BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Application of Madison Gas and Electric Company for Authority to Change Electric and Natural Gas Rates	Docket No. 3270-UR-123

DIRECT TESTIMONY OF DEVI GLICK ON BEHALF OF SIERRA CLUB

1. INTRODUCTION AND PURPOSE OF TESTIMONY

Q Please state your name and occupation.

A My name is Devi Glick. I am a Senior Associate at Synapse Energy Economics, Inc. My business address is 485 Massachusetts Avenue, Suite 3, Cambridge, Massachusetts 02139.

Q Please describe Synapse Energy Economics.

A Synapse is a research and consulting firm specializing in energy and environmental issues, including electric generation, transmission and distribution system reliability, ratemaking and rate design, electric industry restructuring and market power, electricity market prices, stranded costs, efficiency, renewable energy, environmental quality, and nuclear power.

Synapse's clients include state consumer advocates, public utilities commission staff, attorneys general, environmental organizations, federal government agencies, and utilities.

Q Please summarize your work experience and educational background.

A At Synapse, I conduct economic analysis and write testimony and publications that focus on a variety of issues related to electric utilities. These issues include power plant economics, utility resource planning practices, valuation of distributed energy resources, and utility handling of coal combustion residuals waste. I have submitted expert testimony on plant economics, utility resource needs, and solar valuation before state utility regulators in Wisconsin, Indiana, Texas, Arizona, New Mexico, Connecticut, Virginia, North Carolina, South Carolina, and Florida. In the course of my work, I develop in-house electricity system models and perform analysis using industry-standard electricity system models.

Before joining Synapse, I worked at Rocky Mountain Institute, focusing on a wide range of energy and electricity issues. I have a master's degree in public policy and a master's degree in environmental science from the University of Michigan, as well as a bachelor's degree in environmental studies from Middlebury College. I have more than eight years of professional experience as a consultant, researcher, and analyst. A copy of my current resume is attached as Exhibit DG-1.

Q On whose behalf are you testifying in this case?

A I am testifying on behalf of Sierra Club.

Q Have you testified previously before the Public Service Commission of Wisconsin ("Commission")?

A Yes, I submitted testimony in Docket No. 6680-UR-122.

Q What is the purpose of your testimony in this proceeding?

Q The purpose of my testimony is to review the Madison Gas and Electric ("MGE" or the "Company") Fuel Cost Plan for 2021 and to discuss the risks to ratepayers of the uneconomic unit commitment practices being used at MGE's coal plants.

Q How is your testimony structured?

A In Section 2 of my testimony, I summarize my findings and recommendations for the Commission.

In Section 3, I first describe utility commitment practices generally. I then go on to describe scenarios in which imprudent unit commitment occurs, outline the reasons why uneconomic self-commitment occurs frequently at coal plants, and summarize the consequences to ratepayers of this imprudent self-commitment.

In Section 4, I explain how utilities can address uneconomic self-commitment through market commitment or the implementation of price-based commitment and dispatch decision-making processes. I then summarize current actions by commissions and market monitors around the country to evaluate current utility self-commitment practices.

In Section 5, I demonstrate that MGE has not historically used price-based commitment and dispatch either in practice or in developing its annual fuel cost plans. MGE's jointly owned Columbia units 1 and 2 were [redacted] self-committed whenever the units were available while Elm Road units 1 and 2 were [redacted]. The annual fuel cost plan assumes both plants will be committed as must run moving forward. I evaluate the recent economic performance of Columbia 1 and 2 and Elm Road 1 and 2 to demonstrate how this uneconomic practice with MGE's

share of the plants has likely resulted in net losses for MGE ratepayers relative to the market.

Finally, in Section 6, I outline my recommendations. I describe how the Commission should review the prudence of utility commitment projections in Fuel Cost Plans. I recommend that must-run provisions be allowed in the actual dispatch of MGE's share of its coal-fired units and in its modeling of those units only when based on robust price-based analysis. I also recommend that MGE refresh its current fuel plan forecast in light of the COVID-19 pandemic and the corresponding drop observed in locational marginal prices ("LMP").

Q What documents do you rely upon for your analysis, findings, and observations?

A My testimony and analysis rely primarily on the workpapers, exhibits, and discovery responses of MGE's witnesses associated with this proceeding. In addition, I also rely on certain external, publicly available data from the U.S. Energy Information Administration ("EIA"), the U.S. Environmental Protection Agency ("EPA"), and the Midcontinent Independent System Operator ("MISO").

2. FINDINGS AND RECOMMENDATIONS

Q Please summarize your findings.

A My primary findings are:

1. Uneconomic self-commitment of coal units results from imprudent utility decision-making processes and practices. It has cost MISO ratepayers hundreds of millions of dollars over a period of just a few years.

2. Uneconomic self-commitment can be addressed through market commitment or through implementation of price-based commitment and dispatch decision-making processes and tools.
3. Price-based tools are not used to commit and dispatch MGE's share of Columbia Units 1 and 2 and potentially Elm Road 1 and 2. MGE's jointly owned Columbia units have typically been [redacted] whenever they are available; the Elm Road Units have typically been [redacted] but it is unclear if and how price-based tools are used to inform the units' commitment decisions.
4. MGE's current fuel cost planning process both anticipates and enables uneconomic unit commitment of Columbia 1 and 2 and Elm Road 1 and 2.

Please summarize your recommendations.

A Based on my findings, I offer the following recommendations:

1. The Commission should require that MGE model its unit commitment and dispatch for fuel cost plans consistent with the operational commitment and dispatch policies actually utilized at its share of the Columbia and Elm Road plants.
2. The Commission should prohibit MGE's share of Columbia and Elm Road units from being committed in an ongoing must-run configuration. Further, the Commission should require that either (a) MGE's share of both units are committed into MISO with an economic commitment status, or (b) MGE demonstrate that each must-run decision is prudent based on the results of a robust price-based analysis process conducted by the market operator (MGE for Columbia and WEPCO for Elm Road).
3. In the event of any deviations between the unit commitment decisions at MGE's share of its coal plants and the result of the price-based analysis used

to make unit commitment decisions at the plants, the Company should produce documentation of the circumstances that prompted the commitment decision. MGE should need to always demonstrate that unit commitment was demonstrably prudent based on the totality of known and knowable information at the time of the decision, and that the commitment decision was continually reassessed by market operators.

4. The Commission should make clear in its final order that actual utility commitment practices will be subject to a formal prudence review as part of the fuel cost reconciliation process and that the Commission will not allow MGE to recover net operational losses incurred at the Company's share of its coal-fired units as a result of avoidable, uneconomic operations and planning.

5. The Commission should require MGE to refresh its fuel plan to reflect the actual operational practices at its share of its coal plants and update its LMP forecast to reflect potential continuing downward pressure on LMPs from the COVID-19 pandemic.

3. UNECONOMIC SELF-COMMITMENT OF COAL-FIRED POWER PLANTS RESULTING FROM IMPRUDENT UTILITY DECISION-MAKING PROCESSES HAS COST RATEPAYERS IN MISO HUNDREDS OF MILLIONS OF DOLLARS.

Q Please describe how dispatchable power plants are generally committed in the MISO wholesale market.

A Generators operating within the MISO market commit their units with one of five statuses: outage, emergency, economic, must-run, and not participating. In MISO, utilities often commit dispatchable generating units with a status of "economic." For those units, MISO then has the responsibility for unit commitment and operational decisions. Those decisions prioritize reliability, but then are based on

short-term economics to ensure customers are served by the lowest-cost resources.

Q In practice, are all power plants actually committed in this way?

A Not necessarily. For units with long startup and shutdown times, such as coal-fired plants, utilities often elect to maintain control of unit commitment decisions and design independent processes outside of the MISO market to determine when to commit a unit at its minimum operating level. Unlike the market operator, generation owners may choose not to incorporate costs into their decision-making process and may elect to commit units as "must-run," regardless of economics.

In making the self-commitment decision, the generation owner independently decides to operate a unit regardless of MISO's determination of economic unit commitment or dispatch. This is in contrast to economic commitment, where MISO algorithms compare the variable cost of operating (and starting) a unit to the relevant variable costs of all other units available to the market to determine whether the unit will be online the next day. A plant will only operate if it is the least-cost option available to the market.

Q Are MGE's share of its coal-fired units generally committed as must-run?

A Yes, MGE [redacted] commits Columbia Units 1 and 2 as must-run in the MISO market.[1] Elm Road is [redacted] as must-run by Wisconsin Electric Power Company ("WEPCO"), its market operator, [redacted]

[1] MGE CONFIDENTIAL Response to FCP- DM-14.

[redacted][2] I will review specific details of the commitment practices of MGE's units in Section 5.

Q What happens when a unit is committed with a must-run status?

A A unit designated as must-run will operate with a power output no less than its minimum operating level. The market operator may then ramp the unit up from that minimum operating level, but a must-run designation ensures that the unit remains online. During that time period, the unit receives market revenue (and incurs incumbent operational costs) but does not set the market price of energy. Similarly, if the market price of energy falls below a plant's operational cost, it will not turn off and therefore the plant will incur losses that will be passed onto ratepayers.

To properly anticipate the net benefit that will likely result from the decision to commit a unit into the market with a must-run designation, and therefore ensure that a commitment decision has a net positive outcome, an operator has to create market price projections extending several days into the future. But there is no actual requirement that utilities create these projections. Operators are free to self-commit slow-ramping coal-fired units without any understanding of the net benefit that will result. Operators are also free to pass the costs onto their ratepayers if and when their units operate at a net loss.

Q What does the phrase "uneconomic self-commitment" mean?

A The term uneconomic self-commitment refers to a utility's decision to commit a unit into the MISO market with a "must-run" status even when the unit is projected to lose net revenues relative to the purchase of energy from the MISO

[2] *Ibid.*

market. In other words, it costs more money on a variable basis to operate the plant than the plant earns in market revenue.

Q What drives the practice of uneconomic self-commitment?

A There are five main factors that drive uneconomic self-commitment practices with utility coal plants: (1) coal plants have operational costs and constraints that are not always well aligned with the MISO day-ahead market structure; (2) utility unit-commitment processes are not always designed to ensure prudent decision-making; (3) long-term coal contracts lock utilities into running their coal plants; (4) utilities need their plants to appear useful in order to continue collecting undepreciated plant balances; and (5) there has historically been minimal review of unit commitment practices by commissions.

Q Please explain how operational constraints at coal plants drive uneconomic self-commitment practices.

A Coal-fired plants tend to be slow to ramp up and down, sometimes require cool-off periods, and have high start-up and shutdown costs relative to other generation resources. These properties need to be incorporated into unit commitment decision-making, but they are not always properly accounted for by MISO's day-ahead market structures. Many utilities claim that they are better suited to consider these costs and temporal constraints and can achieve better results than MISO if they have control of their unit commitment decisions. These utilities develop their own unit-commitment decision-making "processes" to determine when to commit a unit into the market. But these unit-commitment decision-making processes are not required to ensure prudent commitment decision-making.

Q How and when do utilities' self-commitment decision-making processes drive uneconomic commitment decisions?

A In my experience, there are two common utility approaches or "processes" that result in subpar self-commitment decisions.

In the first approach, the utility performs no independent analysis, and instead commits a unit as must-run whenever the unit is available. Utilities committing at this level will reevaluate commitment practices only in response to macroeconomic or larger market trends, such as a pandemic. There is typically no record of the information the company had available at the time that it made each commitment decision, making it very challenging for a commission to evaluate the prudence of the company's commitment practices (although it is not hard to evaluate the actual result of the imprudent commitment practices, which is net revenue losses).

In the second approach, a utility develops price-based commitment decision-making tools and processes to inform unit commitment decisions, but then undermines those processes by only selectively or systematically using the results in committing its units. MISO is provided no transparency or control over the independent processes used by generation owners to make unit commitment decisions. The utility may or may not retain a record of this information that can be used to assess the prudence of the utility's commitment decisions.

In either case, whether the utility fails to develop robust analysis processes and tools, or just fails to follow the results of its own analysis, the result is uneconomic commitment decisions that incur unnecessary costs, which are often quite considerable, for ratepayers.

There is a third option for unit commitment, however, where the utility develops price-based commitment decision-making tools and actually follows the results of those processes to develop unit commitment decisions. As I discuss below, when following a price-based process, the utility should be able to make prudent and economic commitment decisions that better serve ratepayers.

Q How do long-term coal contracts drive uneconomic unit commitment?

A Most utilities rely on long-term coal contracts—many with take-or-pay provisions—for at least some of their coal supply. These contracts can be enormous and are not always subject to a separate prudential review by the commission. This means that a utility such as MGE can lock its ratepayers into a contract on the same order of magnitude in cost as a new power plant, without any commission review. Long-term contracts can allow utilities to negotiate better terms (lower costs) than they could get from a spot-market purchase based on the utilities' commitment to purchase a large quantity of coal over multiple years.[3] But the utility is contractually required to accept a certain quantity of coal each month[4] and therefore must burn, store, or resell the coal for which it has contracted. Each of these options comes with a cost, and often burning the coal,

[3] Long-term contracts can lock the utility and its ratepayers into reliance on coal for the duration of the contract, regardless of changes in the market. We see this with Arizona Public Service, for example, which is planning the retirement of Four Corners based on the end of a long-term coal contract, or Southwestern Public Service, which has stated that it is modeling its retirement of the Tolk Generating Station based on the time required to use up the coal it has contracted for in its long-term contracts.

[4] Some contracts allow the utility to defer or delay receipt of a certain quantity of coal.

even if it incurs a net loss, may be the least-cost option once the utility is locked into an imprudent contract. This motivates the continued use of a must-run status.

If the utility made particularly bad coal contracting decisions and has accumulated a large oversupply of coal, it can run out of low-cost storage and resale options. In this event, the utility can either run its plants uneconomically to use up the coal or else pay a higher cost for an alternative storage option.[5] A tool called a decrement can be used to reflect the cost to the utility of not burning the coal oversupply (i.e., the cost the utility would incur but for the decision to run the plant) and allow the utility to justify operating the plant over a larger number of hours than it would normally to burn off its oversupply. But either option incurs significant costs that are passed onto ratepayers, often with no review process for either the coal contracting or unit commitment decisions.

Q How do undepreciated plant balances drive uneconomic unit commitment?

A Most coal assets are not fully depreciated and have substantial remaining plant balances that utilities collect from customers though the rate base. The easiest way for a utility to demonstrate that a plant is used and useful, and therefore that it should be allowed to continue collecting the plant balance from ratepayers, is to operate a plant. Further, reasonable use of a plant can be used to justify continued capital investment in plants, which can be added to rate base. If a plant is retired prior to the end of its depreciable life, the utility may not be allowed to continue collecting the full plant balance from ratepayers.

[5] We see this currently in Indiana where Duke has implemented a coal price decrement. Testimony of John D. Swez, IURC Cause No. 38707-FAC 125.

Q Please explain your earlier point, about the impact of limited official review of utility unit commitment practices.

A As the energy market has shifted, coal has become more expensive relative to alternatives, and the need for prudence review as part of fuel dockets has increased. Historically, the implicit guarantee of compensation for all fuel burned has meant utilities have little incentive to ensure their commitment decisions are tied to market or price signals. But self-commitment has become increasingly costly as coal has become more uneconomic, thus increasing unnecessary ratepayer expenditures. A recent report found that between 2015 and 2017 alone, uneconomic unit commitment practices cost U.S. ratepayers $3.8 billion.[6] Numerous state regulatory bodies have begun closing this regulatory loophole and have decided that long-standing fuel docket procedures are the appropriate venue for evaluating these shorter-term choices by utilities for prudence. Others have opened dedicated dockets to consider and evaluate the issue of uneconomic unit commitment, as I will discuss in the next section. But until these loopholes are closed, uneconomic commitment will continue to cost ratepayers billions of dollars per year.

[6] Fisher, Jeremy, Al Armendariz, Matthew Miller, Brendan Pierpont, Casey Roberts, Josh Smith & Greg Wannier, *Playing With Other People's Money: How Non-Economic Coal Operations Distort Energy Markets,* Sierra Club (2019). Available at https://www.sierraclub.org/sites/www.sierraclub.org/files/Other%20Peoples%20Money%20Non-Economic%20Dispatch%20Paper%20Oct%202019.pdf.

4. UNECONOMIC SELF-COMMITMENT CAN BE ADDRESSED THOUGH THE IMPLEMENTATION OF PRICE-BASED COMMITMENT DECISION-MAKING PROCESSES AND COMMISSION OVERSIGHT

Q How should a utility be making unit commitment decisions?

A A utility should be either (a) committing its units as economic and letting the market decide when to operate the units, or (b) making unit commitment decisions based on the results of a price-based analysis, and documenting any deviations from its quantitative analysis. Specifically, a utility should be electing to self-commit a unit on a forward-looking basis only if it expects to make positive energy margins over a reasonable near-term time period (incorporating consideration of start-up and shutdown costs), and the company should keep a unit offline if it is projected to operate at a net loss.

Q Can you explain specifically what information the utility should include and consider in a price-based analysis?

A The utility should include the same general information that it uses to develop its MISO offers. Specifically, the utility should be comparing projected production costs, based on fuel and variable operations and maintenance costs ('O&M"), to potential market revenue, based on projected LMPs (and even ancillary revenues). This analysis should cover the near term, generally at least a week, and should also incorporate start-up and shutdown costs and timing. Although market factors change regularly, and analysis may be updated throughout the day, it is still reasonable to expect a utility to document the information it had at the time it made a unit commitment decision.

Unit commitment must always be demonstrably prudent based on the totality of known and knowable information at the time of the decision, and the appropriate commitment status should be reassessed on an ongoing basis.

Q How can a commission evaluate prudence based on the utility's price-based analysis?

A A commission can critically review the fuel and variable costs being passed onto customers and evaluate if they are prudently incurred by assessing the information the utility has available at the time that it makes each unit commitment decision. If, for example, a period of losses can be attributed to the utility's commitment of a unit with a must-run status despite the utility's own analysis projecting that it would accumulate net losses over the following week period, the commission can decide whether those losses were avoidable and should be disallowed from being passed onto customers.

Additionally, if the utility documents deviations from its price-based analysis, a commission can evaluate the reasonableness of the justifications when considering disallowances. This entire process will discourage the utility from unnecessarily operating its units uneconomically without adequate explanation (that is, when it projects negative energy margins) and will save ratepayers from covering the considerable net losses that result from unnecessary uneconomic unit commitment.

Q Is this issue being reviewed and considered in other parts of the country?

A Numerous commissions around the country have begun to recognize the importance of this issue, with some considering unit commitment as part of

existing dockets and others initiating separate dockets dedicated to evaluating unit commitment practices. These include the following:

- The Minnesota Public Utility Commission opened a docket titled *Investigation into Self-Commitment and Self-Scheduling of Large Baseload Generation Facilities* to review the unit commitment practices for Minnesota Power, Ottertail Power, and Xcel Energy. This docket is ongoing.[7]

- The Indiana Commission opened a subdocket earlier this year to evaluate the prudence of Duke Energy Indiana unit commitment practices after receiving evidence of uneconomic unit commitment practices in a Fuel Adjustment Clause proceeding.[8]

- The Michigan Public Service Commission has an Annual Power Supply Cost Recovery Plan proceeding. This is a reconciliation docket that allows for review of the prudence of the Company's commitment practices.

- The Missouri Public Service Commission has a fuel prudence review docket that occurs every 18 months. In Missouri, this prudence review supplements quarterly FAC adjustment filings.[9]

- The Southwest Power Pool market monitor published a report in December 2019 which found that nearly half of all megawatts (MW) generated between March 2014 and August 2019 were self-committed,

[7] Minnesota Public Utility Commission Docket No. E99/CI-19-704.
[8] Indiana Utility Regulatory Commission Cause No. 38707-FAC125.
[9] Missouri Public Service Commission, Docket No. EW-2019-0370.

and that this was impacting market prices and the efficiency of market operations.[10]

- MISO published a brief analysis earlier this year which found that 12 percent of generation came from uneconomically committed units.[11]

5. PRICE-BASED COMMITMENT AND DISPATCH PROCESSES ARE NOT ALWAYS USED TO PLAN OR OPERATE MGE'S SHARE OF ITS COAL PLANTS, AND THIS UNECONOMIC BEHAVIOR WASTES RATEPAYER'S MONEY

Q How do the Company's unit commitment practices relate to the fuel cost plan at issue in this docket?

A The assumptions that MGE uses in creating its fuel cost plan should approximate its units' actual operational decisions and performance. If MGE is modeling a unit with a must-run status for the purposes of its fuel cost plan, for example, it is presumed that assumption reflects how MGE's share of the plants are actually operated. If there is a significant discrepancy between how MGE models its system for its fuel cost plan and how the system actually operates, the Commission should reject the plan. Further, if MGE is modeling its system for the fuel cost plan in a manner that assumes imprudent self-commitment behavior, the

[10] *Southwest Power Pool Market Monitoring Unit, Self-committing in SPP markets: Overview, impacts, and recommendations*, Southwest Power Pool (Dec. 2019). Available at https://spp.org/documents/61118/spp%20mmu%20self-commit%20whitepaper.pdf.

[11] Catherine Morehouse, *MISO: Majority of coal is self-committed, 12% was uneconomic over 3-year period*, Utility Dive (May 2020) Available at https://www.utilitydive.com/news/miso-majority-of-coal-is-self-committed-12-was-uneconomic-over-3-year-pe/577508/.

Commission should reject the fuel plan, or at the very least make the Company justify its operational assumptions.

Q How does MGE model its share of its coal plants when preparing its fuel cost plan?

A MGE models Columbia 1 and 2 and Elm Road 1 and 2 [redacted] when the units are available[12] as part of its production-cost modeling that anticipates fuel burns for the Company's current fuel cost plan. Enforcing a must-run constraint in a production-cost model, thereby forcing a unit to commit regardless of market prices, is very likely to produce a fuel burn estimate that assumes periods of imprudent commitment behavior. In other words, MGE is planning its future fuel costs around the assumption that its share of its coal units will operate [redacted]—and likely uneconomically—and pass the net losses (and increased total fuel costs) onto ratepayers. If the plants' market participants adhere to the assumptions that MGE used in developing its fuel cost plan over the next year in making actual unit commitment decisions, they will likely engage in imprudent behavior in uneconomically committing MGE's share of its coal units that will unnecessarily increase fuel costs for ratepayers.

Q Is MGE the owner and operator of the coal plants that serve its customers' load?

A No, not entirely. MGE owns 22 percent the Columbia Energy Center along with Alliant Energy (31.8 percent) and WEPCO (46.2 percent). MGE serves as the

[12] MGE CONFIDENTIAL Response to FCP-DM-14.

operating utility for its share of Columbia Units 1 and 2.[13] MGE is a partial owner of the Elm Road plant, receiving 100 MW total from the plant. WEPCO serves as the market operators for MGE's share of Elm Road Units 1 and 2.[14]

Q What role does MGE play in making unit commitment decisions at its plants?

A MGE makes unit commitment decisions for its share of Columbia Units 1 and 2.[15] WECPO makes the unit commitment decisions for MGE's share of Elm Road Units 1 and 2.[16]

Q Based on your understanding of MGE's ownership and operator relationships with the other owners of Columbia and Elm Road, should MGE be held responsible for ensuring that its shares of its coal plants are committed in an economic manner?

A Yes, MGE's ratepayers earn the revenue, and also pay the costs, associated with the operation of MGE's share of its coal plants. This is true regardless of ownership structure and which entity acts as the market participant for the plants. When the market operator or a co-owner commits a unit uneconomically, those costs are passed onto MGE's ratepayers. At Columbia, MGE claims that it is directly responsible for committing its share of each unit, and so its responsibility

[13] MGE Response to SC- 3.8.
[14] MGE Response to SC- 3.9.
[15] MGE Response to SC- 3.8.
[16] MGE Response to SC- 3.9.

is not at issue.[17] But even though WEPCO is responsible for committing MGE's share of both Elm Road units, MGE still has an obligation to its ratepayers to ensure the plant is committed economically. If MGE fails to ensure that this occurs, then the Commission should critically evaluate whether the current ownership and operator arrangements in place are in the best interest of its ratepayers in the current market environment.

Q How are MGE's shares of its coal plants committed into the MISO market?

A As mentioned in Section 3 above, MGE currently [redacted] its share of Columbia 1 and 2. The market operator for Elm Road, WEPCO, [redacted], depending on market conditions.[18]

Q Has MGE demonstrated that the unit commitment processes used at its coal plants deliver better results for customers than an economic commitment into MISO?

A No. MGE has not demonstrated that the internal decision-making process used at its coal plants produces greater net revenues and a more economic output than relying solely on the MISO market. When asked about its unit-commitment decision-making process, MGE replied that "A formal analytic framework is not currently utilized by MGE to determine commitment status."[19] In other words, there is no evidence that MGE (at Columbia) and WEPCO (at Elm Road) are

[17] Technically, it is infeasible for MGE to make a commitment decision that impacts just its share of a unit. A unit commitment decision must by definition apply to the entire unit; so if MGE commits its share of Columbia 1, the other owners of Columbia 1 will also have their shares of the unit committed (and vice versa).

[18] *Id.*

[19] MGE Response to SC- 2.8.

minimizing costs by operating the units only when they are lower cost than market energy. This places the unit commitment policies and procedures used for MGE's share of its plants squarely in the bottom tier of utilities across the country.

Q How have MGE's coal plants actually performed in recent years?

A I used publicly available data to compare the Company's reported monthly fuel receipts (fuel costs) to MISO's reported hourly LMPs (market revenue) for 2019 and 2020 based on hourly generation as reported to the EPA and EIA.[20] Based on this data, I find that Columbia 1 and 2 and Elm Road 1 and 2 are very likely operating at a net loss relative to the market.

Q What specifically did you find regarding Columbia Unit 1 and 2's recent economic performance?

A I find that Columbia 1 and 2 together likely accrued around $9.1 million in net losses between 2019 and the first five months of 2020 (this jumps to around $29 million with a variable cost adder[21]). Specifically, fuel spending at Columbia

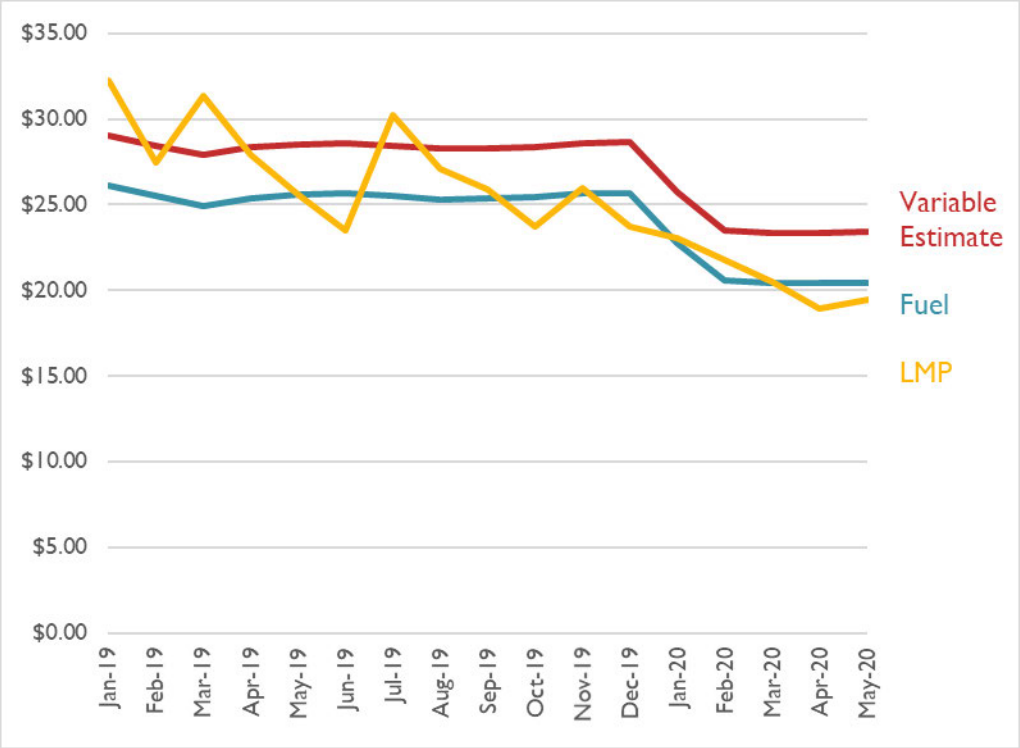
[20] EIA Form 923, MISO LMPs. EPA Air Markets data accessed through the FACT tool.

[21] MGE's reported variable O&M costs for Columbia units 1 and 2 are extremely low relative to industry standard variable O&M costs, and likely leave out a significant portion of actual variable O&M costs. Horizon's Energy, which prepares a National Database that is used in the EnCompass model, estimates variable O&M costs for coal-fired power plants at between $5.56 – $6.37/MWh. EIA also estimates variable O&M costs in the same order of magnitude. MGE reported variable O&M costs for Columbia 1 and 2 at [redacted] in MGE's CONFIDENTIAL Response to FCP-DM-11. Therefore, I estimated variable O&M at $2.94, the [redacted] between the Company's reported value and Horizon Energy's value. This value falls in the range I have observed elsewhere in my work with coal plant economics and therefore is a reasonable proxy. Further, reported variable O&M for Elm Road units is [redacted] from MGE CONFIDENTIAL Response to FCP-DM-11.

exceeded its revenue from the MISO energy markets by around $8.7 million in 2019 and $0.4 million in the first five months of 2020.

I find that, on an hourly basis, the average actual monthly fuel costs exceeded Columbia's hourly LMP for 62 percent of the hours in 2019 and 66 percent of the hours in the first five months of 2020. Further, average total variable costs exceeded Columbia's hourly LMPs for 77 percent of the hours in 2019 and 88 percent of the hours in the first five months of 2020. Figure 1 depicts the results aggregated over a monthly basis. The figure shows that average monthly fuel costs were higher than weighted average monthly LMPs for three months of the year in 2019, and for two out of the first five months in 2020. It also shows that total variable costs exceeded LMPs for 10 months in 2019 and for each of the first five months in 2020.

Figure 1: Average coal and variable cost vs Columbia weighted average LMP ($/MWh)



MGE admitted that it historically operated its coal units [redacted], and that its units were online [redacted] of the time they are available. As a result, we know that in 2019, for approximately [redacted] of the hours where Columbia was operating at least at its minimum load, its variable costs exceeded market prices and it was recording net revenue loses.

Q What did you find specifically regarding Elm Road Unit 1 and 2's recent economic performance?

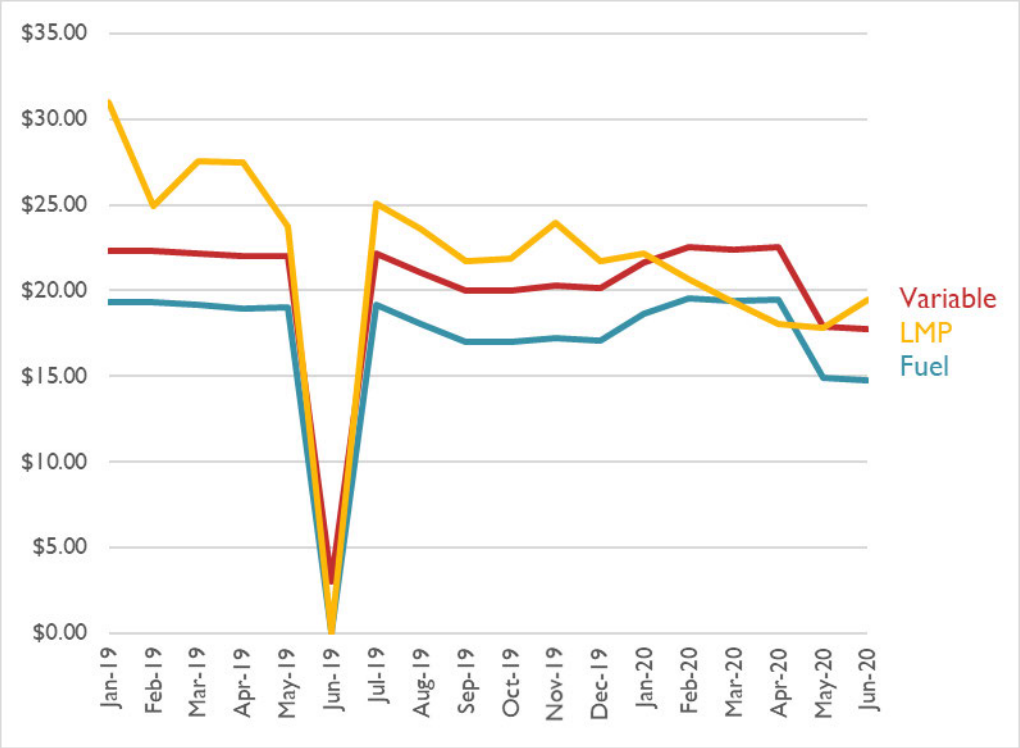
A I find that Elm Road Units 1 and 2 together likely earned net revenues of around $26 million in 2019, but the units have accumulated net losses of $6.3 million in

the first five months of 2020. Notably, these losses were accumulated across the entire five months, including in the months prior to COVID-19.[22]

I find that, on an hourly basis, the average actual monthly variable costs exceeded Elm Road's hourly LMP for 34 percent of the hours in 2019 and 71 percent of the hours in the first five months of 2020. Figure 2 depicts the results aggregated over a monthly basis. The figure shows that while LMPs were higher than average monthly variable costs in 2019, in 2020 weighted average monthly LMPs were at or below variable costs for the first five months in 2020 (the plant was offline or in outage in June 2019).

[22] MGE reported variable O&M for Elm Road units is [redacted] from MGE CONFIDENTIAL Response to FCP-DM-11.

Figure 2: Average coal and variable cost vs Elm Road weighted average LMP ($/MWh)



MGE stated that WEPCO typically operated Elm Road [redacted]. Given that in 2020, for approximately [redacted] of the hours where Elm Road was operating at least at its minimum load, its variable costs exceeded market prices and it was losing net revenue, it is very likely that the units were losing money for a significant portion of the hours that they were online.

Q How did you calculate the values for Columbia and Elm Road discussed above?

A I calculated total monthly fuel spending ($) based on monthly fuel receipts and generation data reported to the EIA. I calculated total monthly revenues ($) based on hourly generation as reported to the EPA and plant day-ahead LMPs as reported by MISO. I then compared monthly fuel spending ($) to monthly revenue ($) to find net revenues. I also compared each plant's fuel spending ($/MWh) to the plant's hourly day-ahead LMPs ($/MWh) to evaluate the frequency with which the plant has positive and negative energy margins. For Columbia, I estimated a variable O&M cost adder because, as discussed above, MGE's stated variable O&M costs are too low to include all relevant variable O&M components, and added it to the average fuel cost to get an estimated total variable cost. MGE provided what I believe to be a reasonable variable cost adder for Elm Road, so I used the Company's values.

Q Has the Company published its own data or analysis on the performance of its coal plants as part of this Fuel Cost Plan docket?

A No, the Company does not file actual data on its plants' recent economic performance as part of the rate case and fuel plan docket. I rely on public data for the calculations presented above; therefore, my results may differ slightly from the results published by the Company.

This difference might occur for a couple different reasons. First, the quantity of fuel purchased in a month does not necessarily equal the quantity burned in that same period, given a utility's ability to store coal. However, this distinction should not be meaningful: if fuel purchases are prudently planned with a robust

fuel cost plan, the total amount of fuel purchased should approximate the total quantity of fuel burned over the period of several months or a year.

Second, MGE's reported variable costs for Columbia were incredibly low[23] relative to industry standards and to reported costs at Elm Road (as mentioned above). Therefore, it is very likely that MGE has omitted a significant portion of its variable O&M costs from its unit commitment decision-making process and fuel plan production-cost modeling. Specifically, MGE is likely classifying as fixed costs a significant portion of its O&M costs that in reality scale directly (and predictably) with the frequency of operation. Further, MGE stated that it does not consider variable O&M costs for the purpose of making unit commitment decisions.[24]

Third, fuel costs data was only available at a monthly granularity. In reality, fuel costs vary on a more granular basis.

So while my estimates may differ slightly from results based on more granular fuel cost data, I must stress that—based on the amount of money MGE actually spent on fuel purchases in 2019 and 2020 and the plants' reported hourly generation and LMPs—it is very unlikely that a more detailed accounting with Company data would substantially impact the results. Any major reported differences would likely be due to (faulty) fixed and variable costs accounting decisions or a misalignment between the quantity of fuel purchased and the quantity needed.

[23] MGE CONFIDENTIAL Response to FCP-DM-11.
[24] MGE CONFIDENTIAL Response to FCP-DM-14.

Q Given the historical data available, is it likely that the utility made imprudent daily commitment decisions?

A Yes. Without actual data on the information that the utility had at the time that it made each unit commitment decision, I cannot *prove* that each individual daily commitment decision in 2019 or 2020 was imprudent. But the body of evidence shows that: (1) MGE develops its fuel plan around anticipated uneconomic unit commitment and plant operation; (2) [redacted] while MGE's share of Elm Road are [redacted]; and (3) market LMPs were below Columbia's average variable costs for the vast majority of 2019 and market LMPs were below both Columbia and Elm Road's average variable costs for the first five months of 2020. Given that evidence, I can say that uneconomic self-commitment decisions are very likely being used to commit MGE's shares of Columbia and Elm Road, and MGE is passing those costs onto ratepayers. I can further state that overall MGE very likely lost money for its ratepayers at Columbia over the last year and a half.

Q Why should the Commission care about the past performance of MGE's plants in a fuel cost plan docket?

A As discussed above, MGE is building losses into its fuel cost plan by assuming [redacted] unit commitment in must-run status regardless of economics. By understanding that MGE's share of its units very likely lost money following these same practices in the past, we can better understand the potential financial impact of the Company's projected fuel plan. Specifically, we know that if MGE is allowed to operate its share of its plants and make (and allow) unit commitment decisions as it has proposed, it will lose ratepayers money. We also know that,

absent a structure to check MGE's reliance on uneconomic self-commitment at its share of its coal plants, the Company will continue to plan its fuel burns and operate in this manner and pass the losses onto ratepayers. Therefore, if the Commission does not incorporate a formal prudency review into its fuel cost plan or fuel reconciliation process, the Company will continue to plan its fuel burns and allow its share of its coal plants to operate uneconomically.

Q Are there any other issues that the Commission should be concerned about regarding MGE's fuel cost plan?

A Yes, I am concerned that the LMPs and the commitment statuses that MGE used to create the fuel cost plan do not reflect actual market and operational conditions. Market conditions have changed significantly since MGE created its fuel cost plan, and the LMP's MGE used in making its fuel cost plan are too high.

MGE's LMP forecast was created during a time with expected higher load (prior to the COVID-19 pandemic); therefore, the market forecasts used in the fuel plan do not reflect the recent and sustained drop in energy market prices that is likely to continue for the foreseeable future. Higher LMPs make it more economic to keep a unit online, and therefore could help MGE justify the decision to model its plants with a must-run status.

Based on these two factors alone, the Commission should be concerned that the fuel plan is significantly over-projecting fuel burns and net revenues for 2021. Customers would be best served if the Commission required MGE to refresh its fuel plan to reflect its actual operational practices and an updated MGE forecast.

Q What unit commitment assumptions should the Commission require MGE to use in creating its fuel cost plans?

A I would normally recommend that MGE model its coal units with an economic commitment status; however, the Company did conduct a model run that used this parameter at the request of Commission Staff and found that [redacted][25] Importantly, this result does not indicate that operating a unit in must-run status is the most economic option; rather, it indicates that the model design and assumptions that MGE uses to develop its fuel plan model likely do not properly reflect the operational and economic realities of operating a coal plant in today's rapidly evolving energy market. There are more options for MGE than just [redacted].[26] There is a third option: develop a new methodology, within the existing model or an entirely new one, and a set of assumptions that actually reflect prudent commitment decisions.

Specifically, the Commission should require that MGE's share of its plants be committed using a modeling structure and assumptions that reflect a price-based unit commitment process and that makes the best decision with the information knowable at the time. The strategy being used currently at MGE's share of at least some its plants of [redacted] is likely not producing actual optimal results for ratepayers. But modeling its coal units in economic mode is also not producing optimal projected results.[27] Therefore, the Commission should

[25] MGE CONFIDENTIAL Response to MAR-2.1.

[26] MGE CONFIDENTIAL Response to FCP-DM-10.

[27] The economic mode is by definition supposed to create a more economic outcome. If it does not do so, then the Company should reevaluate the assumptions it is using in the tool.

require MGE to commit its share of its coal units using a process that both presumes prudent commitment behavior and produces an optimal economic outcome for ratepayers.

6. RECOMMENDATIONS

Q Please summarize your recommendations for the Commission.

A My recommendations are as follows:

1. The Commission should require that MGE model its unit commitment and dispatch for fuel cost plans consistent with the operational commitment and dispatch policies actually utilized at its share of the Columbia and Elm Road plants.

2. The Commission should prohibit MGE's share of Columbia and Elm Road units from being committed in an ongoing must-run configuration and require that MGE's share of both units are either (1) committed into MISO with an economic commitment status, or (2) MGE demonstrate that each must-run decision is prudent based on the results of a robust price-based analysis process conducted by the plant operator (MGE for Columbia and WEPCO for Elm Road).

3. In the event of any deviations between the unit commitment decisions at MGE's share of its coal plants and the result of the price-based analysis used to make unit commitment decisions at the plants, the Company should produce documentation of the circumstances that prompted the commitment decision. MGE should need to always demonstrate that unit commitment was demonstrably prudent based on the totality of known and knowable

information at the time of the decision, and that the plant operators continually reassessed this decision.

4. The Commission should make clear in its final order that actual utility commitment practices will be subject to a formal prudence review as part of the fuel cost reconciliation process and that the Commission will not allow MGE to recover net operational losses incurred at the Company's share of its coal-fired units as a result of avoidable, uneconomic operations and planning.

5. The Commission should require MGE to refresh its fuel plan to reflect the actual operational practices at its share of its coal plants and update its LMP forecast to reflect potential continuing downward pressure on LMPs from the COVID-19 pandemic.

Q Does this conclude your testimony?

A Yes.