BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Application of Wisconsin Electric Power Company for a Certificate of Public Convenience and Necessity to Construct and Operate the South Oak Creek Combustion Turbine Project in the City of Oak Creek, Milwaukee County, Wisconsin **6630-CE-317**

DIRECT TESTIMONY OF DOUGLAS JESTER ON BEHALF OF CLEAN WISCONSIN

Q. Please state your name and business address.

A. My name is Douglas B. Jester. My business address is PO Box 869, Northport, Michigan 49670.

Q. By whom are you employed and in what capacity?

A. I am Managing Partner of 5 Lakes Energy, a Michigan limited liability corporation,

Q. On whose behalf are you testifying?

A. I am testifying on behalf of Clean Wisconsin.

Q. Please describe your educational background.

A. I hold a Bachelor of Individual Studies in Mathematics, Biology, and Fine Arts from New Mexico State University, an M. Sc. in Fisheries and Wildlife from Virginia Tech, another M. Sc. with dual majors in Statistics and Operations Research from Virginia Tech, an additional year of coursework in Natural Resource Economics at the University of British Columbia, and completed all requirements except a dissertation for a Ph.D. in Economics from Michigan State University with concentrations in Development Economics and Environmental Economics.

Q. Please describe your work experience.

A. I have worked for more than 30 years in utility industry regulation and related fields. My work experience is summarized in my resume, provided with this testimony as Ex.-CW-Jester-1. I have testified in 97 cases before the Michigan Public Service Commission, including electric and gas rate cases, integrated resource plan cases, certificate of necessity cases, energy efficiency plan cases, renewable energy plan cases, PURPA avoided cost cases, power supply cost recovery cases, and stranded asset securitization cases.

Additionally, I have testified as an expert witness before the Public Utilities Commission of Nevada in Case No. 16-07001 concerning the 2017-2036 integrated resource Plan of NV Energy; and before the Missouri Public Service Commission in Case Nos. ER-2016-0179, ER-2016-0285, and ET-2016-0246 concerning residential rate design and electric vehicle ("EV") policy, revenue requirements, cost of service, and rate design. I testified before the Kentucky Public Service Commission in Case No. 2016-00370 concerning municipal street lighting rates and technologies. I testified before the Massachusetts Department of Public Utilities in Case Nos. DPU 17-05 and DPU 17-13 concerning EV charging infrastructure program design and cost recovery. Before the Rhode Island Public Utilities Commission, in case 4780, I testified concerning Advanced Metering Infrastructure and EV charging infrastructure. Before the Delaware Public Service Commission, I testified regarding EV charging infrastructure in case 17-1094. I testified before the Georgia Public Service Commission in Case No. 4822 concerning PURPA avoided cost. I testified before the Colorado Public Utilities Commission in Cases No. 20A-0204E and 20A-195E concerning cost recovery for EV charging infrastructure. I also testified before the Minnesota Public Utilities Commission in Case No. 22-432 regarding EV charging rate design.

I have also testified as an expert witness on behalf of the State of Michigan before the Federal Energy Regulatory Commission ("FERC") in cases relating to the relicensing of hydro-electric generation and have participated in state and federal court cases on behalf of the State of Michigan, concerning electricity generation matters, which were settled before trial.

I served as a Commissioner of the Lansing Board of Water and Light, a large municipal utility, from 2017 until 2023. I was appointed by Governor Whitmer to the Michigan UP Energy Task Force, Vice-Chair of the State of Michigan Dam Safety Committee, and Co-Chair with MPSC Commissioner Katherine Peretick of the Energy Production, Transmission, Distribution, and Storage Workgroup of the State of Michigan Council on Climate Solutions.

Q. Are you sponsoring any exhibits with your testimony?

A. Yes, I am sponsoring the following Exhibits:

Ex-CW-Jester-1: Resume of Douglas Jester

Ex-CW-Jester-2: Press report of Microsoft construction delay

Ex-CW-Jester-3: Joint Stipulation and Recommendation filed with the Public Utilities Commission of Ohio (Case No. 24-508-EL-ATA)

Ex CW-Jester-4: Stipulation and Settlement Agreement filed with Indiana Utility Regulatory Commission (Cause No. 46097)

Ex.-CW-Jester-5: Evergy's Large Load Tariff

Ex.-CW-Jester-6: Microsoft Clean Energy Commitment

Ex.-CW-Jester-7: Microsoft's Comments on 2023 Georgia Power's 2023 IRP

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

A. I make recommendations to the Commission regarding its action on WEPCO's Application, including the sequencing of events concerning WEPCO's forecasted load that it should consider

before granting a Certificate of Public Convenience and Necessity ("CPCN") in this case. I observe that WEPCO has not analyzed alternatives that meet clean energy commitments associated with the forecasted load and has therefore failed to demonstrate that the proposed resources are the most reasonable and prudent path for WEPCO. I make recommendations regarding the prudent acquisition of battery storage resources and the comparison of battery storage resources to other resources in evaluating an application for a CPCN.

Q. Are you familiar with the Oak Creek Combustion Turbine Project?

A. Yes, I have reviewed the project application, responses to data requests, and other documents related to this project.

Q. Please summarize your findings.

A. I conclude that:

1. WEPCO has not demonstrated that the proposed Oak Creek CT project is a public necessity or convenience;
2. WEPCO has analyzed resource options using an inapt cost metric, which invalidates their case for the proposed resource portfolio;
3. WEPCO's analysis of battery storage as an alternative resource is fundamentally flawed, and this affected their proposed resource portfolio.

WEPCO HAS NOT ADEQUATELY DEMONSTRATED NECESSITY OF THE OAK CREEK CT PROJECT

Q. What load forecasts are the basis for WEPCO's CPCN Application?

A. According to WEPCO's CPCN Application,

> Wisconsin Electric's demand and energy forecasts all include the forecasted new load in the I-94 corridor starting in 2025. Total annual energy requirements for the I-94 corridor are assumed to start at approximately [redacted] **MWh in 2025** growing

to almost [redacted] **MWh by 2029** and peak demand is assumed to grow from approximately [redacted] **MW to** [redacted] **MW** over the same time period.[1]

Q. Is this assumed load growth important in WEPCO's CPCN Application?

A. Yes. Clean Wisconsin Witness Chelsea Hotaling explains that in her PLEXOS modeling runs, the resulting resource additions differed substantially if she assumed the full amount, 50%, or none of this forecasted new load in the I-94 corridor. The cumulative new resources by 2030 in her model runs, by these levels of load additions are as follows:

Load Assumption	Oak Creek CT	Paris RICE	Generic CT	Solar	Wind	Battery	EE	DR
Full[2]	1185	55	1185	1700	1100	845	31	146
50%[3]	474	55	0	1900	1100	910	31	196
None[4]	0	55	0	400	1100	325	31	146

Clearly, the assumption of the new load along the I-94 corridor is crucial for this CPCN Application.

Q. Why do you say that WEPCO has not adequately demonstrated the necessity of the Oak Creek CT project?

A. WEPCO has not demonstrated that the forecasted new load in the I-94 corridor will happen, nor that the customers that are forecast to provide that load will pay for the cost of serving that load.

It is reasonable to statistically forecast ordinary load growth and to plan capacity to serve that load. Those forecasts of modest change may be erroneous, but the costs of errors in those

[1] Ex.-WEPCO-Application-Application: 2.1.1.
[2] Direct-CW-Hotaling-16: Table 6.
[3] Direct-CW-Hotaling-17: Table 7.
[4] Direct-CW-Hotaling-17: Table 8.

forecasts are small and should over time be self-correcting. If WEPCO builds capacity at the scale of the forecasted new load in the I-94 corridor and that load does not appear, there will be a substantial investment that WEPCO will expect to recover from other customers. In this instance, the estimated cost is approximately $1,205 million.[5] There is an additional cost for the Paris RICE plant proposed in a separate CPCN case to serve the same increased load.

WEPCO has not presented in this case any commitment by the erstwhile customers that would create the new load in the I-94 corridor that they will pay for the costs projected by WEPCO in this CPCN Application. In effect, WEPCO is asking the Commission to determine that other customers should backstop what is effectively a speculative investment by WEPCO.

Q. Do you have reason to believe that the forecasted new load in the I-94 corridor will not occur?

A. Based on the evidence presented by WEPCO, I assume that it is possible that such load will occur. But, WEPCO has not demonstrated that it will, which should be their burden in this case. I will note that customers that are likely to bring such large load typically explore multiple locations in depth in order to gain a competitive package of costs, tax breaks, and grants before they commit to a location. It is reasonable to assume that the potential new customers for whom WEPCO is forecasting this new load in the I-94 corridor are engaging in such a process until and unless they have signed a binding contract to take, or at least pay for, the capacity and energy that WEPCO proposes to supply through this CPCN.

Additionally, the forecasted new load in the I-94 corridor is widely believed to be Microsoft data center(s). If this is the case, the forecasted load is still uncertain. Ex CW-JESTER-2[6] presents

[5] Ex.-WEPCO-Application-Application: Section 1.2.

[6] Ex.-CW-Jester-2 was obtained https://www.wpr.org/economy/microsoft-pauses-construction-on-portions-of-mount-pleasant-project (Any information contained in this citation, based solely on this citation, is not record evidence (NRE)) on January 14, 2025.

news coverage indicating that Microsoft's plans are evolving such that the ultimate load and the ramp to that load may be different than what is forecasted by WEPCO in the present cases. Even if the Commission believes that the customer that is the source of the forecasted load is reasonably certain based on construction, that does not mean that the forecasted load will materialize in the amounts and on the schedule provided in WEPCO's forecast.

Q. Are there additional reasons to question whether the capacity requirements forecasted by WEPCO will materialize?

A. Yes. Large new loads are often able to interrupt some of their projected load, or to be flexible with their load, if given an appropriate incentive. That can be particularly true of facilities that have backup power supply for facility reliability. Until WEPCO, presents the Commission a contract for the forecasted new load in the I-94 corridor, that possibility will be unknown to the Commission.

Q. When a prospective customer is evaluating multiple sites to locate a new facility, what is the usual outcome regarding power supply?

A. It is common that such a customer will seek a rate that is reduced below the established rates for their customer class. Sometimes referred to as "economic development rates", these typically approximate the incremental cost to the utility of serving the forecast load but with some cost risks and/or load forecast risks falling on the utility, hence the utility's other customers. And, in such circumstances, the other customers would not gain any dilution of their share of costs that are fixed with respect to total sales.

Q. On the basis of uncertainty about the forecasted new load in the I-94 corridor, how should the Commission proceed?

A. The Commission should not grant a CPCN based on large new loads unless and until WEPCO demonstrates that it has a customer or customers who are contractually committed to pay the full cost of the new resource, without undue transfer of risk to the utility and its other customers.

Q. Have other Commissions dealt with such circumstances?

A. Yes, on many occasions. I mention three that are salient.

First, I draw the Commission's attention to the special contract between WEC subsidiary Upper Michigan Energy Resources Corporation ("UMERC") and the Tilden Mine. In Case No. U-18224 before the Michigan Public Service Commission, UMERC sought and obtained a Certificate of Public Convenience and Necessity for the construction of 2 RICE facilities totaling approximately 180 MW nameplate capacity. A large portion of the capacity and energy that UMERC sought to serve with these facilities was for the Tilden mine located in their service area. Consistent with a prior agreement with the State of Michigan, this CPCN Application was filed with a proposed long-term special contract between UMERC and the Tilden Mine, which was approved and became effective along with the grant of the CPCN. Simultaneously approval of the special contract and the CPCN provided certainty that the resources for which the CPCN was granted would be paid for by Tilden Mine.

Second, in Public Utilities Commission of Ohio docket 24-508-EL-ATA, AEP sought, and with other parties has proposed a settlement[7] currently under consideration by that commission, a tariff for Electricity-Intensive Customers that applies to any new load greater than 50 MW at a single location. The tariff requires that any such new load enter a contract with AEP Ohio that provides for a specified load ramp period and long-term commitment to take power at the

[7] Ex.-CW-Jester-3.

planned level, with required payment for a minimum demand that is 75% to 85% of the contracted demand.

Third, a settlement[8] is currently pending before the Indiana Utility Regulatory Commission that would apply to customers with demand exceeding 70 MW at a single location or 150 MW aggregated. It would create a mandatory contract term of at least 12 years, with a potential ramp in demand. The customer would be required to pay for a minimum demand of 80% of the contract capacity.

In any approach to this, the Commission should require that the utility demonstrate in a rate case that the large load customer revenues exceed costs.[9]

Q. What, in summary, is your recommendation to the Commission regarding the requested CPCN?

A. The Commission should not grant the requested CPCN unless and until WEPCO has filed with the Commission and the Commission approves, simultaneously with or prior to the approval of, the CPCN contract(s) between WEPCO and the customer(s) who are forecast to produce the new load in the I-94 corridor. The terms of such contract(s) should be subject to full adjudication in a contested case to ensure that the interests of other WEPCO customers are fully considered by the Commission.

WEPCO'S OPTIMIZATION USED AN INAPT COST METRIC

Q. Generally, how did WEPCO analyze alternative resource portfolios?

A. Generally, WEPCO used PLEXOS as a modelling tool to search for the "least cost" resource portfolio under various assumptions and scenarios, where cost was measured as the net present value of incremental revenue requirements.

[8] Ex.-CW-Jester-4.
[9] See for example, Evergy's large load tariff. Ex.-CW-Jester-5.

Q. What is the net present value of incremental revenue requirements inapt in this case?

A. The new load that WEPCO proposes to service is widely understood to be due to new data centers in Wisconsin, to be owned by Microsoft. Microsoft, like most major data center operators, has made certain commitments to clean energy.[10] Microsoft has affirmed aspects of those commitments in utility regulatory filings.[11] Amongst Microsoft's commitments are:

> By 2025, Microsoft will shift to 100% supply of renewable energy, meaning that the company will have PPAs for green energy contracted for 100% of carbon-emitting electricity consumed by all its datacenters, buildings and campuses. By 2030 Microsoft will have 100% of its electricity consumption, 100% of the time, matched by zero-carbon energy purchases.

Unless WEPCO provides electricity to Microsoft matching these commitments, Microsoft will presumably incur costs to meet these commitments. The cost metric that WEPCO has minimized in its analyses in this case does not account for these costs.

Q. What is the consequence of using a cost metric that leaves out the costs that Microsoft will incur to meet their clean energy commitments?

A. If Microsoft is willing to and will pay elsewhere to satisfy their clean energy commitments, that cost should be available for WEPCO to earn by meeting Microsoft's commitments directly in WEPCO's supply of power to Microsoft. WEPCO's cost metric to determine the resource mix it uses to serve Microsoft load should be net of Microsoft's willingness to pay for meeting its clean energy commitments through another party. This could lead to a WEPCO resource mix that satisfies Microsoft's clean energy commitments even though the costs WEPCO will incur for that resource mix might be higher than the one proposed. The result would be a cleaner WEPCO.

[10] *See* Ex-CW-Jester-6, which is a statement from Microsoft's web site concerning their commitments to clean energy, obtained from https://news.microsoft.com/source/emea/features/as-the-world-goes-digital-datacenters-that-make-the-cloud-work-look-to-renewable-energy-sources/ (NRE).

[11] *See* Ex-CW-Jester-7.

Q. How should the Commission consider Microsoft's clean energy commitments in this case?

A. This issue further illustrates that it is problematic to grant a CPCN for a large new load, without a contractual commitment that such load will materialize. WEPCO should have explored through contract negotiations Microsoft's clean energy commitments and provided analysis to support whether WEPCO should meet Microsoft's clean energy requirements or should provide more generic power and leave Microsoft to meet its commitments elsewhere. The Commission should not grant the requested CPCNs unless and until WEPCO has demonstrated the resources for which CPCNs are requested are prudent even if Microsoft's clean energy commitments are explicitly considered.

WEPCO'S ANALYSIS OF BATTERY STORAGE AS A RESOURCE IS FUNDAMENTALLY FLAWED, AFFECTING THE PROPOSED RESOURCE PORTFOLIO

Q. What is the role of battery storage in this case?

A. In this case, WEPCO requests a CPCN for a combustion turbine, based on analyses comparing that resource to other alternative resources, including battery storage. In most scenarios, WEPCO found that the optimal portfolio was a blend of resources including battery storage.[12] Based on its analysis, WEPCO effectively determined that the Oak Creek CT plant and battery storage are competing resources in the portfolio, a conclusion that is supported by the analyses performed by Clean Wisconsin witness Chelsea Hotaling.[13]

Q. What are your concerns about WEPCO's analysis of battery storage in this case?

[12] Ex.-WEPCO-Application-Volume III Appendix D:31.
[13] Direct-CW-Hotaling-9.

A. I have two principal concerns: treatment of investment tax credit normalization, and erroneous battery operational modeling.

Q. What is your concern about investment tax credit normalization?

A. Federal law has traditionally required that investment tax credits to utilities be normalized, which is basically that the tax credits be amortized over the life of the asset for which the tax credit is provided, rather than taken as a reduction of rate base at the time the tax credit accrues. This requirement was modified in the Inflation Reduction Act ("IRA"), but in a way that makes it ambiguous whether normalization is required for battery storage projects whose construction begins after December 31, 2024. The details of this are described by Clean Wisconsin witness Chelsea Hotaling in her testimony.[14] Since battery storage options in WEPCO's analysis would begin construction after December 31, 2024, WEPCO has assumed that normalization is required.

Q. Does normalization affect the optimal resource portfolio?

A. Yes. As Clean Wisconsin witness Hotaling shows, elimination of normalization reduces the effective cost of new battery resources by approximately [redacted]%.[15]

Q. How should normalization have been considered in WEPCO's analysis?

A. Normalization, if required, is only required if the battery storage resource is owned by WEPCO or another utility. WEPCO should have considered ownership by another party who could clearly take advantage of the investment tax credit. There are common options that would definitely allow immediate benefits of the IRA investment tax credit for battery storage. First, WEPCO could have considered a tolling agreement, in which the other party would own the battery storage system (and typically be responsible for maintenance) but WEPCO would pay

[14] Direct-CW-Hotaling-9.
[15] Direct-CW-Hotaling-9.

a fixed schedule of fees for the right to operate the storage system and retain any net revenues from battery operations as well as owning the zonal resource credits provided by the storage system.

Second, WEPCO could have considered a power purchase agreement, in which the other party would own and operate the battery storage system and WEPCO would pay for the energy outflow and zonal resource credits provided by the storage system. Such an arrangement would typically involve an outflow payment for the storage service but WEPCO would pay for charging power and receive payment for the market value of the discharging power.

Third, WEPCO could have considered that the other party would own and operate the battery storage system, including buying power to charge and selling power upon discharge, and WEPCO would purchase the zonal resource credits produced by the battery storage system.

Q. What is your concern about battery operational modeling?

A. WEPCO modeled battery operations in PLEXOS, essentially providing for optimization of battery operations in the context of the merit order dispatch of generation to meet load, in one-hour intervals. That modeling paradigm produces an understatement of the energy arbitrage value of the battery storage system. Because the capacity additions model is effectively comparing cost of resource ownership net of energy arbitrage value, understatement of the energy arbitrage value implies overstatement of cost of ownership net of net energy value and likely leads to selection of less battery storage resource that is actually optimal.

Q. Why does the standard capacity additions modeling paradigm lead to an understatement of the energy arbitrage value of a battery storage system?

A. I have used the standard capacity additions modeling paradigm in my own work.[16] I have since concluded that this approach understates the value of storage because the embedded operations model is fundamentally flawed. The energy arbitrage value of battery storage will always exceed the value calculated by the usual modeling paradigm.

The principal battery storage modeling challenge that is not met by the standard approach used by WEPCO is the stochasticity of power prices, especially over short market intervals. To maximize net revenue to the battery storage system, the battery operator will buy power and charge the system when power prices are low and discharge from the system to sell power when power prices are high. Real-world power prices are more varied and volatile than in the standard model, and a battery storage system will take advantage of that variation to gain additional revenue from the increased opportunity to buy low and sell high. A modeling tool like PLEXOS that optimizes using hourly intervals and prices determined by merit order dispatch cannot capture the energy arbitrage value, so both WEPCO's modeling and the PLEXOS modeling to which Clean Wisconsin Witness Chealsea Hotaling testifies will undervalue battery storage and therefore likely include too little battery storage in "optimal" portfolios.

Q. Why are real-world power prices more varied and volatile than in the standard model?

A. Principally because deviations from load forecasts used to dispatch resources require short-term dispatch of resources that are considerably more expensive than the next resource in a merit order dispatch. Even during periods of relatively low demand that is being met by resources with low operating costs, demand that exceeds the power from dispatched resources must be met with fast but expensive resources such as peaking plants. Such deviations can happen because demand

[16] *See* Energy Storage Roadmap for Michigan, prepared for the Michigan Department of Environment, Great Lakes and Energy, available from https://mieibc.org/wp-content/uploads/2022/03/IEI_EnergyStorageReport_FINAL.pdf (NRE).

is higher than was forecast or because dispatched resources produce less than was directed. These deviations may occur over intervals of hours but also happen in very short intervals, which is the reason that wholesale markets operate with a "real time" market using short intervals to adjust load and supply into balance.[17]

Q. Why doesn't the modeling problem you describe affect the valuation of other resources?

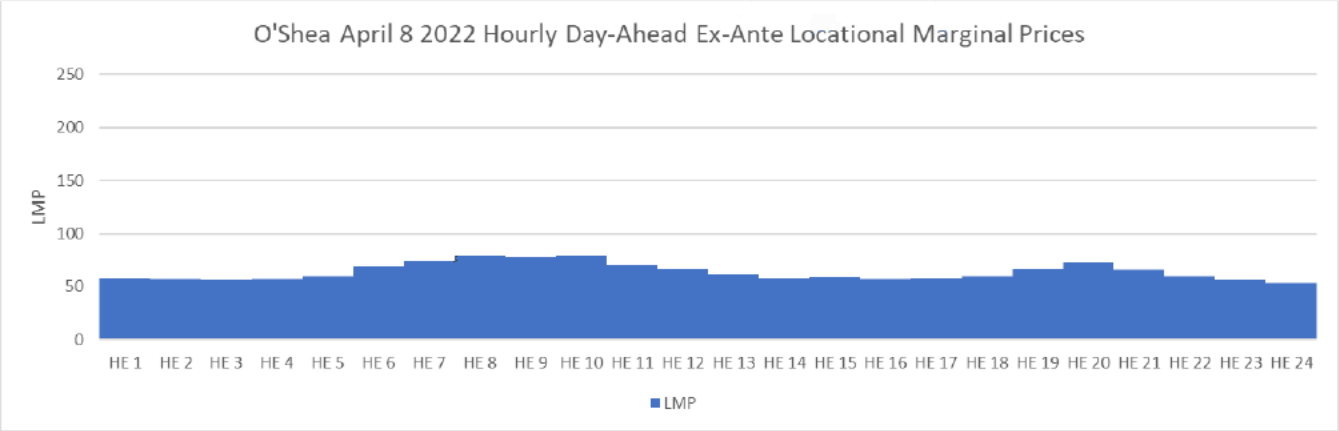
A. It does to a small degree. However, resources that are less agile than a battery storage system are less able to adjust operations in response to price variation. Indeed, it is the lack of agility of most power generation resources that causes price variation and volatility in response to relatively small errors in load forecasts and resource dispatch. As a result, for most resources, hourly averages are reasonably reflective of their operations and energy revenues. The Midcontinent Independent System Operator's ("MISO") Independent Market Monitor produces annual reports that include a comparison of day-ahead hourly and average real-time 5-minute prices, which consistently shows the convergence of those prices.[18] MISO's day-ahead market engine uses logic very similar to that in PLEXOS. Thus, it is not average performance that deviates from the modeled power system, but variation and volatility. Only agile resources like battery storage, and particularly battery storage because it both charges and discharges in response to market prices, that can exploit price variation to obtain economic value. RICE plants are more agile than other fuel-based plants, but because they are not able to use low-priced power to charge, they produce less value from their agility than does battery storage.

Q. Can you illustrate the phenomena you are describing?

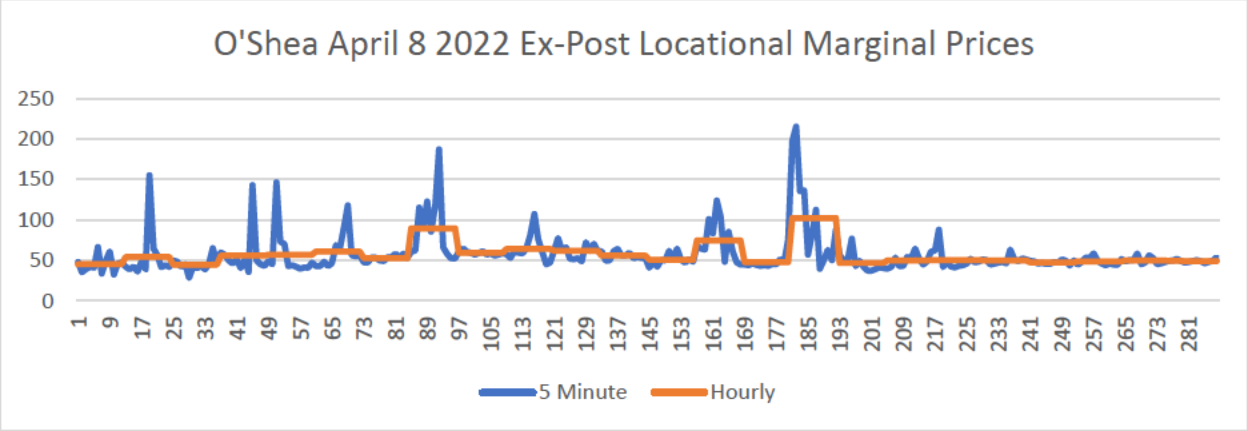
[17] The Midcontinent Independent System Operator, of which WEPCO is a member, operates a 5-minute market.
[18] See, for example, 2023 State of the Market Report for the MISO Electricity Markets, p. 30, available from https://cdn.misoenergy.org/2023%20State%20of%20the%20Market%20Report636641.pdf (NRE).

A. Yes. For simplicity of presentation, I use a single day and location. I have reviewed similar data from many time periods and locations and the case I use for illustration is representative. The specific data I discuss below is for April 8, 2022 at MISO's generation node DECO.OSHEA.BAT, which is the site of a modest battery near Detroit.

The following graph shows the hourly locational marginal prices as calculated by MISO to clear the day-ahead market. As noted above, the day ahead market engine logic is very similar to the PLEXOS modeling done by WEPCO for this case.



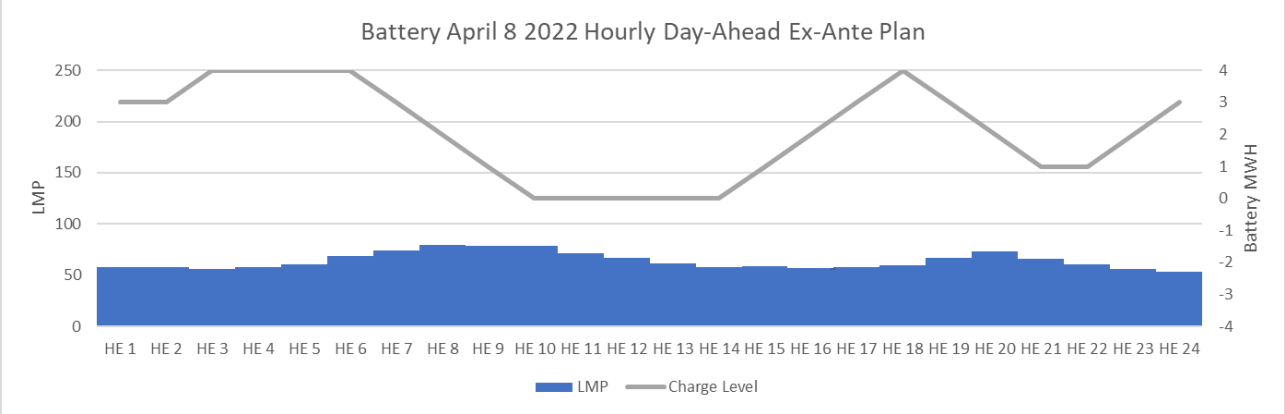
The next graph shows both the 5-minute ex-post locational marginal prices and hourly averages of the 5-minute ex-post locational marginal prices for the same time period.



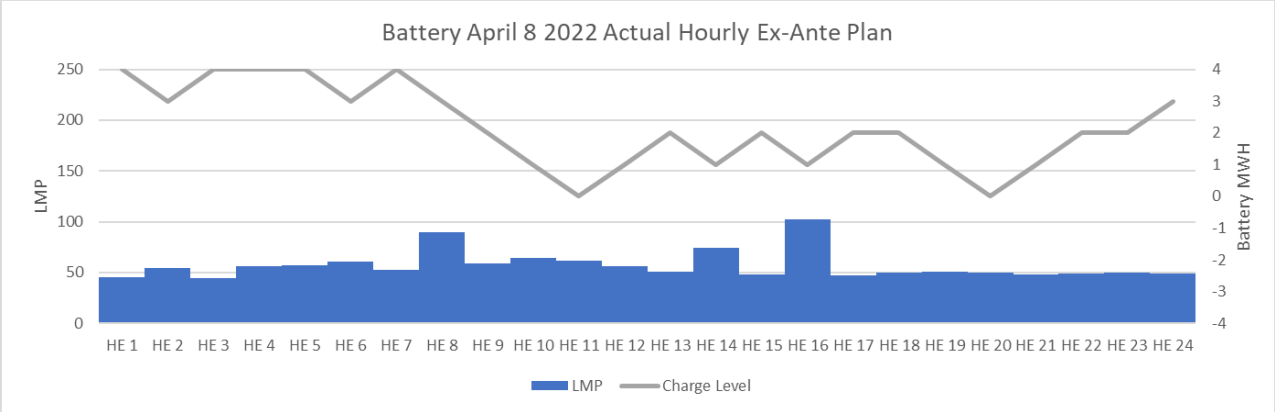
The above graphs illustrate the differences in price variation and volatility between the modeled power system and the actual power system.

Q. How does that difference between the modeled power system and actual power system affect modeled battery operations?

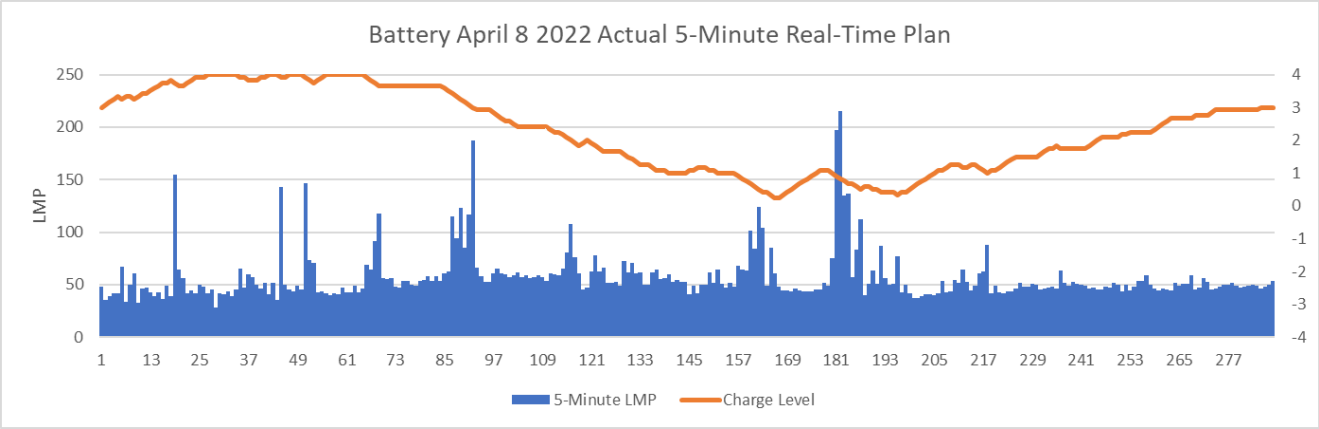
A. For illustration purposes, I assume a 1 MW battery with 4 MWh energy capacity. The following graph shows the day-ahead locational marginal prices and expected battery state of charge under an optimal battery operation plan assuming the day-ahead locational marginal prices. When the state of charge goes down, the battery is discharging. When the state of charge goes up, the battery is charging. When the state of charge remains constant, the battery is neither charging nor discharging. This is the battery behavior that PLEXOS will presume.



The next graph shows the hourly average real-time locational marginal prices and the expected battery state of charge if the battery operations were optimized based on these hourly average real-time locational marginal prices. This pattern of operation would not usually be implemented because it is better to work in the 5-minute market if using actual prices, but I am showing it to illustrate that hourly price variation differs from modeled hourly price variation and has operational consequences.



The following graph shows the 5-minute locational marginal prices and the optimal[19] battery state of charge is optimized based on the 5-minute locational marginal prices. This is representative of the operations that would be expected from a skilled battery operator in the actual market.



Q. What are the financial consequences of these different operating patterns?

A. In this illustrative example, the net arbitrage revenue from this single day of operations would be modeled as $117.35 assuming optimal batter operation with the day-ahead hourly locational marginal prices. This is the way in which WEPCO modeled battery operations. If battery operations had been optimized at hourly intervals using the actual hourly average locational

[19] For this illustration, optimization is an optimized cost-triggered control band. Similar patterns result from other optimization algorithms.

marginal prices derived from the real-time market, the net arbitrage revenue from this single day of operations would be $177.65. If this battery was operated optimally in response to the actual locational marginal prices in the 5-minute market, the net arbitrage revenue would be $253.43. The large difference between the energy arbitrage value as modeled in MISO's market engine, using logic similar to that in PLEXOS, and the actual net arbitrage revenue that would be achieved by an optimal battery operator in the actual market is a fundamental deficiency in the analysis.

Q. Why have you not provided an alternative analysis and portfolio based on this more realistic view of battery operations?

A. Largely because the effort to organize, manage, and analyze this is too large to be done within the time constraints of a case. However, it is also worth noting that modeling tools to produce realistic battery operations embedded within capacity additions models are not readily available.

Q. If this more realistic modeling can't be done in PLEXOS or a similar tool, what do you recommend?

A. I recommend a separate analysis of battery economics, and then embedding battery resources in the capacity additions model with load shapes, net capacity costs and credits reflecting optimized battery operations. Alternatively, market prices for battery-derived zonal resource credits could be used as the net capacity cost from a battery.

Q. How should the Commission respond to your analysis?

A. The Commission should conclude that the analysis presented by WEPCO is not persuasive that a RICE plant is preferred over a storage plant. Rather than trying to resolve this choice with modeling, the Commission should require WEPCO to solicit proposals from battery system developers which WEPCO and the Commission can compare to the expected performance of a

RICE plant. Since battery operators compete, in part, on their dispatch algorithms, the most useful approach would likely be for WEPCO to solicit battery system proposals in which the battery developer would operate the battery and take energy arbitrage profits and sell zonal resource credits to WEPCO for us in meeting its resource adequacy obligations.

SUMMARY OF RECOMMENDATIONS

Q. Please summarize your recommendations to the Commission.

A. I make three recommendations to the Commission:

1. The Commission should not grant a CPCN in this case because WEPCO's demonstration is entirely contingent on expected large new loads, which are not contractually committed to occur or be paid for.
2. The Commission should find that WEPCO has not demonstrated that their proposed resource selection is the most reasonable and prudent option, because their modeling did not consider the incremental costs and revenues of WEPCO meeting Microsoft's clean energy commitments.
3. The Commission should find that WEPCO has not demonstrated that their proposed resource selection is the most reasonable and prudent option, because their modeling of storage resources is fundamentally flawed. The Commission should require that WEPCO obtain market prices for battery storage services to compare to the Oak Creek CT plant proposal.

Q. Does this complete your testimony

A. Yes, it does.