UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)	Docket No. EL19-58-012

COMMENTS OF THE INDEPENDENT MARKET MONITOR FOR PJM

Pursuant to Rule 211 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 these comments responding to the filing submitted by PJM Interconnection, L.L.C. ("PJM") on February 22, 2022 ("February 22nd Filing"). The February 22nd Filing was made in compliance with the order on remand issued December 22, 2021, in this proceeding ("Remand Order"), which directed implementation of the reserve market enhancements initially accepted in the May 2020 Order but with the removal of the changes to the operating reserve demand curves ("ORDCs").[3] The Remand Order was subsequently clarified by order issued February 11, 2022 ("Clarification Order"), stating that energy and reserve market price capping should remain in place.[4]

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1 18 CFR § 385.211 (2021).

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 *PJM Interconnection, L.L.C.*, 177 FERC ¶ 61,209 (2021) ("Remand Order"), *order granting clarification,* 178 FERC ¶ 61,085 (2022) ("Clarification Order"). The Remand Order also directed PJM to submit a compliance filing restoring the historical energy and ancillary services revenue offset for use in PJM's capacity market, which PJM submitted separately in Subdocket No. EL19-58-011.

4 *Id*.

The February 22nd Filing complies with the straightforward removal of the extended ORDCs, but inexplicably proposes to increase the price cap for the nonsynchronized market clearing price ("NSR MCP") by 50 percent, arguing that an increased cap is required to reflect the relatively higher reliability value of nonsynchronized primary (10 minute) reserves over secondary (30 minute) reserves.

The Market Monitor does not agree that the proposed increased cap for NSR MCP is required for reliability or any other reason. Under the process described in the Clarification Order (at P 17), the increase to the cap for NSR MCP should be rejected, but the compliance filing should otherwise be accepted. Acceptance of the February 22nd Filing should be without prejudice to future reform. The rules for reserve shortage pricing need further refinement.

I. COMMENTS

A. The Proposed 50 Percent Increase in the Current Price Cap for Nonsynchronized Reserves is Not Justified.

PJM has not provided any evidence for increasing the NSR MCP at all, let alone by 50 percent. The February 22nd Filing provides no evidence that the nonsynchronized reserve price cap is too low or that a higher price cap would enhance market efficiency or that 50 percent has any logical or economic basis. A higher price cap will not change the clearing of reserves in the economic dispatch. Contrary to the assertion in the February 22nd Filing, the reliability value of nonsynchronized reserve will be no higher due to the implementation of the secondary reserve product than it is without it.

The current approach to administrative reserve pricing that includes multiple identical additive penalty factors is overly simplistic and not the best long term approach in part because it leads to extreme and inefficient pricing not based on good economic logic. But within that current approach, price caps on administrative prices are essential because price caps limit the impact of the additive reserve and transmission constraint penalty factors used in administrative pricing. Administrative pricing, based on five $850 per MWh reserve penalty factors and potentially multiple $2,000 per MWh transmission constraint penalty

factors, can easily exceed efficient levels and impose inefficient wealth transfers from customers to sellers, among sellers, or from physical to financial market participants and create risks that impose collateral costs and limit efficient market transactions. Prices have reached the cap levels even without marginal energy offers reaching the offer cap and even without shortages in all reserve products or zones.[5] [6] In fact, the overall energy and reserve cap of $3,700 per MWh has been reached due to administrative pricing adders but never due to energy prices at the offer cap during a shortage. The cap has prevented other anomalous features of PJM pricing from creating inefficient and punitive administrative excessive pricing, including pricing based on transmission constraint penalty factors and administrative emergency pricing and unexplained features of PJM's pricing software, from exceeding the defined levels.

The February 22nd Filing provides no evidence that the nonsynchronized reserve price cap is too low or that a higher price cap would enhance market efficiency. A higher price cap will not change the clearing of reserves in the economic dispatch. Despite the February 22nd Filing's argument, the reliability value of nonsynchronized reserve will be no higher due to the implementation of the secondary reserve product than it is without it. Changing the price caps does not make nonsynchronized reserves any more reliable and it does not cause the market to clear them any differently. The latter is true because PJM's administrative reserve price caps are implemented after the fact, and do not impact the economic dispatch of energy and reserves.

PJM explains in its February 22nd Filing (at 10) that without its proposed change, when secondary reserves are short, both the secondary reserve clearing price and the primary

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[5] *See* PJM, Formation of Locational Marginal Pricing and the System Energy Component of LMP During Reserve Shortage Events (April 2021) at <https://www.pjm.com/-/media/markets-ops/energy/real-time/shortage-lmp-whitepaper-example.ashx>.

[6] *See* Monitoring Analytics, L.L.C., *2021 State of the Market Report for PJM*, Vol. II., Section 3: Energy Market at 203 – 208.

reserve clearing price would be capped at $850 per MWh and that this outcome does not reflect the incremental reliability benefit provided by 10 minute primary reserve compared to 30 minute secondary reserve. PJM attempts to make a significant and unwarranted change in a compliance filing. Changing the administrative offer caps is not an effective way to differentiate the relative value of reserve products.

As a factual and technical matter, the real-time energy market cannot procure additional nonsynchronized reserve at prices above $850 per MWh. RT SCED, the tool that is used for real-time dispatch and forms the basis for real-time prices, cannot commit or decommit units. Neither RT SCED nor the day-ahead market can procure additional 10 minute nonsynchronized reserves by converting the less valuable secondary reserve into nonsynchronized reserve. The only product substitution that RT SCED can do is to procure additional synchronized reserves by substituting energy, and the synchronized reserve clearing price reflects the additional lost opportunity cost (LOC) of units that are dispatched to provide synchronized reserves instead of producing energy. RT SCED cannot make commitment changes to procure additional nonsynchronized reserve. The day-ahead market can commit resources, but it can only convert offline units to online units. It cannot convert 30 minute offline reserves to 10 minute offline reserves. Therefore, there is no direct product substitution between nonsynchronized and secondary reserves that needs to be accounted for through additive reserve constraint shadow prices. The higher additive penalty factors and resulting clearing prices proposed in the February 22nd Filing would simply increase the credits paid to certain reserve products.

The Commission recognized the complexity and the lack of transparency in energy price formation in PJM when reserve price caps and the SMP caps are implemented and the need to develop a further record.[7] Pricing reserve shortages of all extents and of all products as high as $850 per MWh and having those prices be additive under emergency pricing is not

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[7] Clarification Order at P 17.

necessary for market efficiency or reliability. The price capping mechanism limits the impact of this reserve market design on customers. Future review of PJM shortage pricing should include review of the relative value of the reserve products, and implementation of shortage pricing that accounts for RT SCED's inability to procure nonsynchronized and offline secondary reserves.

B. The Price Caps Protect the Market and Their Implementation Should Be Reviewed and Documented.

In its February 22nd Filing, PJM shows (at 9) its current cap on the energy component of LMP, also known as System Marginal Price (SMP) at $3,700 per MWh.[8] [9] PJM states (at 11) that it is "not proposing to raise the overall energy market price above the existing maximum $3,700/MWh level (LMP energy component only) at this time." The Market Monitor supports retaining an energy price cap while noting that the existing SMP cap does not cap LMP comparably for load at all locations on the PJM system. As discussed in the Commission's Technical Conferences regarding Energy and Ancillary Services Markets, a market design with ORDCs that apply prices lower than $850 per MWh to shortages associated with a low loss of load probability or to shortages of the lower quality reserve products would provide more rational prices than ORDCs that apply the maximum penalty factor to all shortages.[10]

PJM states in a footnote that the $3,700 per MWh cap includes "a $2,000/MWh energy offer and a shortage of all reserve products in the reserve zone and sub-zone."[11] PJM's current implementation of a cap at $3,700 assumes a $2,000 marginal energy offer. However, the default cap on energy offers is $1,000 per MWh, and it only increases to $2,000 per MWh

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8 *Id.* at 9.

9 PJM actually imposes the cap at $3,750 per MWh.

10 Transcript of the Technical Conference Regarding Energy and Ancillary Services Markets, Docket No. AD21-10 (September 14, 2021).

11 February 22nd Filing at n.33.

when energy costs increase above $1,000 per MWh. Energy offers above $1,000 per MWh are allowed to set prices only if the costs have been reviewed and verified by PJM prior to them being used.[12] Without such verification, energy offers used in calculating prices are capped at $1,000 per MWh.[13] However, PJM's SMP capping logic is based on the incorrect assumption that the marginal energy offer is at $2,000 per MWh even when no offers above $1,000 per MWh are approved for setting prices by PJM.

The current implementation is not clearly described in the tariff or PJM manuals. PJM has continued to implement the $3,700 per MWh cap without filing with the Commission and without stakeholder review of the underlying basis for the level of the cap. If the SMP cap were based on the cap on energy offers as PJM states, it would be set at the original $2,700 per MWh value and only increased when verified energy offers greater than $1,000 per MWh are allowed to set prices.

There are also issues with implementing shortage pricing for reserves where the caps are protecting the market from prices exceeding the defined ORDCs based on other nontransparent features of PJM's pricing rules. For example, the Market Monitor has identified instances when the reserve prices are inconsistent with the tariff defined ORDCs.[14] On December 8, 2021, during the interval beginning 0910 EPT, there was a shortage of synchronized reserves, but no primary reserve shortage in the RTO Reserve Zone or the MAD Subzone, but reserve prices exceeded the synchronized reserve ORDCs. Table 1 shows that the RTO synchronized reserve MCP reached $1,668.60 per MWh even though the ORDC for synchronized reserves has a maximum value of $850 per MWh and the RTO primary reserve MCP was zero. The RTO synchronized reserve MCP of $1,668.60 per MWh did not reach the

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12 OA Schedule 1, Section 6.4.3.

13 The default cap and requirement for review and approval also applies to composite energy offers from fast start resources used in the pricing run that generates the final LMPs.

14 *See* 2021 State of the Market Report for PJM, Volume II, Section 3 Energy Market, at 204 – 205.

tariff specified overall price cap on synchronized reserves of $1,700 per MWh, so the RTO synchronized reserve MCP was not capped by PJM. However, the price was inconsistent with the RTO synchronized reserve ORDC that has a maximum price of $850 per MWh. Without a simultaneous primary reserve MCP that is greater than zero, the synchronized reserve MCP for the RTO Zone should not exceed $850 per MWh. On December 8, 2021, at 0910 EPT, PJM's process of implementing shortage pricing for synchronized reserves was inconsistent with the tariff defined ORDC.

Table 1 RTO Zone Reserves on December 8, 2021 at 0910 EPT

Interval (EPT)	Product	RTO Extended Reserve Requirement (MW)	Total RTO Reserves (MW)	RTO Reserve Shortage (MW)	Uncapped RTO Reserve Clearing Price ($/MWh)	Capped RTO Reserve Clearing Price ($/MWh)
08-Dec-21 09:10	Synchronized Reserve	1,856.0	1,435.2	420.8	$1,668.6	$1,668.6
08-Dec-21 09:10	Primary Reserve	2,689.0	2,753.6	0.0	$0.0	$0.0

In the MAD Subzone, the uncapped MCP reached $2,518.60 per MWh, which is the sum of the RTO synchronized reserve uncapped price ($1668.60 per MWh) and the MAD synchronized reserve ORDC price ($850 per MWh). Table 2 shows that PJM applied the tariff defined overall price cap for the MAD synchronized reserve MCP at $1,700 per MWh. With primary reserve MCPs at zero, the uncapped MCP for MAD synchronized reserve should not have exceeded the $1,700 per MWh sum of the RTO and MAD synchronized reserve ORDCs. This shows that the process of calculating reserve prices and implementing reserve price caps in PJM is not transparent, and the reserve price caps prevent this type of pricing anomaly from exceeding the defined levels.

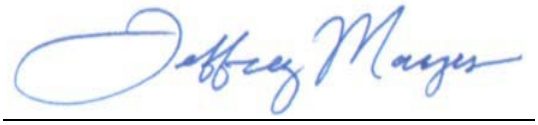
Table 2 MAD Subzone Reserves on December 8, 2021 at 0910 EPT

Interval (EPT)	Product	MAD Extended Reserve Requirement (MW)	Total MAD Reserves (MW)	MAD Reserve Shortage (MW)	Uncapped MAD Reserve Clearing Price ($/MWh)	Capped MAD Reserve Clearing Price ($/MWh)
08-Dec-21 09:10	Synchronized Reserve	1,856.0	1,435.2	420.8	$2,518.6	$1,700.0
08-Dec-21 09:10	Primary Reserve	2,689.0	2,689.0	0.0	$0.0	$0.0

II. CONCLUSION

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

Respectfully submitted,



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Dated: March 11, 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 11th day of March, 2022.

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