UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	**)**	**Docket No. ER23-729-000**
PJM Interconnection, L.L.C.	**)**	**Docket No. EL23-19-000**
		(Not consolidated)

PROTEST OF THE ELECTRIC POWER SUPPLY ASSOCIATION

Pursuant to Rule 211 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission (the "Commission"),[1] the Electric Power Supply Association ("EPSA")[2] respectfully submits this protest to the two filings submitted on December 23, 2022, by PJM Interconnection, L.L.C. ("PJM") in the above-captioned proceedings[3]

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[1] 18 C.F.R. § 385.211 (2022).

[2] EPSA has separately moved to intervene in these proceedings. *See* (doc-less) Motion to Intervene of Electric Power Supply Association, Docket No. ER23-729-000 (filed Jan. 3, 2023); (doc-less) Motion to Intervene of Electric Power Supply Association, Docket No. EL23-19-000 (filed Jan. 3, 2023). EPSA is the national trade association representing competitive power suppliers in the U.S. EPSA members provide reliable and competitively priced electricity from environmentally responsible facilities using a diverse mix of fuels and technologies. EPSA seeks to bring the benefits of competition to all power customers. This pleading represents the position of EPSA as an organization but not necessarily the views of any particular member with respect to any issue.

[3] Proposed Amendment to the Locational Deliverability Area Reliability Requirement Filed Pursuant to Section 205 of the Federal Power Act, Request for Waiver of Notice Requirement, and Request for an Extended Comment Period of 28 Days, Docket No. ER23-729-000 (filed Dec. 23, 2022) (the "ER23-729 Filing"); EL23-19 Complaint Alleging that the Locational Deliverability Area Reliability Requirement is Unjust and Unreasonable as Applied in a Particular Locational Deliverability Area in the 2024/2025 Base Residual Auction And Requesting that the Commission Establish a Refund Effective Date of December 23, 2022, and Request for an Extended Comment Period of 28 Days, Docket No. EL23-19-000 (filed Dec. 23, 2022) (the "EL23-19 Complaint" and together with the ER23-729 Filing, the "December 23 Filings"). The ER23-729 Filing was filed under Section 205 of the Federal Power Act (the "FPA"), 16 U.S.C. § 824d (2018), while the EL23-19 Complaint was filed pursuant to Section 206 of the FPA, 16 U.S.C. § 824e (2018), but both of the December 23 Filings request substantially similar relief and put forward substantially similar arguments. Capitalized terms not otherwise defined herein have the meaning set forth in PJM's

proposing modifications to the Reliability Pricing Model ("RPM") rules applicable to the 2024/2025 Base Residual Auction ("BRA"). As explained below and in the affidavit of Paul M. Sotkiewicz, Ph.D., provided as Attachment A hereto (the "Sotkiewicz Affidavit"), the December 23 Filings must be rejected because the filed rate doctrine and rule against retroactive ratemaking bar PJM from modifying the rules governing the 2024/2025 BRA when the auction window has already closed. Moreover, even aside from that serious legal infirmity, PJM has failed to demonstrate that its proposed tariff modifications are just and reasonable or that its existing Tariff is unjust and unreasonable. PJM's proposed modifications must be rejected because they would make it impossible for market participants to rely on the auction parameters posted by PJM ahead of each auction, deter bilateral contracting and investments, and result in prices that do not reflect reliability needs. This is particularly true because PJM has repeatedly demonstrated, and continues to demonstrate in the December 23 Filings, a bias towards actions that will push down prices while failing to make fixes, much less timely fixes, needed to ensure that resources necessary for reliability have the opportunity and incentive to remain in the market.

I. BACKGROUND

The December 23 Filings seek to modify the definition of the term "Locational Deliverability Area Reliability Requirement" under the Tariff. The Locational Deliverability Area Reliability Requirement is based on the "the projected internal capacity" in the relevant Locational Deliverability Area ("LDA"), plus the Capacity Emergency Transfer

Open Access Transmission Tariff (the "Tariff"), the Reliability Assurance Agreement Among Load Serving Entities in the PJM Region (the "RAA") or the December 23 Filings, as applicable.

Objective ("CETO") for the Delivery Year.[4] However, PJM claims that the definition of the Reliability Requirement must be modified because, in clearing the 2024/2025 BRA, PJM realized that:

> a significant amount of Planned Generation Capacity Resources that were expected to participate in the auction based on the expected in-service date of the resources' Interconnection Service Agreements ("ISAs") did not offer in the auction despite being included in the Locational Deliverability Area Reliability Requirement.[5]

In particular, PJM asserts that the Locational Deliverability Area Reliability Requirement for the Delmarva Power & Light South ("DPL-S") LDA "was overstated for the 2024/2025 BRA,"[6] because "large thermal resources and planned Intermittent Resources in the [DPL-S] LDA that were expected to participate in the auction . . . did not offer in the auction despite being included in the Locational Deliverability Area Reliability Requirement."[7] If it were to use the existing definition of the Locational Deliverability Area Reliability Requirement in the 2024/2025 BRA, PJM:

> estimates that the clearing price for the DPL-S LDA (and the revenues received by the Capacity Market Sellers in this small LDA) would be more than four times what the clearing price should be if the Planned Generation Capacity Resources that did not offer in the auction are excluded from the Locational

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4 *See* Tariff, § 1 (definition of "Locational Deliverability Area Reliability Requirement"). The CETO is "the amount of electric energy that a given area must be able to import in order to remain within a loss of load expectation of one event in 25 years when the area is experiencing a localized capacity emergency, as determined in accordance with the PJM Manuals." RAA, § 1 (definition of "Capacity Emergency Transfer Objective") (also stating that "CETO shall be calculated based in part on EFORD determined in accordance with [RAA], Schedule 5, Paragraph C").

5 ER23-729 Filing at 2. *See also* EL23-19 Complaint at 2.

6 ER23-729 Filing at 2.

7 EL23-19 Complaint at 2.

> Deliverability Area Reliability Requirement given that they did not offer into the BRA.[8]

To address this issue, PJM proposes to modify the definition of "Locational Deliverability Area Reliability Requirement" as follows:

> "Locational Deliverability Area Reliability Requirement" shall mean the projected internal capacity in the Locational Deliverability Area plus the Capacity Emergency Transfer Objective for the Delivery Year, as determined by the Office of the Interconnection in connection with preparation of the Regional Transmission Expansion Plan, less the minimum internal resources required for all FRR Entities in such Locational Deliverability Area. Notwithstanding the foregoing, effective with the 2024/2025 Delivery Year, during the auction process, the Office of Interconnection shall exclude from the Locational Deliverability Area Reliability Requirement any Planned Generation Capacity Resource in an LDA that does not participate in the relevant RPM Auction as projected internal capacity and in the Capacity Emergency Transfer Objective model where the Locational Deliverability Area Reliability Requirement for the Base Residual Auction increases by more than one percent over the reliability requirement used from the prior Delivery Year's Base Residual Auction (for Incremental Auctions the Locational Deliverability Area Reliability Requirement would be compared with the reliability requirement used in the prior relevant RPM Auction associated with the same Delivery Year) for that LDA due to the cumulative addition of such Planned Generation Capacity Resources.[9]

The ER23-729 Filing requests that the proposed Tariff modification be accepted effective December 24, 2022,[10] while the EL23-19 Complaint requests that the Commission establish a refund effective date of December 23, 2022.[11]

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8 ER23-729 Filing at 2. *See also* EL23-19 Complaint at 2-3.

9 ER23-729 Filing, Attachment A, Revisions to the PJM Open Access Transmission Tariff, (Marked/Redline Format); EL23-19 Complaint, Attachment A, Revisions to the PJM Open Access Transmission Tariff, (Marked/Redline Format).

10 *See* ER23-729 Filing at 5.

11 *See* EL23-19 Complaint at 3.

II. PROTEST

The December 23 Filings must be rejected. Critically, regardless of whether PJM's proposed modifications are reviewed under Section 205 or Section 206 of the FPA, the relief requested by PJM with respect to the 2024/2025 BRA is clearly barred. PJM is obviously motivated by its dissatisfaction with the auction results produced by the market rules in place when the 2024/2025 BRA was conducted and wishes to change the rules to get different results. This is exactly the sort of after-the-fact tinkering that is barred under the filed rate doctrine and its corollary, the prohibition against retroactive ratemaking. Moreover, even setting aside this fatal flaw, PJM has failed to demonstrate that the existing Tariff is unjust and unreasonable as required to satisfy its burden under Section 206 of the FPA. In addition, PJM's proposal, even as applied solely on a prospective basis to RPM Auctions not yet commenced, cannot be accepted under Section 205 of the FPA or adopted under Section 206 of the FPA because it is fundamentally unsound and contrary to Commission precedent as it would make it all but impossible for market participants to rely on published planning parameters for RPM Auctions.

A. PJM's Efforts to Modify the Rules Applicable to the 2024/2025 BRA Are Barred by the Filed Rate Doctrine and the Rule Against Retroactive Ratemaking

As the Court of Appeals for the District of Columbia Circuit (the "D.C. Circuit") has summarized them, the filed rate doctrine and its corollary, the rule against retroactive ratemaking, prohibit "a regulated seller of [power] from collecting a rate other than the one filed with the Commission and prevent [ ] the Commission itself from imposing a rate

increase for [power] already sold."[12] The D.C. Circuit further observed that, in the case of the FPA, "the filed rate doctrine rests on two provisions: section 205(c), which requires utilities to file rate schedules with the Commission, and section 206(a), which allows the Commission to fix rates and charges, but only prospectively."[13] The Commission can therefore neither accept the ER23-729 Filing nor grant the relief requested in the EL23-19 Complaint. PJM apparently recognizes the impediment that the filed rate doctrine and rule against retroactive ratemaking pose to its requests as it devotes substantial effort and space in the December 23 Filings to unavailing efforts to spin its proposed Tariff modifications as prospective. PJM's strained arguments must be rejected.

As Dr. Sotkiewicz explains, a BRA does not occur in isolation, but instead is the culmination of months of preparation by PJM and market participants. Months ahead of the auction, PJM and the Independent Market Monitor for PJM (the "IMM") begin to make critical determinations affecting offers, and market participants are required to provide information and make certain elections.[14] Under Sections 5.10 and 5.11 of

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12 *Towns of Concord, Norwood, and Wellesley, Mass. v. FERC*, 955 F.2d 67, 72 (D.C. Cir. 1992) ("*Town of Concord*") (alterations in original) (quoting *Arkansas Louisiana Gas Co. v. Hall*, 453 U.S. 571, 578 (1981) ("*Arkla*")). *See also, e.g.*, *Oklahoma Gas & Elec. Co. v. FERC*, 11 F.4th 821, 829 (D.C. Cir. 2021) ("*Oklahoma Gas*") (the filed rate doctrine is "shorthand for the interconnected statutory requirements that bind regulated entities to charge only the rates filed with FERC and to change their rates only prospectively"); *Old Dominion Elec. Coop. v. FERC*, 892 F.3d 1223, 1226 (D.C. Cir. 2018) ("*ODEC*") ("At bottom, [the filed rate] doctrine means that 'a regulated seller of [power]' is prohibited 'from collecting a rate other than the one filed with the Commission,' and 'the Commission itself' cannot retroactively 'impos[e] a rate increase for [power] already sold.'" (citation omitted)); *Texas E. Transmission Corp.*, 72 FERC ¶ 61,152 at 61,766-67 (1995) ("Under the filed rate doctrine, final rates approved by the Commission cannot be changed retroactively."), *aff'd sub nom. Texas E. Transmission Corp. v. FERC*, 102 F.3d 174 (5th Cir. 1996).

13 *Town of Concord*, 955 F.2d at 71-72 (footnotes omitted).

14 *See* Sotkiewicz Affidavit, ¶¶ 15-31. *See also* RPM Auction Schedule, Tab for 2024-2025 BRA (the "2024/2025 BRA Schedule"), https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/rpm-auction-schedule.ashx (setting forth pre-auction deadlines).

Attachment DD to the Tariff, PJM is required to determine and post certain information ahead of each BRA. Specifically, Section 5.10 requires that PJM establish a Variable Resource Requirement ("VRR") Curve, including the underlying Locational Deliverability Area Reliability Requirement used to plot such VRR Curve, prior to the relevant auction.[15] Section 5.11, in turn, provides that PJM will also "post . . . information for a Delivery Year prior to conducting the Base Residual Auction for such Delivery Year," where the posted auction parameters include:

> The Locational Deliverability Area Reliability Requirement and the Variable Resource Requirement Curve for each Locational Deliverability Area for which a separate Variable Resource Requirement Curve has been established for such Base Residual Auction, including the details of any adjustments to account for Price Responsive Demand and any associated PRD Reservation Prices, and the CETO and CETL values for all Locational Deliverability Areas. . . .[16]

In the case of the 2024/2025 BRA, the auction parameters were initially posted on August 29, 2022 and then were updated on October 24, 2022.[17] After the parameters are posted, market participants are required to make certain elections and decisions, and they also engage in bilateral contracting and hedging activity based on the posted auction parameters ahead of the actual auction.[18] The 2024/2025 BRA auction window opened on December 7, 2022 and closed on December 13, 2022.[19] The Tariff requires PJM to

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15 *See* Tariff, Attachment DD, § 5.10(a)(vi). *See also id.*, § 5.10(a)(ii)(C) (setting forth process for PJM to use the Locational Deliverability Area Reliability Requirement to establish the VRR Curves for LDAs).

16 Tariff, § 5.11(a)(v).

17 *See* 2024/2025 BRA Schedule; Sotkiewicz Affidavit, ¶ 28 n.24.

18 *See* Sotkiewicz Affidavit, ¶¶ 25-30.

19 *See* 2024/2025 BRA Schedule.

"post the results of each auction as soon thereafter as possible,"[20] which was scheduled to occur on December 20, 2022.[21]

As is clear from the foregoing, all of the required pre-auction activities conducted pursuant to the express requirements of the Tariff and the auction itself occurred prior, in some cases months prior, to the submittal of the December 23 Filings. The December 23 Filings also make evident that PJM initially cleared the auction conducted between December 7, 2022 and December 13, 2022 following the rules as set forth in the Tariff. That is the only way it could have "discovered" what it views as "anomalous auction result in the DPL-S LDA . . . ."[22] Rather than post the final results as scheduled, however, PJM made the December 23 Filings proposing to "include an additional factor to be considered in the optimization algorithm when evaluating the Sell Offers and other inputs for the 2024/2025 BRA *before* the results are determined and capacity awards are made."[23] PJM apparently believes that the lack of posted final auction results leaves it free to upend the rules governing the auction, on the theory that "PJM is still in the process of conducting the auction clearing before the results are posted for Market Participants and any capacity commitments are awarded."[24] PJM further claims that its proposal is "entirely consistent with the filed-rate doctrine and the rule against retroactive ratemaking" because it:

> (i) does not violate any specific deadline or date contained within the text of the Tariff; (ii) effectuates an existing tariff provision providing prior notice to customers that PJM may seek Commission approval of tariff modifications where "imminent severe economic harm to electric consumers

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20 Tariff, Attachment DD, § 5.11(e).

21 *See* 2024/2025 BRA Schedule.

22 ER23-729 Filing at 9; EL23-19 Complaint at 9.

23 ER23-729 Filing at 4 (emphasis in original); EL23-19 Complaint at 4 (emphasis in original).

24 ER23-729 Filing at 8; EL23-19 Complaint at 9.

> requires a prompt Section 205 filing;" (iii) will only impact future actions not yet taken in the auction process – namely, the inclusion of the correct Locational Deliverability Area Reliability Requirement in the optimization algorithm used in conducting the 2024/2025 BRA; and (iv) because no capacity awards have been made or final results posted, there is not a final rate for which any entity has an entitlement or settled expectation at this time.[25]

PJM's arguments are an affront to the underlying facts and logic. Contrary to PJM's strained arguments, the modifications it proposes can in no way be classified as "prospective" or otherwise reconciled with the demands of the filed rate doctrine and the rule against retroactive ratemaking.

First, although the Tariff does not stipulate a date certain for the posting of results,[26] this does not mean that there were no applicable Tariff deadlines implicated by PJM's requests. As indicated above, the Tariff in fact sets forth a number of actions that PJM and market participants are required to take prior to the actual running of a BRA. Critically, the Tariff requires that "[t]he parameters of the Variable Resource Requirement [("VRR")] Curve ***will be established prior*** to the conduct of the Base Residual Auction for a Delivery Year and ***will be used for*** such Base Residual Auction."[27] In order to establish these VRR Curves, PJM needs to determine certain inputs. Among other things:

> The Office of the Interconnection shall determine the PJM Region Reliability Requirement and the ***Locational Deliverability Area Reliability Requirement*** for each Locational Deliverability Area for which a [VRR] Curve has been established for such Base Residual Auction . . . ***prior to the conduct of the Base Residual Auction*** for the first Delivery Year in

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25 ER23-729 Filing at 24 (footnote omitted); EL23-19 Complaint at 24 (footnote omitted).

26 *See* ER23-729 Filing at 25-28; EL23-19 Complaint at 25-27.

27 Tariff, Attachment DD, § 5.10(vi)(A) (emphases added).

> which the new values will be applied, in accordance with the Reliability Assurance Agreement.[28]

As Dr. Sotkiewicz explains, the Locational Deliverability Area Reliability Requirement establishes an anchor point for the VRR Curve[29] that the Tariff stipulates "***will*** be used for [the] Base Residual Auction."[30] The Locational Deliverability Area Reliability Requirement therefore cannot now be changed without violating the Tariff. At the same time, Section 5.11 of Attachment DD also requires that PJM post the Locational Deliverability Area Reliability Requirement prior to the BRA.[31]

In this respect, when the Commission approved PJM's proposal to modify the timing of the 2024/2025 BRA, it expressly "recognize[d] PJM's commitment to post the specific dates of pre-auction activities no later than eight months prior to the commencement of any associated BRA in order to ensure that all market participants are aware of the relevant deadlines."[32] In accordance with the 2024/2025 BRA Schedule, PJM posted the Locational Deliverability Area Reliability Requirement on August 29, 2022. The fact that those auction parameters have, in PJM's view, not yet been applied in the 2024/2025 BRA are beside the point, because the Tariff mandates that the

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28 *Id.*, § 5.10(vi)(B) (emphases added). This provision requires the determination of the PJM Region Reliability Requirement and the Locational Deliverability Area Reliability Requirement by February 1 of each year. That date was not applicable in this case because of the modified schedule for the 2024/2025 BRA. *See PJM Interconnection, L.L.C.*, 178 FERC ¶ 61,122 (2022) ("RPM Schedule Order"). However, the delay of the 2024/2025 BRA in no way affected the requirement that PJM establish the VRR Curve and the underlying Locational Deliverability Area Reliability Requirement prior to conducting the BRA.

29 *See* Sotkiewicz Affidavit, ¶ 25.

30 Tariff, Attachment DD, § 5.10(vi)(A).

31 *See id.*, § 5.11(a)(v).

32 RPM Schedule Order, 178 FERC ¶ 61,122 at P 15.

previously established parameters will be used to determine the VRR Curves that "will be used for such Base Residual Auction."[33]

In addition, PJM in this case has insisted that the 2024/2025 BRA is ongoing and therefore has not yet posted the final results of the auction.[34] This delay in finalizing and publicizing the final 2024/2025 BRA results cannot be squared with the Tariff's requirement for PJM to "post the results of each auction as soon . . . as possible" after conducting the auction.[35] To be sure, "as soon as possible" does not mean within a specific number of days. But these words are not meaningless. In this context, it plainly means that PJM should post the final results promptly after clearing the auction under the rules set forth in the Tariff and compiling the relevant data for posting. It cannot reasonably be construed to mean that PJM can delay posting final results indefinitely until it can change the rules to obtain its desired outcome. Indeed, there are any number of provisions of the Tariff that similarly require market participants to complete actions "as expeditiously as possible," or "as promptly as possible."[36] It is unimaginable that PJM (or the Commission) would consider a party to be in compliance with such a deadline if it

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33 Tariff, Attachment DD, § 5.10(vi)(A).

34 Although the December 23 Filings provide some indication of the potential price impacts of its actions, EPSA supports PJM's decision not to post what PJM has characterized as "indicative results" from the 2024/2025 BRA at this time. *See* PJM Inside Lines, *UPDATE: 2024/2025 Capacity Auction*, https://insidelines.pjm.com/pjm-updates-members-on-2024-2025-capacity-auction-results/. The Tariff does not authorize PJM to post "indicative results," and such a posting would only have compounded the damage done by PJM's failure to adhere to the deadline for posting final results and thereby concluding the entire auction process.

35 Tariff, Attachment DD, § 5.11(e).

36 *See, e.g.*, Tariff, § 217.8 (" . . . the parties to the Network Upgrade Funding Agreement shall use due diligence to execute the Network Upgrade Funding Agreement as expeditiously as possible"); Tariff, Attachment K – Appendix, § 1.9.4 (a) ("Each Market Seller that owns or controls a pool-scheduled resource, or Generation Capacity Resource whether or not pool-scheduled, shall: (i) advise the Office of the Interconnection of a Generator Forced Outage suffered or anticipated to be suffered by any such resource as promptly as possible . . . .").

were dragging its feet pending Commission action on its request to modify or eliminate the underlying obligation.

Second, even assuming that the Tariff allows PJM to delay posting the final auction results, there would still be no legal basis for PJM's claim that the auction rules remain subject to change. PJM's reliance on Section 9.2(b) of the Tariff[37] is hopelessly misplaced, because that provision only permits PJM to avoid having to consult with transmission owners and PJM members at least seven days before submitting a filing under Section 205 of the FPA.[38] That provision does not say anything about the effectiveness of any proposed changes in such a filing, nor could the Commission have approved a Tariff provision that would effectively violate the filed rate doctrine and rule against retroactive ratemaking by permitting PJM to effectuate retroactive rate changes.[39]

Third, it also defies reason for PJM to claim that its proposed amendment "will only impact future actions not yet taken in the auction process – namely, the inclusion of the correct Locational Deliverability Area Reliability Requirement in the optimization algorithm used in conducting the 2024/2025 BRA . . . ."[40] As explained above, under Section 5.10 of Attachment DD, the Locational Deliverability Area Reliability Requirement is used to establish VRR Curves ***prior*** to each BRA and those VRR Curves are not subject to

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37 *See* ER23-729 Filing at 28-30; EL23-19 Complaint at 28-30.

38 *See* Tariff, § 9.2(b).

39 *See, e.g., Arkla*, 453 U.S. at 577 ("[T]he Commission itself has no power to alter a rate retroactively."). *Cf. City of Arlington v. FCC*, 569 U.S. 290, 297 (2013) ("[T]he question a court faces when confronted with an agency's interpretation of a statute it administers is always, simply, whether the agency has stayed within the bounds of its statutory authority."); *Colo. River Indian Tribes v. Nat'l Indian Gaming Comm'n*, 466 F.3d 134, 139 (D.C. Cir. 2006) ("An agency's general rulemaking authority does not mean that the specific rule the agency promulgates is a valid exercise of that authority.").

40 ER23-729 Filing at 24; EL23-19 Complaint at 24.

change. Moreover, PJM willfully ignores the fact that its supposed "future actions" will completely disrupt the expectations of market participants that relied on the posted auction parameters for purposes of pre-auction decisions and other actions.[41]

Finally, the only reason why "there is not a final rate for which any entity has an entitlement or settled expectation at this time"[42] is because, as discussed above, PJM has unlawfully refused to accept the auction outcome produced by the rules in effect when the auction was conducted and to post the final results of the 2024/2025 BRA. Even then, the lack of posted final auction ***results*** in no way means that market participants did not rely on the existing market rules or the auction parameters that were posted prior to the auction. Indeed, as discussed in more detail below, PJM itself has previously recognized that market participants rely on the auction parameters for purposes of making binding financial decisions.

PJM also attempts to muddy the waters by claiming that its belated modifications to the Locational Deliverability Area Reliability Requirement are permitted and expected by market participants because "the Tariff already requires PJM to adjust the Locational Deliverability Area Reliability Requirement *after* the bidding window closes (but before the conclusion of the auction)," as, under Section 5.11(e) of Attachment DD, "PJM is required to make 'any adjustments to PJM Region or LDA Reliability Requirements to reflect Price Responsive Demand with a PRD Reservation Price equal to or less than the applicable Base Residual Auction clearing price.'"[43] As an initial matter, Price Responsive Demand

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41 *See* Sotkiewicz Affidavit, ¶¶ 17-19, 29-31 (discussing disruptions to market participants' settled expectations).

42 ER23-729 Filing at 24; EL23-19 Complaint at 24.

43 ER23-729 Filing at 23 (emphasis in original); EL23-19 Complaint at 23 (emphasis in original).

is "end-use customer load . . . capable of curtailing such load . . . ."[44] That being the case, PJM reflects Price Responsive Demand as a reduction on the load side, rather than as an offer on the supply side.[45] That does not mean that the underlying Reliability Requirement is modified in any way that would, like PJM's proposed adjustment, alter the auction clearing price. As Dr. Sotkiewicz explains, information regarding Price Responsive Demand and PRD Reservation Prices is posted prior to each BRA.[46] The full text of Section 5.11(e), in turn, makes clear that this provision is not about changing the underlying Locational Deliverability Area Reliability Requirement or the algorithm, but instead "pertains to posting auction results and the manner and form in which the information is posted."[47] Moreover, even if clearing Price Responsive Demand could be interpreted as some kind of "adjustment" to the Locational Deliverability Area Reliability Requirement, it goes without saying that, simply because the Tariff expressly provides for one specific and limited type of adjustment, that does not give PJM license to make after-the-fact changes to any and all other aspects of the Locational Deliverability Area Reliability Requirement as it pleases.

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44 RAA, § 1 (definition of "Price Responsive Demand").

45 *See, e.g.*, Tariff, Attachment DD, § 5.4(c)(1) (PJM shall conduct Incremental Auctions to "seek additional capacity commitments to serve the PJM Region or an LDA if the PJM Region Reliability Requirement or LDA Reliability Requirement utilized in the most recent prior auction conducted for the Delivery Year (including any reductions to such reliability requirements as a result of any Price Responsive Demand with a PRD Reservation Price equal to or lower than the clearing price in the Base Residual Auction for such Delivery Year)").

46 *See* Sotkiewicz Affidavit, ¶¶ 40-41; Tariff, Attachment DD, §§ 5.11(a)(iv), 5.11(a)(v).

47 Sotkiewicz Affidavit, ¶ 43. *See also id.*, ¶¶ 44-45 (describing PJM's auction algorithm).

At the end of the day, the fundamental problem ignored by PJM is that the RPM ***rules***, rather than the prices resulting from those rules, are the filed rate.[48] It is therefore irrelevant that PJM has not posted the final auction results. What is relevant and, indeed, dispositive is that the RPM rules required that PJM determine the Locational Deliverability Area Reliability Requirement ahead of time and also established the process that PJM should apply to clear each auction. As the Commission has made clear, what matters are "the filed rates in existence at the time" that the 2024/2025 BRA and the filed rate doctrine prohibits the application of a rule that is "not consistent with the Tariff in effect at the time . . . ."[49] The 2024/2025 BRA closed 10 days before the filing of the December 23 Filings, and the Commission cannot lawfully approve PJM's effort to modify the rules applicable to that auction now.

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[48] *See, e.g., Public Citizen, Inc. v. Midcontinent Indep. Sys. Operator, Inc.,* 168 FERC ¶ 61,042 at P 89 (2019) ("We also find that Public Citizen is incorrect in identifying the result of each Auction as the 'filed rate' because, in the market-based rate context, the rate on file with the Commission is the Tariff describing the Auction procedures, not the prices that may change over time."); *Bangor-Hydro Elec. Co. v. ISO New England, Inc.*, 97 FERC ¶ 61,339 at 62,589-90 ("[T]he clearing prices that were calculated for the period in question were the result of a formula that was prescribed by the market rules and applied as intended by them, and therefore the clearing prices comply with ISO-NE's tariff."); *Black Oak Energy, LLC v. N.Y. Indep. Sys. Operator, Inc.*, 122 FERC ¶ 61,261 at P 32 (2008) (noting that market rules "are the filed rate"); *Allete, Inc. v. Midwest Indep. Transmission Sys. Operator, Inc.*, 119 FERC ¶ 61,142 at P 36 (2007) (same); *ISO New England Inc.*, 90 FERC ¶ 61,141, at 61,425 (same).

[49] *Midwest Indep. Transmission Sys. Operator, Inc.*, 153 FERC ¶ 61,101 at P 40 (2015), *on reh'g*, 155 FERC ¶ 61,174 (2016), *aff'd sub nom. MISO Transmission Owners v. FERC*, 860 F.3d 837 (6th Cir. 2017). *See also, e.g.*, *AEP Appalachian Transmission Co.*, 164 FERC ¶ 61,180 at P 18 (2018) (finding "that retroactive approval of the formula rate change results in a violation of the filed rate doctrine and the prohibition against retroactive ratemaking"); *Midcontinent Indep. Transmission Sys. Operator, Inc.*, 161 FERC ¶ 61,020 at PP 7-8 (2017) (finding that filed rate doctrine barred application of true-up mechanism that had been accepted effective January 1, 2017, and rejecting argument that "because the true-up for the 2016 rate year will not be calculated until June 1, 2017, and will not actually affect customers' rates until January 1, 2018, it is a 'forward-looking rate mechanism'"); *Haviland Holdings, Inc. v. Pub. Serv. Co. of N.M.*, 107 FERC ¶ 61,034 at P 17 (2004) (finding that "the events subject to [a] complaint occurred prior to the . . . effective date of [a final rule]" and that procedures required by that rule "are not relevant to the Commission's determination on the issues in this proceeding").

Applying the filed rate doctrine and rule against retroactive modification is especially important in this case because PJM acknowledges that its proposed Tariff modifications are motivated by, and seek to avoid, the results that would be produced under the rules in effect when the auction was conducted. While PJM tries to characterize the results as an "error" that may be corrected under the filed rate doctrine,[50] the December 23 Filings make clear that there was no error in applying the existing rules but that PJM simply wants to "reduce charges that Load Serving Entities would otherwise have to pay absent these revisions."[51] Such an attempt to avoid the ramifications of the rate on file is precisely what the filed rate doctrine and the rule against retroactive modification are meant to prevent.[52] And, even assuming *arguendo* PJM were correct that the existing rules would produce an unjust and unreasonable result – and, indeed, even if the effects of doing so may be perceived as "harsh"[53] – these doctrines "leave the Commission no discretion to waive the operation of a filed rate or to retroactively change or adjust a rate for good cause or for any other equitable considerations."[54]

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50 *See* ER23-729 Filing at 30-31; EL23-19 Complaint at 30-31.

51 ER23-729 Filing at 5.

52 *See, e.g., Town of Norwood, Mass. v. FERC*, 53 F.3d 377, 381 (D.C. Cir. 1995) ("The retroactive ratemaking doctrine prohibits the Commission from authorizing or requiring a utility to adjust current rates to make up for past errors in projections.").

53 *Maislin Indus., U.S., Inc. v. Primary Steel, Inc.*, 497 U.S. 116, 117 (1990).

54 *ODEC*, 892 F.3d at 1230 (citation omitted). *See also, e.g., Arkla*, 453 U.S. at 578 (explaining that the filed rate doctrine "bars 'the Commission's retroactive substitution of an unreasonably high or low rate with a just and reasonable rate'" (citation omitted)); *Oklahoma Gas*, 11 F.4th at 832 (noting that the filed rate doctrine "limits [the Commission's] remedial authority" (citations omitted)); *Pub. Utils. Comm'n of Cal. v. FERC*, 988 F.2d 154, 168 n.12 (D.C. Cir. 1993) (explaining that if the Commission's actions "violated the filed rate doctrine or the rule against retroactive ratemaking, we would not then invoke the Commission's assessment of the equities to overcome those violations"); *Alabama Power Co. v. ICC*, 852 F.2d 1361, 1373 (D.C. Cir. 1988) (requiring railroads "to pay refunds, based on a determination that the earlier Commission-approved rates were impermissible, runs counter to the well-established prohibition against

B. Even Aside from the Limitations Imposed by the Filed Rate Doctrine, the December 23 Filings Must be Rejected because PJM Has Not Demonstrated the Existing Tariff to be Unjust and Unreasonable, and Also Has Not Demonstrated Its Proposed Tariff Revisions are Just and Reasonable

Even assuming that the filed rate doctrine and rule against retroactive ratemaking did not prohibit the Commission from granting the relief requested by PJM, the December 23 Filings must still be rejected. As the proponent of the Tariff modifications set forth in the ER23-729 Filing, PJM bears the burden of proof of demonstrating that those modifications are just and reasonable but has failed to satisfy that burden.[55] Similarly, PJM, as the complainant under the EL23-19 Complaint, has failed to satisfy its burden of proof to demonstrate the existing Tariff provisions are unjust and unreasonable.[56] Moreover, even assuming that the Commission has any concerns regarding the existing Tariff provisions, PJM has not put forward a proposal that the Commission could use to satisfy its obligation under Section 206 to establish a just and reasonable replacement rate that could be applied on a prospective basis.[57]

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retroactive ratemaking"); *Sea Robin Pipeline Co. v. FERC*, 795 F.2d 182, 189 n. 7 (D.C.Cir.1986) ("FERC may not order a retroactive refund based on a post hoc determination of the illegality of a filed rate's prescription."); *Entergy Servs., Inc.*, 153 FERC ¶ 61,303 at P 152 (2015) ("Because the bandwidth formula is the filed rate, the Commission correctly ruled that the bandwidth formula could not be adjusted retroactively even if the bandwidth formula had been found unjust and unreasonable.").

[55] *See, e.g., Arizona Pub. Serv. Co.*, 181 FERC ¶ 61,223 at P 54 (2022) ("In analyzing a filing made pursuant to FPA section 205, the filer has the burden to demonstrate that a proposal is just and reasonable and not unduly discriminatory or preferential.").

[56] *See* 16 U.S.C. § 824e(b) (2018) ("In any proceeding under this section [206 of the FPA], the burden of proof to show that any rate, charge, classification, rule, regulation, practice, or contract is unjust, unreasonable, unduly discriminatory, or preferential shall be upon the Commission or the complainant").

[57] *See* 16 U.S.C. § 824e(a) (2018) (in the event the Commission finds an existing rate "is unjust, unreasonable, unduly discriminatory or preferential, the Commission shall determine the just and reasonable rate, charge, classification, rule, regulation, practice, or contract to be thereafter observed and in force, and shall fix the same by order").

1. PJM's Proposal Would Create Substantial Uncertainty and Upset Market Expectations

As explained previously, the Tariff requires PJM to determine the Locational Deliverability Area Reliability Requirement ahead of time so that it may develop its VRR Curves and also requires that information on the Locational Deliverability Area Reliability Requirement be posted ahead of each auction. Given that the BRAs are held well in advance of the relevant Delivery Year, this necessarily requires PJM to develop the Locational Deliverability Area Reliability Requirement based on forecasts, which are by nature imprecise. PJM has not demonstrated that there is anything unjust or unreasonable about such pre-determination of the Locational Deliverability Area Reliability Requirement based on the information available to PJM at the time, even if that information later turns out to have been inaccurate.[58] To the contrary, it is appropriate and reasonable for the Locational Deliverability Area Reliability Requirement to be firmly established and posted in advance because, as PJM itself previously explained to the Commission, this "posting of the fundamental auction parameters . . . is an important precondition for parties to make decisions regarding bilateral contracts, capacity imports or export, and the manner in which they participate in the Base Residual Auction."[59]

Dr. Sotkiewicz confirms that market participants will rely on such auction parameters, including the Locational Deliverability Area Reliability Requirement, to make

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[58] *Cf. Joint Consumer Representatives v. PJM Interconnection, L.L.C.*, 153 FERC ¶ 61,187 at P 32 (2015) (rejecting complaint regarding PJM's failure to update its load forecasts based on updated model where "PJM complied with its OATT by developing its 2015 PJM Peak Load Forecast according to its manuals and posting it prior to February 1, 2015" and finding that "there will inevitably be some difference between PJM's load forecast and the amount of capacity that PJM ultimately needs in a given Delivery Year" (footnotes omitted)).

[59] *PJM Interconnection, L.L.C.*, 126 FERC ¶ 61,275 at P 198 (2009).

commercial decisions, such as whether to enter into bilateral contracts, how to structure their offers and, for resources that are not subject to the must-offer obligation, whether to submit offers into the BRA in the first instance.[60] For that same reason, the Commission has recognized that a load-serving entity's obligations under RPM are established when its load is included in PJM's auction parameters:

> [W]e conclude that Duquesne's RPM liability extends to all auctions in which its load forecasts are included. We also agree with PJM that these obligations are set at the time that PJM establishes its RPM auction parameters. This conclusion is warranted given the necessary reliance that market participants place on these published forecasts and is otherwise consistent with the intent and underlying purpose of the RA Agreement. . . . [M]arket participants will make business decisions and enter into binding contracts, including financial hedges and bilateral arrangements, based on these auction parameters.[61]

By contrast, the new definition proposed in the December 23 Filings is not just and reasonable as it would effectively make the Locational Deliverability Area Reliability Requirement a moving target, thereby disrupting the expectations of market participants. As Dr. Sotkiewicz explains, if changes to the Locational Deliverability Area Reliability Requirement were made known, "Capacity Market Sellers would likely want to change their offers and may also possibly want to change their decision to offer at all if not subject to the must-offer requirement" while "[b]ilateral contract parties would want to change their contract terms and pricing."[62] Under PJM's proposal, however, the Locational Deliverability Area Reliability Requirement would only be subject to change during the

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60 *See* Sotkiewicz Affidavit, ¶¶ 17, 25, 27-29.

61 *Duquesne Light Co.*, 122 FERC ¶ 61,039 at P 92 (2008). *See also Maryland Pub. Serv. Comm'n v. PJM Interconnection, L.L.C.*, 127 FERC ¶ 61,274 at P 25 (2009) (quoting same))

62 Sotkiewicz Affidavit, ¶ 32.

auction process, meaning that market participants would have zero transparency into the revised requirement and no opportunity to modify their offers or contracts.[63] Thus, Dr. Sotkiewicz explains, PJM's proposal would create substantial uncertainty that "also changes the offer behavior of Capacity Market Sellers and bilateral contracting parties in that they now must account for the possibility the constrained LDA in which they are located may change in ways that cannot be predicted."[64] In rejecting requests that PJM's forward-looking energy and ancillary services ("E&AS") offset be applied to previously run BRAs, the Commission similarly recognized that it is impossible to know how market participants would want to change their offers if the auction parameters are changed after the fact:

> even if we were to re-calculate the VRR curve and other capacity auction parameters based on a new E&AS Offset, there is no way to accurately determine how market participants would have offered in those BRAs based on the new parameters.[65]

If market participants cannot rely on the posted auction parameters, "the newly introduced uncertainty may cause Capacity Market Sellers simply not to offer at all if they believe the uncertainty creates additional risks that cannot possibly be mitigated."[66] In addition, it may "deter bilateral contracting for capacity between parties due to increasing differences in expected market outcomes between buyers and sellers in the bilateral

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63 *See id.*, ¶ 33.

64 *Id.*, ¶ 34.

65 *PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,153 at P 332 (2020).

66 Sotkiewicz Affidavit, ¶ 36.

market," as "[i]ntroducing greater uncertainty in the validity of the planning parameters simply makes hedging and risk mitigation harder for all parties in the capacity market."[67]

In short, the Tariff reasonably requires PJM to set the Locational Deliverability Area Reliability Requirement based on PJM's projections, and even to the extent that these projections wind up, in hindsight, to have been inaccurate, it would result in greater harm to disrupt market participants' expectations by modifying the Locational Deliverability Area Reliability Requirement during the course of the auction as PJM proposes. Accordingly, not only has PJM failed to show that the existing Tariff definition is unjust and unreasonable, but its proposed remedy must be rejected.

Even if the Commission believes that PJM has shown the existing Tariff to be unjust and unreasonable, PJM's proposal cannot be accepted because, as discussed in Section II.B.2 below, it creates a disconnect with its modeling of the Locational Deliverability Area Reliability Requirement. The Commission should direct PJM to conduct a stakeholder process or should initiate its own further proceedings to allow for the development of a just and reasonable replacement rate that will allow market participants to rely on posted auction parameters and that will only be applied prospectively to future RPM Auctions.

2. PJM Has Failed to Properly Consider the Reliability Implications of its Proposed Revisions

Dr. Sotkiewicz explains that the December 23 Filings fail to present an accurate and complete picture of the reliability concerns implicated by PJM's requests. Here, PJM claims that the Locational Deliverability Area Reliability Requirement was too high

67 *Id.*, ¶ 35.

because it was calculated including certain planned resources, including "a large quantity of planned Intermittent Resources,"[68] that did not offer into the 2024/2025 BRA.[69] PJM therefore wants to now clear the BRA using a lowered Locational Deliverability Area Reliability Requirement that assumes those planned resources will not be in commercial operation during the 2024/2025 Delivery Year, which would significantly lower the clearing price.[70]

As Dr. Sotkiewicz explains, PJM glosses over the fact that the Locational Deliverability Area Reliability Requirement and CETO are designed to maintain a 1-day-in-25-year loss of load expectation ("LOLE"), and are calculated in a way that does "not depend on resources with RPM commitments, but rather only existing resources and any projected resources expected to be in service regardless of RPM commitments . . . ."[71] PJM's planning process thus accounts for the fact that "resources that are in service and available to produce energy will affect reliability outcomes regardless of their RPM commitment status."[72] Nonetheless, the December 23 Filings claim that the Locational Deliverability Area Reliability Requirement must be revised if Planned Generation

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68 ER23-729 Filing at 16; EL23-19 Complaint at 16.

69 As the December 23 Filings explain, PJM calculates the Locational Deliverability Area Reliability Requirement taking into account planned resources because "planning models need to address the probability of forced outages" and also need to account for the fact that "Intermittent Resources . . . increase the reliability requirement if they do not operate coincident with peak periods." ER23-729 Filing at 4. *See also id.* at 12-15; EL23-19 Complaint at 12-15. *See also* Sotkiewicz Affidavit, ¶¶ 48-53 (discussing calculation of the Locational Deliverability Area Reliability Requirement).

70 *See* ER23-729 Filing at 16; EL23-19 Complaint at 16.

71 Sotkiewicz Affidavit, ¶ 48. *See also* PJM, *PJM Manual 20: PJM Resource Adequacy Analysis*, at 32 (Revision 12, Aug. 25, 2021), https://pjm.com/~/media/documents/manuals/m20.ashx (stating that, for purposes of modeling the CETO, "[a] planned generation resource addition or planned increase in rating that has executed an Interconnection Service Agreement (ISA) is modeled").

72 Sotkiewicz Affidavit, ¶ 50.

Capacity Resources that were included in the planning process "are not ***offered*** into the BRA . . . ."[73] That is, PJM has created a "false equivalence between the reliability needs of an LDA and the supply and demand in the LDA in an RPM auction"[74] by assuming that resources that are not offered into a BRA will not actually be operating during the relevant Delivery Year.

Notably, PJM focuses only on the lack of offers by Planned Generation Capacity Resources, but fails to properly consider the fact that various resources, including planned ***and existing*** Intermittent Resources, are exempt from the RPM must-offer obligation,[75] and the amount of capacity offered into an RPM auction therefore does not necessarily provide an accurate gauge of the CETO or Reliability Requirement for an LDA. This is especially true because the amount of Intermittent Resources offered into the RPM auctions has in fact decreased by as much as half, despite such resources being increasingly developed in the region.[76] Accordingly, "[t]he implication of the data is that Intermittent Resources are choosing not to take on RPM Capacity commitments and that just because there was no offer into the BRA does not mean these resources will not be in-service for the 2024/2025 [Delivery Year]."[77]

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73 ER23-729 Filing at 4 (emphasis added). *See also* EL23-19 Complaint at 5.

74 Sotkiewicz Affidavit, ¶ 57.

75 *See id.*, ¶¶ 54-56. *See also* Tariff, Attachment DD, § 6.6A(c) ("Intermittent Resources, Capacity Storage Resources, Hybrid Resources consisting exclusively of components that in isolation would be Intermittent Resources or Capacity Storage Resources, Demand Resources, and Energy Efficiency Resources shall not be required to offer as a Capacity Performance Resource . . . .").

76 *See* Sotkiewicz Affidavit, ¶ 59.

77 *Id.*, ¶ 60.

The December 23 Filings provide no rational basis for modifying the previously-determined Locational Deliverability Area Reliability Requirement during the BRA clearing process based solely on whether resources without a must-offer obligation choose to offer into the BRA. As an initial matter, Dr. Sotkiewicz states that PJM's claim that it was surprised by the auction results rings hollow and fails to justify the proposed Tariff modification.[78] More fundamentally, however, PJM's purported fix is not just and reasonable because PJM arbitrarily proposes to modify the Locational Deliverability Area Reliability Requirement in circumstances where planned resources enter the market but do not submit offers into the BRA, but not where they offer but do not clear in the relevant BRA, even though the effect is functionally the same "from a reliability perspective . . . ."[79] This would also mean that there will be dramatically different clearing prices based solely on whether planned resources offer into a BRA, without consideration of whether those resources are actually present in the relevant Delivery Year. For example, if one assumes that many or even all of the planned Intermittent Resources modeled in the posted DPL-S Reliability Requirement do come online as scheduled for the 2024/2025 Delivery Year despite not offering into the 2024/2025 BRA, Dr. Sotkiewicz explains:

> The price signal PJM wants to send would be a fraction of the price that would prevail if PJM had allowed the reliability and auction process work as designed. The prices would be too low for the actual reliability need. ***The prices PJM would determine might not be high enough to attract future new resources to take on an RPM commitment especially knowing PJM is willing to put its finger on the scale to reduce prices even in the face of reliability needs with its proposal.***

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78 *See id.*, ¶¶ 96-108.

79 *Id.*, ¶ 66. *See also id.*, ¶¶ 61—66.

> PJM's solution . . . would concoct an LDA reliability requirement that differs from the planning model determination of the LDA Reliability Requirement, for the purpose of driving a different pricing outcome. This would leave PJM in a reliability mismatch where the physical system matches the reliability needs as determined by PJM planners when all resources showed up in the DY, but not matching up with the concocted LDA Reliability Requirement used to clear the BRA.[80]

Given the risks and costs of assuming a capacity obligation, it is entirely reasonable to assume that at least some large proportion of the Intermittent Resources PJM earlier expected to come online in time for the 2024/2025 Delivery Year will, in fact, do so even if they were not offered into the 2024/2025 BRA.[81] Yet PJM's proposal irrationally and arbitrarily assumes that none of the Intermittent Resources not offered into the 2024/2025 BRA will in fact come online as scheduled. PJM also arbitrarily focuses only on Planned Generation Capacity Resources that do not submit offers into the RPM auctions, while ignoring the fact that certain types of existing resources are also exempt from the must-offer requirement and thus "can come and go as they please from RPM, and yet they, too, are included in the CETO and Reliability Requirement determination for LDAs exactly like Planned Generation Capacity Resources."[82]

Similarly arbitrary is PJM's proposal to use a one percent threshold to determine when it will modify the Locational Deliverability Area Reliability Requirement.[83] The

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80 *Id.*, ¶¶ 68-69 (emphasis in original).

81 *See id.*, ¶¶ 59-60, 67.

82 *Id.*, ¶ 55.

83 *See* ER23-729 Filing at 10 (stating that "the Locational Deliverability Area Reliability Requirement should be revised to allow PJM to exclude from the reliability requirement calculation all Planned Generation Capacity Resources that did not participate in the auction in LDAs where the reliability requirement materially increases by more than one percent compared with the values used in the relevant RPM Auctions from the prior Delivery Year due to the addition of such Planned Generation Capacity Resources"); EL23-19 Complaint at 11 (same).

December 23 Filings claim that "[u]sing a materiality standard of one percent avoids having to arbitrarily define a MW value for what constitutes a small LDA,"[84] but never explain how PJM determined a one percent difference to be material in the first instance.[85]

As discussed, PJM's proposed modifications in the December 23 Filings fail to consider PJM's underlying modeling assumptions, and thus fail to send price signals necessary for reliability. As a result, even assuming that the Commission agrees that PJM has identified a concern with its determination of the Locational Deliverability Area Reliability Requirement that must be addressed, it must reject PJM's hastily crafted and ill-conceived proposal and should instead direct stakeholders to more thoroughly consider potential solutions for the future. For example, Dr. Sotkiewicz states that one option would be to require planned resources to commit whether they will be in service for the relevant Delivery Year ahead of the Third Incremental Auction, which takes place close to start of the Delivery Year.[86] PJM would then adjust the Locational Deliverability Area Reliability Requirement based on the resources that will actually be in service during the Delivery Year, at the same time as it makes adjustments to account for changes in the load forecast, and purchase or sell capacity as needed in the Third Incremental Auction.[87] Alternatively, Dr. Sotkiewicz states that another approach could be to change PJM's underlying modeling approach altogether so that only resources with RPM commitments (rather than resources that are in service) would be modelled.[88] Dr. Sotkiewicz

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84 ER23-729 Filing at 19-20; EL23-19 Complaint at 19.

85 *See* Sotkiewicz Affidavit, ¶ 37.

86 *See id.*, ¶ 120.

87 *See id.*, ¶¶ 121-123. *See also id.*, ¶¶ 109-115 (discussing role of Incremental Auctions).

88 *See id.*, ¶¶ 124-127.

emphasizes, however, that coming up with a viable alternative will require thorough consideration of a number of serious policy and market design issues.[89]

3. The December 23 Filings Reflect PJM's Bias

As detailed above, the December 23 Filings suffer from numerous fatal flaws and must be rejected. EPSA emphasizes, however, that these filings are indicative of a broader problem that has become increasingly obvious in the recent past: despite its role as a supposedly independent entity, PJM has repeatedly signaled that its focus is on reducing prices for load, rather than acting in accordance with its regulatory mandate to maintain reliability and ensure that suppliers needed for reliability receive adequate compensation for the services they provide.[90]

In this respect, Dr. Sotkiewicz states that, while the December 23 Filings focus on clearing prices, PJM overlooks a more serious underlying reliability issue.[91] Specifically, PJM overlooks the following issues:

> 1) increasing levels of Intermittent Resource penetration in small LDAs do not help the LDA satisfy the 1-day-in-25 years LOLE as much as they help the RTO satisfy the 1-day-in-10 years LOLE because of the high correlation in outages/unavailability when the LDAs need them most; and 2) resources without must-offer requirements, largely Intermittent Resources on an ongoing basis, and Planned Generation Capacity Resources as they enter the market, cannot appropriately reflect their risk of non-performance going forward once they are Existing Generating Capacity Resources and thus may choose to not offer into the RPM BRA or [Incremental Auction].[92]

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89 *See id.*, ¶¶ 128-129.

90 *See, e.g.*, 18 C.F.R. § 35.34(j)(2) (2022) (stating that a regional transmission organization like PJM must "support efficient and non-discriminatory power markets").

91 *See* Sotkiewicz Affidavit, ¶¶ 73-74.

92 *Id.*, ¶ 75.

Dr. Sotkiewicz further explains that PJM's "solution" in the December 23 Filings does not address these concerns and may even make them worse as discussed above.[93] In fact, Dr. Sotkiewicz points out that the largest resource in DPL-S, the Indian River 4 Generating Station ("Indian River"), sought to retire after failing to clear in prior BRAs, and is now under a Reliability Must Run ("RMR") agreement because PJM found it to be necessary for transmission reliability.[94] Nonetheless, the December 23 Filings seek to decrease the clearing price for DPL-S, rather than sending necessary price signals for the replacement of Indian River. This is true even though clearing prices in DPL-S dropped significantly in the BRAs for the 2022/2023 and 2023/2024 Delivery Years despite the Reliability Requirements increasing for the same years.[95] Nonetheless, PJM focuses only on the immediate price impacts for customers, rather than attempting to ensure that prices appropriately reflect reliability needs and maintain confidence in its market construct by ensuring that market participants are not subject to unnecessary risks because of rule changes that are motivated by PJM's efforts to achieve its desired results.

It is also particularly noteworthy how PJM rushed to file the December 23 Filings very soon after the close of the 2024/2025 BRA for the purpose of "reduc[ing] charges that Load Serving Entities would otherwise have to pay absent these revisions."[96] In the same way, PJM rushed to file tariff changes under Sections 205 and 206 of the FPA to modify Transmission Constraint Penalty Factor rules that it claimed were "resulting in

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93 *See id.*, ¶¶ 68--69, 76—77. *See also id.*, ¶¶ 78-95 (providing and discussing hypothetical examples).

94 *See id.*, ¶ 70.

95 *See id.*, ¶¶ 71-72.

96 ER23-729 Filing at 4. *See also, e.g.*, EL23-19 Complaint at 29, 34.

unjust and unreasonable energy market rates for consumers,"[97] without going through the stakeholder consultation process.[98]

PJM has moved much slower and more deliberately where perceived flaws cut the other way. Notably, PJM has stubbornly refused to modify its Effective Load Carrying Capability accreditation process to properly consider the Capacity Interconnection Rights ("CIRs") of intermittent and storage resources, which is necessary to ensure that their reliability contributions are being properly valued.[99] The IMM raised concerns almost a year ago that PJM was counting on "output [that] is not deliverable when needed for reliability because it is in excess of the defined deliverability rights (CIRs) and therefore should not be included in the definition of intermittent capacity."[100] The IMM further stated that "[t]his results in an overstatement of the supply of capacity and reduces the clearing price in the capacity market."[101] The IMM raised similar concerns with respect to the

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97 Section 206 Filing Demonstrating the Existing Transmission Constraint Penalty Factor Rules are Unjust and Unreasonable, Request for Fast Track Processing, and Request to Shorten the Comment Period to 7 Days at 1, Docket No. EL22-26-000 (filed Jan. 31, 2022) (the "EL22-26 Complaint"). *See also* Proposed Amendment to the Transmission Constraint Penalty Factor Filed Pursuant to section 205 of the Federal Power Act, Request for Waiver of Notice Requirement, and Request for a Shortened Comment Period of 7 Days at 4, Docket No. ER22-957-000 (filed Jan. 31, 2022) (the "ER22-957 Filing") ("[I]t is imperative that the Commission acts quickly in accepting PJM's proposed amendment to protect consumers from prolonged periods of significant cost increases").

98 *See* EL22-26 Complaint at 22; ER22-957 Filing at 22.

99 *See generally* Complaint that PJM Interconnection LLC has violated its filed Tariff, Governing Agreements, and Contracts when Identifying the Energy Output in the Accredited UCAP for Variable/Intermittent Resources Offered in PJM's Reliability Pricing Model Auctions, thus Causing Unjust, Unreasonable, and Unduly Discriminatory Rates for Load and Competing Capacity Resources, Docket No. EL23-13-000 (filed Nov. 30, 2022).

100 Monitoring Analytics, *Analysis of the 2022/2023 RPM Base Residual Auction*, at 31 (Feb. 22, 2022), https://www.monitoringanalytics.com/reports/Reports/2022/IMM_Analysis_of_the_20222023_RPM_BRA_20220222.pdf.

101 *Id.*

2023/2024 BRA,[102] without any corrective action by PJM. As another example, PJM is also well aware that the large number of recent Performance Assessment Intervals ("PAIs") that occurred on December 23, 2022, and December 24, 2022, are not contemplated under its Market Seller Offer Cap rules.[103] Nonetheless, PJM has taken no steps thus far to ensure that sellers will be able to reflect the risks of incurring Non-Performance Charges during PAIs in their offers.

PJM's one-sided approach is particularly obvious in the limited relief requested in the December 23 Filings. Not only has PJM proposed a remedy that disrupts expectations and harms suppliers that entered into bilateral contracts in reliance on the posted auction parameters, but its proposed "fix" for the identified issue focuses only on lowering the clearing price without making any attempt to permit suppliers to re-do their offers. In this respect, while EPSA strongly urges the Commission to reject the December 23 Filings outright, to the extent that the Commission decides to grant the relief requested by PJM, it should also ensure that sellers have the opportunity to modify their offers to account for the revised rules. This would be consistent with other situations where the Commission has taken steps to ensure that suppliers are able to modify their offers to reflect rule changes.[104] This will not help those suppliers that have already

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[102] *See* Monitoring Analytics, *Analysis of the 2023/2024 RPM Base Residual Auction*, at 12-13 (Oct. 2022), https://www.monitoringanalytics.com/reports/Reports/2022/IMM_Analysis_of_the_20232024_RPM_Base_Residual_Auction_20221028.pdf. *See also* Paul M. Sotkiewicz, O*verview of Issues Regarding CIR for ELCC Resources* (PJM Planning Committee Special Session, CIRs for ELCC Resources, June 24, 2022), https://www.pjm.com/-/media/committees-groups/committees/pc/2022/20220624-special/item-03---e-cubed-overview-of-issues-regarding-cir-for-elcc-resources.ashx.

[103] *See* Rule 28(j) Supplemental Authority, *Vistra Corp. v. FERC*, Nos. 21-1214, *et al.* (D.C. Cir.) (filed Jan. 9, 2023).

[104] *See ISO New England Inc.*, 175 FERC ¶ 61,172 at P 63 (2021) ("[W]e direct ISO-NE to facilitate market participants' use of the final FCA 16 values, once approved by the Commission,

entered into bilateral arrangements based on the prior auction parameters but could at least mitigate some of the harm resulting from PJM's proposal.

III. CONCLUSION

Wherefore, EPSA respectfully requests that the Commission reject both of the December 23 Filings and otherwise take the concerns raised herein under consideration in issuing any orders on the December 23 Filings.

Respectfully submitted,

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On behalf of the
Electric Power Supply Association

Dated: January 20, 2023

in FCA 16 qualification and retirement submissions. This includes ISO-NE's ensuring that market participants have the ability to modify or withdraw any submissions made based on rejected FCA 16 values, and submitting with the compliance filing any necessary Tariff revisions to revise the FCA 16 qualification process timeline.").

CERTIFICATE OF SERVICE

I hereby certify that I have this day electronically served the foregoing document on each person designated on the official service lists compiled by the Secretary of the Federal Energy Regulatory Commission in these proceedings.

Dated at Washington, D.C., this 20th day of January, 2023

/s/ *Stephanie S. Lim*
Stephanie S. Lim

ATTACHMENT A
THE SOTKIEWICZ AFFIDAVIT

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)	**Docket Nos. ER23-729-000**
	)	**EL23-19-000**

AFFIDAVIT OF PAUL M. SOTKIEWICZ, PH.D.

I. INTRODUCTION AND QUALIFICATIONS

1. My name is Dr. Paul M. Sotkiewicz. I am the President and Founder of E-Cubed Policy Associates, LLC ("E-Cubed") and formerly served as the Chief Economist in the Market Service Division of PJM Interconnection, L.L.C. ("PJM"). I have also served as an economist at the Federal Energy Regulatory Commission ("FERC" or "Commission") during the formative periods of organized wholesale markets from 1998-2000 where I worked primarily on the California ISO and New York ISO markets.

2. I have been retained by the Electric Power Supply Association ("EPSA") to submit this affidavit in support of its Protest to PJM's December 23, 2022 filings in Docket Nos.

ER23-729-000[1] and EL23-19-000[2] to change the Locational Deliverability Area ("LDA") Reliability Requirement[3] when the actual offers of Planned Generation Resources differ from expected offers into an RPM auction that result in a change to the Reliability Requirement by one percent or more.

3. I have intimate knowledge and experience with the PJM Reliability Pricing Model ("RPM") auction process including all actions/milestones/requirements and the market clearing engine from my over 8 years at PJM that I will bring to bear in this affidavit supporting EPSA's Protest.

4. I possess over 25 years of experience on matters at the intersection of utility regulatory policy, power system economics, and environmental economics. I advise private-sector, public-sector, and public interest organization clients on a range of economic issues related to electricity market design and performance, power generation economics, utility regulatory policy, and the economic impacts of state and federal environmental policies.

5. Prior to founding E-Cubed, I worked for PJM in Audubon, Pennsylvania from February 2008 to October 2016. In my time at PJM, I served as a Senior Economist until March 2010 and subsequently as the Chief Economist in the Market Service Division until June 2015. From July 2015 to October 2016, I worked as a contractor for PJM under the title

[1] *PJM Interconnection, L.L.C.,* Docket No. ER22-729-000, Proposed Amendment to the Locational Deliverability Area Reliability Requirement Filed Pursuant to section 205 of the Federal Power Act, Request for Waiver of Notice Requirement, and Request for an Extended Comment Period of 28 Days ("PJM 205 Filing").

[2] *PJM Interconnection, L.L.C.,* Docket No. EL23-19-000, Section 206 Filing Alleging that the Locational Deliverability Area Reliability Requirement is Unjust and Unreasonable as Applied in a Particular Locational Deliverability Area in the 2024/2025 Base Residual Auction And Requesting that the Commission Establish a Refund Effective Date of December 23, 2022, and Request for an Extended Comment Period of 28 Days ("PJM 206 Filing").

[3] Capitalized terms in my affidavit are PJM Tariff, Operating Agreement ("OA"), or Reliability Assurance Agreement ("RAA") defined terms and have the same meaning as in those PJM governing documents.

of Senior Economic Policy Advisor. Prior to joining PJM, I served as the Director of Energy Studies at the Public Utility Research Center, University of Florida from August 2000 to February 2008 and I was an Economist at FERC from September 1998 to August 2000. I have a B.A. in History and Economics from the University of Florida (1991), and an M.A. (1995) and Ph.D. (2003) in Economics from the University of Minnesota.

6. The entirety of my experience and work history can be found in my professional biography in Attachment A and my CV in Attachment B.

II. BACKGROUND AND SUMMARY OF PJM'S FILINGS

7. PJM proposes to change the LDA Reliability Requirement as part of the market clearing algorithm due to actual Planned Generation Capacity Resources participation that differs from the "expected" Planned Generation Capacity Resource participation that is used in developing the planning parameters.[4] PJM further states that absent this change prices in the Delmarva Power & Light – South ("DPL-S") LDA for the 2024/2025 Base Residual Auction ("BRA") would be unjust and unreasonable[5] because the prices would not reflect the actual supply-demand balance.[6] PJM asserts this change is required as the results were so unexpected that it could not have been foreseen and has only now been revealed as a possible market design issue that needs to be immediately addressed.[7]

[4] *See* PJM 205 Filing at 1-2, 20-22. *See also* PJM 206 Filing at 20-22.

[5] PJM 205 Filing at 2-4, 10.PJM 206 Filing at 1-2, 4, 16-17.

[6] PJM 205 Filing at 4-5,16. PJM 206 Filing at 2, 5.

[7] PJM 205 Filing at 8-10. PJM 206 Filing at 9-10.

8. The actions/milestones/requirements for the 2024/2025 BRA commenced on July 10, 2022 and the offer window closed on December 13, 2022.[8] The changes proposed by PJM would result in an LDA Reliability Requirement that differs from the posted planning parameters in the 2024/2025 BRA market clearing algorithm ***after***: 1) all pre-auction window actions/milestones/requirements have been concluded; and 2) all offers have been submitted.[9] PJM's proposal provides no mechanisms by which market participants would be informed of any changes in any LDA Reliability Requirement.[10] PJM avers this change is prospective in nature.[11]

9. PJM asserts its proposed changes in the PJM 205 Filing are just and reasonable,[12] but if the Commission finds otherwise, offers its PJM 206 Filing that is nearly identical in the proposed solution as to allow the Commission to craft its own just and reasonable solution.[13]

III. EXECUTIVE SUMMARY OF AFFIDAVIT

10. For all the reasons as discussed below in my affidavit, the Commission must reject both PJM's 205 and 206 filings and order PJM to immediately post the results for the 2024/2025 BRA under the now effective, Commission-approved PJM Tariff provision. PJM has failed to show its existing Tariff to be unjust, unreasonable, or unduly

[8] PJM Interconnection, L.L.C., *Auction Schedule*, "2024-2025 BRA" tab, available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/rpm-auction-schedule.ashx. Last accessed January 11, 2023. ("BRA Schedule").

[9] BRA Schedule. The auction window opened December 7, 2022, and closed December 13, 2022.

[10] *See* PJM 205 Filing at 1-2, 20-22. *See also* PJM 206 Filing at 20-22. The proposed tariff language does not propose market participants be informed that any changes were made, nor does the proposed tariff language propose to inform of the magnitude of changes.

[11] PJM 205 Filing at 4, 22-23. PJM 206 Filing at 4, 22-23

[12] PJM 205 Filing at 20-23.

[13] PJM 206 Filing at 1-2 and footnote 4.

discriminatory. In short, PJM's proposed solution in both filings suffers from the following fatal flaws:

1) PJM's proposed solution is clearly retroactive rather than prospective, upsets settled expectations, introduces unnecessary uncertainty, and is bad market design as discussed in Section IV below.

2) PJM's filings create a false equivalence between physical reliability needs as determined by PJM's own planning methods with its own ideas of economic supply-demand balance as discussed in Section V below.

3) PJM ignores the real reliability problems that exist in DPL-South as evidenced by historically high prices, tight supply-demand conditions, and the auction outcome PJM seeks to avoid as discussed in Section VI below.

4) Without a shred of credibility, PJM asserts that the market outcome the filings seek to avoid was unanticipated despite data and models that indicate otherwise as discussed in Section VII below.

5) PJM incorrectly asserts that Incremental Auctions ("IAs") are not a potential solution when past practice and Commission precedent indicate otherwise as discussed in Section VIII below.

11. Additionally, as discussed in Section IV, PJM falsely claims its Tariff already permits it to adjust auction parameters to clear the market, citing to Attachment DD, Section 5.11(e) with regard to adjusting the Variable Resource Requirement ("VRR") Curve for Price Responsive Demand ("PRD") commitments.[14] What PJM fails to inform the Commission is that this adjustment is related only to posting results after the auction algorithm has been run.[15] In effect what PJM would have the Commission believe to be an adjustment to an auction parameter used to clear the auction is merely an adjustment

[14] PJM 206 Filing at 23, PJM 205 Filing at 23.

[15] PJM Tariff Attachment DD, Section 5.11(e).

to the way the data are presented in the auction results posting and is irrelevant to the auction algorithm.

12. Reliability is ultimately determined by the physically present resources and their availability to produce energy when needed to reach a target loss of load expectation ("LOLE") in any LDA in the PJM Region. The RPM capacity market commits units to help meet these requirements, where resources receiving RPM commitments get paid in exchange for taking on various obligations to ensure they are physically available to provide energy to meet the LOLE target. What PJM proposes to do is to change the LDA Reliability Requirement based on an erroneous assumption that resources that do not offer in the BRA will not be physically available.[16] This assumption is not backed by the facts and, in particular, neglects the reality that resources without must-offer requirements increasingly choose to not offer into the BRAs but are physically available.

13. PJM omits relevant and crucial information from its filings as explained throughout my affidavit. PJM fixates on Planned Generation Capacity Resources not offering in the BRA as they do not have a must-offer requirement. Yet, PJM neglects to inform the Commission that Intermittent Resources that are not planned, Storage Resources, Hybrid Resources, Demand Resources ("DR"), Energy Efficiency Resources ("EER"), and PRD whether planned or existing also do not have must-offer requirements into RPM.[17] Moreover, PJM omits the key details regarding resources included in the models to determine the LDA Reliability Requirement and Capacity Emergency Transfer Objective

[16] PJM 206 Filing at 16, PJM 205 Filing at 16.

[17] PJM Tariff, Attachment DD, Section 6.6A(c). The Tariff is silent on PRD bid/offer requirements and thus is assumed not to have a must-offer obligation.

("CETO") which are essential to understanding the results from the 2024/2025 BRA and the change PJM proposes to make.

14. Finally, if the Commission has any concerns about the issues raised in PJM's filings regarding the availability of Planned Generation Capacity Resources to be physically available in the Delivery Year ("DY") with or without an RPM commitment, Section IX offers two potential paths forward that PJM could file under Section 205 that are purely prospective in nature. One path stays true to the use of models historically and currently used by the PJM planners in setting the auction parameters and focuses on the physical capacity in service while relying on IAs to perform their intended purpose. The second path develops for RPM capacity market purposes a different set of LDA Reliability Requirements and CETO calculations based solely upon resources that have committed to making offers in the BRA rather than focusing on physical capacity in service.

IV. PJM'S FILINGS SEEK RETROSPECTIVE RELIEF, FAIL TO ACCOUNT FOR ALL AUCTION ACTIVITIES, UPSET SETTLED EXPECTATIONS AND VIOLATE GOOD MARKET DESIGN PRINCIPLES

15. The proposed solution in PJM's 205 and 206 Filings is retrospective. The 2024/2025 BRA activities commenced on July 10, 2022, yet PJM fails entirely to mention this in its Section 205 and 206 filings. The BRA offer window closed on December 13, 2022, but the Filings were submitted on December 23, 2022, only after PJM had already run its market clearing engine to discover a result PJM did not like.

16. PJM's assertion that its proposal is not retrospective fails logically and flies in the face of the 2024/2025 BRA timelines. PJM erroneously claims its proposal would be prospective simply because it has not reported the result of the 2024/2025 BRA yet. That is the equivalent of the horse leaving its stall and fleeing the barn through the open door,

but the farmer then claiming that since the missing horse "has not been reported," we can close the barn door and thus claim the horse remains in the barn.

17. When the 2024/2025 BRA activities started, market participants already had settled expectations regarding the market rules going forward, and the activities leading up to the opening of the auction window. In addition, once the planning parameters are posted, market participants would also have expectations regarding the demand for capacity reflected in the VRR Curves for the RTO and modeled LDAs. The planning parameter information allows market participants to develop offers, engage in bilateral contracting, and make decisions at various BRA milestones.

18. PJM fails to grasp the very basics of good market design in that changing the market rules, as PJM proposes, would change behavior embedded in offers, bilateral contracting, and hedging decisions. There are many steps Existing and Planned Generation Capacity Resources as well as PRD, DR, and EER need to take, and decisions to be made prior to the opening of the auction offer window. To change the parameters as part of the market clearing algorithm, as PJM proposes, upsets settled expectations as market participants would not have the ability to change their decisions in reaction to PJM's changing of crucial planning parameters such as an LDA Reliability Requirement.

19. In fact, the Commission has found that changes in capacity market auction parameters once the process timeline has commenced do in fact upset "settled expectations" and has rejected changes that have the same timing considerations as those proposed by PJM in their Filings.[18]

[18] *ISO New England Inc.*, 170 FERC ¶ 61,187 at P 17 (2020).

A. Auction Timelines, Milestones, and Actions Prior to the Posting of Planning Parameters are an Essential Part of Any RPM Auction

20. Prior to the posting of planning parameters, Existing Generation Capacity Resources must provide data to PJM and the IMM to determine Market Seller Offer Caps ("MSOC") and whether they wish to be exempted from the must-offer requirement or retire and provide evidence they are not subject to the Minimum Offer Price Rule ("MOPR"). On the other hand, Planned Generation Capacity Resources only must provide evidence as to whether they are subject to MOPR.

21. Prior to the posting of the planning parameters, PJM and the IMM also post data used to determine offer caps and MOPR default price floors. Decisions on whether to use a default MSOC or MOPR or a unit specific MSOC or MOPR are all made prior to the posting of planning parameters. These are important RPM auction components that cannot be ignored.

22. By PJM's logic of what prospective means, Capacity Market Sellers can request the Commission to allow them to change their decisions after offers have been submitted as long as they are changed prior to the announcement of the BRA or IA results, and thus be considered "prospective." When viewed in these terms, the absurdity of PJM's position is made obvious, as the auction process had already been started (if not actually completed) and the proposed changes are most definitely retrospective.

B. PJM's Current Tariff Recognizes the Establishment of the VRR Curves and Reliability Requirement Happen Prior to the Auction

23. PJM Tariff Attachment DD, Section 5.10 a) vi) states very clearly, for a BRA auction schedule that is a full three years prior to the DY:

> A) The parameters of the Variable Resource Requirement Curve will be established prior to the conduct of the Base Residual Auction for a Delivery Year and will be used for such Base Residual Auction.
>
> B) The Office of the Interconnection shall determine the PJM Region Reliability Requirement and the Locational Deliverability Area Reliability Requirement for each Locational Deliverability Area for which a Variable Resource Requirement Curve has been established for such Base Residual Auction on or before February 1, prior to the conduct of the Base Residual Auction for the first Delivery Year in which the new values will be applied, in accordance with the Reliability Assurance Agreement.[19]

24. PJM's proposed changes countermand this simple and explicit directive. PJM's changes are so haphazard as to not even consider the timing that the VRR Curves and the Reliability Requirements must be posted prior to the conduct of the auction itself. The same is true for IAs.[20]

25. There is a good reason for establishing the VRR Curves and LDA Reliability Requirements prior to the BRA or IA. The LDA Reliability Requirement is the anchor point on the VRR Curve, and along with the Net CONE in an LDA defines the position of the VRR Curve. The LDA Reliability Requirement and the resulting VRR Curve provide critical information to market participants to make final decisions on offers, hedging, and bilateral contracts. Posting prior to the auction itself also allows those without must-offer requirements to make offer decisions. Resource owners can finalize retirement decisions that may have been made prior to the posting of the planning parameters that contain the VRR Curves and Reliability Requirements.[21]

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[19] PJM Tariff, Attachment DD, Section 5.10 a) vi) A) and B).

[20] PJM Tariff, Attachment DD, Section 5.10 e).

[21] Capacity Market Sellers can request an RPM must-offer exemption based on having provided a deactivation notice to PJM. *See* PJM Tariff Attachment DD, Section 6.6 (g) A. However, this does not forbid such a resource from offering into the BRA. There have been instances where announced deactivations have been withdrawn which are permitted under the Tariff. *See also* PJM Interconnection,

26. Finally, the current PJM Tariff rules conform well with a hallmark of competitive markets: providing as much open and transparent information to market participants as is possible.[22] It also removes a source of uncertainty to market participants which helps ensure supply offers that will lead to least-cost (on an offer/production basis) outcomes and enhances competition that preserves reliability in PJM.

C. Auction Timelines, Milestones, and Actions After the Posting of Planning Parameters are an Essential Part of Any RPM Auction

27. What is most troubling about PJM's proposed solution is that it upsets the decisions on the level of offers made by both Existing and Planned Generation Capacity Resources, which are based on the full transparency of the planning parameters.

- After the posting of the planning parameters, Existing Generation Capacity Resources that have been granted a must-offer-exemption during the auction timeline must decide and inform PJM and the IMM of whether they will submit offers into the BRA or IA.
- For those Existing Generation Capacity Resources under must-offer requirements, decisions on what the level of offers will be, subject to the MSOC.
- For Existing Generation Capacity Resources that do not have a must-offer requirement into an RPM BRA or IA such as Intermittent Resources, DR, and

L.L.C., *Generation Deactivations*, available at https://www.pjm.com/planning/services-requests/gen-deactivations ("PJM Deactivations") and click on "Withdrawn Deactivations".

[22] *See* Steven A. Greenlaw and David Shapiro, *Principles of Microeconomics 2e*, OpenStax, September 15, 2017, updated July 15, 2022, available at https://openstax.org/details/books/principles-microeconomics-2e. Chapter 8 at 188 describing perfect competition states, "sellers and buyers have all relevant information to make rational decisions about the product that they are buying and selling."

EER must decide whether they will offer, and if so, at what price will they offer their resources.

28. ***Planned Generation Capacity Resources do not have a must-offer requirement into an RPM BRA or IA.*** They face the same decisions as planned and existing wind and solar resources (Intermittent Resources), DR, and EER that do not have must-offer requirements. Planned Generation Capacity Resources like DR and EER also do not face an offer cap or market power mitigation.[23] While Planned Generation Capacity Resources are required to provide PJM a Notice of Intent to Offer prior to the posting of planning parameters,[24] ***a stated intent to offer is not a requirement or a binding commitment to offer into the BRA or IA.*** Existing Generation Capacity Resources that are wind or solar (Intermittent Resources) do not even have to inform PJM or the IMM of their intent to offer. PJM omits these key pieces of information in its filings.

D. Bilateral Contracting by Capacity Market Sellers Occurs Prior to the Opening of the Offer Window but After Posting of Planning Parameters

29. Many Capacity Market Sellers engage in bilateral contracting with Load Serving Entities ("LSEs") with capacity market obligations as a hedge against uncertainty in BRA and IA pricing outcomes. Both sides of bilateral transactions have settled expectations about the outcome of BRAs and IAs given the planning parameters and their own private expectations on capacity price outcomes given those parameters.

[23] PJM Tariff Attachment DD, Section 6.6A(C) regarding the must-offer requirement. *See also* PJM Tariff, Attachment DD, Section 6.5(a)(ii) for Planned Generation Capacity Resources not subject market power mitigation, and PJM Tariff, Attachment DD, Section 6.5(b) with regard to no mitigation of DR and EER.

[24] BRA Schedule. For the 2024/2025 BRA, the Notice of Intent to Offer was due by August 4, 2022, and Planning Parameters were posted August 29, 2022 and were updated on October 24, 2022.

30. Bilateral contracting can be done by Existing or Planned Generation Resources regardless of must-offer obligations. These actions do not show up in the PJM BRA or IA timelines, but they are ever present and must be acknowledged.

31. However, PJM's proposed changes that alter LDA Reliability Requirements during the clearing process after offers have been submitted would make bilateral contracting much riskier, if not impossible, by undermining the reasonable expectations that underpinned the transaction. PJM's proposed request to change the LDA Reliability Requirements during the clearing process may leave bilateral contracting parties with buyer's/seller's remorse for having done deals that are no longer economic after the LDA Reliability Requirement changes.

E. Changing the Reliability Requirement After Offer Decisions Have Been Made and the Offer Window Closes is Bad Market Design

32. Very simply, changing the market rules, or market information in a non-transparent fashion, changes market behavior and introduces unnecessary uncertainty for all market participants, but in an asymmetric way. If the new Reliability Requirement in a constrained LDA were known, Capacity Market Sellers would likely want to change their offers and may also possibly want to change their decision to offer at all if not subject to the must-offer requirement. Bilateral contract parties would want to change their contract terms and pricing. Introducing greater uncertainty simply makes hedging and risk mitigation harder for all parties in the capacity market.

33. PJM fails to even consider, let alone acknowledge, this fundamental underpinning of good market design. PJM does not even propose its solution to announce what the new Reliability Requirements would be, or even consider allowing Capacity Market Sellers

to update their offers or change decisions to offer at all. Instead, PJM will modify the LDA Reliability Requirements absent any transparency to market participants.

34. Uncertainty can never be eliminated, but introducing additional uncertainty is never good market design. PJM's proposal introduces new uncertainty regarding the validity/durability of the LDA Reliability Requirement in the auction. Once understood by market participants, this new uncertainty also changes the offer behavior of Capacity Market Sellers and bilateral contracting parties in that they now must account for the possibility the constrained LDA in which they are located may change in ways that cannot be predicted.

35. The uncertainty introduced by PJM's proposal may deter bilateral contracting for capacity between parties due to increasing differences in expected market outcomes between buyers and sellers in the bilateral market. Introducing greater uncertainty in the validity of the planning parameters simply makes hedging and risk mitigation harder for all parties in the capacity market.

36. In addition, the newly introduced uncertainty may cause Capacity Market Sellers simply not to offer at all if they believe the uncertainty creates additional risks that cannot possibly be mitigated. PJM's proposed change may make the "problem" it seeks to "solve" worse. It may encourage future Planned Generation Capacity Resources to not offer at all into a BRA or IA at all because of the risk that the LDA Reliability Requirements may be potentially changed. Ironically, this makes the one percent change in the LDA Reliability Requirements a self-fulfilling prophecy of greater and greater instances of changing LDA Reliability Requirements due to Planned and Existing Intermittent Generation Capacity Resources choosing to not offer into a BRA.

37. PJM in its filings has provided no empirical evidence, data or analytical support for its choice of a one percent threshold of change in the LDA Reliability Requirement.[25] PJM has provided no historic analysis of how often an LDA Reliability Requirement would have been changed if the actual offers Planned Generation Capacity Resources did not match the offers PJM expected in the BRAs or IAs, and what the price and commitment impacts might be.

38. Manipulating LDA Reliability Requirements because of "unwelcome" price outcomes is a dangerous game that could lead to premature retirements of resources in areas where they are actually needed. PJM's proposal would send market signals that are not commensurate with the reliability needs and lead to the retirement of resources that are needed to maintain reliability (both transmission and resources adequacy). DPL-South is already experiencing this with the desire for the Indian River 4 facility, which is the largest resource in DPL-South, to deactivate.[26] Yet, because it is crucial to transmission reliability, Indian River 4 has filed for and operates under a Reliability-Must-Run ("RMR") agreement approved by FERC.[27]

F. PJM Erroneously Implies It Makes Adjustments to the VRR Curve and Reliability Requirements After the Auction Window Closes

39. Citing Section 5.11 e) of Attachment DD to its Tariff, PJM avers in its 205 Filing, "… the Tariff already requires PJM to adjust the Locational Deliverability Area Reliability Requirement after the bidding window closes (but before the conclusion of the auction). Specifically, PJM is required to make 'any adjustments to PJM Region or LDA

[25] *See* PJM 205 Filing at 10, 19-20. *See also* PJM 206 Filing at 5, 11, 19-20.

[26] *See* PJM Deactivations and click on "Future Deactivations."

[27] *NRG Power Mktg. LLC*, 179 FERC ¶ 61,156.

Reliability Requirements to reflect Price Responsive Demand with a PRD Reservation Price equal to or less than the applicable Base Residual Auction clearing price.'"[28]

40. However, Section 5.11 of Attachment DD is entitled, "Posting of Information Relevant to the RPM Auctions" and states in subsection a) that prior to conducting a BRA, PJM must post

> iv) The PJM Region Reliability Requirement, and the Variable Resource Requirement Curve for the PJM Region, ***including the details of any adjustments to account for Price Responsive Demand and any associated PRD Reservation Prices;***
>
> v) The Locational Deliverability Area Reliability Requirement and the Variable Resource Requirement Curve for each Locational Deliverability Area for which a separate Variable Resource Requirement Curve has been established for such Base Residual Auction, ***including the details of any adjustments to account for Price Responsive Demand and any associated PRD Reservation Prices***, and the CETO and CETL values for all Locational Deliverability Areas;[29]

41. So clearly, PRD bids in aggregate are provided to market participants ***ahead*** of the auction window to provide up to date information to suppliers in formulating their offers for the same reasons having the other information under Section 5.10 provides transparency to the market.

42. PJM's statement is misleading because it neglects to provide the full quote to Attachment DD Section 5.11 e). With respect to Price Responsive Demand, Section 5.11 e) states:

> After conducting the Reliability Pricing Model Auctions, PJM will post the results of each auction as soon thereafter as possible, including any adjustments to PJM Region or LDA Reliability Requirements to reflect Price Responsive Demand with a PRD Reservation Price equal to or less than the applicable Base Residual Auction clearing price. The posted results shall include graphical supply curves that are (a) provided for the entire PJM Region, (b) provided for any Locational

[28] PJM 205 Filing at 23, the underlined is a direct quote from Section 5.11 e). *See also* PJM 206 Filing at 23.

[29] PJM Tariff, Attachment DD, Section 5.11 a) iv) -v). The same is applied for IAs. *See* PJM Tariff, Attachment DD, Section 5.11 b).

> Deliverability Area for which there are four (4) or more suppliers, and (c) developed using a formulaic approach to smooth the curves using a statistical technique that fits a smooth curve to the underlying supply curve data while ensuring that the point of intersection between supply and demand curves is at the market clearing price.[30]

43. I underlined the direct quote from the Tariff PJM provides in its 205 Filing. Within the full context of the quote around PRD adjustments, Section 5.11 e) has nothing to do with auction clearing at all but pertains to posting auction results and the manner and form in which the information is posted. This clearly shows PJM has deliberately taken the underlined quote out of context as it has nothing to do with changing the VRR Curve as part of the market clearing algorithm as PJM proposes to do in its Filings.

44. Furthermore, PJM's filings mischaracterize how the RPM auction algorithm works so as to fit the reference to PRD in Section 5.11(e) into PJM's chosen, but false, narrative that adjusting planning parameters already happens during the auction clearing process.

45. The RPM auction algorithm is available publicly to all market participants.[31] The PJM auction algorithm is a mixed integer program that minimizes the sum of offer costs (production costs) of resources less the value of demanded capacity along the different segments of the VRR Curve,[32] and subject to a set of constraints including locational constraints.[33] In economic terms, the PJM auction algorithm maximizes market surplus through the combination of load purchasing capacity and suppliers selling capacity and

[30] PJM Tariff, Attachment DD, Section 5.11 (e).

[31] PJM Interconnection, L.L.C., *Base Residual Auction Optimization Formulation,* available at https://www.pjm.com/-/media/markets-ops/rpm/20071212-rpm-optimization-formulation.ashx.

[32] *Id*. at 2.

[33] *Id.* at 2-4.

in no place shows any iterative or post-processing means for handling PRD as PJM wrongly implies in its filing.

V. PJM EXPLICITLY DRAWS A FALSE EQUIVALENCE BETWEEN RELIABILITY NEEDS AND ECONOMIC SUPPLY-DEMAND BALANCES IN THE RPM AUCTIONS

46. PJM leads its 206 Filing with the following statement:

> "…the calculation of the Locational Deliverability Area Reliability Requirement, as set forth in the Tariff and PJM Manuals, produces an unjust and unreasonable result when Planned Generation Capacity Resources, including large thermal resources and Intermittent Resources are modeled in a small Locational Deliverability Area ("LDA") and such resources do not participate in the Base Residual Auction ("BRA"). ***This is because the Locational Deliverability Area Reliability Requirement in an LDA is a function of both forecasted load and expected supply resources in the LDA.*** Ultimately, the impact of including Planned Generation Capacity Resources in the calculation of the Locational Deliverability Area Reliability Requirement that then do not participate in the BRA produces an unjust and unreasonable outcome in small LDAs. ***Such outcomes would be inconsistent with the actual market fundamentals because they do not reflect the actual supply and demand of the LDA***."[34]

47. PJM has made it clear that it is drawing an equivalence between the determination of the LDA Reliability Requirements and what it determines to be the supply and demand balance in the constrained LDA in the BRA or IA. Yet, PJM fails to explain to the Commission by way of example or analytics why adding Planned Generation Capacity Resources would increase the Reliability Requirement of an LDA.[35]

48. What PJM fails to inform the Commission of is the LDA Reliability Requirement and the associated CETO do not depend on resources with RPM commitments, but rather only existing resources and any projected resources expected to be in service regardless of RPM commitments, as discussed below.

[34] PJM 206 Filing at 2-3 (emphasis added).

[35] PJM attempts to explain this in its 205 Filing. See PJM 205 Filing at 12-15.

49. Further, PJM also fails to inform the Commission that, beyond Planned Generation Capacity Resources, many of the resources modeled in the analysis for the CETO and LDA Reliability Requirement do not have must-offer requirements into the RPM BRAs and IAs. These include all (whether planned or existing) Intermittent Resources, DR, and EER. These resources have offers that may change in price and quantity from one DY to the next or may choose not to offer at all; yet they are physically present and in operation and can have the same effects on the CETO and LDA Reliability Requirements as PJM's sole fixation with Planned Generation Capacity Resources.

A. Calculation of the CETO and the Reliability Requirement Does Not Depend upon Whether Resources Have RPM Commitments

50. For the purposes of the BRA and IA, PJM calculates the Reliability Requirement in each LDA and the associated CETO in accordance with PJM Manual 20, Section 4, with the primary details provided in Section 4.3 of Manual 20.[36] Nothing in Section 4 of Manual 20 requires resources to have RPM commitments to enable PJM to determine the Reliability Requirement or CETO for that LDA. This makes sense because resources that are in service and available to produce energy will affect reliability outcomes regardless of their RPM commitment status.

51. The CETO is the import capability required by the LDA to comply with a transmission event LOLE of, on average, 1-day-in-25-years to maintain the overall level of PJM

[36] PJM Interconnection, L.L.C., *PJM Manual 20: PJM Resource Adequacy Analysis*, Revision 12, August 25, 2021, Section 4 at 31-32, available at https://www.pjm.com/-/media/documents/manuals/m20.ashx ("PJM Manual 20"). (Specifies that for purposes of determining what planned resources are included in the Locational Deliverability Area Reliability Requirement as projected internal capacity and the CETO modeling, any "planned generation resource addition or planned increase in rating that has executed an Interconnection Service Agreement (ISA) is modeled.").

resource adequacy at 1-day-in-10-years.[37] PJM's Probabilistic Reliability Index Study Model ("PRISM") model determines the LDA Reliability Requirement where the LDA is modeled, and PJM serves as the "rest of the world" from which the LDA can import resources.[38]

52. Modeled in the CETO analysis are the existing resources in the LDA used in the most recent Reserve Requirement Study; the LDA unrestricted non-coincident peak load forecast adjusted for forecasted load management (DR); energy efficiency (EER); and behind-the-meter load.[39] Also included in the modeling are: unit retirements that have been publicly announced; resources with a RMR contract for part of or for the entire Delivery Year; and Planned Generation Capacity Resources with an executed ISA.[40]

53. The way in which supply resources are modeled in determining the CETO and by extension the LDA Reliability Requirement does not distinguish between RPM-committed and non-RPM-committed resources. The analysis assumes all resources contribute to the determination of the CETO and Reliability Requirement. Inexplicably, PJM omits this crucial fact entirely in its Filings.

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[37] *Id*. Section 4.1 at 31.

[38] *Id*. Section 4.3 at 32. *See also*, PJM Interconnection, L.L.C., *PJM Generation Adequacy Analysis: Technical Methods,* Capacity Adequacy Planning Department PJM Interconnection, L.L.C. October 2003, available at https://www.pjm.com/-/media/planning/res-adeq/20040621-white-paper-sections12.ashx and PJM Interconnection, L.L.C., *2022 PJM Reserve Requirement Study,* PJM Resource Adequacy Planning, October 4, 2022, available at https://www.pjm.com/-/media/planning/res-adeq/2022-pjm-reserve-requirement-study.ashx.

[39] PJM Manual 20, Section 4.3 at 32.

[40] *Id*. Section 4.3 at 32.

B. Many Resources Included in the CETO LDA Reliability Requirement Modeling Do Not Have Must-Offer Requirements into the RPM BRAs or IAs

54. PJM's ***only concern in its filings is with Planned Generation Capacity Resources with executed ISAs*** which do not have must-offer requirements. But these are not the only resources included in the CETO and Reliability Requirement model that do not have must-offer requirements. Other planned or existing resources that do not have such must-offer requirements include Intermittent Resources such as wind, solar and run-of-river hydro, Capacity Storage Resources, Hybrid Resources, DR, and EER.[41]

55. PJM has failed to explain why it does not foresee any problems with the supply and demand balance in RPM as these resource types can come and go as they please from RPM, and yet they, too, are included in the CETO and Reliability Requirement determination for LDAs exactly like Planned Generation Capacity Resources. PJM in its filings totally ignores these facts in its sole focus on Planned Generation Capacity Resources.

56. The resource types that do not have must-offer requirements may be existing resources that remain in service or may be planned resources that still come into service for the DY, and would thus affect the CETO and Reliability Requirement regardless of whether they offer into RPM. In fact, RPM captures these resources' contribution to resource adequacy: any resource regardless of an RPM capacity commitment is eligible to receive performance bonuses if it was producing energy to maintain reliability during Performance Assessment Intervals ("PAIs").[42]

[41] PJM Tariff, Attachment DD, Section 6.6A (c).

[42] PJM Tariff, Attachment DD, Section 10A (g).

C. PJM is Incorrectly Assuming Planned Generation Capacity Resources Not Offered in the 2024/2025 BRA Will Not Be In-Service for the 2024/2025 DY

57. In making its false equivalence between the reliability needs of an LDA and the supply and demand in the LDA in an RPM auction, PJM has ignored the lack of must-offer requirements for Planned Generation Capacity Resources and the likelihood of being in-service for the 2024/2025 DY.[43]

58. According to the PJM interconnection queue, there are 195.9 MW of solar and storage capacity, 64.4 MW of off-shore wind capacity, and a single 451 MW combined cycle gas addition with executed ISAs or Wholesale Market Participation Agreements ("WMPAs") and 2024 in-service dates in DPL-South. This is 711.3 MW of capacity in total. [44]

59. PJM data has shown the amount of wind and solar capacity offered into the BRA has declined by 40 and 8.5 percent, respectively, between the 2022/2023 BRA and the 2023/2024 BRA[45] despite an increasing deployment of wind and solar resources. The IMM has shown that unoffered Intermittent Resources have increased substantially from the 2022/2023 BRA to the 2023/2024 BRA from 1,571 MW UCAP to 3,721 MW UCAP or a more than doubling of unoffered Intermittent Resources.[46]

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[43] PJM 205 Filing at 16. PJM 206 Filing at 16.

[44] PJM Interconnection, L.L.C,, *New Services Queue,* available at https://www.pjm.com/planning/services-requests/interconnection-queues. Accessed December 25, 2022. These values can be found by downloading the entire queue, looking at status, expected in-service dates, DPL transmission area, and then by county for DPL-South.

[45] PJM Interconnection L.L.C., *Commitments by Fuel Type & Delivery Year 2007/08 - 2023/24,* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/rpm-commitment-by-fuel-type-by-dy.ashx. Last accessed January 11, 2023.

[46] Monitoring Analytics, Independent Market Monitor for PJM ("IMM"), *Analysis of the 2023/2024 RPM Base Residual Auction*, October 28, 2022, ("2023/2024 BRA Report"), Table 8 at 83, available at https://www.monitoringanalytics.com/reports/Reports/2022/IMM_Analysis_of_the_20232024_RPM_Base_Residual_Auction_20221028.pdf. *See also* IMM, *Analysis of the 2022/2023 RPM Base Residual Auction*, February 22, 2022, ("2022/2023 BRA Report"), Table 9 at 83.

60. The implication of the data is that Intermittent Resources are choosing not to take on RPM Capacity commitments and that just because there was no offer into the BRA does not mean these resources will not be in-service for the 2024/2025 DY.

D. PJM Is Using Its False Equivalence Between Reliability Needs and Supply and Demand Balance to Draw Incorrect Conclusions Regarding RPM Price Formation and Reliability

61. PJM's 205 and 206 Filings make clear that PJM did not like the prices produced after running the 2024/2025 BRA auction using the posted DPL-South LDA Reliability Requirement. Thus, as discussed above, they focus on the failure of specific resources -- Planned Generation Capacity Resources -- to offer into the 2024/2025 BRA. A reasonable inference from PJM's filing is that the price in DPL-South would be at or near 1.5 Net CONE under the posted LDA Reliability Requirement as there would not have been enough internal resources plus the CETO to meet the LDA Reliability Requirement otherwise.[47] This inference on pricing in the DPL-South LDA is important in understanding the discussion of scenarios in the following paragraphs.

1. Planned Generation Capacity Resources Could Have Offered and Not Cleared, Satisfying PJM's Supply-Demand Balance but Leading to the Same Price Outcome PJM Seeks to Avoid

62. Consider two scenarios that are observationally equivalent in the pricing outcomes that PJM seeks to change. In the first scenario, assume all the Planned Generation Capacity Resources offer into the BRA, but none of them clear because they require a high capacity price to take on risks of being unable to deliver on RPM commitments. Such a scenario for resources is not unimaginable. In the December 23-24, 2022 Winter Storm Elliot

[47] Had there been sufficient resources internal to DPL-South, the price would have been set by the highest cost resource available to meet the demand for capacity, or the DPL-South price would have been set by resources in EMAAC and DPL-South would not have price separation from EMAAC.

event, PJM experienced 277 PAIs.[48] That translates to over 23 hours of emergency conditions, many in the overnight and these resources would have been at risk for performance penalties.

63. In this first scenario, because none of the Planned Generation Capacity Resources clear, the entire CETO is used up and there are still insufficient resources in the LDA, so the price rises to 1.5 Net CONE. Nonetheless, PJM's concern about the supply-demand balance would be satisfied since the Planned Generation Capacity Resources offered into the BRA.

2. Planned Generation Capacity Resources Could Have Offered and Cleared, Satisfying PJM's Supply-Demand Balance but Leading to the Same Price Outcome PJM Seeks to Avoid

64. In the second scenario, assume all the Planned Generation Capacity Resources offered at 1.5 Net CONE and all cleared and set the price at 1.5 Net CONE. Planned Generation Capacity Resources are assumed to be competitive and not subject to market power mitigation.[49] Prices would be set at 1.5 Net CONE, the resources would clear, and this would also satisfy PJM's concern about supply and demand imbalance.

3. Planned Generation Capacity Resources Not Offering Leads to Equivalent Pricing Outcomes That PJM Would Implicitly Accept Had Offers Been Made Showing PJM's False Equivalence

65. Now consider a third scenario where none of Planned Generation Capacity Resources offered in the BRA, ***but all went into service for the 2024/2025 DY***. The reliability situation from the perspective of CETO and the LDA Reliability Requirement in DPL-South would be the same as modeled by PJM for the planning parameters and would also

[48] PJM Interconnection, L.L.C. Presentation on Winter Storm Elliott, Market Implementation Committee ("MIC"), January 11, 2023, *available at* item-0x---winter-storm-elliott-overview.ashx (pjm.com).

[49] PJM Tariff, Attachment DD, Section 6.5(a).

be the same as if the resources in the first scenario went into service despite not clearing in RPM.

66. How is the third scenario any different from the first scenario where all offered, but none cleared, and all resources still went into service? The short answer is it is not different from a reliability perspective in that all resources modeled for CETO and the Reliability Requirement are physically in service as expected, but this third scenario fails "PJM's false supply and demand equivalence" because in the third scenario PJM did not see these resources show up in the BRA with offers.

67. It is this third scenario upon which PJM is laser focused to try and find a way to change the price in the auction. It is this third scenario in which PJM makes the explicit, but unstated, assumption these resources will not physically be in service in the DY.[50] But in making such an assumption, PJM is ignoring the trends of Planned Generation Capacity Resources and Intermittent Resources (of which there is an overlap) not offering into the BRAs as described above, yet still going into service without capacity commitments.[51]

68. But PJM's proposed solution in the third scenario jeopardizes reliability. The price signal PJM wants to send would be a fraction of the price that would prevail if PJM had allowed the reliability and auction process work as designed. The prices would be too low for the

[50] PJM 205 Filing at 16, "Put another way, certain large Planned Generation Capacity Resources and planned Intermittent Resources ***are not expected to be physically available*** to serve as capacity for the 2024/2025 Delivery Year so the Locational Deliverability Area Reliability Requirement should not include such resources." (emphasis added)

[51] Once committed as a Planned Generation Capacity Resource, a resource becomes an Existing Generation Capacity Resource and takes on the risk of non-performance penalties that cannot be mitigated through offers. *See* PJM RAA, Section 1 (Definitions) of Existing Generation Capacity Resource. There is currently no means to reasonably reflect performance risks under the current MSOC. Thus, an Intermittent Resource that is also an Existing Generation Capacity Resource has the option of not offering into the BRA to avoid the performance risk entirely. *See Independent Market Monitor for PJM v. PJM Interconnection, L.L.C.* 176 FERC ¶ 61,137 (2021) P 21 citing to PJM arguing all relevant risks should be included in CPQR, P 55 citing Vistra requesting clarification on how CPQR can be modeled and expressed. *See also infra* Note 70.

actual reliability need. ***The prices PJM would determine might not be high enough to attract future new resources to take on an RPM commitment especially knowing PJM is willing to put its finger on the scale to reduce prices even in the face of reliability needs with its proposal.***

69. PJM's solution in the third scenario would concoct an LDA reliability requirement that differs from the planning model determination of the LDA Reliability Requirement, for the purpose of driving a different pricing outcome. This would leave PJM in a reliability mismatch where the physical system matches the reliability needs as determined by PJM planners when all resources showed up in the DY, but not matching up with the concocted LDA Reliability Requirement used to clear the BRA.

E. PJM Has Ignored the Reliability Must Run ("RMR") Contract with Indian River 4 in DPL-South and the Reliability Needs it Signals

70. From an examination of PJM RPM auction data, it appears that Indian River 4 did not clear in the 2022/2023 BRA and is under a FERC filed RMR agreement with PJM, which went into effect on June 1, 2022 and would keep Indian River 4 in service until December 31, 2026.[52] The retirement date is presumably set for when transmission reinforcements will be completed allowing Indian River 4 to retire without jeopardizing transmission

[52] *See* Reliability Must-Run Rate Schedule, Electric Rate Schedule FERC No. 3, Transmittal Letter at 5, Docket No. ER22-1539-000 (filed Apr. 1, 2022), *accepted & suspended*, *NRG Power Mktg. LLC*, 179 FERC ¶ 61,156 (2022).

reliability.[53] Indian River 4 would also be modeled in the CETO Reliability Requirement analysis[54] and not have a must-offer requirement into RPM.[55]

71. However, nowhere in the PJM 205 or 206 Filing is the Indian River 4 RMR mentioned. This large existing resource (410 MW ICAP and largest in service in DPL-South) is a reliability canary in the RPM coal mine. As prices for capacity have declined in DPL-South from an average of nearly $158/MW-day from the 2019/2020 DY through the 2021/2022 DY to $83/MW-day over the past two BRAs for the 2022/2023 and 2023/2024 DYs,[56] the cleared capacity has fallen 21 percent or 350 MW UCAP from the 2021/2022 DY to the 2023/2024 DY.[57] Reliability Requirements increased nearly 250 MW from 2021/2022 to 2023/2024 in DPL-South at the same time.[58]

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[53] PJM Deactivations and click on "Future Deactivations," *available at* PJM - Generation Deactivations.

[54] PJM Manual 20, Section 4.3 at 32.

[55] *NRG Power Marketing LLC*, 179 FERC ¶ 61,156 (2022) at 12, "NRG-PML states that in accordance with section 4.1(a) of the RMR Rate Schedule, NRG-PML is not obligated to offer Unit 4 into the PJM capacity market."

[56] PJM Interconnection L.L.C., *Commitments by Fuel Type & Delivery Year 2007/08 - 2023/24* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/rpm-commitment-by-fuel-type-by-dy.ashx. Last accessed January 11, 2023.

[57] PJM Interconnection, L.L.C., *2021/2022 Base Residual Auction Results*, available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2021-2022/2021-2022-base-residual-auction-results.ashx. PJM Interconnection, L.L.C., *2022/2023 Base Residual Auction Results*, available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2022-2023/2022-2023-base-residual-auction-results.ashx. PJM Interconnection, L.L.C., *2023/2024 Base Residual Auction Results*, available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2023-2024/2023-2024-base-residual-auction-results.ashx.

[58]. PJM Interconnection, L.L.C., *Planning Period Parameters for the 2021/2022 Base Residual Auction,* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2021-2022/2021-2022-bra-planning-period-parameters.ashx. PJM Interconnection, L.L.C., *Planning Period Parameters for the 2022/2023 Base Residual Auction,* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2022-2023/2022-2023-planning-period-parameters-for-base-residual-auction.ashx. PJM Interconnection, L.L.C., *Planning Period Parameters for the 2023/2024 Base Residual Auction,* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2023-2024/2023-2024-planning-period-parameters-for-base-residual-auction.ashx.

72. Couple Indian River 4 with the increasing trend of Intermittent Resources choosing to not offer their eligible capacity into RPM as prices have fallen the past two auctions, it seems RPM in DPL-South is not attracting RPM commitments, though Indian River 4 and all Planned Generation Capacity that are Intermittent Resources are likely to be in service as modeled in the LDA Reliability Requirement.

VI. PJM HAS MISDIAGNOSED THE SITUATION: IT DOES NOT HAVE A PRICING PROBLEM OR A MODELING PROBLEM, IT HAS A RELIABILITY PROBLEM

73. As the previous discussion shows, PJM is fixated with the LDA pricing outcome in DPL-South for the 2024/2025 BRA and other LDAs in the future. However, what PJM's planning models and RPM market participation of resources without must-offer requirements are showing is an underlying reliability problem. PJM has all but admitted this in its Filing when it states, "…the reliability value of a large Planned Generation Capacity Resource or planned solar resource used to calculate the CETO for a small LDA is lower than the resource's projected internal capacity value, which is based on a class average forced outage rate ("EFORD") or Effective Load Carrying Capability value, respectively, derived from the PJM Region."[59]

74. This reliability problem of resources having a lower reliability value in the LDA, which has a more stringent LOLE target of 1 day in 25 years, than in the RTO overall, which has a LOLE of 1 day in 10 years, is not sustainable. Ideally, resources in a constrained LDA such as DPL-South should have equivalent or higher reliability value in the LDA

[59] PJM 205 Filing at 14. The same identical quote can be found in the PJM 206 Filing at 14.

with the more stringent LOLE than in the RTO Region that has a comparatively less stringent LOLE.

75. The reliability problem that is quietly identified and then overlooked by PJM is being manifested in two ways: 1) increasing levels of Intermittent Resource penetration in small LDAs do not help the LDA satisfy the 1-day-in-25 years LOLE as much as they help the RTO satisfy the 1-day-in-10 years LOLE because of the high correlation in outages/unavailability when the LDAs need them most; and 2) resources without must-offer requirements, largely Intermittent Resources on an ongoing basis, and Planned Generation Capacity Resources as they enter the market, cannot appropriately reflect their risk of non-performance going forward once they are Existing Generating Capacity Resources and thus may choose to not offer into the RPM BRA or IA. In this sense resources owners are thinking ahead. Their choice to offer as a Planned Generation Capacity Resource locks them into a MSOC paradigm that they deem does not reflect the risks of non-performance. Therefore, resource owners may choose to forego offering into the BRA as a Planned Generation Capacity Resource and effectively rely only on revenues from the energy market and bonus payments during PAIs to mitigate performance risk. [60]

76. The first implication is that PJM's "solution" only makes the problem worse and not better as discussed above. The proposed PJM solution only hides the reliability problem in LDAs and does not address it head on by sending the appropriate market signals. This is akin to a patient having chronic headaches and the doctor prescribing two aspirin and

[60] *See infra* Note 70.

sending the patient away. It masks the problem but does not solve the underlying issue of the chronic headaches.

77. The second implication is that the set of solutions to the underlying reliability problem has nothing to do with PJM's proposal. The set of possible solutions must attract or retain the types of resources that have at least equal reliability value for both the LDA, especially smaller LDAs, and the PJM Region in total. This means resource types that can avoid correlated outages or unavailability with other resources within the LDA provide some degree of controllability/dispatchability, and importantly, do not unintentionally create a single point mode of reliability failure in the LDA.

A. Absent any Internal Resources, the LDA Reliability Requirement Must Equal the CETO, and the LDA is Entirely Dependent Upon Imports to Maintain Reliability

78. For the sake of example and ease of explanation, it is helpful to consider a small LDA with a winter and summer peak load of 2400 MW, similar to DPL-South. This peak load can be perfectly forecasted for ease of the example. As PJM has correctly stated, the LDA Reliability Requirement ("RR") is equal to the CETO plus the sum of internal resources ("IR"), such that (RR=CETO+IR).[61]

79. Assume for the time being there are no internal resources (IR=0). Because load can be forecasted perfectly, the Reliability Requirement is 2400 MW. This implies the CETO must be 2400 MW as well. As long as there is sufficient transmission capacity in the Capacity Emergency Transfer Limit ("CETL"), the entire LDA Reliability Requirement can be met by satisfying the CETO.

B. An LDA Dependent Upon a Single Resource Will Have an LDA Reliability Requirement That Equals CETO Plus the

[61] PJM 205 Filing at 13.

UCAP Value of the Single Resource and is Still Highly Dependent on Imports via CETO

80. Continuing the example in the previous subsection, now add a single resource in the LDA that can satisfy the entire load in the LDA and even export energy and capacity to the rest of the PJM Region. The single generator has 3000 MW of ICAP with a 5 percent Equivalent Forced Outage Rate under Demand ("$EFOR_d$") which results in 2850 MW of Unforced Capacity ("UCAP").

81. Because the generator has a probability of not being available 5 percent of the time, there will be times when the 2400 MW peak load may need to be served from the rest of the PJM Region. We know IR=2850, but the LDA also needs the 2400 MW of CETO to ensure the peak load can be served when the lone generator is forced out.

82. Applying the formula RR=CETO+IR, this means the RR=5250=2850 + 2400. This is a counter-intuitive result, but logically makes sense because probabilistically, there are times when the single generator will be unavailable and cannot serve the peak load. This is a situation where there is a single point mode of failure (a large generator) that increases the Reliability Requirement.

C. An LDA with Many Smaller Resources Reduces the LDA Reliability Requirement Substantially as Outage Risk is More Diversified and is Less Dependent on Imports via a Lower CETO.

83. Continuing with the example, again, rather than a single large resource, consider 20 units at 100 MW ICAP each, with a 5 percent $EFOR_d$ for an internal UCAP of 1900 MW total (95 MW UCAP for each unit). Outages are random and uncorrelated for ease of the example, but simulations show the highest amount of capacity unavailable at peak is 300 MW ICAP (285 MW UCAP).

84. Internal resources are 1900 MW UCAP (IR=1900). We also know that at peak, simulations show 285 MW UCAP, at most, will be out during the peak, leaving only 1615 MW UCAP internally to serve the 2400 MW of peak load. This implies the imports of CETO must be 2400-1615=785 MW. Given RR = IR (1900) + CETO (785), the Reliability Requirement is 2685 MW.

85. A larger number of smaller resources brings greater reliability value to a small LDA, all else equal, reducing the Reliability Requirement and the CETO relative to having a single large unit in a small LDA.

D. Introducing Additional Resources in the LDA with Highly Correlated Outages/Unavailability Such as a Single Type of Intermittent Resource Increases the LDA Reliability Requirement Despite an Increase in Internal Resources.

86. Continue with the same example, but with a different configuration of generation. Consider 18 units at 100 MW ICAP each that are controllable with a 5 percent $EFOR_d$ for an internal UCAP of 1710 MW total (95 MW UCAP for each unit) and outages that are random and uncorrelated. Add 2 more units each with 158 MW ICAP (95 MW UCAP each via Effective Load Carrying Capability ("ELCC") or 60 percent of nameplate rating) but these are solar resources, just as we are seeing in DPL-South. This also results in 1900 MW UCAP as in the previous subsection example.

87. For the 18 units, simulations show the highest amount of capacity unavailable at peak is only 270 MW ICAP (256.5 MW UCAP). This is the same percentage as in the previous subsection. However, during winter peaks, solar output is simulated to be zero. This is consistent with winter peaks occurring in the early morning before any meaningful solar radiance, or in the evening after sundown. In total, simulations show 256.5 MW UCAP from controllable resources plus 190 MW UCAP of solar resources unavailable at peak.

88. There is now 446.5 MW UCAP that is unavailable to meet the peak load, though internal resources are 1900 MW UCAP (IR=1900). This leaves only 1453.5 MW UCAP internally to serve the 2400 MW of peak load. This implies the imports of CETO must be 2400-1453.5=946 MW. IR (1900) + CETO (946) = 2846 MW for the Reliability Requirement.

89. This shows how a relatively small number of Intermittent Resources of the same type with highly correlated outages can easily raise the Reliability Requirement in a small LDA.

E. DPL-South Does Not Have a Single Point Mode of Failure, Has Many Resources, and Intermittent Resources or Large Resource Additions that Affect the LDA Reliability Requirement

90. The published PJM Resource Model for the 2024/2025 BRA shows DPL-South has 56 different resources with an average size of just over 30 MW, but with the largest resource being Indian River 4 at 410 MW ICAP, and the second largest being Garrison at 309 MW, with 1688 MW ICAP in total. [62] Of these resources, 100 MW are solar resources.

91. There are 16 Planned Generation Resources in DPL-South that can be identified in the PJM interconnection queue, for a total of approximately 711 MW. Of these, 1 is an offshore wind resource with 64.4 MW of ICAP capacity value, 14 are solar resources with a combined 195.9 MW of ICAP capacity value, and there is a single combined cycle resource with 451 MW ICAP capacity value. There is 260.3 MW ICAP in total for Intermittent Resources. [63]

[62] 2024/2025 BRA Resource Model. The Resource Model does not report UCAP values for specific units.

[63] PJM Interconnection, L.L.C,, *New Services Queue,* available at https://www.pjm.com/planning/services-requests/interconnection-queues. Accessed December 25, 2022. These values can be found by downloading

1. DPL-South Triples the Solar Capacity in the 2024/2025 DY and Adds Off-Shore Wind Such That Intermittent Resources Equal Approximately Ten Percent of the LDA Reliability Requirement, An Increase from Just under Three Percent of the LDA Reliability Requirement in the 2023/2024 DY.

92. If all the Planned Generation Capacity Resources that are solar resources come into service in the 2024/2025 DY, which seems likely given trends of avoiding participation in RPM, then the LDA Reliability Requirement posted for the 2024/2025 BRA provides a reasonable estimate of the reliability need in DPL-South. Existing solar resources in DPL-South in the resource model are 100 MW UCAP already.[64] Adding an additional 195.9 MW from the queue in one large step will result in a large step change increase in the LDA Reliability Requirement alone like the example above.

93. Add in a 64.4 MW UCAP offshore wind turbine whose output might be somewhat correlated with the solar resources during winter peaks, and this adds a total of 260.4 MW UCAP of Intermittent Resources should it come into service. With the approximately 100 MW of existing solar resources in DPL-South, this indicates about 360 MW of Intermittent Resources which account for just over ten percent of the 2024/2025 DPL-South LDA Reliability Requirement of 3,514 MW.[65] This is three-fold change from the 2023/2024 BRA and DY in which the approximately 100 MW of

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the entire queue, looking at status, expected in-service dates, DPL transmission area, and then by county for DPL-South.

[64] 2024/2025 BRA Resource Model.

[65] PJM Interconnection, L.L.C., *Planning Period Parameters for the 2024/2025 Base Residual Auction,* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2024-2025/2024-2025-planning-period-parameters-for-base-residual-auction.ashx.

Intermittent Resources was under three percent of the 3,141 MW LDA Reliability Requirement.[66]

94. Finally, the 450 MW gas resource is likely to have interactions on outages, even if random, with the two other larger units in DPL-South at least for some time, increasing the Reliability Requirement, but likely has only a small impact relative to the Intermittent Resource impacts.

95. The examples in this section demonstrate PJM's proposed solution solves nothing. It ignores the fact that Planned and Intermittent Resources may not offer in the BRA, but still go into commercial operation for the 2024/2025 DY. PJM's solution for modifying the LDA Reliability Requirement solely for purposes of clearing the BRA will jeopardize reliability by ignoring the reality of resources without must-offer requirements that are physically in service and send a price signal that does not match the reliability needs of a constrained LDA such as DPL-S. However, if some of these resources do not come into service, then PJM could use the IAs to adjust the Reliability Requirements in LDAs to make near DY adjustments as discussed below in Section IX.

VII. PJM SHOULD NOT BE SURPRISED BY THE CHANGE IN RELIABILITY REQUIREMENT, VOLUME OF UNOFFERED RESOURCES, OR PRICING OUTCOMES

96. PJM claims the auction results for DPL-South were unanticipated, and that Planned Generation Capacity Resources, which include Intermittent Resources, were the driver

[66] PJM Interconnection, L.L.C., *Planning Period Parameters for the 2023/2024 Base Residual Auction,* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2023-2024/2023-2024-planning-period-parameters-for-base-residual-auction.ashx.

of what PJM calls an anomalous pricing result.[67] Furthermore, PJM avers that the Reliability Requirement is greater than required because those Planned Generation Capacity Resources did not offer into the 2024/2025 BRA.[68]

97. I have already addressed the issue regarding the Reliability Requirement and why it cannot be deemed too high in Sections V and VI. As for the "unanticipated" factors, such an argument by PJM rings hollow. First, PJM is the owner of the models to determine the Reliability Requirement in LDAs as well as CETO and should understand the interactions of Intermittent Resources and large resources in a small LDA as I have shown in Section VI. Second, PJM has access to participant level data from each auction and therefore should be aware of the trends of declining RPM participation by resources without must-offer requirements. Third, PJM also runs scenario analyses after each BRA and can see the impacts of reduced supply, which mimics an increase in the Reliability Requirements in small LDAs.

98. Given PJM's access to and ownership of the models and data that show this kind of result could easily happen, PJM is confessing to one of the following. It is either working so much in silos that the markets team and the planning teams are oblivious to how their individual work interacts and leads to market and reliability outcomes, or they simply do not pay attention to the data they have and do not understand how their models and markets work.

99. Neither of these is credible for an organization such as PJM with years of deep experience and knowledge. In the alternative it seems to be an excuse to justify PJM's attempt to

[67] PJM 206 Filing at 9-10 and PJM 205 Filing at 8-10.

[68] PJM 205 Filing at 10 and PJM 206 Filing at 10.

change a market price outcome PJM simply does not like, even though that price is necessary for reliability going forward.

A. In Recent BRAs There is a History of Planned Generation Capacity and Intermittent Resources Not Offering into the RPM BRA

100. Table 1 shows the history over the last five BRAs of unoffered Intermittent Resources and Unoffered Planned Generation Capacity Resources. There is precedent for Planned Generation Capacity Resources not offering into the BRA, so PJM should not be surprised that this has carried over to the 2024/2025 BRA.

Table 1: Unoffered Intermittent and Planned Generation Capacity Resources in the Last 5 BRAs[69]

Delivery Year	Unoffered Intermittent	Unoffered Planned
2019/2020	--	322.1
2020/2021	1889	1021
2021/2022	1397.6	3,005.3
2022/2023	1571.6	236.1
2023/2024	3720.9	149.3

101. Table 1 also shows, starting in the 2021/2022 BRA ever increasing amounts of Intermittent Resources eschewing participation in the BRA, confirming the trend I

[69] 2023/2024 BRA Report, Table 8 at 83, 2022/2023 BRA Report, Table 9 at 83, Monitoring Analytics, Independent Market Monitor for PJM ("IMM"), *Analysis of the 2021/2022 RPM Base Residual Auction*, August 24, 2018, ("2021/2022" BRA Report"), Table 9 at 89, available at https://www.monitoringanalytics.com/reports/Reports/2018/IMM_Analysis_of_the_20212022_RPM_BRA_Revised_20180824.pdf. *See also* IMM, *Analysis of the 2020/2021 RPM Base Residual Auction*, November 17, 2017, ("2020/2021 BRA Report"), Table 12 at 76, available at https://www.monitoringanalytics.com/reports/Reports/2017/IMM_Analysis_of_the_20202021_RPM_BRA_20171117.pdf. *See also* IMM, *Analysis of the 2019/2020 RPM Base Residual Auction*, August 31, 2016, ("2019/2020 BRA Report"), Table 12 at 72, available at https://www.monitoringanalytics.com/reports/Reports/2016/IMM_Analysis_of_the_20192020_RPM_BRA_20160831-Revised.pdf.

discussed earlier. This is despite ever increasing amounts of nameplate capacity for wind and solar over time.

102. The takeaway is simple. PJM should not be surprised by Intermittent Resources and Planned Generation Capacity Resources not offering into the BRA. Yet, it is also clear that much of the renewable capacity is coming on-line, but without receiving capacity payments through RPM participation.

103. The decision not to offer into an RPM auction is likely driven by the risk of penalties if the resource is unable to produce energy during a PAI, like the 277 PAI PJM just experienced on December 23 and 24, 2022. Given the FERC Orders on the MSOC, and the PJM IMM's stance on the MSOC which severely restricts how performance risk can be reflected in offers,[70] Intermittent Resources with low going forward costs and extreme performance risk during certain peak times, may be viewing the RPM capacity market as too risky to take on a capacity commitment without the ability to reflect that risk in their RPM offers.

B. PJM Scenario Analyses of Previous BRAs Show Prices Could Easily Reach the Cap of 1.5 Net CONE in Small LDAs

104. After each BRA, PJM runs scenario analyses in which they either subtract or add MW of capacity to the bottom of the supply curve to show how prices and commitment levels would change. Of course, when supply is added to the bottom of the supply curve, prices

[70] *Independent Market Monitor for PJM v. PJM Interconnection, L.L.C.*, Complaint of the Independent Market Monitor for PJM, Docket No. EL19-47, February 21, 2019. In its complaint, the IMM explains that PJM had failed to update the expected Performance Assessment Hours ("PAH") given historic experience. Moreover, the IMM proposed the default offer cap be set to 1/6 Net CONE*B which translates to only 5 PAH per year (60 PAI), but without altering the penalty levels. Since this complaint, there have been 3 events, all of which have exceeded this 5 PAH level requested by the IMM. However, the Commission Order effectively sets the PAH (PAI) to zero as a default. *See Independent Market Monitor for PJM v. PJM Interconnection, L.L.C*. 176 FERC ¶ 61,137 (2021) PP 61-62.

decline, and commitment levels rise in total. Conversely, when supply is subtracted from the bottom of the supply curve prices rise and commitment levels fall.

Table 2:DPL-South Scenarios as Part of Subtracting 6000 MW from Bottom of Supply Curve in MAAC[71]

Delivery Year	Actual Price	DPL-S amount subtracted	New price	DPL-S Net Cone Multiple
2019/2020	$119.77	239.4 MW	$292.87	1.12
2020/2021	$187.87	240.1 MW	$424.65	1.87
2021/2022	$165.73	241.8 MW	$273.06	0.89
2022/2023	$97.86	254.5 MW	$154.06	0.65
2023/2024	$69.95	240.1 MW	$431.26	1.63

105. Table 2 shows the scenario analyses for DPL-South subtracting 6000 MW from the bottom of the MAAC supply curve, with the amount subtracted shown for DPL-South. First, this shows how sensitive DPL-South is to changes in the MAAC region as well as within DPL-South. Second, it shows that in some of the scenarios, the prices exceed 1.5 Net CONE in DPL-South because DPL-South clears with EMAAC and the transmission constraint between DPL-South (CETL) and EMACC is not binding.

106. The next takeaway from Table 2 is that if there were sufficient resources within DPL-South that were low cost, they would have been committed and the price in DPL-South

[71] PJM Interconnection, L.L.C, *2023/2024 BRA Scenario Analysis*, available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2023-2024/2023-2024-bra-scenario-analysis.ashx, PJM Interconnection, L.L.C, *2022/2023 Scenario Analysis for Base Residual Auction,* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2022-2023/2022-2023-bra-scenario-analysis.ashx. PJM Interconnection, L.L.C, *2021/2022 Scenario Analysis for Base Residual Auction,* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2021-2022/2021-2022-bra-scenario-analysis.ashx. PJM Interconnection, L.L.C, *2020/2021 Scenario Analysis for Base Residual Auction,* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2020-2021-bra-scenario-analysis.ashx. PJM Interconnection, L.L.C, *2019/2020 Scenario Analysis for Base Residual Auction,* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2019-2020-bra-scenario-analysis.ashx.

may have been lower. Instead, prices in DPL-South are being set from other resources in EMAAC in these scenario analyses.

107. The big takeaway is that prices can rise steeply in DPL-South due to small changes in the supply, or equivalently increases in the Reliability Requirement, that are smaller than the increase in the Reliability Requirement in DPL-South from 2023/2024 to 2024/2025. And the price increase is not just because of the change in the Reliability Requirement. It is also the fact that Indian River 4, the largest unit in DPL-South, is operating under an RMR contract until it retires and likely is not offering into the BRA.

108. In short, PJM should have known that small changes in available supply along with changes in the Reliability Requirement could lead to extremely high prices in DPL-South and should not have been surprised.

VIII. INCREMENTAL AUCTIONS CAN BE A USEFUL TOOL TO ENSURE AN LDA PROCURES SUFFICIENT CAPACITY FOR THE DELIVERY YEAR

109. In its filings, PJM asserts IAs cannot fix the identified issue for the 2024/2025 DY since prices and quantities transacted in IAs are lower than in the BRAs.[72] PJM also states that IA transactions would do nothing to prevent unjust and unreasonable economic harm to consumers.

110. PJM's short IA discussion reveals PJM's true objective is to reduce prices to load and totally ignore the reliability implications for load in DPL-South and similarly situated LDAs in the future, as discussed above. IAs exist as a means for resource owners to buy out of positions if they will be unavailable in the DY following a BRA commitment. They also exist as a means for capacity to be bought back if the Reliability Requirements

[72] PJM 205 Filing at 17.

have changed between the BRA and the IA due to a reduction in the peak load forecast, and by extension the LDA Reliability Requirement, as has historically been the case.

111. PJM historically has taken the position that market participants in RPM have been trying to "inappropriately" arbitrage price differences between the BRA and IA during the period when the three-year ahead load forecast was higher (and associated LDA Reliability Requirements higher) than the load forecasts (and associated LDA Reliability Requirements) going into the IAs, especially the third IA that occurs three months prior to the DY. The Commission has rejected such arguments and filings made by PJM four different times:

> On three separate occasions, the Commission has rejected as unjust and unreasonable PJM's proposals to value sell-back offers at a level that differs from the valuation of excess of capacity reflected by PJM's capacity demand curve. We again find PJM's proposal to submit sell-back offers at the relevant Base Residual Auction clearing price to be unjust and unreasonable, as it fails to establish a reasonable price for excess capacity as the Commission has found in the prior orders and, as a result, the Incremental Auctions would not adequately correct for PJM's over-procurement of capacity in a Base Residual Auction and would not produce prices commensurate with load's value of the over procured capacity.[73]

112. This Commission precedent is essential in that if there is an over-procurement of capacity as claimed by PJM, the Commission has consistently upheld the IAs as the place for buying back excess capacity and the prices in the IA reflect the load's value of the excess capacity being sold. Four previous times PJM asked the Commission to alter price formation through IA rules, and four times the Commission rejected PJM attempting to puts its thumb on the scale regarding price formation. In the instant filings, PJM by stating the IAs are not an appropriate remedy, is once again revealing it wants to put its

[73] *PJM Interconnection, L.L.C.*, 163 FERC ¶ 61,101 at P 43 (2018) (footnote omitted).

thumb on the scale of price formation not just in the BRA, but in the IAs as well. The Commission should once again reject PJM's attempts at inappropriately tampering with price formation in RPM auctions.

113. Given the magnitude of prices PJM discusses in its filings, it is reasonable to infer that, absent PJM's proposed changes, there was insufficient capacity in the DPL-South LDA, and prices reached 1.5 Net CONE. Given that there are insufficient resources in DPL-South rather than excess resources, IAs can also serve as an opportunity to procure "just in time" capacity from existing resources in the LDA without an RPM capacity commitment, or from DR or EER to help meet the Reliability Requirements that are not yet met for the DY.

114. Maintaining the BRA price signal will attract additional supply to the IA if available to ensure meeting the Reliability Requirement in the constrained LDA. In contrast, should the Commission accept PJM's proposed changes, this would lower prices and hide the true reliability need for the constrained LDA, thereby discouraging additional supply, and leaving DPL-South and other similarly situated LDAs in the future exposed to the reliability risk during the operating year when PJM's "altered" Reliability Requirement does not match the physical realities of the power system within the LDA.

115. Furthermore, in subsequent DYs, the high BRA price in a single year is likely to attract additional capacity so that reliability needs can be met at lower prices in the future. This is not theoretical, but something we have seen in PJM before. In the 2015/2016 BRA the ATSI LDA cleared at just under Net CONE ($357/MW-day) in large measure due to costs associated with complying with the Mercury and Air Toxics Standards ("MATS")

that resources in ATSI faced. In the subsequent 2016/2017 DY, the ATSI LDA cleared at $114.23/MW-day.[74]

IX. ALTERNATE PATHS FORWARD

116. For all the reasons provided herein, the Commission must reject the PJM 205 Filing as I have shown the ways in which PJM's proposal is not just and reasonable and have also pointed out PJM's paucity of evidence in support and omission of key facts.

117. Furthermore, PJM has not shown its current Tariff is unjust and unreasonable in its 206 Filing. If anything, as discussed herein, PJM's current Tariff and methodology to determine the LDA Reliability Requirements remains just and reasonable and provides a consistency between physical resources in service and the reliability modeling that is currently in place.

118. Given that PJM has not met its burdens under either the 205 Filing or 206 Filing, the Commission should order PJM to immediately release the 2024/2025 BRA results without the changes PJM has proposed. This provides certainty to market participants and obviates the need to further delay the 2025/2026 and 2026/2027 BRAs so that PJM can return to the three-year ahead schedule for BRAs for the 2027/2028 BRA scheduled for May 2024.

119. However, if the Commission believes PJM has raised some valid issues with respect to offers from Planned Generation Capacity Resources, Intermittent Resources, DR, or EER that do not have must-offer requirements continuing not to offer in the BRAs, there are

[74] PJM Interconnection L.L.C., *Commitments by Fuel Type & Delivery Year 2007/08 - 2023/24* available at https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/rpm-commitment-by-fuel-type-by-dy.ashx. Last accessed January 11, 2023.

multiple paths forward on which the Commission could provide guidance to PJM for a future Section 205 filing as discussed below.

A. Maintain Consistency with PJM's Current Models and Assumptions Used in the Planning Process, Consistent with Physical Resources in Service

120. If the Commission is concerned that Intermittent Resources, DR, EER, and Planned Generation Capacity Resources with signed ISAs will not be physically available for the DY, PJM can require each such resource to make a binding commitment prior to the third IA, which is conducted three-months before the DY, to either be physically in service or not for the DY.

121. This path forward treats all resources without must-offer requirements the same. With updated information on what resources will be physically in service, PJM can alter the LDA Reliability Requirements just as it does for changes in the load forecast. PJM can then sell back "excess capacity" or buy additional capacity as the changes in the LDA Reliability Requirement dictate.

122. This pathway has multiple benefits in that it is not retroactive and does not upset settled expectations after planning parameters have been posted. It also addresses the possibility that some Intermittent or Planned Generation Capacity Resources that had not offered in the BRA or previous IAs could offer in the third IA or make a binding obligation to be physically in service at the start of the DY.

123. As I discussed previously, in determining the LDA Reliability Requirement, PJM planners consider resources that are in service, regardless of whether those resources have RPM commitments. This pathway is consistent with that approach and would focus on whether planned resources will physically be in service, thereby treating planned and existing resources the same for modeling purposes.

B. Develop New Model Assumptions for RPM Only That Differ from Current Planning Model Assumptions but Keep the Supply-Demand Balance in RPM Based on Offered Resources

124. An alternate pathway would address PJM's fixation with the offers of Planned Generation Capacity Resources and extend this to all other resource types that do not have a must-offer requirement including Intermittent Resources, DR, EER, Storage Resources, and Hybrid Resources, so they are all treated the same unlike PJM's proposal that is discriminatory. Along this path, all resources without a must-offer requirement would have to make a binding offer commitment into the BRA and all subsequent IAs for a DY. This commitment would be made prior to the issuance of the BRA planning parameters.

125. PJM would then only use those resources that have committed to offer plus those with a must-offer requirement to determine the LDA Reliability Requirements and CETO which is a departure from the current PJM methods and assumptions that are based on resources physically in service or forecasted to be in service without regard to RPM commitment or offer status.

126. This pathway does away with the current PJM false equivalence between the physical realities of what is in service and PJM's desire to have a supply-demand balance in offers that match the market determined needs. Here, the market determined needs (LDA Reliability Requirement) would directly be a function of resources being offered into a BRA.

127. The implications of this pathway are that resources that opt out of a capacity obligation by not offering into a BRA have an implied reliability value of zero, and that the LDA Reliability Requirements and CETO could change dramatically from those calculated

under the current PJM methods, but price formation based on supply-demand balance will be maintained and be consistent throughout the BRA and IAs.

C. Policy and Design Features that Can Bring Convergence or Drive Divergence to the Two Paths Forward

128. The underlying issues that have been dragged out from the shadows of the PJM market design and now into the bright sunshine by these dockets are three-fold: 1) the disparate and asymmetric application of the must-offer requirements into RPM; and 2) the assumption in the current PJM Tariff for developing LDA Reliability Requirements and CETO which heretofore had been underappreciated; and 3) the role of the current MSOC in driving us to this point. The Commission is in a position to provide guidance to PJM and interested stakeholders on these three areas, that if considered carefully, can drive a *de facto* convergence or divergence between the two pathways discussed above.

129. The issues are complex and there many trade-offs to be considered. If the Commission finds some kind of solution is necessary, it should send this back to PJM stakeholders to debate the merits of different options so that stakeholders along with PJM can jointly develop a just and reasonable solution rather than having a rushed, ill-considered, and unilateral filing such as that proposed by PJM here.

* *

130. This concludes my affidavit.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.,	)	**Docket Nos. ER23-729-000**
	)	**EL23-19-000**

AFFIDAVIT OF PAUL M. SOTKIEWICZ, PH.D.

Pursuant to 28 U.S.C. § 1746, I, Paul M. Sotkiewicz, Ph.D., declare under penalty of perjury under the laws of the United States of America that the statements contained in the foregoing Affidavit of Paul M. Sotkiewicz, Ph.D. are true and correct to the best of my knowledge and belief.

Paul M. Sotkiewicz, Ph.D.

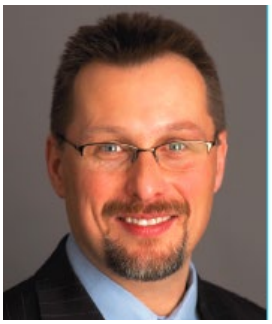
Executed on
this 20th day of January, 2023

Attachment A

to the

Affidavit of Paul M. Sotkiewicz

E-CUBED POLICY ASSOCIATES, LLC
WWW.E-CUBEDPOLICY.COM | GAINESVILLE, FLORIDA



Paul M. Sotkiewicz, Ph.D.

President and Founder, E-Cubed Policy Associates, LLC

Paul M. Sotkiewicz, Ph.D. is the President and Founder of E-Cubed Policy Associates, LLC ("E-Cubed"), an energy and environmental economic consultancy based in Gainesville, Florida that started in 2016. Dr. Sotkiewicz brings more than 25 years of experience across parts of three decades at the intersection of utility regulatory policy, power system economics, and environmental economics to provide analysis and advice to private and public sector clients on a range of economic issues related to electricity market design and performance, power generation economics, market power mitigation, utility regulatory policy, distributed energy resources and the economic impacts of state and federal environmental policies on the power and gas industries. Dr. Sotkiewicz also supports law firms in litigation proceedings including rate case, need determinations, rate design and market power/manipulation cases.

Clients have included:

Market and system operators

- Alberta Electric System Operator
- New York Independent System Operator
- Electric Reliability Council of Texas.

Trade associations such as the

- Electric Power Supply Association
- New England Power Generators Association
- PJM Power Providers Group
- American Petroleum Institute
- Industrial Power Consumers Association of Alberta
- Dual Use Customers of Alberta

Merchant generation and transmission developers in North American power markets

- ITC Holdings,
- JPower USA Ltd.
- Panda Power Funds
- Vistra Energy
- ENMAX
- Rockland Capital
- Kalina Distributed Power
- Capstone Infrastructure Corporation

- Pine Gate Renewables
- NextEra Energy Resources
- PVOne
- Bechtel

Generation and transmission cooperatives

- Intermountain Rural Electric Association
- Buckeye Power

Non-Governmental Entities

- Natural Resources Defense Council
- Southern Environmental Law Center

Regulatory Agencies/Governmental Entities

- Delaware Public Service Commission
- US Department of State (via Lawrence Berkeley National Laboratory)
- Government of Vietnam
- Florida Department of Environmental Protection
- Belize Public Utilities Commission

Natural Gas Industry Customers

- Blue Racer Midstream

Prior to founding E-Cubed, Dr. Sotkiewicz worked for PJM Interconnection, LLC in the role of Chief Economist and as a Senior Economic Policy Advisor. At PJM, Dr. Sotkiewicz provided analysis and advice regarding all aspects of PJM's markets and supported regulatory filings and implementation of market design changes. At PJM Dr. Sotkiewicz led initiatives related to shortage pricing and real-time dispatch co-optimization of energy and reserves, integration of demand response in PJM's markets including price formation and compensation of demand resources. At PJM Dr. Sotkiewicz supported PJM's regulatory position with respect to the application of the Three Pivotal Supplier Test supplier market power, helped develop an opportunity cost calculator for run-limited resources used for market mitigation purposes, and administered implementation of the minimum offer price rule (MOPR) to curb buyer-side market power in the PJM capacity market. Dr. Sotkiewicz also authored or co-authored a series of policy analyses and whitepapers on ranging from transmission cost allocation to gas-electric coordination to the effects of environmental rules on PJM's markets. While at PJM, Dr. Sotkiewicz was a frequent speaker at FERC Computation Technical Conferences related to advances in unit commitment models and computation methods that could be applied in ISO/RTO markets.

As an economist at the United States Federal Energy Regulatory Commission (FERC) in the Office of Economic Policy and later, on the Chief Economic Advisor's staff at Dr. Sotkiewicz conducted research and provided analysis and advice on market design

issues related to the ISO/RTO markets, in particular the California ISO and New York ISO, as they were being formed and implemented and worked on merger cases to analyze any potential for market power. As part of this work, Dr. Sotkiewicz has co-authored peer review articles related to unit commitment models and price formation to account for discrete decisions related to start-up, shut-down, and minimum run conditions.

Dr. Sotkiewicz is the author or co-author of multiple book chapters and publications related to wholesale market design and policy including price formation in unit commitment models, the integration of demand response and distributed energy resources in markets and operations environmental economic policy, distribution rate design, economic decisions for nuclear resource build decisions, and renewable resource integration. In addition to his tenures at PJM and FERC, Dr. Sotkiewicz served as the Director of Energy Studies at the Public Utility Research Center (PURC), University of Florida, and he was an Instructor in the Department of Economics at the University of Minnesota where he earned the Walter Heller Award for Outstanding Teaching of Economic Principles four times.

Dr. Sotkiewicz holds a Bachelor of Arts in history and economics from the University of Florida (1991) with High Honors, a Master of Arts (1995) and Doctorate in Economics from the University of Minnesota (2003). Dr. Sotkiewicz is also a member of Phi Beta Kappa academic honor society and a former Fulbright Scholar.

Attachment B

to the

Affidavit of Paul M. Sotkiewicz

PAUL M SOTKIEWICZ, Ph.D.

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E-mail : drpaulg8r@gmail.com Phone : +1-352-244-8800 Mobile: +1-610-955 2411

EDUCATION

PhD, Economics, University of Minnesota, 2003
M.A., Economics, University of Minnesota, 1995
B.A. (High Honors), History/Economics, University of Florida, 1991

PROFESSIONAL AND ACADEMIC EXPERIENCE

2016- President and Founder, E-Cubed Policy Associates, LLC, Gainesville, FL

- Founded to provide expert advice, testimony, and policy research to private sector and government clients at the intersection of energy, environmental, and economic policy, and regulation.
- Supporting litigation defending market participants against accusations of market manipulation in PJM's markets
- Worked with the Ontario Independent System Operator (IESO), in conjunction with the Brattle Group, to help implement new settlement logic and protocols in their move to LMP-based market design.
- Assisted Brattle Group and NYISO in developing strategies and analysis to move the NYISO markets toward a less carbon intensive future in response to state climate change initiatives
- Conducting analysis of recent past and future expected profitability of nuclear power plants under consideration for state subsidies to keep these facilities in commercial operation and providing reports and testimony in front of state legislative bodies.
- Provide capacity market design and expertise to the ENMAX Corp. in Calgary, AB regarding the AESO capacity market proposal filed in late 2018
- Supported rate case litigation for a reactive power rate case for Panda Stonewall explaining the history behind markets and that the filed rate from Panda Stonewall was consistent with precedent and lost market opportunities
- Providing PJM expertise to JPower USA Ltd in its development of new combined cycle gas facilities in PJM and help move the project through the PJM interconnection processes as well as advising on existing facilities in the PJM and NYISO market.
- Provided capacity market design expertise to the Alberta Electric System Operator in 2017 as they started their transition from an energy-only market to a combined energy and capacity market.
- Supporting the Greek Electricity Market authoring, through ECCO International, a whitepaper on market power mitigation with a special look at buyer side market power mitigation in the energy market with the different indices that could be indicative of buyer market power.
- Authored a Meter Data Study for the NYISO encompassing a survey of metering requirements for demand resources and distributed energy resources in key ISO/RTO markets, the current use of demand response baseline methodologies and use of such baselines for distributed energy resources in the context of REV in New York.
- Work with clients in generation and merchant transmission development projects in various parts of PJM related to helping them through the interconnection process, understanding market rules, and regulatory policy and economic advice in the face of changing market rules.
- Supporting clients in docketed proceedings at FERC and at the Florida Public Service Commission providing expert testimony and analysis used in regulatory proceedings. These proceedings include need determinations, rate filings, RTO market design changes, and policy related proceedings.
- Supporting US government initiatives in exporting knowledge and experience regarding US electric power market and gas market development to the Chinese and Indian governments as they

undertake green energy initiatives and look to improve the overall efficiency of the power system.

2015-2016 Contractor, YOH Inc. and working under the title of Senior Economic Policy Advisor, PJM Interconnection, L.L.C., Audubon, PA

2010-2015 Chief Economist, Market Services Division, PJM Interconnection, L.L.C., Audubon, PA

2008-2010 Senior Economist, Market Services Division, PJM Interconnection, L.L.C., Audubon, PA

- Provide analysis and advice with respect to the PJM market design and market performance including demand response mechanisms, intermittent and renewable resource integration, market power mitigation strategies, capacity markets, ancillary service markets, and the potential effects of environmental policies on the PJM markets.
- Co-authored papers related to effects of the proposed Waxman-Markey climate change bill in 2009, the implementation of the Mercury and Air Toxics Standards (MATS) and Cross State Air Pollution Rule in 2011, and the potential effects of the EPA-proposed Clean Power Plan in 2015.
- Led the Stakeholder Process to implement reserve shortage pricing in PJM in 2009-2010 and provided expert testimony associated with FERC filings in 2010.
- Co-authored paper to explain various market and policy concepts for PJM and its stakeholders including a paper explaining generator costs and compensation in 2010, a paper on alternatives for transmission cost allocation in 2010, and a whitepaper on capacity market issues in 2012.
- Advised PJM executives on market power mitigation issues related to the Three Pivotal Supplier test and cost-based offers used for market power mitigation in the PJM Energy Market in 2008-2009
- Advised PJM executives and Board of Managers on demand response compensation prior to the issuance of FERC Order 745.
- Supported and advised the Capacity Market Operations staff and PJM executives on all matters related to the Reliability Pricing Model (RPM) capacity market including implementation of the Minimum Offer Pricing Rule in its various iterations, administered determinations and/or reasonableness of Market Seller Offer Caps during disputes between Capacity Market Sellers and the Independent Market Monitor.
- Provided advice to Capacity Market Operations staff and PJM executives on the RPM Triennial Parameter Review Process in 2011 and in 2014 including supporting legal staff in making filings, providing expert testimony, and providing expert advice during the 2011 and 2012 hearing and settlement process at FERC.
  Supported and provided advice to Capacity Market Operations staff and PJM executives on Capacity Performance through stakeholder presentations, regulatory filings, and working jointly with the IMM in developing the ideas and concepts taken from ISO New England's Pay for Performance design for us in PJM.
- Supported the Federal State Government Policy outreach through by providing subject matter expertise during one-on-one meetings with regulatory staff and Commissioners related to any issues of mutual interest and import between PJM and state commission, state environmental regulators, FERC staff, and EPA staff as needed.
- Co-authored and co-led PJM's responses to the Independent Market Monitor's (IMM's) *State of the Market Reports* as well as remaining in communication with the IMM on various matters of concern and interest related to PJM market performance and design.
- Led technical and non-technical external outreach efforts to promote PJM markets or explain PJM positions on policy or market design issues of current interest to industry stakeholders including academic audiences and invited presentations at industry sponsored events.
- Provided support in gas/electric coordination discussions within PJM and the between the power and gas industries, as well as operations support during critical operating periods in January 2014 through calls and inquiries to PJM generators and pulling environmental permits to better understand generator operating limitations on back-up fuel.
- Provided periodic reports on market performance and the state of PJM's markets to the PJM Board of Managers Competitive Markets Committee including the relationship between PJM's markets and

major fuel market, environmental policy, and macroeconomic trends.

- Acted in the role of an internal consultant and advisor to all PJM departments and divisions, as needed, to address any questions or concerns surround market performance, market design, and general economic or environmental policy questions.
- Supported development and issuance of the PJM Renewable Integration Study by outside vendors.

2000–2008 Director of Energy Studies, Public Utility Research Center and Lecturer, Department of Economics, University of Florida, Gainesville, FL

- Designed and delivered executive education and outreach programs in electric utility and regulatory policy and strategy for professionals in government, regulatory agencies, and industry primarily for developing countries.
- Created and delivered electricity regulatory policy curriculum for the *PURC/World Bank International Training Program on Utility Regulation and Strategy* offered twice per year for 65 to 95 industry and regulatory professionals in each course.
- Served as the electricity expert and liaison to the Florida electric utilities who were contributing members of PURC.
- Developed electricity related topics and obtained speakers for the PURC Annual Conferences held each February on matters related to environmental policy, wholesale market restructuring, so-called "hurricane hardening" of power systems after the 2004-2005 hurricane seasons, and other policy related matters of interest to the state of Florida.
- Served the PURC liaison to the consultants retained by PURC to evaluate the hardening of electricity infrastructure in the wake of the 2004 and 2005 hurricane seasons.
- Conducted original academic research related to electricity regulation and policy and published in peer reviewed academic and policy journals
- Developed customized regulatory training courses or sessions jointly prepared with other organizations for on-site delivery in Panama, Trinidad & Tobago, Brazil, Mexico, Peru, Bolivia, Argentina, Grenada, South Africa, Zambia, Namibia, and Cambodia
- Served as an advisor and subject matter expert on wholesale restructuring and market issue to Florida Governor Jeb Bush's *Energy 2020 Study Commission* 2000-2001.
- Taught classes as needed in the Economics Department on environmental economics, regulatory economics, and a large lecture class of managerial economics

1999–2000 Economist, Office of Markets, Tariffs, and Rates, United States Federal Energy Regulatory Commission, Washington, DC

1998–1999 Economist, Office of Economic Policy, United States Federal Energy Regulatory Commission

- Provided analysis and research related to filings made by ISO/RTO markets as they commenced operations as centralized wholesale power markets.
- Led the economic analysis and evaluation of the NYISO wholesale power market in its initial filings of its market design and subsequent filings after operations commenced.
- Led economic analysis and evaluation of multiple filings by the California ISO related to requested market design changes filed after starting operations in 1998.
- Supported analysis and evaluation of other ISO/RTO markets as needed.
- Supported and provided analysis on merger applications as needed.
- Conducted original research while on the staff of the Chief Economic Advisor in the Office of Markets, Tariffs, and Rates related to unit commitment models used in day-ahead electricity markets and pricing in the presence of lumpy decisions and operational characteristics (technically known as non-convexities).

1992–1998 Instructor, Department of Economics, Augsburg College, Minneapolis, MN

- Taught small classes of introductory microeconomics, labor economics, money and banking, and environmental economics

1992–1998 Instructor, Department of Economics, University of Minnesota, Minneapolis, MN

- Taught large lecture classes of primarily introductory microeconomics to classes of up to six hundred students three times per year, managing a staff of teaching assistants and graders and developing curriculum and exams.
- Taught smaller classes of introductory microeconomics as well as environmental economics.

PUBLICATIONS AND BOOK CHAPTERS

Erik Ela; Farhad Billimoria; Kenneth Ragsdale; Sai Moorty; Jon O'Sullivan; Rob Gramlich; Mark Rothleder; Bruce Rew; Matti Supponen; Paul Sotkiewicz, "Future Electricity Markets: Designing for Massive Amounts of Zero-Cost Variable Renewable Resources," *IEEE Power and Energy Magazine,* Volume 17, Issue 6, November/December 2019, Page 58-66.

Covino, Susan, Andrew Levitt, and Paul Sotkiewicz, "The Fully Integrated Grid: Wholesale and Retail, Transmission and Distribution," in *Future of Utilities- Utilities of the Future: How Technological Innovations in Distributed Energy Resources Will Reshape the Electric Power Sector*, Fereidoon P. Sioshansi, editor, Chapter 22, pp.417-434, 2016.

M. Ahlstrom; E. Ela; J. Riesz; J. O'Sullivan; B. F. Hobbs; M. O'Malley; M. Milligan; P. Sotkiewicz; J. Caldwell, "The Evolution of the Market: Designing a Market for High Levels of Variable Generation," *IEEE Power and Energy Magazine*, Volume: 13, Issue: 6, 2015, Pages: 60 – 66.

Anthony Paul, Chair, Meghan McGuinness, Walter Short, Paul Sotkiewicz, John Weyant, "Integrated Planning Model (IPM) Base Case Version 5.13 Peer Review," Peer Review Report Prepared for the U.S. Environmental Protection Agency, Clean Air Markets Division through RTI International, October 2014.

P. Sotkiewicz, G. Helm, M. Abdur-Rahman, "A Forward Capacity Market as a Necessary Condition for Integrating Renewable Resources," CIGRE Study Committee C5, C5-307, *CIGRE Sessions and Proceedings*, 2014.

J. Smith, M. Ahlstrom, J. Dumas, P. Eriksen, J. O'Sullivan, P. Sotkiewicz, "Market Evolution for RES Integration in the US and Europe," CIGRE Study Committee C5, C5-308, *CIGRE Sessions and Proceedings*, 2014.

Bresler, Stuart, Paul Centollela, Susan Covino, and Paul Sotkiewicz, "Smarter Demand Response in RTO Markets: The Evolution Towards Price Responsive Demand in PJM," in *Energy Efficiency: Towards the End of Demand Growth*, Fereidoon P. Sioshansi, editor, Chapter 16, pp.419-442, 2013.

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P. M. Sotkiewicz, "Value of Conventional Fossil Generation in PJM Considering Renewable Portfolio Standards: A Look into the Future," *IEEE Power and Energy Society General Meeting, 2012.*

R. F. Chu; P. F. McGlynn; P. M. Sotkiewicz, "Transmission Planning for Generation at Risk due to Environmental Regulations and Public Policy Initiatives" *IEEE Power and Energy Society General Meeting, 2012.*

P. M. Sotkiewicz; J. M. Vignolo, "The Value of Intermittent Wind DG under Nodal Prices and Amp-mile Tariffs," *Transmission and Distribution: Latin America Conference and Exposition (T&D-LA), 2012 Sixth IEEE/PES.*

Helman, Udi, Harry Singh, and Paul Sotkiewicz, "RTOs, Regional Electricity Markets, and Climate Policy," in *Generating Electricity in Carbon Constrained World,* Fereidoon P. Sioshansi, editor, Chapter 19, pp.527-564, 2010.

J. C. Smith; S. Beuning; H. Durrwachter; E. Ela; D. Hawkins; B. Kirby; W. Lasher; J. Lowell; K. Porter; K. Schuyler; P. Sotkiewicz, "The Wind at Our Backs," *IEEE Power and Energy Magazine*, Volume: 8, Issue: 5, 2010 Pages: 63 - 71

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Holt, Lynne, Sotkiewicz, Paul, and Berg, Sanford, "(When) To Build or Not to Build? The Role of Uncertainty in Nuclear Power Expansion." *Texas Journal of Oil, Gas, and Energy Law*, Volume 3, Number 2, 2008, pp. 174-217.

Sotkiewicz, Paul M. and Vignolo, J. Mario, "Towards a Cost Causation Based Tariff for Distribution Networks with DG." *IEEE Transaction on Power Systems,* Vol. 22, No. 3, August 2007, pp. 1051-1060.

Sotkiewicz, Paul and Vignolo, Jesus Mario. "Distributed Generation." The Encyclopedia of Energy Engineering and Technology, Vol. 1, pp 296-302. Ed. Barney Capehart. New York: CRC Press, Taylor, and Francis Group, 2007.

Sotkiewicz, Paul. "Emissions Trading." The Encyclopedia of Energy Engineering and Technology, Vol. 1, pp. 430-437. Ed. Barney Capehart. New York: CRC Press, Taylor, and Francis Group, 2007.

Vignolo, Jesus Mario and Sotkiewicz, Paul M., "Towards Efficient Tariffs for Distribution Networks with Distributed Generation," *Cogeneration and On-site Power Production*, November-December 2006, pp. 67-75.

Jamison, Mark A. and Sotkiewicz, Paul M., "Defining the New Policy Conflicts," *Public Utilities Fortnightly,* July 2006, pp. 36-40, 50.

Sotkiewicz, Paul M. and Vignolo, Jesus Mario "Nodal Pricing for Distribution Networks: Efficient Pricing for Efficiency Enhancing DG." *IEEE Transaction on Power Systems*, Vol. 21, No. 2, May 2006, pp. 1013-1014.

Sotkiewicz, Paul M. and Vignolo, Jesus Mario "Allocation of Fixed Costs in Distribution Networks with Distributed Generation," *IEEE Transaction on Power Systems*, Vol. 21, No. 2, May 2006, pp. 639-652.

Sotkiewicz, Paul M., and Lynne Holt, "Public Utility Commission Regulation and Cost Effectiveness of Title IV: Lessons for CAIR." *Electricity Journal* 18(8): 68-80, October 2005.

O'Neill, Richard P., Sotkiewicz, Paul M., Hobbs, Benjamin F., Rothkopf, Michael H., and Stewart, William R. Jr., "Efficient Market Clearing Prices in Markets with Non-Convexities." *European Journal of Operational Research*, Volume 164, Issue 1, 1 July 2005, Pages 269-285.

Sotkiewicz, Paul M., "The Impact of State-Level Public Utility Commission Regulation on the Market for Sulfur Dioxide Allowances, Compliance Costs, and the Distribution of Emissions" Ph.D. Dissertation, Department of Economics, University of Minnesota, January 2003.

O'Neill, Richard P., Helman, Udi, Sotkiewicz, Paul M., Rothkopf, Michael H., and Stewart, William R. Jr., "Regulatory

Evolution, Market Design, and the Unit Commitment Problem" The Next Generation of Unit Commitment Models, B. Hobbs, M. Rothkopf, R. O'Neill, and H.P. Chao editors. 2001.

Sotkiewicz, Paul M. "Opening the Lines," Forum for Applied Research and Public Policy, Special Issue on the Role of Public Power in Utility Restructuring, Summer 2000, pp. 61-64.

SELECTED WORKING PAPERS AND UNPUBLISHED MANUSCRIPTS

Holt, Lynne, and Paul M. Sotkiewicz. "Understanding Fuel Diversity Trade-Offs and Risks: Making Decisions for the Future (pdf)" University of Florida, Department of Economics, PURC Working Paper, 2007.

O'Neill, Richard P., Sotkiewicz, Paul and Rothkopf, Michael. "Equilibrium Prices in Exchanges with Non-convex Bids." PURC Working Paper, January 2006, updated September 2007.

Sotkiewicz, Paul M. "Cross-Subsidies That Minimize Electricity Consumption Distortions" University of Florida, Department of Economics, PURC Working Paper, 2003.

CONSULTING AND ADVISING EXPERIENCE PRIOR TO JOINING PJM IN 2008

2007 Advisor to the Government of Vietnam regarding the design and experience of wholesale electricity markets as Government looked at the creation of US style ISOs to attract investment in generation assets for IPPs

2007 Independent Expert in the Matter of the Public Utilities Commission of Belize Initial Decision in the 2007 Annual Review Proceeding for Belize Electricity Limited

2006 Advisor to the Division of Air Resource Management, Florida Department of Environmental Protection (FDEP) Regarding Implementation the Clean Air Interstate Rule (CAIR)

HONORS AND AWARDS

2007 Fulbright Senior Specialist Grant in Economics with a specific request for expertise in electricity markets, electricity regulation, and distribution tariff design, Universidad de la República, Montevideo, Uruguay.

2007 Principal Investigator, PPIAF/World Bank Grant to conduct two on-site training courses on the regulation of the electric power sector and on independent power producers and power purchase agreements for the Electricity Authority of Cambodia. Grant award $59,900.

2006 "Efficient Market Clearing Prices in Markets with Non-Convexities" published in *European Journal of Operational Research* received New Jersey Policy Research Organization Bright Idea Research Award in Decision Sciences.

2003 Transportation and Public Utilities Group, Ph.D. Utilities Dissertation Award for "The Impact of State-Level Public Utility Commission Regulation on the Market for Sulfur Dioxide Allowances, Compliance Costs, and the Distribution of Emissions"

1992-97 Distinguished Instructor, Department of Economics, University of Minnesota

1995-96
1994-95 Walter Heller Award for Outstanding Teaching of Economic Principles, Department of Economics,
1993-94 University of Minnesota
1992-93

1991-92 Distinguished Teaching Assistant, Department of Economics, University of Minnesota

1991 Phi Beta Kappa, University of Florida

Referee and Review Experience

IEEE Transactions on Power Systems

Ecological Economics

Environmental Science and Technology

Determining the Economic Value of Coastal Preservation and Restoration on Critical Energy Infrastructure, prepared for The Economic and Market Impacts of Coastal Restoration: America's Wetland Economic Forum II, September 28, 2006, Washington, DC

National Research Council of the National Academy of Sciences report entitled "Changes in New Source Review Programs for Stationary Sources of Air Pollutants," February 2006

California Energy Commission (CEC) Energy Innovations Small Grant (EISG) Program

Energy Journal

Journal of Environmental Economics and Management

IEEE PES Letters

IASTED International Journal of Power and Energy Systems

The Next Generation of Unit Commitment Models B. Hobbs, M. Rothkopf, R. O'Neill, and H.P. Chao editors

2001.

Professional Affiliations

American Economic Association
International Association for Energy Economics
Association of Environmental and Resource Economists
IEEE Power and Energy Society

EXPERT TESTIMONY

PJM Interconnection, L.L.C. **FERC Docket No. ER09-1063-004, Affidavit in Support of PJM's Compliance Filing with Order No. 719 and Order on Compliance Filing *PJM Interconnection, L.L.C.*, 129 FERC ¶ 61,250 (2009). June 18, 2010**
In support of its compliance filing to establish a mechanism that ensures appropriate pricing during periods of operating reserve shortages, as required by Commission Order No. 719, I provided the following: 1) A high-level overview of PJM markets, planning, and operations, including a description of what is meant by an operating reserve shortage, and how such shortages arise; 2) An overview of PJM reserve requirements, current reserve market structure, and data on PJM's prices and operations at times when the grid it manages has experienced operating reserve shortages; 3) A showing why PJM's then current scarcity pricing not satisfy the Commission's Order No. 719 criteria for operating reserve shortage pricing mechanisms; 4) Description of the main elements of PJM's proposal to comply with Order No. 719's shortage pricing policy, and how PJM's proposal satisfies the six criteria for reserve shortage pricing set by Order No. 719.

PJM Interconnection, L.L.C. **FERC Docket No. ER09-1063-004, Affidavit in Support of Answer to Comments and Motion for Leave to Answer to Protests, August 23, 2010.** The purpose of this affidavit is to provide the following regarding PJM's proposed shortage pricing mechanism: 1) The complementary relationship between capacity adequacy in the Reliability Pricing Model ("RPM") and shortage pricing; 2) Additional evidence showing why PJM' shortage pricing proposal leads to energy prices that reflect the cost and/or value of energy, allocates energy to those who value it most, enhance operational reliability, and leads to efficient market outcomes while the alternate proposal from the Independent Market Monitor (IMM) fails to achieve any of these goals; 3) An explanation of how the proposed mechanism is consistent with shortage pricing mechanisms in the New York Independent System Operator ("NYISO") and ISO New England ("ISO-NE") that the Commission has already approved as Order 719 compliant.

PJM Interconnection, L.L.C. **FERC Docket No. ER12-513, Affidavit in Support of Filing to Update its RPM Auction Parameters (aka Triennial Review) December 1, 2011.** This affidavit was submitted in support of three aspects of PJM's proposed changes related to PJM's capacity market, known as the Reliability Pricing Model ("RPM") including: 1) the continued use of a nominal levelized approach to calculating the estimated Cost of New Entry ("CONE") that is used in RPM's Variable Resource Requirement ("VRR") Curve; 2) retention of a combustion turbine ("CT") as the Reference Resource.

PJM Interconnection, L.L.C. **FERC Docket No. ER-14-2490, Affidavit in Support of Filing to Update its RPM Auction Parameters (aka Quadrennial Review) September 25, 2014** This affidavit was submitted in support of five aspects of PJM's proposed changes related to PJM's capacity market, known as the Reliability Pricing Model ("RPM"): 1) adoption of The Brattle Group's ("Brattle") recommended VRR Curve shape right shifted by 1% of the Installed Reserve Margin ("IRM"); 2) continued use of a nominal levelized approach to calculating the estimated Cost of New Entry ("CONE") that is used in RPM's Variable Resource Requirement ("VRR") Curve; 3) retention of a combustion turbine ("CT") as the Reference Resource: 4) use of a composite of Bureau of Labor Statistics ("BLS") indices to adjust Gross CONE estimates in between periodic VRR parameter reviews; and 5) adoption of the labor estimates provided by the PJM Independent Market Monitor ("IMM") to determine Gross CONE values.

Grid Reliability and Resilience Pricing **FERC Docket No. RM18-1, Affidavit in Support of the Electric Power Supply Association (EPSA), October 23, 2017**. This affidavit provides evidence the Department of Energy Notice of Proposed

Rulemaking ("NOPR" or "Proposal") released on September 28, 20171 and appearing in the Federal Register on October 2, 2017, does nothing to enhance reliability or "resiliency" of the bulk power system and will only succeed in distorting wholesale power markets while also raising costs. Consequently, my affidavit supports EPSA's contention the NOPR should be rejected outright by the Commission.

***ISO New England Inc. and New England Power Pool Participants Committee*, FERC Docket No. ER18-620-000, Affidavit in Support of the Protest of the New England Power Generators Association, Inc. January 29, 2018.** In summary, my affidavit explains that the proposed updated DDBT from $5.50/kW-month to $4.30/kW-month: 1) Relies on a flawed and logically inconsistent methodology that differs from the DDBT methodology approved by the Commission three years ago; 2) Sets a dangerous precedent in ISO-NE taking a position on the direction of its Forward Capacity Market ("FCM") in terms of supply-demand balance and expected market prices that could anchor expectation of market participants. The anchoring of such expectations can change FCA bidding and operational behavior that could harm reliability; 3) The previous methodology approved by the Commission of using Static De-List Bids from oil steam and oil combustion turbine generators remains the appropriate methodology for determining the DDBT; and 4) The cost-based DDBT is likely higher than for FCAs 10-12 given that net going forward costs for oil steam and oil combustion turbine units has likely increased given their age, and other risks and opportunity costs that may be coming into play. My affidavit concludes that retaining the current DDBT until such time as a new DDBT threshold can be determined using the current Commission-approved methodology following the discovery of the actual costs and risks faced by oil units.

Petition for Determination of Need for Seminole Combined Cycle Facility in Docket No. 20170266-EC and Joint Petition for Determination of Need for Shady Hills Generating Facility in Docket No. 20170267-EC, January 29, 2018. Testimony and Exhibits on Behalf of Quantum Pasco Power, LP, Michael Tulk, and Patrick Daly. My testimony supports the notion that there is no need for either combined cycle facility as Seminole Electric has consistently over-forecast its load growth since the "great recession" and that once correcting for these large errors, there is no need to build two new combined cycle facilities when there were other lower cost merchant generator facilities that offered their capacity to Seminole.

***PJM Interconnection, L.L.C.* FERC Docket No. E18-34, Affidavit in Support of EPSA's Filing and Comments in PJM's Fast Start Pricing Proposal, March 14, 2018** My affidavit in this proceeding provides support for PJM's desire to allow resources with up to two-hour start up times to be considered "fast start" resources and to set price in accordance with the fast start pricing principles the Commission has enumerated in its Fast Start Pricing NOPR. I explain PJM's use of IT SCED and request to allow two-hour start time resources to set prices as fast start resources are entirely consistent with the ideas the Commission has enumerated with respect to fast start pricing.

***PJM Interconnection, L.L.C. Capacity Repricing or in the Alternative MOPR-Ex Proposal: Tariff Revisions to Address Impacts of State Public Policies on the PJM Capacity Market*, FERC Docket No. ER18-1314-000, Affidavit is Support of Comments of American Petroleum Institute, JPower USA Development, Ltd., and Panda Power generation Infrastructure Fund, LLC May 7, 2018.** My affidavit provides evidence that 1) The PJM Capacity Repricing Proposal is not just and reasonable and is unduly discriminatory and results in an inefficient commitment of resources; 2) The alternative proposal from PJM, MOPR-Ex, is just and reasonable and results in the most efficient and cost-effective se of resource commitments; and 3) The current and previous iterations of the MOPR are not just and reasonable and are unduly discriminatory because they do not apply to existing resources and they only apply to gas-fired resources. Furthermore, my affidavit provides evidence that MOPR has always been viewed as a market power mitigation mechanism that was originally intended to thwart or mitigate the exercise of buyer-side market power. I show in this affidavit that MOPR and MOPR-Ex are still powerful market power mitigation tools that mitigate the exercise of supplier market power facilitated by the current round of state subsidies to generation. Moreover, I show that Capacity Repricing helps facilitate the exercise of supplier market power through three different means.

***Grid Resilience in Regional Transmission Organizations and Independent System Operators,* FERC Docket No. AD18-7-000, Affidavit is Support of Comments of the American Petroleum Institute, May 9, 2018. T**his affidavit focuses of the comments submitted by PJM and: 1) Supports the idea that in the context bulk power system markets and operation resilience and reliability are indistinguishable and that markets and well-designed incentives are the best

avenue to achieve a resilient and reliable bulk power system; 2) Explains why market mechanisms rather than suspension of market and command and control regimes are better at achieving resiliency/reliability even during emergency conditions and that PJM has not made a case for being given the authority to suspend markets; 3) That PJM has not made the case that price formation through integer relaxation is linked to resilience/reliability while other price formation that are crucial to reliability/resilience, such as shortage pricing and fast start pricing, be considered concurrently; and 4) So-called "fuel security" is only a minimal contributor to resilience/reliability while transmission and distribution assets are the leading causes for shedding firm load and outages of gas-fired units are not the leading category of generation outages. With respect to generator reliability/resilience, simply providing additional compensation (or minimize penalties) to generators in wholesale markets, without any ties to generator performance, does nothing to enhance reliability/resilience of generators to withstand or minimize the impact of adverse events on the bulk power system. Experience in PJM prior to and following the discussion and implementation of capacity performance has shown this to be the case as generator performance has improved even in the face of lower energy market prices.

***New England Power Generators Association, Complainant v. ISO New England Inc., Respondent*. FERC Docket No. Docket No. EL18-154-000, Affidavit in Support of Complaint and Request for Expedited Consideration of the New England Power Generators Association, Inc. May 24, 2018.** This affidavit in support of NEPGA's complaint shows the impact of treating Mystic Units 8 and 9 as a price taker on the ISO-NE markets as well as NEPGA's proposed alternative to accommodating the participation of the Mystic units. Discussions include: 1) treating Mystic and other resources retained for fuel security as price takers will do significant harm to the competitiveness of the FCM market and is inconsistent with the first principles of capacity markets articulated by the Commission; 2) the proposal to insert an above market cost resource into the FCM as a price taker does exactly the same harm as an exercise of buyer-side market power, which he Commission has found to be unjust, unreasonable, and unduly discriminatory; and 3) the proposed remedy offered by NEPGA does not distort the results of the Forward Capacity Auction, results in competitive pricing outcomes in FCA, does not displace otherwise economic resources, and provides better reliability outcomes for ISO-NE load than the current ISO-NE proposal.

***New England Power Generators Association, Complainant v. ISO New England Inc., Respondent*. FERC Docket No. Docket No. EL18-154-000, Affidavit in Support of the Motion for Leave and Answer of the New England Power Generators Association, Inc. June 19, 2018.** This affidavit in support of NEPGA's answer refutes the answer of ISO-NE and protesters and responds that nothing in ISO-NE's answer to the Complaint or the protests to the Complaint provides a basis for ignoring that treating the Mystic Units as price takers would suppress prices below competitive levels and inefficiently displace otherwise economic resources in a manner that is observationally equivalent to the harm done by an exercise of buyer-side market power.

***Panda Stonewall, LLC.* FERC Docket No. ER17-1821-002, Testimony is Support of Panda Stonewall, LLC Reactive Power Filing, July 2, 2018.** This testimony supports Panda Stonewall's reactive power rate case that has gone to hearing and supports the inclusion of firm gas pipeline transportation, the use of proxy cost of capital values from the PJM CONE study and supports the inclusion of other administrative and overhead costs consistent with fixed, going forward costs incurred by Panda Stonewall to remain in commercial operation. Furthermore, the testimony puts the costs of reactive power into the context of the wider PJM market and other opportunities for compensation and well as providing historical context around the Commission-approved AEP Methodology for reactive power rates.

***ISO New England Inc.* FERC Docket No. ER18-2364-000, Affidavit in Support of the Protest of the New England Power Generators Association, Inc. September 21, 2018.** This testimony supports NEPGAs protest that the proposed ISO-NE treatment of resources held for winter fuel security as price takers in the FCA makes no sense since winter fuel security is not associated with overall resource adequacy which is based on the summer peak. Moreover, the testimony clearly shows the artificial price suppression that would occur based on ISO-NE proposed treatment of resources held for winter fuel security in the FCA.

***Calpine Corporation v. PJM Interconnection, L.L.C. Docket No, EL16-49; PJM Interconnection L.L.C. Docket No. ER18-1314-000, ER18-1314-001, EL18-178* Affidavit in Support of the Electric Power Supply Association, October 2, 2018.** This testimony refutes the idea that the Commission proposed remedy a resource specific FRR Alternative

equally removes both demand and supply from the market and therefore does no harm. Such a mechanism is the equivalent of an exercise of buyer side market power, artificially reduces price below competitive levels, inefficiently displaces lower cost, economic resources with higher cost resources, shifts cost and benefits between market participants, and reduces overall market efficiency. Additionally, PJM market simulations for scenarios from the 2020/2021 auction show the kind of damage that done to the market through the proposed remedy or equivalently buyer sider market power by showing prospective price decreases and generation displacement, and the level of subsidy that could facilitate a successful exercise of buyer-side market power.

Panda Stonewall, LLC. **FERC Docket No. ER17-1821-002, Rebuttal Testimony is Support of Panda Stonewall, LLC Reactive Power Filing, October 12, 2018.** This rebuttal testimony supports Panda Stonewall's reactive power rate case responding to interveners and FERC staff and supports the inclusion of firm gas pipeline transportation, the use of proxy cost of capital values from the PJM CONE study and supports the inclusion of other administrative and overhead costs consistent with fixed, going forward costs incurred by Panda Stonewall to remain in commercial operation. Furthermore, the testimony puts the costs of reactive power into the context of the wider PJM market and other opportunities for compensation and well as providing historical context around the Commission-approved AEP Methodology for reactive power rates.

In the Matter of the Implementation of L. 2018, c. 16 Regarding the Establishment of a Zero Emission Certificate Program for Eligible Nuclear Power Plants, New Jersey Board of Public Utilities, **BPU Docket No. EO 18080899**, **Testimony in Support of PJM Power Providers, October 22, 2018.** This testimony responds to questions posed by the BPU in this docket and provides analysis showing that the nuclear units in New Jersey seeking ZECs are not in need of them to remain in commercial operation. The testimony shows that these resources, given know forward prices for energy and capacity prices can cover their going forward costs in the absence of subsidies in the form of ZECs and will remain in commercial operation despite warnings these resources will retire in the absence of ZEC payments.

Calpine Corporation v. PJM Interconnection, L.L.C. Docket No, EL16-49; PJM Interconnection L.L.C. Docket No. ER18-1314-000, ER18-1314-001, EL18-178 **Affidavit in Support of the Electric Power Supply Association, November 6, 2018.** This testimony responds to the Illinois Commerce Commission's protest that suggests eliminating the RPM Capacity Market and replacing it with an energy-only market construct because the capacity market is not a market at all. It also responds to the notion that markets should account directly for environmental policy and because they do not, it justifies Illinois zero emission credit program for nuclear resources. The testimony refutes these ideas by describing in detail that all markets have administrative rules, and those markets can account for environmental policies when properly formulated to put a price on emissions rather than subsidizing resources out-of-market. Moreover, this testimony provides evidence of the need for the RPM Capacity Market to maintain resource adequacy as an energy only construct would not result in sufficient resources covering going forward costs in the energy market alone.

Alberta Utilities Commission, Consideration of ISO Rules to Implement and Operate the Capacity Market, Proceeding No. 23757, **Evidence in Support of ENMAX Corporation, February 28, 2019.** This evidence outlines the elements of the Alberta Electric System Operator (AESO) proposed capacity market framework that require changes to make align the capacity market with fair, efficient, and openly competitive market principles. The evidence addresses the resource adequacy model, capacity value of resources, penalties and bonuses, market power mitigation, Net CONE determination, and interactions with the energy market framework. The evidence also provides a high-level overview of the objectives of a capacity market and how it should interact with the energy and retail markets in Alberta.

In the Matter of the Implementation of L. 2018, c. 16 Regarding the Establishment of a Zero Emission Certificate Program for Eligible Nuclear Power Plants, New Jersey Board of Public Utilities, **BPU Docket No. EO 18080899**, **Response to Staff Questions on Accounting for Risk in Support of PJM Power Providers, March 8, 2019.** This is a response to BPU staff questions regarding market risk. This response discusses the mitigation of overall market risk based on changing conditions, optimal energy market offers and mitigation of energy market operational risk, and optimal offers and risk mitigation in the capacity market that are available to all generation resources including nuclear resources.

In the Matter of the Implementation of L. 2018, c. 16 Regarding the Establishment of a Zero Emission Certificate

***Program for Eligible Nuclear Power Plants, New Jersey Board of Public Utilities,* BPU Docket No. EO 18080899**, **Reply Testimony in Support of PJM Power Providers, March 19, 2019.** This reply testimony responds to PSEG comments regarding the need for ZECs for New Jersey's nuclear units. This reply testimony updates the economic analysis showing New Jersey nuclear units are currently profitable and expected to remain profitable in the future. Furthermore, this reply points out that PSEG did not dispute the costs used in the initial analysis or the idea that new entry of combined cycle gas generation can reduce emissions at zero cost at the margin given these resources will enter the market absent subsidies. The reply argues, contrary to PSEG's position, the threat to retire is not credible given the statements and evidence provided by PSEG in its Securities and Exchange Commission (SEC) filings. This reply also provides evidence that it would be infeasible for PSEG to buy out of its capacity commitments in Incremental Auctions (IAs) given the supply and demand conditions present in IAs to date.

***Alberta Utilities Commission, Consideration of ISO Rules to Implement and Operate the Capacity Market, Proceeding No. 23757,* Reply Evidence in Support of ENMAX Corporation, April 4, 2019.** This evidence replies to the comments of other interveners regarding various elements of the Alberta Electric System Operator (AESO) proposed capacity market framework. The reply evidence responds to intervener comments on elements of the Net CONE determination, capacity and energy market power mitigation, the capacity value of resources inconsistencies between the resource adequacy model and offered supply, and penalties and bonuses.

***PJM Interconnection, L.L.C.* FERC Docket Nos. ER19-1486 and EL19-58, Affidavit in Support of EPSA's Filing and Supporting Comments in PJM's Enhanced Price Formation in Reserve Markets Proposal, May 15, 2019.** This affidavit supports PJM's proposed extension of the ORDC concept to the Day-ahead Energy Market and further refinements to the ORDC construct that employs methods of using history of reserve levels, load forecast error, and generation output and reserves to determine an ORDC based on a loss of load probability. The affidavit also explains and supports other refinements proposed by PJM such as explicitly pricing what was known as Tier 1 reserves to accurately reflect the value those reserves provide to the system. Finally, I argue reserve pricing and the ORDC must explicitly account for operator discretion in making reliability commitments outside of the market framework.

***PJM Interconnection, L.L.C.* FERC Docket Nos. ER19-1486 and EL19-58, Supplemental Affidavit in Support of EPSA's Reply Comments in PJM's Enhanced Price Formation in Reserve Markets Proposal, June 26, 2019.** This supplement affidavit rebuts assertions made during the initial comment period. First, positive reserve prices do not imply reserve shortage or scarcity conditions, but the price of reserves based on the value reserve provides beyond the Minimum Reserve Requirement. Second, that PJM's proposed ORDC appropriately accounts for out of market operator actions that would otherwise result in the wrong price signal to the market regarding reserve position and system needs. Third, that the proposed claw back of any revenues earned under the PJM proposal is inefficient and not just and reasonable and confuses capacity market concepts with short-term operational needs.

Colorado Public Utilities Commission in the Matter of the Commission's Implementation of §§ 40-2.3-101 and 102, C.R.S. The Colorado Transmission Coordination Act, PROCEEDING NO. 19M-0495E, in Support of the Intermountain Rural Electric Association, November 15, 2019. This evidence provides the Colorado Commission with an overview of the benefits of RTO markets for electric cooperatives.

***American Transmission Systems Incorporated, Docket No. ER20-1740* Affidavit is Support of Buckeye Power Inc. Counter the Capacity Market Benefits of ATSI Moving from MISO to PJM and Recovery of Transition Costs, May 29, 2020**. This affidavit provides empirical evidence and theoretical support that load connected to the ATSI transmission system paid more in capacity costs in PJM than they would have paid had ATSI stayed in MISO to counter ATSI's argument that ATSI connected load would have paid more for capacity had ATSI remained in MISO.

***Alberta Utilities Commission ("AUC") Distribution System Inquiry Proceeding 24116*, Response from Kalina to AUC Information Request Round 2, Jointly with Regulatory Law Chambers, Terradigm Energy, Inc, and Nican International Consulting, Ltd on Behalf of Kalina Distributed Power, June 17, 2020.** This response to information requests provides support for an optimal distribution tariff design that rewards resources that reduce the need for additional upgrades and reduce line losses and send price signals regarding the optimal location on the distribution

system. This response also argues against tariff policies that would inefficiently charge such resources for costs they do not cause to either the distribution system or the transmission system and argues that efficient pricing is consistent with the competitive objectives of the Alberta energy market.

***Investigation into Resource Adequacy Alternative, New Jersey Board of Public Utilities,* BPU Docket No. EO 20030203**, **Prepared Comments in Support of PJM Power Providers, June 24, 2020.** These prepared comments address the benefits of Reliability Pricing Model (RPM) Participation for New Jersey customers and the additional costs of moving to a Fixed Resource Requirement (FRR) Plan as proposed by PSEG and Exelon in earlier comments. These comments note the extra costs could be over $700 million per year for New Jersey customers and would facilitate the exercise of market power by a small set of generation owners.

***American Transmission Systems Incorporated, Docket No. ER20-1740* Reply Affidavit is Support of Buckeye Power Inc. Counter the Capacity Market Benefits of ATSI Moving from MISO to PJM and Recovery of Transition Costs, June 25, 2020**. This reply affidavit supports the previously supplied empirical evidence and theoretical support that load connected to the ATSI transmission system paid more in capacity costs in PJM than they would have paid had ATSI stayed in MISO to counter ATSI's argument that ATSI connected load would have paid more for capacity had ATSI remained in MISO. Additionally, the reply affidavit responds to ATSI critiques of the original affidavit and the ATSI responses to answers.

Alberta Utilities Commission ("AUC") Distribution System Inquiry Proceeding 24116, **Concluding Remarks of Kalina Distributed Power, Jointly with Regulatory Law Chambers, Terradigm Energy, Inc, and Nican International Consulting, Ltd on Behalf of Kalina Distributed Power, July 15, 2020.** These concluding remarks reiterates support for an optimal distribution tariff design that rewards resources that reduce the need for additional upgrades and reduce line losses and send price signals regarding the optimal location on the distribution system. These concluding remarks provide established economic theory to explain why the current policies that inefficiently charge such resources for costs they do not cause are not in the best interests of Alberta's energy market or Alberta energy customers.

***Investigation into Resource Adequacy Alternative, New Jersey Board of Public Utilities,* BPU Docket No. EO 20030203**, **"Prospective Minimum Offer Price Rule Price Floors and Cost-Effectiveness of the PSEG/Exelon Fixed Resource Requirement Plan for New Jersey" in Support of PJM Power Providers, July 22, 2020.** This whitepaper responds to the PSEG and Exelon comments submitted on June 24, 2020, and it responds to the report of the PSEG/Exelon Consultant assertions about the alleged cost savings of moving to a Fixed Resource Requirement (FRR) Plan as proposed by PSEG and Exelon in earlier comments. This paper also discusses the Minimum Offer Price Floor levels for various clean energy resources to show they would not be excluded from the RPM capacity market and would clear the market given historic capacity prices.

***PJM Interconnection, L.L.C. FERC Docket No. EL19-58-003 "Forward Looking Energy and Ancillary Service Offset,"* Affidavit in Support of Comments of the Electric Power Supply Association, September 2, 2020.** Supports and explains PJM's forward-looking energy and ancillary service offset filing in the context of Commission approved methods that use the same framework as the energy and environmentally limited opportunity costs which uses forward looking fuel and power prices in the same way as the PJM proposal. The Affidavit also calls for further analysis of the forward-looking methodology once there are realizations of actual power and gas prices compared to the forward prices used in the methodology.

Alberta Utilities Commission ("AUC") Proceeding 26090 DG Credit Module for Fortis's 2022 Phase II Tariff Application, **Evidence in Support of Kalina Distributed Power and Capstone Infrastructure Corporation, December 14, 2020.** This expert report discusses the economic and electrical equivalence of distribution connected generation (DCG) to reduced load on the distribution level and the resulting effects on transmission rates and cost recovery in the Alberta power system. This report also points out that DCG is not the cause of so-called erosion of billing determinants from the transmission system costs, but those are caused by over-forecasting load and transmission overbuild. The report argues for retention of Fortis's DCG Credit based on cost causation principles given DCG helps reduce loading on the transmission system.

Alberta Utilities Commission ("AUC") Proceeding 26090 DG Credit Module for Fortis's 2022 Phase II Tariff Application, **Reply Evidence in Support of Kalina Distributed Power and Capstone Infrastructure Corporation, January 27, 2021.** This reply report provides additional detail regarding the subjects discussed in the initial report, responds to intervenor comments, and explains how DCG can enhanced the efficiency of the Alberta Energy Market as well as providing cost-effective reductions in future transmission build out.

Southeast Energy Exchange Market Agreement FERC Docket ER 21-1111, Affidavit is Support of Public Interest Organizations, March 15, 2021. This affidavit points out the market design and market power shortcoming of the proposed Southeast Energy Exchange Market (SEEM) rules and governance structure as well as problems with the supporting benefit/cost analysis supporting the proposed market design. The affidavit highlights transactional complexity, computational complexity, and rules that allow market power exercised through manipulating submitted parameters as why the Commission should not approve the proposed design and set a technical conference to discuss a more robust market for the Southeast.

Jackson Generation, LLC v. PJM Interconnection in FERC Docket No. EL21-062, Affidavit in Support of Jackson Generation's Complaint, March 30, 2021. This affidavit argues that it makes economic sense for PJM and the Independent Market Monitor to consider a longer asset life than 20 years and the consideration of sunk costs in determining the Minimum Offer Price that Jackson could offer into the 2022/2023 Base Residual Auction. Furthermore, I argued that the tariff language is explicitly consistent with the tariff language as well as previous PJM precedent in allowing longer asset lives and sunk costs when I served as PJM's Chief Economist and oversaw making Minimum Offer Price determinations.

Southeast Energy Exchange Market Agreement FERC Docket ER 21-1111, Affidavit is Support of Public Interest Organizations, June 28, 2021. This affidavit responds to the Southeast Energy Exchange Market (SEEM) filing responding the FERC Staff's Deficiency Letter and continues to point out the market design and market power shortcomings of the rules and monopoly position of the filing parties. This affidavit concentrates on data transparency and the lack of truly independent market monitor to guard against market abuses by large participants, uses existing data from Southern Company's auction market to show that market participation in the prosed design will be effectively non-existent and that this is all by design since the incentives of large franchise monopoly supporters of SEEM are to retain their monopoly positions. governance structure as well as problems with the supporting benefit/cost analysis supporting the proposed market design. The affidavit also highlights areas around computational complexity and the ability to foreclose transactions with other parties leads to an inability to run the market in the time allotted and results in de facto market manipulation.

Alberta Electric System Operator Transmission Rate Design, in Alberta Utilities Commission Proceeding 26911, Report in Support of Industrial Power Consumers Association of Alberta (IPCAA) and the Dual Use Customers (DUC), March 28, 2022. Report entitled "Transmission Rate Design and Energy Market Efficiency" shows why the AESO's proposed rate design to shift fixed costs into volumetric charges is inefficient and leads to uneconomic bypass and harms the Alberta Energy Market. This report also shows why a shift to non-coincident peak charges away from peak charges leads to inefficient decision making by customers and violated cost causality principles in rate design. The conclusion is that the optimal rate design for bulk power transmission should be based on coincident peak charges that includes all the fixed costs of the system.

Rebuttal Report Regarding the Review and Evaluation of Alternatives and Benefit Cost Analysis Prepared for Renovo Energy Center in Clean Air Council et al. v. Pennsylvania Department of Environmental Protection, Environmental Hearing Board Docket No. 2021-055, May 2, 2022. This report responds to Appellants refuting statements regarding benefit-cost analyses, facts regarding the PJM and NYISO markets, and assertions emissions increases of the proposed facility.

Department of Environmental Protection, Environmental Hearing Board Docket No. 2021-055 Affidavit Prepared for Renovo Energy Center, July 18, 2022. This responds to Appellants affidavits regarding emissions data, PA DEP not

being responsible for generator entry and exit decisions, and logical flaws in Appellants Expert benefit-cost analysis.

PJM Interconnection, L.L.C., Docket No. ER22-2984-000; Periodic Review of Variable Resource Requirement Curve Shape and Key Parameters, Affidavit in Support of Protest of J-Power USA Development Co. Ltd. This affidavit explains why PJM's choice of a 20-year asset life for the Reference Resource Net CONE in the ComEd LDA is in error due to the Climate and Equitable Jobs Act (CEJA) that requires all gas resources reach zero net emissions by 2045. Additionally, the affidavit explains that such LDA specific adjustments for the Energy and Ancillary Service Offset and CONE area differences for labor are common, hence reducing the asset life in ComEd would reasonably be accommodated.

POLICY WHITEPAPERS and Reports

NYISO Meter Data Study-Final Report, December 8, 2017. Available at https://www.nyiso.com/documents/20142/1391862/NYISO-Meter-Data-Study-Report.pdf/db0de386-04b1-8818-3f77-194bc71a8c37. This report examines the meter data policies in the NYISO in comparison to similar polices in PJM, CAISO, and ISO-NE and the role of entities providing meter services for DER as may be required into the future. This report address and provides recommendations on 1) Baselines for DER as required and modification to existing baselines if needed; 2) Potential for the statistical sampling of a subset of DERs for establishing baselines and for market settlement in the energy, capacity, and ancillary services markets; 3) Interactions of baselines and DER aggregation; and 4) Simultaneous participation in both retail and wholesale markets by DERs.

The Market and Financial Position of Nuclear Resources in Pennsylvania, April 5, 2019. Available at https://citizens-against-nuclear-bailouts.prezly.com/new-report-highlights-long-term-profit-projections-for-pennsylvania-nuclear-generators and https://cdn.uc.assets.prezly.com/210b1e76-c577-4ffb-9bb9-c60c1f4299b8/-/inline/no/
This paper shows that nuclear resources in Pennsylvania are profitable historically and going forward and are in no need of any subsides to keep these resources in service.

The Market and Financial Position of Nuclear Resources in Ohio, May 13, 2019. Available at https://img1.wsimg.com/blobby/go/30b6d3a5-dffd-4a1b-9b4d-0bf3451282cd/downloads/OH%20Nuclear%20Analysis%2020190513-final.pdf?ver=1559092681975
This paper shows that nuclear resources in Ohio, Davis-Besse and Perry, are profitable historically and going forward and are in no need of any subsides to keep these resources in service as proposed under House Bill 6.

Economic Benefits to Ohio Electricity Consumers from the Repeal of House Bill 6, September 16, 2020. This paper shows that the Repeal of HB 6 in Ohio would lead to lower electricity bills for Ohio consumers with saving coming from keeping energy efficiency and demand response programs, and the repeal of subsidies for legacy coal units and the Davis-Besse and Perry nuclear units.

Assessment of the Fixed Resource Requirement Option for Delaware, Prepared for the Delaware Public Service Commission, June 29, 2021. Presented to the Delaware Public Service Commission Open Meeting, October 6, 2021. This paper reviews the FRR Rules in PJM and analyzes the trade-offs for Delaware of opting into an FRR Plan with regard to costs, ability to meet RPS requirements, and overall feasibility. The meeting agenda and minutes are available at https://publicmeetings.delaware.gov/#/meeting/67673.