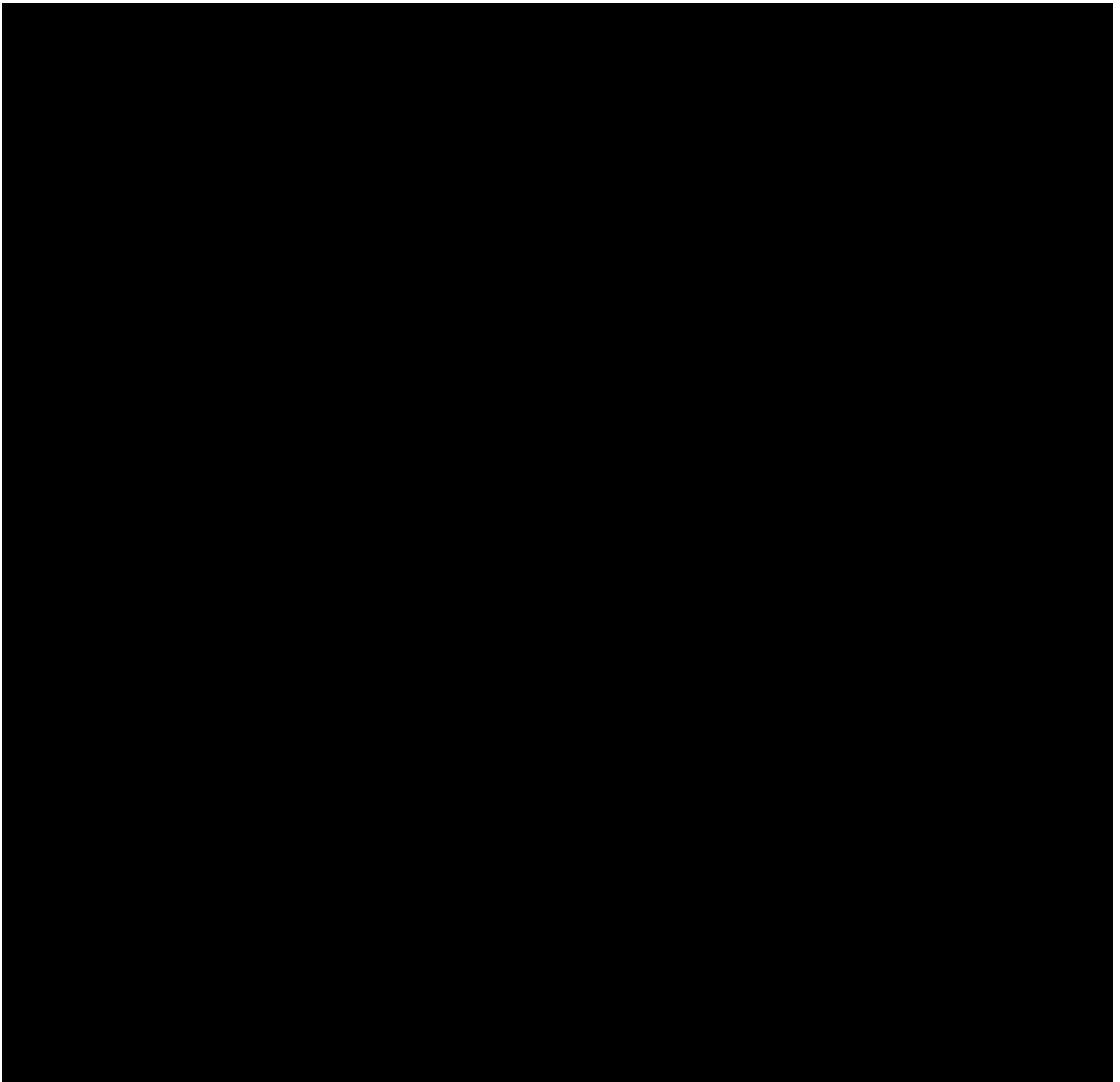
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This evaluation of the net revenue for the Boswell plant shows an even clearer seasonal trend. This same data is presented below in graphical form, next to results for self-scheduled hours and fuel costs (i.e. the methodology Minnesota Power used in their May 8 filing). We show these two data sets side by side to better illustrate the impact of including variable O&M.

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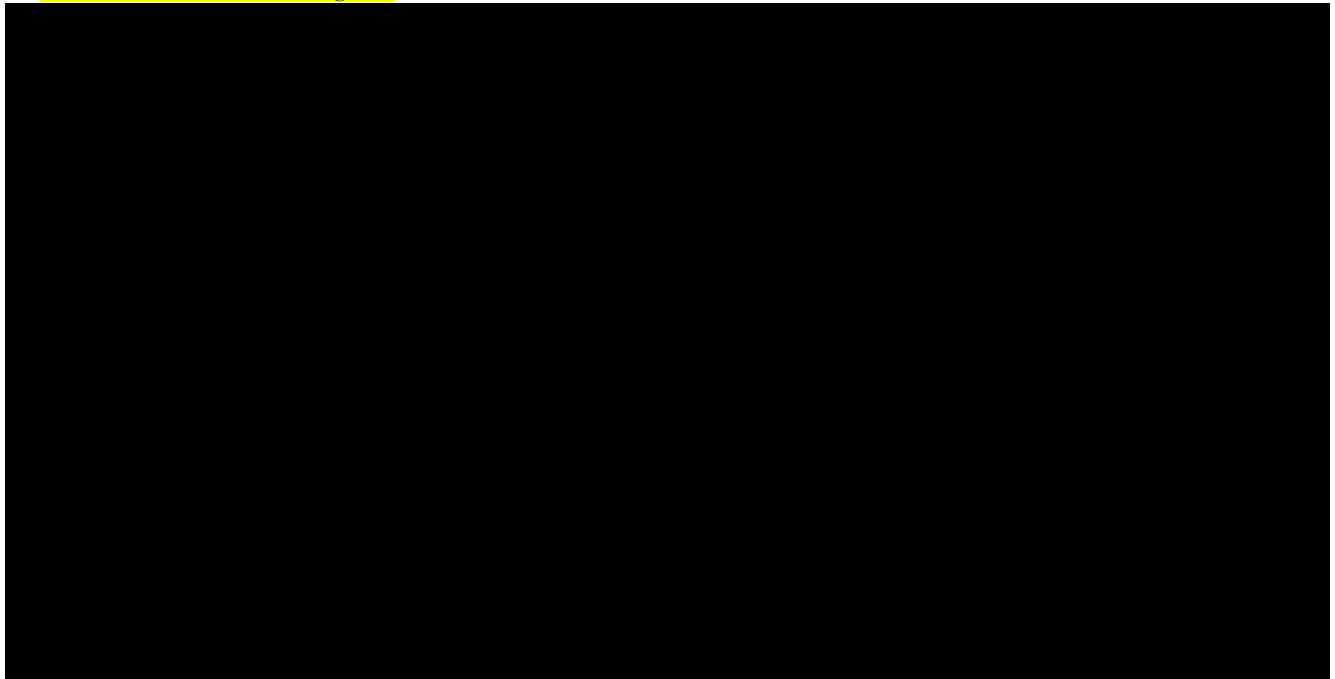
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v. All hours, FERC Form 1 production costs

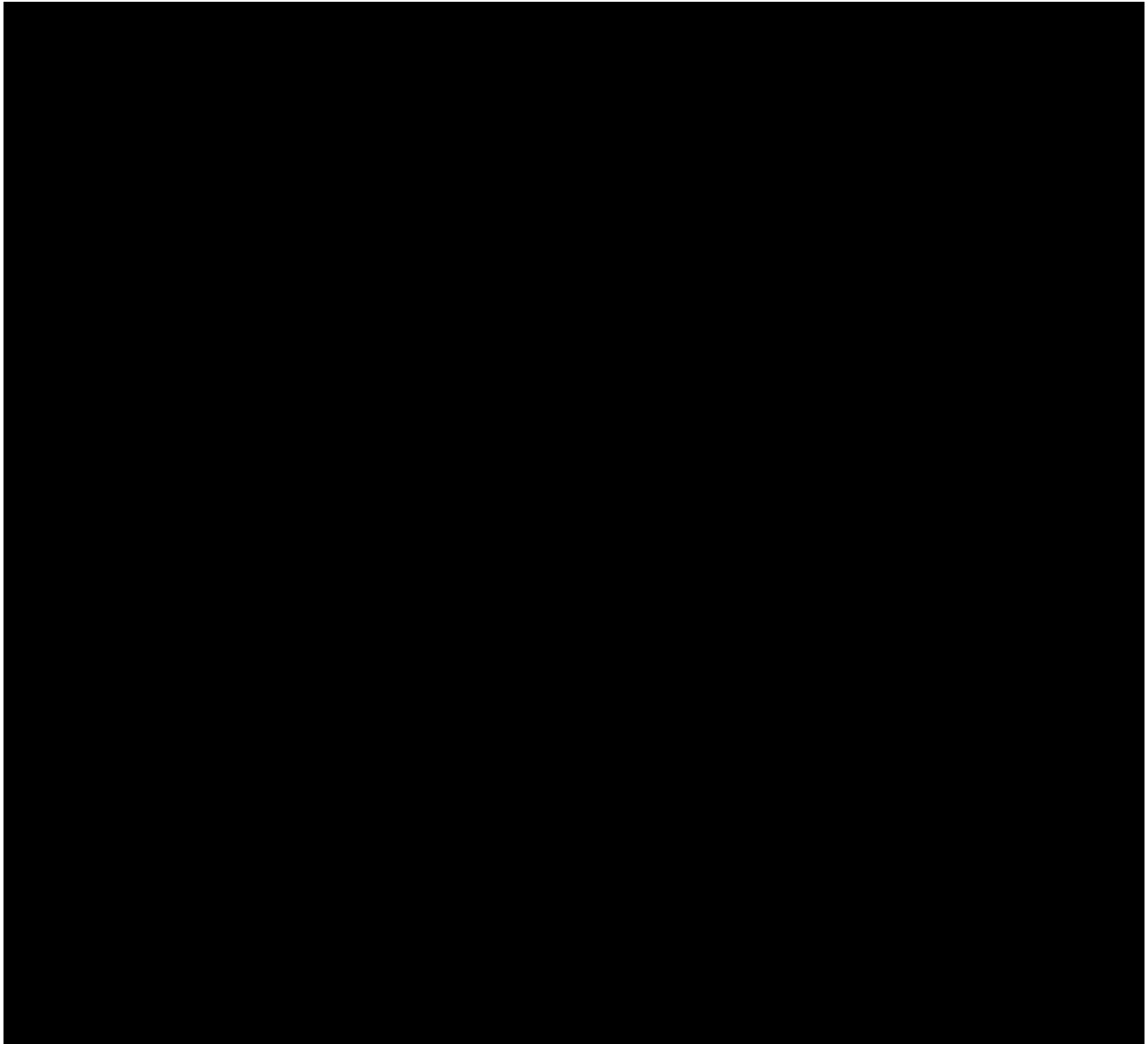
In performing this analysis, we discovered that the level of production costs reported on FERC Form 1 in 2016-2018 for the Boswell plant¹⁶ is significantly higher than the level reported in Minnesota Power's compliance filing and Response to Fresh Energy IR 1. We hope that this discrepancy is the result of certain costs being included in the FERC Form 1 report that the utilities do not typically consider variable fuel or O&M costs, or that are not included in the MISO offer curve for Boswell 3 and 4. However, we were not able to determine what costs are driving this difference and if they are properly excluded from Minnesota Power's analysis.

Nonetheless, for the purposes of comparison, the chart and graphs below illustrate this differential for each unit, showing net cost and benefit for all hours using first Minnesota Power's reported fuel and variable O&M cost, and then the production cost reported on FERC Form 1 for 2016-2018.

[Trade Secret Data Begins]



¹⁶ See ALLETE's FERC Form 1 years 2016-2018, Section 402, Row 35 "Expenses per Net kWh," under Production Expenses for Boswell. These sections are included in PDF form in Attachment B.



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IV. Summary and Recommendations

a. Methodology

Access to underlying data, assumptions, and calculations is a foundational component of effective stakeholder engagement. Fresh Energy respectfully recommends the following modifications for future filings on this matter in the interest of consistency and clarity:

1. Utilities should report the self-commitment and self-scheduling analysis using a consistent methodology and should clearly define their assumptions and data inputs in the compliance filing.
 - a. Additional direction from the Commission on how utilities should define production cost for this analysis would be helpful. Fresh Energy recommends including fuel cost and variable O&M costs, matching the offer curve submitted to MISO energy markets.
2. Utilities should provide stakeholders with the underlying data (workpapers) used to complete the analysis, in a live Excel spreadsheet.
 - a. Fresh Energy recommends that the attachment referred to in recommendation 2 include at minimum the data points listed below for each generating unit, with the understanding that this attachment 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)
- 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)
- w) Capital revenue requirements (annual)
- x) Average heat rate at economic minimum

y) Average heat rate at economic maximum

Fresh Energy understands that fixed operations and maintenance costs, capital revenue requirements, and MISO payments when the plant is set to economic dispatch do not have a direct bearing on the net cost or benefit of self-committed and self-scheduled hours. However, this data is essential for evaluating how self-scheduling and self-commitment fit into a unit's overall operation, how a unit performs when being dispatched economically, and how the MISO market responds to different dispatch statuses. However, if the Commission decides that is beyond the scope of this investigation, it could omit v) and/or w) above.

Consistency in methodology, clarity about the calculations being performed, and inclusion of this data upfront will enable more robust and timely stakeholder engagement.

b. Further Investigation

As discussed in Section III, the evaluation of net cost or benefit by month for Boswell units 3 and 4 reveals a seasonal trend. This trend is visible when looking at all hours of the year, though it is stronger when looking at just self-scheduled hours. For each fiscal year, the months that both units show [Trade Secret Data Begins] [Trade Secret Data Ends] are quite consistent, regardless of which net cost or benefit methodology is used. While we have not completed a counterfactual analysis, the results of the preliminary net revenue evaluations above indicate that Boswell 3 and 4 may have higher net revenues on an annual basis if the units were idled or dispatched on an economic basis during certain months, [Trade Secret Data Begins] [Trade Secret Data Ends].

This raises several questions about the technical and economic limitations of changing Boswell's commitment and dispatch status more regularly, and about how the plant's net revenues would change if Boswell 3 and/or 4 was operated differently. For example, it seems that changing one or both of the Boswell units' commitment status to "economic"¹⁷ for the units' full output would greatly reduce the hours the units are running at a loss. Using this commitment status would still make the units available to the market. However, in this scenario, if a unit is not economically dispatched by MISO, it would not be running and would need to incur a "start-up cost" in any subsequent market offers.

However, utilizing an "economic" commitment would 1) still allow the units to qualify for MISO resource adequacy purposes; 2) would still protect Minnesota Power's customers from unexpected high market prices, because in those cases the units would be dispatched economically. Even accounting for a "start-up cost" that would be included in a market offer

¹⁷ As defined in MISO Energy and Operating Reserve Markets Business Practices Manual BPM-002-r19 Effective Date: OCT-15-2018, section 4.2.3.4.6 at p. 93 ([link](#)).

price any time the unit was not running, the unit's marginal costs plus start-up cost would provide a very reasonable protection, or "hedge" for Minnesota Power's customers in the case of unusually high or unexpected market prices; and 3) in months that have consistently higher market prices, the unit would likely dispatch on the first day with higher prices.

Finally, utilizing an "economic" commitment does not need to be selected for a whole year, or even monthly. Rather, it is a daily decision. Therefore, another option would be for Minnesota Power to consider utilizing "economic" commitment only for certain periods of time for more optimal operation of Boswell 3 and 4.

For these reasons, Fresh Energy recommends that the Commission require Minnesota Power to make a compliance filing analyzing the potential options for seasonal dispatch generally, and potential options and strategies for utilizing "economic" commitments for Boswell 3 and 4. In addition to the cost saving opportunity for customers from these approaches, the filing should 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, etc.) as relevant.

Fresh Energy greatly appreciates the Commission's interest in self-commitment and self-scheduling. We intend to continue to follow this important issue and to provide more in-depth feedback and analysis in future compliance filings. Please contact me at (651) 294-7148 or ricker@fresh-energy.org if you have any questions regarding this filing.

Respectfully submitted,

/s/ Isabel Ricker

Isabel Ricker

Fresh Energy

408 St. Peter Street, Suite 220

St. Paul, MN 55102

651.294.7148

ricker@fresh-energy.org

Attachment A: Calculations, Workpapers and Underlying Data

Please see excel workbook Attachment A separately filed
in Dockets 17-492 and 18-373.

Attachment B: ALLETE FERC Form 1, Section 402, 2016-2018

Please see PDF Attachment B separately filed
in Dockets 17-492 and 18-373.