UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)	Docket No. ER21-278-000

ANSWER AND MOTION FOR LEAVE TO ANSWER OF THE INDEPENDENT MARKET MONITOR FOR PJM

Pursuant to Rules 212 and 213 of the Commission's Rules and Regulations,[1] Monitoring Analytics, LLC, acting in its capacity as the Independent Market Monitor ("Market Monitor") for PJM Interconnection, L.L.C. ("PJM"),[2] submits this answer to the answer filed December 11, 2020, by the Sustainable FERC Project, Natural Resources Defense Council, Union of Concerned Scientists, and Sierra Club, who refer to themselves as "PIOs."[3] This proceeding concerns the filing submitted on October 30, 2020 ("October 30th Filing"), proposing revisions to the PJM market rules to apply an Effective Load Carrying Capability ("ELCC") approach for determining the contribution to reliability of a MW of variable (intermittent), limited duration (storage), or combination (hybrid) resources ("ELCC Proposal").

The Market Monitor filed comments on November 20, 2020, and an answer to other comments and protests filed on December 10, 2020, explaining that the October 30th Filing is simply inadequate and should be rejected. This pleading is limited to arguments raised by

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1 18 CFR §§ 385.212 & 385.213 (2020).

2 Capitalized terms used herein and not otherwise defined have the meaning used in the PJM Open Access Transmission Tariff ("OATT"), the PJM Operating Agreement ("OA") or the PJM Reliability Assurance Agreement ("RAA").

3 The pleading was also signed by counsel for and submitted under cover letter of Earthjustice.

PIOs that may not have been fully addressed in the prior pleading. This answer is needed to correct inaccurate statements and to ensure a complete record in this proceeding. The ELCC Proposal has not been shown to be just and reasonable, its flaws have been exposed, and it should be rejected.

While the goal of the PIOs is unclear, the ELCC Proposal does not improve the prospects for renewable energy in PJM markets. In fact, the ELCC Proposal favors batteries over renewable energy. The ELCC Proposal does not provide incentives for the continued development of new and innovative renewable technologies. In fact, the ELCC Proposal strongly favors incumbent technologies over new entrants. The ELCC Proposal is not good for customers. In fact, the ELCC Proposal shifts costs and risks to customers.

The Market Monitor's goal is to ensure that the reliability contribution of all resource types is calculated correctly to ensure an efficient and competitive market outcome. A competitive market provides the right incentives to developers of renewable technologies and the lowest cost outcome to customers. The Market Monitor believes that renewable resources are competitive and do not require special treatment or biasing the rules to ensure their success and that markets will continue to provide incentives to new and innovative technologies.

I. ANSWER

A. PIOs Fail to Show PJM's Proposed ELCC Modelling Is Just and Reasonable

1. Location Matters

PIOs argue that location does not matter in PJM markets. The assertion is clearly and factually incorrect on its face. LMP, the cornerstone of PJM markets, is locational marginal pricing. Locational detail is fundamental to PJM markets. Yet PIOs claims (at 5): "[T]he IMM does not point to real-life situations where PJM actually modeled those highly localized interactions in other market contexts—because doing so would require a level of modeling granularity that does not exist elsewhere at PJM or other RTOs."

PIOs are incorrect. As a current, obvious counterexample, PJM modeling of the net revenue offset in the capacity market is fully locational. All well-functioning, accurate and efficient models of wholesale power markets are fully locational.

The ELCC analysis ignores location and treats all resources in PJM, regardless of location, as identical. That is clearly incorrect, from the perspective of wind and solar because of differential wind and solar attributes, and from the perspective of all resources because of transmission constraints and different energy and capacity market prices. ELCC resources will offer into the PJM Capacity Market, which is a locational market and the PJM Energy Market, which is a locational market. The lack of any ELCC analysis at the LDA level means that the values included in the ELCC Proposal are not consistent with PJM's locational energy market and are not consistent with PJM's locational capacity market.

2. Imprecision Matters

PIOs argue (at 5) that precision in the ELCC modeling is not needed "right away." PIOs argue (at 5): "However, modeling is by its nature an imprecise science, and it is unrealistic to expect any model to achieve the level of detail advocated by the IMM."

PIOs clearly understand that the ELCC model is inadequate. But PIOs miss the associated point.

PIOs seem to confuse a model, in the sense of a simulation model, with a core part of PJM's market design that directly affects clearing prices and quantities in the capacity market. The ELCC Proposal is not a simulation model that can be improved so that it provides more interesting analytical results. The ELCC model, analogous to the capacity market model, is part of PJM's integrated market design that will directly affect clearing prices and quantities in the real world capacity market for 13 years or more. [4] [5]

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[4] Each ELCC resource will be assigned a 13 year schedule of ELCC floors based on the resource's ELCC class and its first delivery year. See October 30th Filing, Attachment A, proposed RAA Schedule 9.1 § J(1).

PJM needs to develop a complete and accurate ELCC model that is consistent with market design principles, subject to thorough vetting by participants, and rigorous testing prior to implementation.

B. Data Is Not Data When It Is Estimated Hypothetical History or Simply Assumed

PIOs argue (at 6) that the Market Monitor "indulges in wordplay" when it points out that the ELCC Proposal uses imaginary values for resource performance. Unfortunately, it is not wordplay.

PIOs misunderstand the seriousness of this issue. It is not wordplay to explain exactly what the term used by PJM actually means. The word putative has a clearly defined meaning. The PIOs did not disagree with the definition cited in the Market Monitor filing. PJM itself describes the data as "estimated hypothetical historical output" in the RAA description of the performance adjustment for planned resources.[6] The PIOs would ignore the fact that PJM is actually using hypothetical data because it has no actual performance data for the resources in question. Hypothetical data is not data. In the case of storage, the data is assumed. Assumed data is not data.

PIOs have lost sight of the real issue. It would be fine to use estimates and hypothetical data and backcasted data and other putative data if the purpose were to run a sensitivity model to develop a sense of how ELCC might work in the real world and in real markets. It would be fine if the knowledge from that modeling exercise were used to develop estimates of likely impacts and to guide market design. It would be fine if PJM then

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[5] The ELCC Proposal requests that the new ELCC rules be applicable starting with the 2023/2024 Delivery Year and the RAA revisions call for a review of the ELCC floor rules by the end of 2026. By the end of the review the 2029/2030 RPM BRA will be complete. Capacity values for new resources that cleared in the 2029/2030 RPM BRA will be subject to ELCC floors for 13 years, through the 2041/2042 Delivery Year. If approved the proposed ELCC rules would be in place for delivery years 2023/2024 through 2041/2042 or 19 years

[6] October 30th Filing, Attachment A, proposed RAA Schedule 9.1 § E(2)(a).

let the market actually work, with real participants and real investors taking real risks based on their own assessment of market outcomes and real ELCC values revealed by market dynamics. But PJM is proposing to use putative data to establish actual ELCC floor values for existing resources that will have a significant impact on markets for at least 13 years and likely longer. PIOs ignore this very practical and real world problem in their theoretical discussion of modeling exercises. The ELCC Proposal is not a modeling exercise.

PIOs ignore the fundamental and explicitly stated purpose of the ELCC Proposal which is to shift risk from owners of existing technology, to new entrants with innovative technology, and, although not explicitly stated, to customers. That is not an efficient or competitive way to encourage the development of renewable resources and it will actively hinder the development of new renewable technologies.

PJM will backcast whenever historical data is unavailable.[7] [8] Backcasting means, for wind and solar resources, to assume historical behavior based on a combination of current information and historical weather data.[9] Backcasting results are not data about actual behavior and should not be used as if they were.[10] The ELCC analysis and results are heavily dependent on hypothetical data rather than actual data. In the case of batteries, PJM will assume behavior when there is no current operational information that can be used as the basis for a backcast. For example, PJM does not have four hour limited use storage resources on its system participating in its reserve or energy markets. The limited use

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7 *See* PJM at 25–28.

8 PJM has noted in stakeholder meetings that the owners of ELCC resources would be allowed to submit their own historical backcasting data and that PJM would use an undefined verification process to assess the validity of the data.

9 Given that weather is local and PJM is assuming no transmission constraints and therefore no locational differences, the basis for the weather assumptions is not clear.

10 See PJM at 25–28.

storage resources currently on PJM's system (less than 10 hour limited use) are participating in PJM's Regulation Market.

PJM relies on estimated hypothetical historical output that is not data to create very long lived commitments under the ELCC Proposal. The results will be damaging to PJM markets. There is no reason to do so.

C. Average vs. Marginal ELCC

PIOs attempt to defend (at 7–8) the average approach as "reasonable," because "reliability can be reasonably modelled by examining the performance of PJM's entire fleet of resources."

There is no basis for PIO's assertions regarding PJM's proposed average approach.

ELCC analysis requires the use of marginal rather than average ELCC values. Marginal ELCC values are needed for determining unit specific contributions to total capacity contribution capacity by class, for determining UCAP obligations of cleared resources, for determining market clearing prices for ELCC affected resources, for ensuring that the market clears efficiently, and for determining potential performance penalties for ELCC affected resources. It is generally recognized that marginal ELCC values will decline as additional ELCC resources are added.[11] That relationship must be included in the market clearing process in order to have and efficient and competitive outcome. PJM's failure to use marginal rather than average ELCC values in its market evaluations of resources in the capacity market will cause the market to overvalue, over compensate and over procure the ELCC resources. The use of average rather than marginal ELCC values will cause PJM's capacity market results to be incorrect and inefficient, at the expense of the PJM customers, at the expense of new renewable resources, and at the expense of non-ELCC resources.

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[11] See for example, the presentation by PJM's consultant: August 7, 2020 Presentation by E3, "E3 Allocating Effective Load Carrying Capability (ELCC) MW from Portfolio to Classes"; <https://pjm.com/-/media/committees-groups/task-forces/ccstf/2020/20200807/20200807-item-04-e3-allocating-elccmw-from-portfolio-to-classes.ashx> .

D. PJM Markets Use Marginal Values Not Average Values

PIOs incorrectly assert (at 7–8) that the Commission has rejected arguments in prior cases supporting "the use of dynamic marginal values is essential to efficient market clearing."

Markets clear based on the marginal output and price characteristics of resources. Supply and demand curves are based on marginal values. Markets solve simultaneously for the optimal, least cost mix of resources. The market clearing values are a function of the dynamic market clearing process. The Commission has not accepted a PJM market that clears and settles on average values. PJM's energy market, capacity market, regulation market and reserve markets all clear on the basis of simultaneously (PJM and PIOs use the term dynamic as an apparent synonym) calculated marginal quantity and marginal price. That is how markets work. It is the most basic of basic economics.[12]

E. The ELCC Proposal Does Not Model Energy Storage Realistically or Reasonably

PIOs argue (at 9) that the ELCC Proposal uses reasonable behavioral assumptions about energy storage.

PIOs are wrong. PIOs confuse flexibility of a resource with the reliability contribution of a resource. PIOs ignore the fact that batteries are a net load and have limited output capability within a day. PIOs ignore that rational batteries will make charge and discharge decisions on a short term basis based on prices and expected prices. These attributes make any behavioral assumptions about batteries in the energy market central to any evaluation of the reliability contribution of batteries. The ramp rates and start up times of batteries are irrelevant to the determination the availability of output from a battery,

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[12] The PIOs misunderstand how the regulation market works. The regulation market clears on the basis of a dynamically calculated marginal value called the marginal benefit factor. The problem in the regulation market identified by the Market Monitor and PJM is how the marginal prices, which are dependent on the dynamic marginal benefit factor, are used inconsistently in settlement.

assuming a profit maximizing owner. PJM's assumptions about battery behavior are implausible. PJM assumes that batteries will behave perfectly from the perspective of a planner and system operator and only provide output when all other resources are exhausted.[13] This extreme, unsubstantiated and demonstrably incorrect assumption is the sole source of the implausible ELCC values that PJM assigns to batteries.[14] There is no support for this assumption and the PIOs do not pretend to provide any actual analytical support.

It is logically possible to use a carefully defined and developed ELCC type analysis for calculating the reliability contribution of non dispatchable intermittent resources, because the output of these resources results from factors outside the control of the resource owners. The availability of non dispatchable intermittent resources and fully dispatchable resources is based only on an assumption of rational, profit maximizing behavior. Wind will follow the wind profile and solar will follow the solar profile, regardless of market conditions. The wind and solar profiles are accounted for in the ELCC analysis, although not locationally.

The limited nature of batteries means that behavior in hours other than PJM's super peak limits the availability of the resource for those super peak periods.

For example, an energy storage resource could discharge in response to high prices during the morning ramp and exhaust its output capability. Or, an energy storage resource could provide regulation and exhaust its output capability. Neither of these possible outcomes, or myriad others, are accounted for in PJM's ELCC analysis.

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13 *See* PJM October 30th Filing at 30.

14 *Id*. ("Dr. Rocha Garrido explains that this principle 'recognizes that to take advantage of the flexibility provided by Limited Duration Resources and Combination Resources, and thus maximize their reliability benefit to the PJM system, it is essential to dispatch these resources after Unlimited Resources and Variable Resources.'").

II. MOTION FOR LEAVE TO ANSWER

The Commission's Rules of Practice and Procedure, 18 CFR § 385.213(a)(2), do not permit answers to answers or protests unless otherwise ordered by the decisional authority. The Commission has made exceptions, however, where an answer clarifies the issues or assists in creating a complete record.[15] In this answer, the Market Monitor provides the Commission with information useful to the Commission's decision making process and which provides a more complete record. Accordingly, the Market Monitor respectfully requests that this answer be permitted.

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[15] *See, e.g., PJM Interconnection, L.L.C., 119 FERC ¶61,318 at P 36 (2007) (*accepted answer to answer that "provided information that assisted … decision-making process*"); California Independent System Operator Corporation*, 110 FERC ¶ 61,007 (2005) (answer to answer permitted to assist Commission in decision-making process); *New Power Company v. PJM Interconnection, L.L.C.*, 98 FERC ¶ 61,208 (2002) (answer accepted to provide new factual and legal material to assist the Commission in decision-making process); *N.Y. Independent System Operator, Inc.*, 121 FERC ¶61,112 at P 4 (2007) (answer to protest accepted because it provided information that assisted the Commission in its decision-making process).

III. CONCLUSION

The Market Monitor respectfully requests that the Commission afford due consideration to this answer as the Commission resolves the issues raised in this proceeding.

Respectfully submitted,

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Dated: December 18, 2020

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Eagleville, Pennsylvania,
this 18th day of December, 2020.

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