UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)	Docket No. ER22-2984-000

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 of PJM submitted November 9, 2022; the answer of the Public Interest Entities submitted October 21, 2022 ("Public Interest Entities");[3] and to comments and protests submitted October 21, 2022. This proceeding concerns PJM's filing on September 30, 2022, of proposed revisions to certain Reliability Pricing Model ("RPM") auction parameters, including adjustments to the existing Variable Resource Requirement ("VRR") Curve ("Quadrennial Review Filing"). The Quadrennial Review Filing is the product of the

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1 18 CFR §§ 385.212 & 385.213 (2022).

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 "Public Interest Entities" include: the Sierra Club, the Illinois Citizens Utility Board, New Jersey Division of Rate Counsel, Maryland Office of People's Counsel, the Office of the People's Counsel for the District of Columbia, the Delaware Division of the Public Advocate, PennFuture, Southern Environmental Law Center, Natural Resources Defense Council, and the Sustainable FERC Project.

analysis and the stakeholder review process required by the OATT every four years ("Quadrennial Review").[4]

The primary issues addressed in PJM's Quadrennial Review Filing are: the choice of the reference resource; the calculation of the energy and ancillary offset, including revenues from the reactive ancillary service; and the separately defined specific shape and location parameters of the VRR Curve, including the slope. All these parameters have a significant effect on the final shape and location of the VRR curve and on capacity market outcomes.

The capacity market plays a central function in the PJM markets and, in particular, contributes significantly to the incentives of new generation to enter and existing generation to remain in the PJM market when it is economic. The Quadrennial Review sets the level of core parameters that are intended to reflect the economic fundamentals while it is in effect. The goal is neither to inflate or suppress capacity market prices but to help ensure that they are competitive.

I. COMMENTS

A. Reference Technology

PJM elected to use a combined cycle ("CC") rather than the combustion turbine used in prior years as the reference resource. The proposed CC reference resource is a CC configured with a double train 1x1 single shaft General Electric Frame 7HA.02 turbine with an F-A650 steam turbine with evaporative cooling, Selective Catalytic Reduction (SCR) technology and carbon monoxide catalyst, with firm gas transportation, and a heat rate of 6.604 MMbtu/MWh (with duct firing) and 6.369 MMbtu/MWh (without duct firing). The Market Monitor supports the choice of the CC reference resource because it reflects the

[4] *See* OATT Attachment DD § 5.10(a).

actual type of unit actually being added to the PJM system. No significant level of combustion turbines has been added since the introduction of PJM markets in 1999.[5]

B. Energy and Ancillary Services Net Revenue Offset

The Net Cost of New Entry ("Net CONE") is a key determinant of the shape and location of the VRR Curve. The Net CONE is defined as the gross CONE minus the energy and ancillary service ("EAS") offset. The Market Monitor agrees with PJM's basic position on the gross CONE values for the reference technology, based on the Market Monitor's independent investigation into the gross CONE cost components. The Market Monitor also supports PJM's use of a forward looking EAS offset in defining Net CONE.

The forward looking approach is consistent with the way that actual investors evaluate the markets and is clearly preferable to the historical approach for that reason. Both the Market Monitor and PJM have been using the essential elements of the forward looking approach for a long time in the calculation of the opportunity costs associated with environmental limits on the operation of generating units.

The use of a forward looking EAS offset rather than a backward looking EAS offset is especially important in this Quadrennial Review given the significant change in market conditions that has occurred since 2020. PJM prices and net revenues were at historical lows in 2020. The markets are at an inflection point. Current and forward looking energy prices have increased significantly. For example, energy prices increased significantly in the first nine months of 2022 from the first nine months of 2021.[6] The real-time load-weighted average LMP in the first nine months of 2022 increased 118.2 percent from the first nine months of 2021, from $35.68 per MWh to $77.84 per MWh. This is the highest average PJM price ($77.84 per MWh), the highest price increase ($42.16 per MWh) and the highest

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[5] *See* 2022 State of the Market Report for PJM: January through September (November 10, 2022) at 709 & Table 12-26.

[6] *Id*. at 159.

percent price increase (118.2 percent) for the first nine months of a year since the creation of PJM markets in 1999. Use of a backward looking EAS offset would result in an understatement of the reasonably expected EAS offset and therefore an overstatement of Net CONE which would result in overstated capacity market prices.

But the PJM Quadrennial Review Filing also continues to add complexity to the calculation of the forward looking EAS offset, which is unnecessary and also incorrect in some important ways. The calculation of the forward looking EAS offset should be as accurate and as simple as possible, but no more simple. The approach should be transparent so that any participant can replicate the results if they have data on forward prices and historical PJM LMPs, the relevant parameters for the technology and can simulate the dispatch of a unit using the resultant forward prices on a nodal and hourly basis. This is within the capabilities of many PJM participants and certainly enough to serve as a check on PJM's calculations.

PJM's continued inclusion, without explicit discussion or support by PJM, of long term FTRs in the forward EAS calculation adds unnecessary complexity, has no articulated basis, is not accurate and cannot be implemented as a result of the timing of capacity auctions and FTR auctions. Long term FTR prices for the relevant delivery year will not be available at the time of the capacity market auctions even when the Base Residual Auction ("BRA") schedule returns to the three year cycle. Because the FTR data include a measure of congestion, but not losses, and do not capture monthly and hourly price variation, this approach requires additional adjustments based on historical LMPs. The more direct, simpler, more transparent, and more accurate approach starts with the forward curves and calculates hourly and nodal forward prices based on historical LMPs, which are a more reliable and more transparent method of calculating locational price differences. PJM should be required to use this approach rather than its proposed approach to the calculation of the forward looking EAS offset.

The Market Monitor's proposal is based on the existing approach to the forward looking EAS offset calculations with the minimum complexity required for accuracy. The

Market Monitor's proposed approach to the EAS offset includes identified key components. The Market Monitor's proposed approach includes real-time monthly on and off peak forward prices for the delivery year at the PJM Western Hub, adjusted to the zone and hour using the historical zonal, nodal and hourly real-time price differentials for each of the last three years. The Market Monitor's proposed approach includes generating costs equal to the short run marginal costs of each technology. The short run marginal cost of gas fired resources is equal to the forward price of gas for the defined zonal gas delivery point multiplied by the heat rate of the resource plus operating costs.

This is a relatively straightforward solution and one which the Market Monitor and PJM have been implementing for years in the calculation of the opportunity costs associated with environmental limits on the operation of generating units.[7] This calculation method is documented in PJM Manuals and can easily be used for the EAS offset calculation in the Quadrennial Review.

One of the primary reasons for implementing a forward looking EAS offset in the capacity market is to better reflect the way actual investors evaluate the markets. The more that unnecessary complications are added to the calculation of forward prices, the less likely it is that the calculations reflect investors' actual expectations about the future.

C. Reactive Revenue Offset

One part of the EAS offset is revenue from the reactive ancillary service. The Commission is currently considering options for addressing reactive payments. PJM stakeholders are currently considering options for addressing reactive payments. Both tracks have the potential to significantly change the forward looking expectation of revenues from the reactive ancillary service. PJM has included a single number for the

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7 *See* "PJM Manual 15: Cost Development Guidelines," Rev. 35 (April 24, 2020) § 12.7.

forward looking reactive revenue in the tariff: $2,546 per MW-year.[8] That number was taken from the Market Monitor's State of the Market Report.[9] Given that significant changes are very possible within the term of this Quadrennial Review, the Market Monitor requests that the tariff language be modified to require that PJM reconsider the reactive revenue offset based on any significant change. For example, if the reactive capability revenue is reduced to zero, this would significantly increase capacity market prices and revenues. The current single number should not be fixed for four years.[10]

D. Shape and Location of the VRR Curve

The shape of the VRR Curve directly results in load paying substantially more for capacity than load would pay with a vertical demand curve. The Market Monitor recommends that the VRR Curve be rotated half way towards the vertical demand curve at the reliability requirement for the current Quadrennial Review. The shape of the VRR Curve was discussed in the stakeholder process, PJM reviewed the impact of a range of VRR Curve shape options, and PJM agreed that the VRR Curve should be rotated towards the vertical demand curve, but by only approximately one quarter of the way towards vertical.[11]

The demand for capacity includes expected peak load plus a reserve margin, and points on the VRR Curve, exceed peak load plus the reserve margin. The shape of the VRR Curve results in the purchase of excess capacity and higher payments by customers. The

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8 *See* PJM Filing, Docket No. ER22-2984-000 (September 30, 2022) at 51.

9 *See id.*; 2022 State of the Market Report for PJM: January through June, (August 11, 2022) at 603 (Table 10-67).

10 *See* "Estimated Impact of Reactive offset on Capacity Market Results," presented to the RCPTF <http://www.monitoringanalytics.com/reports/Presentations/2022/IMM_RCPTF_Estimated_Impact_of_Reactive_Offset_on_Capacity_Market_Results_20220928.pdf>.

11 *See* PJM Filing, Docket No. ER22-2984-000 (September 30, 2022) at 9; MIC Special Sessions: 2022 Quadrennial Review.

impact of the VRR Curve shape used in the 2023/2024 BRA compared to a vertical demand curve was a significant increase in customer payments for load as a result of buying more capacity than needed for reliability and paying a price above the competitive level as a result. The defined reliability goal is to have total supply greater than or equal to the defined demand for capacity. The level of purchased demand under RPM has generally exceeded expected peak load plus the target reserve margin, resulting in reserve margins that exceed the target.

The downward sloping shape of the VRR Curve had a significant impact on the outcome of the auction. As a result of the flatter downward sloping VRR Curve, more capacity cleared in the market than would have cleared with a steeper VRR Curve set at half way between the VRR Curve used in the 2023/2024 BRA and the vertical demand curve defined by the reliability requirement. Based on actual auction clearing prices and quantities and uplift MW, total RPM market revenues for the 2023/2024 RPM Base Residual Auction were $2,196,444,791. If PJM had used a VRR Curve set at half way between the VRR Curve used in the 2023/2024 RPM Base Residual Auction and the reliability requirement for 2023/2024 RPM Base Residual Auction and everything else had remained the same, total RPM market revenues for the 2023/2024 RPM Base Residual Auction would have been $1,790,941,751, a decrease of $405,503,039, or 18.5 percent, compared to the actual results. From another perspective, clearing the auction using a downward sloping VRR Curve resulted in a 22.6 percent increase in RPM revenues for the 2023/2024 RPM Base Residual Auction compared to what RPM revenues would have been with a VRR Curve set at half way between the VRR curve used in the 2023/2024 RPM Base Residual Auction and the reliability requirement.[12]

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[12] *See* "Analysis of the 2023/2024 RPM Base Residual Auction" (October 28, 2022), Scenario 2 at 69–70 & Table 28.

Although the Market Monitor is not proposing a vertical VRR Curve in this proceeding, the Market Monitor calculated the impact of using a vertical demand curve rather than the current VRR Curve shape. If PJM had used a vertical demand curve set equal to the reliability requirement for the 2023/2024 BRA and everything else had remained the same, total RPM market revenues for the 2023/2024 BRA would have been $1,212,977,260, a decrease of $983,467,530, or 44.8 percent, compared to the actual results. From another perspective, clearing the auction using a downward sloping VRR Curve resulted in an 81.1 percent increase in RPM revenues for the 2023/2024 RPM BRA compared to what RPM revenues would have been with a vertical demand curve set equal to the reliability requirement.[13]

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.[14] 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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13 *See id.*, Scenario 1 at 67–69 & Table 27.

14 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 pleading as the Commission resolves the issues raised in this proceeding.

Respectfully submitted,

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Dated: November 16, 2022

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 16th day of November, 2022.

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