UNITED STATES OF AMERICA

BEFORE THE

FEDERAL ENERGY REGULATORY COMMISSION

Sierra Club, et al.	)	
	)	
v.	)	
	)	**Docket No. EL24-148-000**
PJM Interconnection, L.L.C.	)	
	)	

PROTEST OF THE PJM POWER PROVIDERS GROUP

"It's like déjà vu all over again"
-Yogi Berra

Here we go, again.[1] This Complaint marks another attempt to change the rules to drive capacity prices below the level that reflects actual market conditions, seeking short-term rate reductions at the price of long-term resource adequacy. The market has responded to this downward price pressure and investors have made rational commercial decisions to exit the market or sit on the sidelines, which have resulted in lower total supply.[2] Yet, when prices now signal a dire need for supply-side investment, we again see that familiar reaction to artificially lower prices. And so, the cycle continues.

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[1] Pursuant to Rule 211 of the Federal Energy Regulatory Commission's ("FERC" or "Commission") Rules of Practice and Procedure, 18 C.F.R. § 385.211 (2024), The PJM Power Provider's Group ("P3") submits this protest in opposition to the complaint ("Complaint") filed on September 27, 2024 by Sierra Club, National Resources Defense Council, Public Citizen, Sustainable FERC Project and the Union of Concerned Scientists (collectively, "Complainants"). P3 is a non-profit organization dedicated to advancing federal, state and regional policies that promote properly designed and well-functioning electricity markets in the PJM Interconnection, L.L.C. region. Combined, P3 members own over 83,000 MWs of generation assets and produce enough power to supply over 63 million homes in the PJM region covering 13 states and the District of Columbia. For more information on P3, visit www.p3powergroup.com. The comments contained herein represent the position of P3 as an organization, but not necessarily the views of any particular member with respect to any issue.

[2] *See generally* Attachment 1, Affidavit of Dr. Roy Shanker. The supporting affidavit of Dr. Roy J. Shanker, Ph.D. is attached hereto and is incorporated into this protest in its entirety.

These attempts to undermine the capacity market cannot be allowed to continue. First, PJM Interconnection, L.L.C. ("PJM") essentially eliminated the Minimum Offer Price Rule ("MOPR"), a decision that exposed the market to the price-warping effects of subsidies paid to favored classes of generators, leaving the market exposed to the prospect of buyer-side market manipulation.[3] FERC then modified the Market Seller Offer Cap ("MSOC") that used to allow generators to include risks in their capacity offers to reflect the liability assumed by participating in PJM's capacity market under its Capacity Performance rules. The earlier MSOC was replaced with an onerous unit-specific review that effectively obstructs asset owners from independently assessing the costs and risks of operating the assets they know better than anyone.[4] Compounding the problem, PJM proposed (and the Commission approved) changes to the capacity market demand curve that increased the risk of significant, continuous price volatility.[5]

These market interventions had their intended effect—prices *were* driven lower such that the market's price signals no longer reflected actual market conditions and, because the incentives necessary to retain existing generation or to induce investment were impaired, reliability was jeopardized. This is no mere economic theory. Since 2018, the last time that the Base Residual Auction ("BRA") clearing price was over $100, PJM's load has grown, and early

[3] *See* Notice of Filing Taking Effect by Operation of Law re PJM Interconnection, L.L.C., Docket No. ER21-2582 (Sept. 29, 2021); *see also* Fair RATES Act Statement of Commissioner James P. Danly re PJM Interconnection L.L.C., Docket No. ER21-2582 (Oct. 27, 2021) (explaining that the proposed revisions to the MOPR are not just and reasonable and that they undercut buyer-side market power mitigation); Fair RATES Act Statement of Commissioner Mark Christie re PJM Interconnection, L.L.C., Docket No. ER21-2582 (Oct. 19, 2021) (same).

[4] *See Indep. Market Monitor for PJM v. PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,137 at P 76 (2021), *on reh'g, clarification & accepting compliance filing*, 178 FERC ¶ 61,121 (2022).

[5] *See PJM Interconnection L.L.C.*, 182 FERC ¶ 61,073 at PP 144–45, 152, 157 (2023).

retirements have reduced supply.[6] PJM and the North American Electric Reliability Corporation ("NERC") have repeatedly warned about impending resource adequacy shortfalls.[7] And yet during the past five years—a period of increasing scarcity—capacity prices *went down*.[8]

Until July. The last BRA saw capacity prices finally reflect scarcity.[9] The widespread outcry over rising prices has been understandable from the ratepayers' standpoint—they had become accustomed to suppressed prices. But ratepayer habituation aside, the fact remains that

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[6] *See* PJM, *Energy Transition in PJM: Resource Retirements, Replacements & Risk*, at 5–6 (Feb. 24, 2023), https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx (PJM Retirements Report).

[7] *See* Mark Takahashi, Chair, PJM Board of Managers, Letter to Stakeholders Re: Initiation of the Critical Issue Fast Path Process to Address Resource Adequacy, at 1 (Feb. 24, 2023), https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20230224-board-letter-re-initiation-of-the-critical-issue-fast-path-process-to-address-resource-adequacy-issues.ashx ("Energy policies and market forces already have, and could further expedite, the retirement of existing generation resources faster than new resources are able to come online. PJM's analysis in its recent report, 'Energy Transition in PJM: Resource Retirements, Replacements and Risks,' indicates that there is up to 40 GW at risk of retirement from economic and policy drivers by 2030. The report also highlights significant uncertainty around the pace of resource additions, which at current completion rates would be inadequate to maintain resource adequacy."); PJM Retirements Report at 2 ("[T]he current pace of new entry would be insufficient to keep up with expected retirements and demand growth by 2030."); PJM, *Reliability in PJM: Today & Tomorrow*, at 12 (Mar. 11, 2021), https://www.pjm.com/-/media/library/reports-notices/special-reports/2021/20210311-reliability-in-pjm-today-and-tomorrow.ashx ("The changes occurring in the electric industry and evolving resource mix have the potential to significantly impact the provision of adequate supply and reliability in PJM."); *see also* Robert Walton, *NERC Wary of 100 GW in Possible Plant Retirements and Other Takeaways from CEO Jim Robb*, Utility Dive (July 26, 2024), https://www.utilitydive.com/news/5-takeaways-from-jim-robbs-wires-address-NERC/722486 ("NERC is aware of another possible 100 GW of capacity at risk of retirement in the PJM, Mid-Atlantic and South areas. Right now those areas are characterized as having a 'normal energy risk,' but the next [NERC Long-Term Reliability Assessment] 'will almost certainly put those areas into the high-risk category if those retirements get solidified,' Robb said." (quoting James (Jim) B. Robb, NERC President and CEO)).

[8] *See* PJM, *2024/2025 RPM Base Residual Auction Results*, at 1, 5 https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2024-2025/2024-2025-base-residual-auction-report.ashx (2024/2025 RPM Base Residual Auction Results); *see also* PJM, *2024/2025 RPM Third Incremental Auction Results* (May 23, 2024), https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2024-2025/2024-2025-3ia-report.ashx.

[9] *See* PJM, *PJM Capacity Auction Procures Sufficient Resources to Meet RTO Reliability Requirement* (July 30, 2024), https://www.pjm.com/-/media/about-pjm/newsroom/2024-releases/20240730-pjm-capacity-auction-procures-sufficient-resources-to-meet-rto-reliability-requirement.ashx (PJM 2025/2026 Delivery Year Auction Results). The terms "scarce" or "scarcity" are used here consistent with the definition put forward by Dr. Shanker to indicate auction clearing quantities that are very near to or below target reliability objectives such as the Installed Reserve Margin or IRM. While not the traditional use of the terms, they are consistent with the original discussions about reliability and acceptable performance of the Reliability Pricing Model process and the shape of the Variable Resource Requirement (demand) curve.

the last auction[10] saw prices move from being 10–12% of the Net Cost of New Entry ("Net CONE") to just barely over Net CONE—the target price at which the market was designed to resolve over the long haul.[11] This is well within expectations, given market conditions. No one can rightly call a price near Net CONE during times of scarcity a "high price," unless divorced from history and market conditions. Now, rather than heed the market's warning and allow the accurate reflection of scarcity in the market's prices, rather than embrace the fact that the market is *designed* to raise prices when faced with capacity shortfall, Complainants instead rush to the Commission, mere months before the next BRA, asking it to impose the very Tariff revisions they failed to persuade the PJM Board to pursue just weeks before.[12]

One of the Complainants, Sierra Club, was primarily responsible for the very Reliability Must Run ("RMR") contracts at issue in this proceeding. As detailed in PJM's filing, Sierra Club boasted that it had entered into a settlement agreement that would lead to the closure of Brandon Shores and Wagner—generators located in a highly constrained region in Maryland.[13] Never once as it sought to close these two units did Sierra Club discuss with PJM the impact of these closures.[14] Never once did it ask about the effect that Brandon Shores's closure would have on

[10] *See* PJM 2025/2026 Delivery Year Auction Results at 3 (illustrating that the 2025/2026 capacity prices are $269.92 per MW-day RTO-wide, $466.35 per MW-day in the Baltimore Gas and Electric delivery area, and $444.26 per MW-day in the Dominion delivery area).

[11] *See Id*.

[12] *See* Pub. Interest Orgs., Letter to PJM Board of Managers Re: Support for Urgent Reforms Regarding Reliability Must Run Units and the PJM Capacity Market a 2 (Sept. 6, 2024), https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/2024/20240906-pios-letter-of-support-to-pjm-bard-on-rmrs-in-rpm.ashx, (asking PJM to reform its tariff by "requiring RMR units to participate in the capacity market as supply" and "accounting for the capacity provided by RMR units by adjusting the demand curve to procure less capacity overall").

[13] *See* Press Release, Sierra Club, *Sierra Club and Stoney Beach Association Statements on Talen Energy's Commitment to Stop Burning Coal by the End of 2025* (Nov. 10, 2020), https://www.sierraclub.org/press-releases/2020/11/sierra-club-and-stoney-beach-association-statements-talen-energy-s-commitment.

[14] October 18, 2024 Answer of PJM Interconnection, L.L.C. at 22.

reliability (it would lead to over 600 violations).[15] Never once did it ask about the closures' impact on capacity prices. Never once did it question or challenge PJM's long-standing RMR tariff provisions as it negotiated a settlement.

Instead, as detailed in Talen's Energy Corporation's ("Talen") filing in this proceeding, the Sierra Club pursued a litigation strategy focused on closing needed generation facilities only to turn around now and try to remedy the price effects for which they are responsible. You can't burn down the house and then complain about the ashes. Actions have consequences and it is easily foreseeable that acting to remove supply from constrained areas will cause prices to rise. As Talen succinctly offered, "[t]he Sierra Club cannot eschew competitive markets and publicly litigate for out-of-market solutions to achieve its policy goals only to turn around and feign urgency to fix those same markets that its own efforts broke."[16]

Less than two years ago, these same Complainants came before the Commission arguing that PJM "hosts significantly more generation resources than are required to maintain grid reliability."[17] At the time, they lamented that PJM, "has a long history of procuring more capacity than required for reliability, which has promoted the development of a large existing generation fleet."[18] They labeled concerns about looming supply challenges as "catastrophizing" and referred to the current state of the capacity market as "robust."[19] Astonishingly, these same

[15] *See* PJM, Motion for Leave to Answer and Answer of PJM Interconnection, L.L.C., Docket Nos. ER23-2612-000, at 3 (Oct. 3, 2023), https://www.pjm.com/-/media/documents/ferc/filings/2023/20231003-er23-2612-000.ashx.

[16] October 21, 2024 Protest of Talen Energy Corp. at 8.

[17] Motion for Leave to File Answer and Answer of the Sierra Club, Docket No. ER22-2984-000, at 3 (Nov. 4, 2022).

[18] *Id.* at 4.

[19] *Id.* at 3.

Complainants now come before the Commission pretending that the scarcity in the BGE locational deliverability area ("LDA") is either an unpredictable surprise or PJM's fault.

The Commission should not be fooled again into adopting the misguided policies advanced by the Complainants. It should instead remember that a functional capacity market is essential to reliability—it is the mechanism by which PJM, over the long haul, procures the capacity it needs to ensure resource adequacy. Capacity suppliers will only operate while commercially viable. Recent prices have been insufficient to support the costs of providing generation and this has led to the scarcity (retirements and reduced new entry) reflected in recent auction results. Absent the higher prices that attend scarcity, signals cannot not be sent to attract the new investment needed to ensure that the market has enough generation to meet load.

Further, prudent investment in infrastructure cannot be made on a boom-bust cycle. Frequent alteration of market rules and drastic changes in price signals erode investor confidence and hinder access to needed capital by increasing perceived risk. While this is always true, it is especially true now. PJM's market already suffers from widespread price suppression caused by subsidies and recently implemented policies. This cannot go on forever. Eventually the impediments to price formation will so badly impede the market's operation that it will no longer attract investment, and PJM will suffer reliability failures. And, as PJM's independent market monitor ("IMM") has recognized, "[t]he result of the 2025/2026 BRA make even more critical the fact that the markets face a challenge from potentially high levels of expected thermal generator retirements, with no clear source of replacement capacity or the fuel required for that capacity."[20]

[20] Monitoring Analytics, LLC ("PJM IMM"), *2024 Quarterly State of the Market Report for PJM: January through June*, at 2 (Aug. 8, 2024), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2024/2024q2-som-pjm.pdf ("Q2 2024 Quarterly State of the Market Report").

The Commission must dismiss this complaint. Its central argument is that PJM's Tariff is unjust and unreasonable because it does not "consistently account" for the resource adequacy contributions of generators operating under RMR arrangements in PJM's BRAs. Complainants are wholly mistaken. PJM's tariff *precisely* accounts for the resource adequacy contributions of soon-to-be-retired generators by permitting the exclusion of their capacity from the BRA. This preserves the very price signals upon which the market relies to reflect scarcity, and which would have resulted from those generators' retirements but for the out-of-market intervention of RMR arrangements.[21]

PJM's practice is perfectly consistent with the assumptions underpinning (and the mechanics implementing) PJM's Reliability Pricing Model ("RPM") which was established in 2006.[22] Complainants' claim of inconsistent treatment ignores the basic structure and purpose of PJM's capacity market, attempts to distort prices in pursuit of a myopic goal of lowering ratepayer costs in the face of rising scarcity, and seeks to impose a "heads I win, tails you lose" market design in which ratepayers willingly benefit from low prices in times of surplus, while in times of scarcity they rush toward piecemeal reforms in the hopes of marginal rate relief today at the cost of reliability tomorrow. Moreover, the Complainants' replacement rate would compound the price suppression that has put PJM in the very position it is now, except that the situation would be worse. Complainants' proposed replacement rate would not only suppress prices, it would likely deprive PJM of the RMR generators upon which it now relies to maintain the stability of its transmission system while transmission is built to relieve constraints. If the

[21] PJM Open Access Transmission Tariff ("PJM OATT"), Attach. DD § 6.6(g) (excepting RMR units from must-offer requirement).

[22] *See PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079 (2006), *denying reh'g & approving settlement subject to conditions*, 117 FERC ¶ 61,331 (2006); *see also* Shanker at PP 8-17.

Commission forced all generators operating under an RMR agreement to participate in the BRA, it would require RMR units to assume profound liability when they received their capacity supply obligation and its attendant exposure to PJM's Capacity Performance penalties. Under such conditions, it is unlikely that any rational generator seeking to retire would voluntarily assume the risk of potential performance penalties merely to pursue RMR payments. They would simply deactivate.[23]

Do not grant this Complaint. If the Complaint is granted, the Commission will imperil reliability by impeding needed new entry just as the market is facing historic reliability challenges: accelerating loss of supply due to early retirements;[24] drastic increases in load growth caused by electrification, data centers and manufacturing;[25] and profound impediments to the development of infrastructure to reinforce the transmission system.[26] If prices are artificially low (the inevitable consequence of the Complainants' proposed remedy), transmission planners (and merchant investors) will not receive accurate price signals and cannot begin the lengthy process of planning and building transmission as generators are forced into premature retirement and it

[23] As PJM and the Commission have made clear, suppliers have the right to make that choice. *See* PJM OATT, Attach. DD § 6.6(g); *PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079 at P 36.

[24] *See* PJM IMM, *2023 State of the Market Report*, at 1 (2024) https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2023/2023-som-pjm-sec1.pdf ("One of the key challenges facing the PJM markets is the potentially high level of expected thermal resource retirements between now and 2030 with no clear source of replacement capacity.").

[25] *See* Q2 2024 Quarterly State of the Market Report at 2 ("Demand is a function of forces in the broader economy, including the addition of data centers."); PJM, Load Forecast Report, at 2 (Feb. 1, 2024), https://www.pjm.com/-/media/library/reports-notices/load-forecast/2024-load-report.ashx; Ethan Howland, *PJM Triples Annual Load Growth Forecast to 2.4% Driven by Data Centers, Electrification*, Utility Dive (Jan. 9, 2024), https://www.utilitydive.com/news/pjm-interconnection-load-forecast-data-center-ev-dominion-firstenergy/704040.

[26] *See, e.g.*, Energy Permitting Reform Act of 2024, S. 4753, 118th Cong. (2024); Building American Energy Security Act of 2023, S. 1399, 118th Cong. (2023); Herman K. Trabish, C*ongressional Action on Energy Permitting Remains Stuck, but States, Developers Are Finding Solutions*, Utility Dive (Feb. 27, 2024), https://www.utilitydive.com/news/federal-energy-permitting-reform-doe-ferc-congress/705818; Ethan Howland, *Sens. Manchin, Barrasso Craft Bipartisan Permitting Reform Bill Amid Growing Load Forecasts*, Utility Dive (May 22, 2024), https://www.utilitydive.com/news/manchin-barrasso-permitting-reform-bill-demand-hearing-aep/716809.

may be many years before transmission can be built to mitigate the reliability effects of those retirements.

I. Background—PJM's Current RMR Procedures

When a Generation Owner decides to deactivate a unit[27] it must indicate whether the generator "is being retired or mothballed, the desired Deactivation Date, and, if mothballing, a good faith estimate of the time period the generating unit would be out of service."[28] PJM must then inform the Generation Owner "whether the Deactivation of the generating unit would adversely affect the reliability of the Transmission System."[29]

If so, PJM must "(1) identify the specific reliability impact resulting from the proposed Deactivation of the generating unit; and (2) provide an initial estimate of the period of time it will take to complete the Transmission System reliability upgrades necessary to alleviate the reliability impact."[30] Finding a reliability impact does not, however, mean that the generating unit may not be deactivated—a Generation Owner or a Designated Agent may deactivate a generating unit so long as they follow the notice requirements in PJM's OATT.[31] PJM does not authorize a deactivation of the generating unit—rather, it merely assesses whether there is a reliability impact.[32] In parallel, the IMM reviews the requested deactivation and conducts a

[27] PJM OATT at Part V § 113.

[28] *Id*. § 113.1.

[29] *Id*. § 113.2.

[30] *Id*.

[31] *Id*.; *see also id*. §§ 113.3-113.4.

[32] *See* PJM OATT Part V § 113.2; *id.* at Attach. M § IV*; see also* Q2 2024 Quarterly State of the Market Report at 360 ("When notified of an intended deactivation, the MMU performs a market power study to ensure that the deactivation is economic, not an exercise of market power through withholding, and consistent with competition. . . . If PJM determines that it needs a unit for a period beyond the intended deactivation date, PJM will request a unit to remain in service, generally only as an option in the event the unit is needed for reliability. *(cont'd)*

market power analysis, determining whether the deactivation is consistent with competitive behavior.

An RMR agreement is implemented after a deactivation notice under Part V of the PJM OATT, when "Necessary Network Upgrades associated with that Deactivation Notice cannot be completed prior to the requested deactivation date," and "[n]o mitigating operational measures are available."[33] PJM may then ask a generating unit enter into an RMR agreement to continue operation in order to alleviate the reliability impact caused by the unit's deactivation.[34] The decision of a generating unit in PJM to enter into an RMR is entirely voluntary. Should the generator agree to continue to operate beyond its proposed retirement date, RMR arrangements with negotiated provisions can allow PJM to rely upon a generator to mitigate transmission constraints. [35]

Once a generator voluntarily enters an RMR agreement, it may file with the Commission a cost-of-service recovery rate,[36] or it may receive a Deactivation Avoidable Cost Credit.[37] The generator will also file any associated terms and conditions it may have agreed to as part of its

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The PJM market rules do not require an owner to remain in service, but owners must provide advance notice of a proposed deactivation . . . ." (footnotes omitted)).

[33] PJM, *Generation Deactivation Informational Item Identifying RMR Units*, at 3 (2022), https://pjm.com/-/media/committees-groups/subcommittees/sos/2022/20220707/20220707-item-10-rmr-informational-item.ashx.

[34] *See* PJM, *Generation Deactivation Education*, at 13 (Oct. 12, 2023), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2023/20231012/20231012-item-07---generation-deactivation-education.ashx ("When PJM has determined a proposed deactivation(s) would adversely affect the reliability of the Transmission System, and upgrades cannot be completed by proposed deactivation date, and no operational measures are available, PJM requests the Generation Owner to extend operations of the deactivating unit(s) until necessary upgrades are completed. The Generation Owner may elect to support system reliability by operating until necessary network upgrades are completed.").

[35] *See PJM Interconnection, L.L.C.*, 110 FERC ¶ 61,053 (2005).

[36] *See* PJM OATT, Part V § 119 ("[A] generating unit proposed for Deactivation that continues operating beyond its proposed Deactivation Date may file with the Commission a cost of service rate to recover the entire cost of operating the generating unit until such time as the generating unit is deactivated pursuant to this Part V . . . .").

[37] *See id*. § 114.

Federal Power Act ("FPA") section 205[38] filing.[39] PJM's tariff allows a generating unit that plans to deactivate to receive an exception to the requirement that Existing Generation Capacity Resources located in the PJM region must offer into PJM's capacity auction.[40] Should a unit as part of an RMR agreement choose to voluntarily participate in the capacity auction, it assumes all the burdens and responsibilities of becoming a Capacity Resource, if it clears the auction.[41] For example, Capacity Resources are subject to non-performance penalties under PJM's Capacity Performance requirements should the resource not perform as expected when an Emergency Action[42] is in effect.[43]

II. PJM's Tariff is Just and Reasonable.

The Complaint must be rejected because PJM's Tariff is just and reasonable. PJM allows the exclusion of the capacity value of generators operating under voluntarily negotiated RMR agreements by recognizing the generators' right to decline to participate in the capacity auction. RMR units may decide whether to assume additional obligations that come with a capacity

[38] 16 U.S.C. § 824d.

[39] *See, e.g.*, *NRG Power Mkt'g LLC*, 179 FERC ¶ 61,156, at PP 1-2, 7 (2022); *RC Cape May Holdings, LLC*, 159 FERC ¶ 62,088 (2017).

[40] *See* PJM OATT, Attach. DD § 6.6(g) ("In order to establish that a resource is reasonably expected to be physically unable to participate in the relevant auction as set forth in (i) above, the Capacity Market Seller must demonstrate that: A. It has a documented plan in place to retire the resource prior to or during the Delivery Year, and has submitted a notice of Deactivation to the Office of the Interconnection consistent with Tariff, Part V, section 113.1, without regard to whether the Office of the Interconnection has requested the Capacity Market Seller to continue to operate the resource beyond its desired deactivation date in accordance with Tariff, Part V, section 113.2 for the purpose of maintaining the reliability of the PJM Transmission System and the Capacity Market Seller has agreed to do so . . . .").

[41] PJM OATT, Attach. DD §§ 4.4, 6.6(g).

[42] An "Emergency Action" includes "any megawatt shortage of the Primary Reserve Requirement . . ." or "anytime the Office of Interconnection identifies an emergency and issues a load shed directive, Manual Load Dump Action, Voltage Reduction Action, or deploy all resources action for an entire Reserve Zone or Reserve Sub-zone." PJM OATT, § 1.

[43] *See* PJM OATT, Attach. DD § 10A(a).

supply obligation or immediately proceed to deactivation. Allowing generators to choose whether to participate in the capacity auction is consistent with—indeed, it is required by—the basic assumptions underpinning the Reliability Pricing Model—the heart of PJM's capacity mechanism.

The FPA requires that rates for the sale of electric energy in interstate commerce for resale be "just and reasonable."[44] To ensure that rates remain just and reasonable, section 206 of the FPA entitles the Commission, by its own motion or upon complaint from a third party, to remedy any "rate [or] charge" or "any rule, regulation, practice, or contract affecting such rate [or] charge" found to be "unjust [or] unreasonable."[45] Respondents to an FPA section 206 complaint are not required to make an affirmative showing that the challenged rates are just and reasonable. Rather, "[t]he burden of proving an unjust or unreasonable rate rests with the party that initiated the proceeding—that is, the Commission or the third-party complainant."[46] Upon a successful showing that the prevailing rate is unjust and unreasonable, the Commission may order a replacement rate.[47] Complainants have failed to meet their burden of demonstrating that PJM's current rate is not just and reasonable.

The "reasonableness of a rate is assessed in light of the FPA's goals of promoting reliable service at reasonable rates and developing plentiful energy supplies."[48] PJM's Reliability Pricing

[44] 16 U.S.C. § 824d(a).

[45] *Id.* § 824e(a).

[46] *Pub. Citizen, Inc. v. FERC*, 7 F.4th 1177, 1183 (D.C. Cir. 2021).

[47] 16 U.S.C. § 824e(a).

[48] *Constellation Mystic Power, L.L.C. v. FERC*, 45 F.4th 1028, 1035 (D.C. Cir. 2022).

Model achieves that very goal, i.e., of ensuring "reliable service at reasonable rates" and to "develop[] plentiful energy supplies.[49]

Complainants have not, and indeed cannot, show that the recent brief period of relatively elevated prices that resulted from the most recent BRA,[50] is unjust and unreasonable because those rates send accurate, necessary price signals to the market. They also cannot show—because it would impede the formation of accurate price signals caused by scarcity—that it is unjust and unreasonable to permit RMR generators to decline to participate in the capacity auction because the exclusion of that capacity ensures that accurate price signals are formed. Lastly, it is also just and reasonable for PJM to employ RMR generators' capacity value differently when calculating different values. There is no need for artificial "consistency." PJM includes RMR units' capacity value when calculating reliability metrics while permitting the exclusion of that capacity value from the capacity auction. One is for reliability criteria, the other is for price formation. The FPA does not require utilities to employ artificially "consistent" arithmetic when calculating different values.

A. The Complaint's Focus on a Single Auction Ignores the Multi-Year Business Cycle Upon Which the Reliability Pricing Model is Based.

The Complaint makes much of the results of PJM's recent BRA. It cites eye-popping figures in the billions of dollars, claiming "excessive costs" to ratepayers.[51] The Complaint treats these prices as a problem to be fixed, rather than what they are, a deliberately-designed

[49] *Id.*

[50] *See supra* note 10.

[51] *See, e.g.*, Complaint at 2 (citing estimated costs of $4.2 billion); *id.* at 3 (citing estimated costs of $5 billion).

feature of the market, implemented in order to ensure investment in new capacity.[52] The Reliability Pricing Model was designed to produce fluctuating costs that respond to reliability needs and market conditions, varying over time, depending upon the scarcity of capacity at the time of the auction.[53] Indeed, "eye-popping" is a relative word. The increase from one auction to the next may seem large because the two prior auctions yielded prices of 10% and 12% of the reference price of Net CONE. But the purpose of PJM's market design was not to ensure permanently low capacity rates, it was designed to procure sufficient capacity—over a long-term business cycle—to meet reliability criteria at least cost. *Least cost*, not low prices. To design a market that constantly sought low prices for their own sake would be unsustainable because it would never attract the capacity necessary to ensure resource adequacy. Instead, it was designed to be price sensitive to induce investment or delay retirements, as soon as the system (or a constrained area within the system) experienced shortages.[54]

While there would be some degree of volatility from auction to auction, with prices varying, sometimes widely, due to changing market fundamentals and regulatory requirements, the Reliability Pricing Model was designed to compensate the market over a business cycle that lasted decades, ensuring a just and reasonable average compensation throughout the course of that business cycle.[55]

As any freshman economics student learns, when supply is abundant, prices moderate and when supply is scarce, prices rise. And when prices rise, supply expands and when prices

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[52] Shanker at P 37-38.

[53] *Id.*

[54] *Id.*

[55] *Id.*

fall, supply contracts. Otherwise put, the remedy for high prices is high prices, and similarly, the remedy for low prices is low prices. This is because for a market to truly be competitive, it must produce elevated prices in times of scarcity and low prices in times of surplus.[56] The Reliability Pricing Model's design recognizes this ebb and flow. When the capacity market undercompensates generators for an extended period of time, two things happen: 1) marginal, less efficient units deactivate because they are no longer commercially viable without higher capacity payments; and 2) new entry slows because the lower prices reduce the profit motive for new generators to be built. The result, over time, is a reduction in supply. Eventually, this will lead to capacity shortages which could potentially be accelerated by simultaneous load growth, or by the obstruction of the development of non-generation infrastructure. The excess capacity will exit the market, or demand will grow to the point that the market faces scarcity. At that point, prices will rise. And while it takes time for market participants to respond to those market signals, eventually profit motive will induce generators to enter the market to capture that revenue. Supply will rise and the scarcity will be relieved. And the cycle will repeat.[57]

In recognition of this business cycle, PJM's initial filing proposing the Reliability Pricing Model deliberately included a time interval between price formation and delivery in order to

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[56] *Cf. Coalition of MISO Transmission Customers v. Midcontinent Indep. Sys. Operator, Inc.*, 181 FERC ¶ 61,005 (2022) (Danly, Comm'r, concurring at P 6) ("Regardless of poor decisions by market participants or the long-term consequences of systemic defects in MISO's capacity construct, the 2022/2023 Auction *actually functioned* as intended. As MISO explained, the results of the Auction reflected a capacity shortfall in the MISO North/Central regions, which resulted in participating entities being net short. The clearing price was then set at the Cost of New Entry (CONE) for the Planning Year. Why observers of MISO would shriek and clutch their pearls when the price rises to CONE in the event of a capacity shortfall (which is to say, in the event of scarcity) is beyond me. Anyone who gets upset about prices rising in times of scarcity cannot truly be a proponent of competitive markets." (footnotes omitted)); s*ee also PJM Interconnection, LLC*, Docket No. EL05-148-000, Affidavit of Dr. Joseph E. Bowring at 15 (Aug. 31, 2005) ("Wholesale energy markets, like other markets, are cyclical. When the markets are long, prices will be lower and when the markets are short prices will be higher.").

[57] Shanker at P 33.

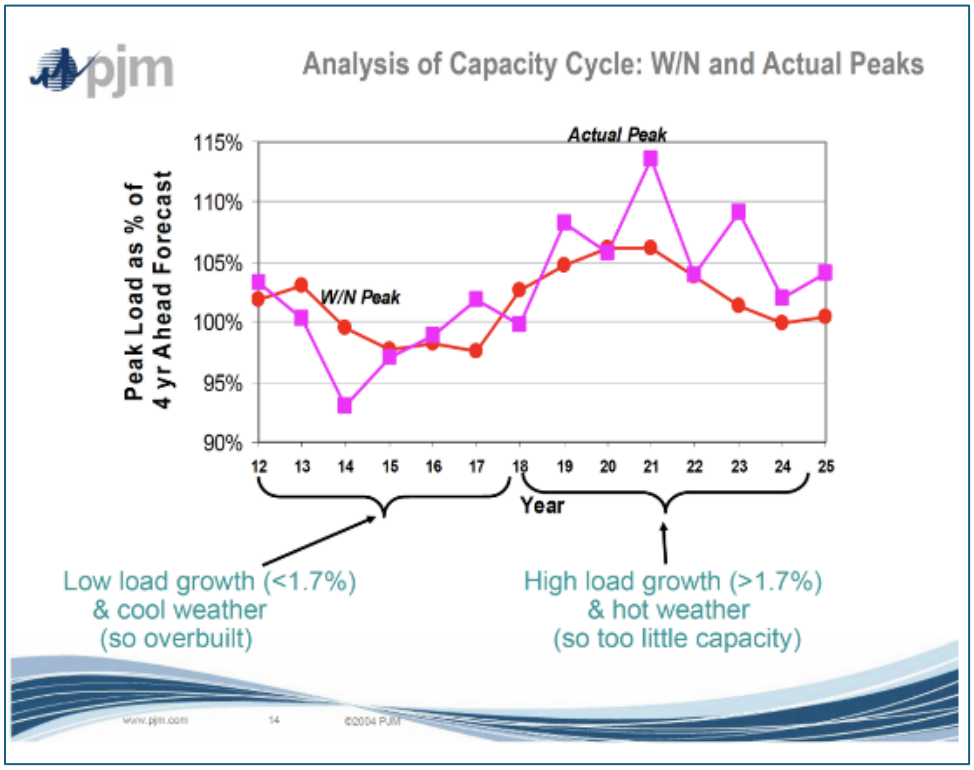
afford the opportunity to induce desired behavior. This is the reason the market is operated on a three-year forward basis,[58] so that there is time between the auction and the delivery year for project developers to recognize the price signal, plan a project, secure financing, and build the project before their obligation commences.[59]

Moreover, the necessity of implementing a lag between the time that a price signal is sent and the time in which new generation had to perform was recognized in the analysis supporting PJM's initial filing, as the slides accompanying that proposal demonstrate:

[58] PJM's original 2005 filing contemplated a four-year-forward procurement interval. *See* Transmittal Letter, Docket No. ER05-1410, at 3 (Aug. 31, 2005). The Commission's Initial Order on Reliability Pricing Model also "f[ound] that a four-year-forward procurement period is a reasonable requirement." *See PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079, at P 72. Following settlement, a three-year-forward capacity commitment was established. *See PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,331 at P 28 ("The Settlement retains a forward commitment of capacity proposed in the August 31 filing, but reduces the period of time between the Base Residual Auction and the start of the delivery year from four years to three years."); *see also* PJM OATT, Attach. DD § 5.4(a).

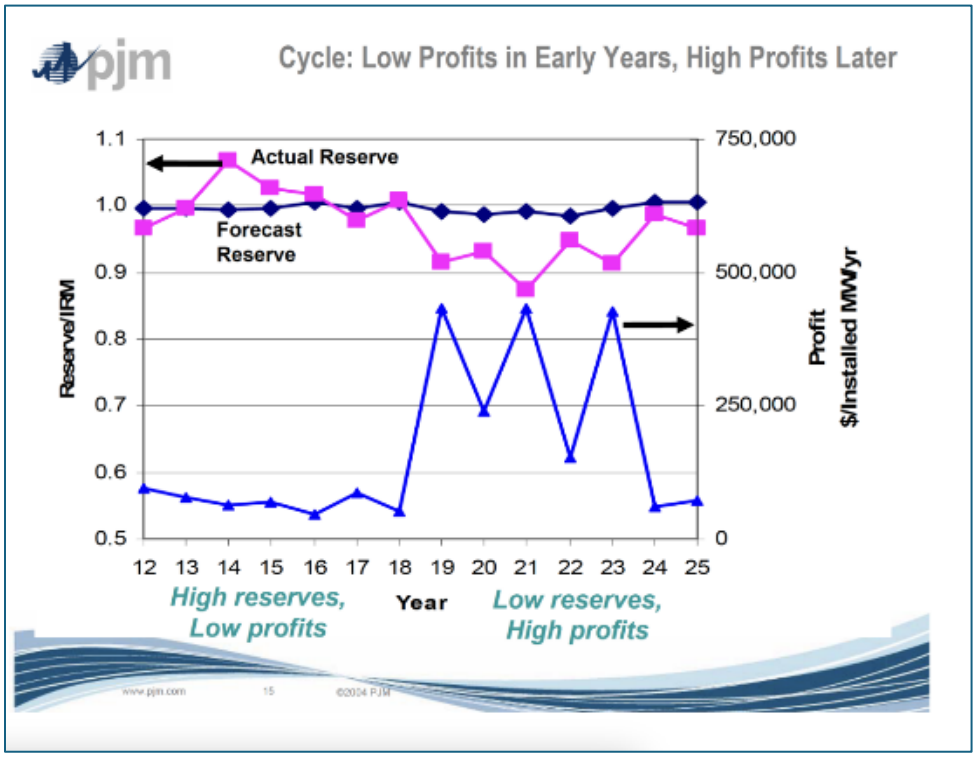
[59] Shanker at P 32.

Figure 1[60]



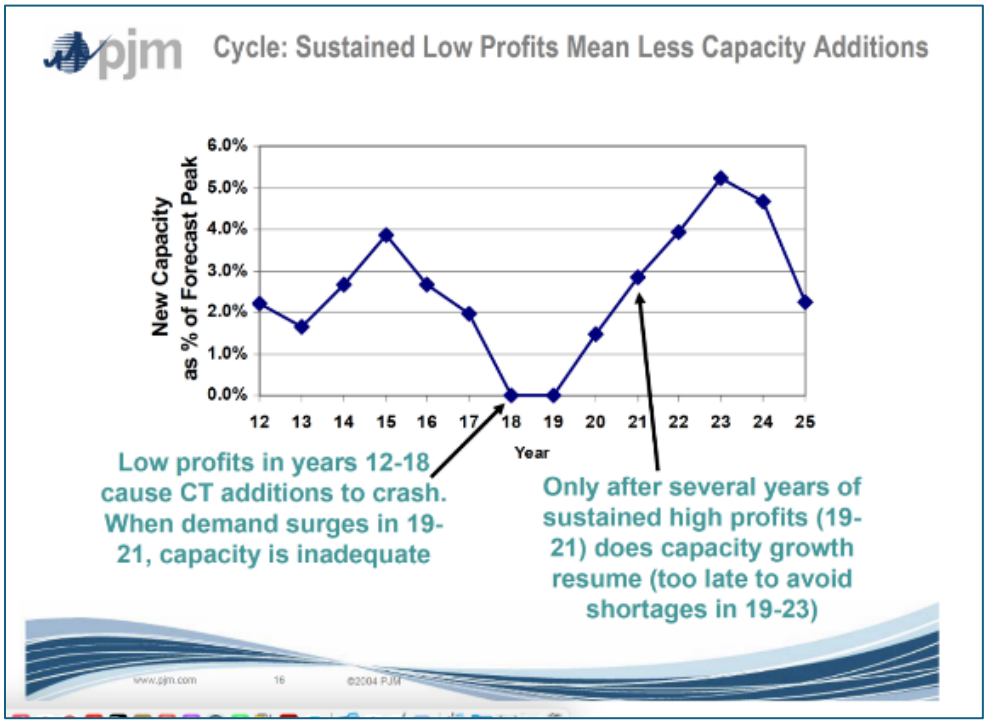
[60] Bowring et al., *Dynamic Analysis of Demand Curves for PJM Reliability Pricing Model: Update* 14 (Jan. 26, 2005), https://www.monitoringanalytics.com/reports/Presentations/2005/20050126-ram-item-2-dynamic-analysis-demand-curves.pdf. These slides were presented by PJM and Dr. Benjamin Hobbs to stakeholders in January 2005. They were also part of Dr. Hobbs's affidavit in the original RPM filing (ER05-1410, August 31, 2005).

Figure 2[61]



[61] *Id.* at 15.

Figure 3[62]



These slides show the Reliability Pricing Model's prediction: in the normal business cycle, there would be a period in which excess capacity would drive low capacity prices and consequent retirements.[63] The reserve margins would fall over the course of that period of low capacity prices, as generators retired and new entry was suppressed.[64] Eventually the market's total capacity would cross a threshold at which point the market will move from a period of excess to one of scarcity.[65] At that point, the market would see a dramatic increase in capacity prices in recognition of that scarcity—that can be seen in the light blue line in Figure 2 at year 18.[66]

[62] *Id.* at 16.

[63] Figure 2, blue line, years 12–18; *see also* Shanker at P 39.

[64] Figure 2, pink line, years 12–18; Figure 3, years 12–18; *see also* Shanker at P 39.

[65] Figure 2, pink line, years 18–19; *see also* Shanker at P 39.

[66] Figure 2, blue line, years 18-19; *see also* Shanker at P 39.

Despite the fact that the clearing prices go up dramatically from year 18 to 19, it is evident, from the pink line in the same figure, that total capacity is still going down for another two years and does not reach its lowest point until year 21. This lag was expected—it takes time to respond to market signals and for infrastructure to be built to respond to the incentives created in response to scarcity. As Figure 3 states "[o]nly after several years of sustained high profits (19-21) does capacity growth resume (too late to avoid shortages in 19-23)."[67]

These were the predictions and the reasoning underpinning PJM's original Reliability Pricing Model filing in 2005, the fundamentals of which were ultimately implemented following settlement. These predictions were proven right because this is almost exactly what has happened. After years of suppressed capacity prices, some the result of ample capacity, some the result of policy interference with the market, we have seen an increase in retirements of the last few years and growing shortages of capacity.[68] Empirically, as noted by Dr. Shanker, average compensation over almost two decades has been about a third of the levelized annual Net CONE, the value used as a reference point by the Reliability Pricing Model and which indicates an "equilibrium" market value.[69] If anything, this price history suggests under- not over-compensation. The market did exactly what was predicted back in 2005, and what the Commission *approved it to do* in 2006: remedy scarcity through elevated capacity prices.[70]

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[67] Figure 3.

[68] *See* PJM 2025/2026 Delivery Year Auction Results at 1; NERC, *2023 Long-Term Reliability Assessment*, at 75–77 (Dec. 2023), https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2023.pdf; PJM, E*nergy Transition in PJM: Resource Retirements, Replacements & Risks* (Feb. 24, 2023), *see generally* PJM Retirements Report.

[69] Shanker at P 43 & tbl.1; *see also* Fifth Review of PJM's Variable Resource Requirement Curve for Planning Years Beginning 2026/27 **(**Apr. 19, 2022) ("Brattle Study"), https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf.

[70] *See* PJM, *2025/2026 Base Residual Auction Report*, at 3 (July 30, 2024), https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.ashx.

There is no justification for the Complainants' breathlessness over a single auction—the effects of scarcity on auction prices were known from the beginning. When viewed across the expected business cycle this paradigm has worked as intended. During extended periods of sufficiency, prices were low.[71] Now the market is short capacity, and prices have risen.[72] This was expected from the beginning and the Commission found the Reliability Pricing Model to be just and reasonable because it ensured that, over the long-haul, prices would hover around the Net CONE, fluctuating in response to market conditions, all the while balancing rates and at the same time ensuring reliability.[73] Yes, ratepayers will pay more money than they have in the last few auctions because lower supply and higher demand always causes prices to rise. And that is a necessary feature of the market. It is critical to understand that ratepayers benefit from *both* the low prices in times of abundance *and* the elevated prices in times of scarcity—both are needed and it is the most efficient way to ensure reliability while at the same time driving the orderly retirement of uneconomic generation and attracting new resources in times of scarcity.

From the beginning, PJM anticipated—and indeed embraced—periods of shortage as a feature of the market. In fact, PJM's tariff does not permit the implementation of its Reliability Backstop protocols until it is triggered by *three years* of capacity shortages:

> If such a shortfall [of procured capacity] occurs in the Base Residual Auctions for three consecutive Delivery Years, the Office of the Interconnection shall declare a capacity shortage and make a filing with FERC for approval to conduct a Reliability Backstop Auction.

[71] *See id.* at 4 tbl.2 (showing BRA clearing prices in the RTO of $136.00 for delivery year 2015-16, $59.37 for 2016-17, $120.00 for 2017-18, $164.77 for 2018-19, $100.00 for 2019-20, $76.53 for 2020-21, $140.00 for 2021-22, $50.00 for 2022-23, $34.13 for 2023-24, and $28.92 for 2024-24); *see also id.* at 5 fig.2 (showing extended periods of low clearing prices for major LDAs).

[72] *Id.* at 3.

[73] Shanker at P 37.

> Upon receipt of such approval, the Office of the Interconnection will conduct a Reliability Backstop Auction . . . .[74]

From the outset, PJM expected a period of high prices during times of scarcity, understanding that it was necessary to allow time to elapse before scarcity pricing could induce the development of new capacity. This time period, in which the market as a whole experiences relatively higher prices due to scarcity, is so important to the formation (and response to) price signals that the Reliability Backstop is not even triggered until the market has allowed the "high" prices for at least three years. That was the paradigm implemented by the tariff approved as just and reasonable by the Commission in 2006. For the Commission to grant the Complaint, thereby departing from this fundamental assumption upon which the Reliability Pricing Model was based would, at this point, be to call the Commission's earlier determination into question, and would demand a compelling explanation.

Because the Reliability Pricing Model was designed to compensate the market over a long interval, and in light of the fact that the market is operating *exactly as intended*, it necessarily follows that 1) no single auction result can provide sufficient evidence that the market mechanism is unjust and unreasonable—a long view must be taken in order to properly assess the success or failure of the capacity market—and 2) high prices are both expected and *desired* at times of scarcity.

B. Allowing the Exclusion of RMRs from the Capacity Market Ensures Accurate Price Signals and is Therefore Just and Reasonable.

PJM's Tariff gives a unit requesting deactivation the right to voluntarily agree to an RMR arrangement, and as an RMR unit, to be excused from the Reliability Pricing Model's must offer

[74] PJM OATT, Attach. DD § 16.3(a)(ii).

requirements.[75] In excusing the RMR units from the must offer requirement, PJM allows the exclusion of the RMR units' capacity value from the capacity auction. This is necessary to ensure accurate price signals. This element of PJM's market design cannot be altered, or the market will fail to attract new investment, and the capacity market will be unable to procure the capacity required to meet load. Because permitting the exclusion of RMR units' capacity from the market is necessary to preserve accurate price signals, their exclusion is necessarily just and reasonable.[76]

PJM's capacity market employs a sloped demand curve (the Variable Resource Requirement or VRR curve).[77] The slope of the demand curve was established, in part, due to PJM's prediction of how often the market would operate under scarcity conditions.[78] The purpose of the sloped demand curve is to create immediate price signals in response to changes in capacity. As stated in Dr. Shanker's affidavit:

> The RPM intended the demand curve construct to act like a control system: pushing prices up during shortage to incentivize new entry, and reducing prices slowly (but always with aggregate lower total costs) when the system had excess capacity. The objective was for prices—over the long haul—to approximate the cost of new entry, while also keeping the quantity of capacity usually, but not always, above reliability targets.[79]

[75] Shanker at PP 12, 62, 67-68; Q2 2024 State of the Market Report for PJM, at 5 ("[I]nclusion [of RMR units in supply of capacity for auctions] overstates market supply and suppresses the capacity market price signal needed to incent the new entry needed to replace the retiring unit"), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2024/2024q2-som-pjm.pdf.

[76] Shanker at P 12.

[77] Shanker at P 22.

[78] *Id.* P 9.

[79] *Id.* P 10.

The demand curve would ensure that prices reflected the market's actual scarcity conditions, while at the same time dampening the price volatility that PJM had suffered before the implementation of the Reliability Pricing Model in 2006.[80] That volatility sent complicated price signals that impeded investor decisions. The tariff provisions in place for the last auction, in contrast, strike a balance between immediate, drastic price signals in times of even minor scarcity (as the market did prior to the implementation of the Reliability Pricing Model), and a dampened price signal that creates the predictability needed to induce investment, all the while accurately reflecting capacity scarcity.[81]

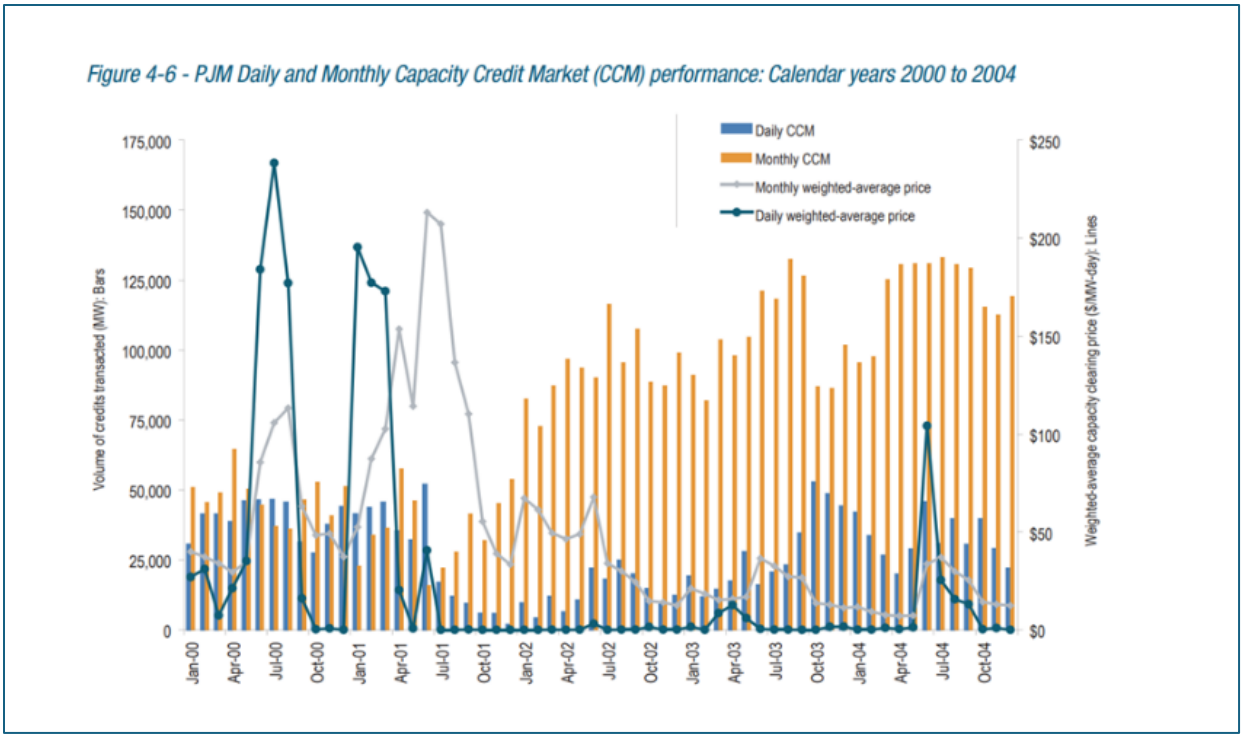
But the dampening of volatility was not designed to *suppress prices*, it was merely meant to allow investors to more easily perceive the price signal amidst what had been overwhelming noise from the market's volatility. The objective had always been to ensure that the price signal would, over time, correctly compensate the market for the capacity that it had and that it would procure. Again, "[t]he shape of the demand curve was an administrative construct designed to reflect the reliability needs of the overall system and localities that would send price signals."[82] Below is a chart from the IMM's State of the Market Report from 2004, immediately before the Reliability Pricing Model was adopted.[83]

[80] *Id.* P 22 ("At the time of the RPM proposal, this volatility was cited by Andrew Ott as a primary reason to adopt the . . . downward sloping demand curve which has now been a central feature of the RPM market for almost twenty years.")

[81] *Id.* P 23 (Quoting Andrew Ott: "Since the [pre-Reliability Pricing Model] capacity market has exhibited pricing behavior that bounces between two pricing extremes . . . the result has been increased forward uncertainty for generation.").

[82] *Id.* P 24.

[83] PJM IMM, *2004 State of the Market Report*, at 159 (Mar. 8, 2005), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2004/pjm-som-2004.pdf.



As the chart shows, over the course of four years, the prices in PJM's market swung drastically between very high prices at times of even minimal scarcity to zero (or nearly zero) when there was any surplus.[84] The Reliability Pricing Model's implementation of the sloped demand curve greatly reduced this volatility.[85]

Even though it was important to dampen PJM's sensitivity to small scarcity signals, PJM would not have implemented it if it had obstructed accurate price signals. To ensure that the market accurately prices scarcity, it must still assign the correct value to the *actual* quantity of capacity that is (or will be) available. The under- or over-inclusion of capacity will impede the development of accurate price signals under the sloped demand curve.[86]

[84] Shanker at P 21.

[85] *Id.* P 24.

[86] *Id.* P 10.

PJM *should* allow the exclusion of RMR generators' capacity value from the auction, or prices will be further suppressed. The forced inclusion of RMR generators' capacity in the auction would frustrate price formation because RMRs and capacity resources are different things. RMR generators voluntarily operating until necessary reliability upgrades are implemented do not necessarily assume the same obligations of a cleared Capacity Resource, they voluntarily negotiate any obligations and most importantly, will deactivate as soon as the underlying reliability issue is satisfied. Requiring the inclusion of RMRs in the market's supply after those generators have sought retirement, and would have retired absent administrative intervention, obscures the *actual supply of capacity* available to the market.[87] As the IMM stated on this very subject, "[s]uch inclusion overstates market supply and suppresses the price signal needed to incent the new entry needed to replace the retiring units."[88]

It is critical to the formation of scarcity pricing to allow the exclusion of the capacity of generators that have elected to retire and chosen not to participate in the capacity auction. To do otherwise would be to indicate to the market that there is more supply than can actually be relied upon. This RMR capacity will disappear once a "fix" is made by new generation or transmission. While an RMR arrangement is active, though the RMR unit is serving a local transmission need, the capacity is not "there." Every RMR agreement contemplates termination when it is no longer needed to solve a transmission constraint and, upon termination, the

[87] *Id*.

[88] PJM IMM, 2023 Q3 State of the Market Report for PJM, at 2 (Nov. 9, 2023), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2023/2023q3-som-pjm.pdf).

generating unit is then able to retire.[89] To encourage new entry to be market-based requires an accurate depiction of the supply and demand conditions in the locality or overall RTO.

Including RMR capacity obscures those conditions, sending the wrong price signals and incenting the wrong behavior. The result? Insufficient procurement, resource inadequacy, and more administrative "fixes" by mandated out-of-market Band-Aids. This just perpetuates the problem that could have been solved with accurate price signals from the beginning. The purpose of the price signal is to accurately reflect the needs of the market by expressing scarcity ahead of the time that the capacity is actually called upon to provide power given the approved deactivation.[90] If the capacity of a generator operating under an RMR is required to be included in the capacity auction during its operation as an RMR resource, the market will price capacity under a mistaken assumption because it will do so deprived of a critical piece of information—that the generator intends to deactivate *as soon as the constraint is relieved*.[91]

Were the Commission to implement the Complainants' requested relief, it would frustrate price formation over the three-year forward time lag upon which the capacity market relies. If

[89] *See, e.g.*, NRG Business Marketing LLC submits tariff filing per 385.602: Settlement Agreement and Offer of Settlement, Docket No. ER22-1529-002, at Attach. A, § 2.3 (Apr. 2, 2024) (stating in the Settlement RMR RS that ("Utility may terminate the provision of RMR service pursuant to this Rate Schedule consistent with the requirements of Section 113.3 of the PJM Tariff"); Brandon Shores Reliability Must Run Continuing Operations Rate Schedule, at § 2.3 ("Brandon Shores may terminate this Rate Schedule consistent with the requirements of Section 113.3 of the PJM Tariff."); H.A. Wagner LLC Reliability Must Run Continuing Operations Rate Schedule, at § 2.3 ("H.A. Wagner may terminate this Rate Schedule consistent with the requirements of Section 113.3 of the PJM Tariff."); *see also* PJM OATT at Part V, § 113.3 ("In the event that a Generation Owner or its Designated Agent, which has informed Transmission Provider pursuant to section 113.2 that a generating unit will continue operating, desires to deactivate such generating unit prior to the completion date of the Transmission System reliability upgrades necessary to alleviate the reliability impact resulting from the Deactivation of the generating unit, or the date that the Transmission Provider otherwise determines, in accordance with established reliability criteria, that the continued operation of the generating unit is no longer necessary for the reliability of the Transmission System, the Generation Owner or its Designated Agent shall provide notice of such proposed Deactivation in writing to the Transmission Provider no later than 90 days prior to the desired Deactivation Date for the generating unit.").

[90] Shanker at P 11.

[91] *Id.* P 11.

the RMR unit is required to offer into the capacity market during the pendency of its RMR agreement, when the constraint that required the RMR to be implemented in the first place is eventually relieved, the capacity value of the RMR generator, which the market had been pricing into its capacity values throughout the life of the RMR, will disappear instantly. It will take a further three years before that scarcity will be reflected in the capacity price, squelching the price signal that should have been sent throughout that entire time and frustrating the formation of the price needed to attract investment.[92] Absent the interval between the time the price signal is initially sent and the delivery year, the price signal will not have had time to attract necessary investment. It should be evident upon the most cursory inspection that Complainants are wrong when they claim that PJM's "capacity prices are inflated by ignoring generation that consumers are already paying to stay online" and that the capacity prices formed excluding RMR units' capacity "are not reflecting a true resource adequacy need."[93]

It should be apparent that now, more than ever, accurate price signals are needed to attract investment due to looming scarcity. Complainants themselves assert that "RMRs may become more common in PJM given the projected rate of retirements, challenges planning for and building transmission, and the slow pace of PJM's interconnection queue."[94] The fact that PJM may become more reliant on RMRs—due to the retirement of generators that are being *undercompensated*—does not indicate that the existing Reliability Pricing Model is unjust and unreasonable but that the Reliability Pricing Model needs to be given an opportunity to work so that investment can be attracted. Across several RTOs/ISOs, including PJM, electric generating

[92] *Id.* at PP 12-13.

[93] Complaint at 4.

[94] *Id.* at 24.

units are retiring at an increased rate.[95] PJM has assessed this and has estimated that "40 GW of existing generation are at risk of retirement by 2030."[96] This estimate is based on "6 GW of 2022 deactivations, 6 GW of announced retirements, 25 GW of potential policy-driven retirements and 3 GW of potential economic retirements," and "this represents 21% of PJM's current installed capacity."[97] The risk from increased retirements is more acute when taking into account that "PJM's long-term load forecast shows demand growth of 1.4% per year for the PJM footprint over the next 10 years" and "[d]ue to the expansion of highly concentrated clusters of data centers, combined with overall electrification, certain individual zones exhibit more significant demand growth—as high as 7% annually."[98] These changes in market fundamentals can—and will—be solved for by the Reliability Pricing Model, but only if the Commission forbears interfering with the formation of price signals that accurately reflect scarcity.

Any market construct that results in prices based on inputs that are known to be inaccurate cannot be just and reasonable.[99] The inclusion of RMR units' capacity would overstate the quantity of capacity available to the market, necessarily understating scarcity while disguising the impending deactivation. PJM's current practice of permitting the exclusion capacity contributions from RMR units that have been approved to deactivate is just and

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[95] *See generally* PJM, G*eneration Deactivations*, https://www.pjm.com/planning/service-requests/gen-deactivations#:~:text=Retired%20%2D%20inactive%20and%20not%20expected,been%20notified%20of%20the%20deactivation.; EIA, Elec. Power Monthly Table 6.6 Planned U.S. Elec. Generating Unit Retirements, https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=table_6_06 (providing examples of planned retirements from 2024 to 2072).

[96] PJM, *Energy Transition in PJM: Resource Retirements, Replacements & Risks*, at 2 (Feb. 24, 2023), https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx.

[97] *Id*.

[98] *Id.* (citation omitted).

[99] *See, e.g.*, *Managing Transmission Line Ratings*, Order No. 881, 177 FERC ¶ 61,179 at P 29 (2021) (finding that inaccurate transmission line ratings cause unjust and unreasonable rates).

reasonable. The recent auction's elevated prices do not mean the Reliability Pricing Model is unjust and unreasonable—it means that it is working.

C. There is No Double Counting.

Complainants argue that allowing the exclusion of the capacity value of RMR units from the auction results in a double payment for the resource by the ratepayers.[100] Any intuitive appeal this argument may have is belied by the actual mechanics of the market. There is no double payment because the ratepayers are paying for two completely different products when they pay for capacity procured by the auction and at the same time pay for the continued operation of a generator under an RMR contract.[101]

This can be demonstrated with a simple thought experiment. Assume a generator announces its intention to retire. Further assume that it passes the market power test because its retirement is decided upon for legitimate economic reasons, e.g., its offers to sell capacity fail to clear. In that case what happens? The generator retires and the supply of generation available in the auction (e.g., 1,000 MWs) decreases by the capacity value of the generator. If there is no intervention—if it is just allowed to retire, the new pricing structure for the BRA will reflect a decrease in capacity of 1,000 MW in that LDA. The BRA will then solve for the reduced supply and reflect the same or a higher price. But what happens if PJM determines that the generator is needed for reliability purposes? Clearly, if the generator were needed *and* the market had accounted for the constraint that its retirement had exposed, the offer to sell (at the higher uncleared price) would have been accepted because the market would have properly valued the

[100] Complaint at 28–29, 33 (claiming that ratepayers pay once for RMR resources and again for "redundant capacity" in the auction).

[101] Shanker at P 60.

reliability contributions of the generator.[102] But in this later scenario the market failed to correctly compensate the generator for its actual value, so the market's capacity price upon retirement should be *exactly the same* as the market would arrive at after PJM excludes the capacity value of the RMR unit from the auction. There can be no double counting—i.e., ratepayers cannot be paying too much—if the resultant price is identical.

We have just demonstrated that the correct capacity price is established without the generator's capacity being added to supply. What should PJM do then? Should it just let the unit deactivate, secure in the knowledge that it has arrived at the correct capacity price (regardless of what the consequences to reliability might be)? No. PJM will act to secure the reliability benefits that the generator provides to the transmission system by entering into a temporary RMR arrangement, at a price the Commission deems just and reasonable, which lasts until facilities are built to relieve the constraint for which the market failed to solve. That price will likely be higher than the market clearing price, and that makes sense: the difference between the RMR price and the clearing price represents the premium owed by the market for securing the reliability attributes not priced by the market.

In a word, there is no double payment because the market clearing price is the same as if the generator had fully deactivated. Any additional cost is the premium the market pays to prevent deactivation to keep the RTO's supply and transmission systems reliable.

D. There Are No Legitimate Market Power Concerns.

The Complaint raises the specter of market manipulation to frighten the Commission into undermining the Reliability Pricing Model's price formation, arguing that to allow "RMR units

[102] This, of course, assumes that the market rules would allow a generator to offer its actual costs, unconstrained by contentious artificial price limits like the Market Seller Offer Cap which may not allow the generator to fully express their costs and risks.

to participate in the capacity market renders the market more vulnerable to manipulation."[103] Specifically, the Complaint claims that "the absence of any requirement for RMR units to participate in the capacity market renders the market more vulnerable to manipulation through withholding than similar markets in other RTO/ISOs."[104] The relief they request is a replacement rate in which RMRs would be subject to the market's must-offer requirement and be obligated to offer into the auction as price-takers.[105]

Complainants' threats are unconvincing. All competitive markets are, to a degree, vulnerable to the exercise of market power. But the Complainants have not alleged that the exercise (not existence) of market power has occurred, or that it has an articulable effect on clearing prices, or that RMR units, after the IMM has approved their deactivation and the Commission has accepted their agreement, have been implicated in the exercise of market power. The Complainants are just trying to scare people by talking about it. They ignore, as discussed below, the explicit requirement that a request for deactivation must be reviewed by the IMM, and presumably corrective action will be taken if the retirement is uneconomic but for the impacts related to withholding of supply. Effectively, they are arguing the Market Monitor cannot be trusted to do his job.

Instead of offering actual evidence of the exercise of market power, the Complaint merely suggests that, because the quantity of supply in the auction will be reduced when the capacity value of an RMR is excluded from the auction, there is a greater likelihood of the exercise of

[103] Complaint at 43.

[104] *Id*.

[105] *See id*. at 47 (asserting that "other RTO/ISOs' capacity markets are not vulnerable to the exercise of market power through the non-participation of RMR units, because market rules in other RTO/ISOs require RMR units to participate in capacity auctions as price-takers").

market power. The same could be said about retirements generally, and in this instance there is a specific tariff-based check to ensure that the deactivation decision is consistent with competitive behavior. There is nothing about PJM's practice of allowing the exclusion of an RMR's capacity value from the auction that would lead to more frequent or more damaging exercises of market power than if the RMR unit were required to offer into the capacity market. In both instances, the action is subject to IMM review to guard against the anti-competitive exercise (not existence) of market power.

Since capacity will be lost in the ordinary course of retirements due to market forces, occasional reductions in supply and concomitant market concentration are not only inevitable, they are also a necessary artifact of the very entry and exit that the market was designed to facilitate. There is no reason to point to RMRs as a particular culprit, and there is certainly no reason to imperil accurate price formation by including RMRs' capacity value in supply merely for the sake of staving off a speculative threat of market manipulation when retirements and capacity loss are part of a properly functioning market.

It is particularly unjustified when the market—as the Complaint itself recognizes—"relies on certain rules and mitigation measures to prevent noncompetitive outcomes."[106] This includes—again, as the Complaint itself recognizes—the IMM's "process for evaluating whether a generator's deactivation constitutes an exercise of market power."[107] First, the owner assesses the economics of the unit. If the owner determines that the unit is uneconomic, the generation owner can then avail itself of the process under Part V of the PJM OATT to deactivate.[108] Then,

[106] *Id*. at 43.

[107] *Id*. at 46.

[108] PJM OATT Part V § 113.

the IMM evaluates whether the deactivation would be an exercise of market power. If the plant is deemed to be uneconomic, then the deactivation is deemed as being undertaken for legitimate economic reasons and it is permitted to retire, or PJM can request that it enter into an RMR if PJM determines that its deactivation will result in a reliability impact. If, however, the IMM determines that the retirement is not economically justified the IMM may presumably make a referral to FERC's Office of Enforcement.[109] Ultimately, the choice to retire rests with the owner of the generation unit; neither PJM nor the IMM decide whether the unit retires.

This is a robust process, requiring the IMM's scrutiny of the reasons for retirement and PJM's examination of the retirement's effect on reliability. If the IMM determines that the generator's retirement is justified under prevailing economic conditions, it will deactivate and that is the end of the story. This is exactly how the Reliability Pricing Model is meant to work. If not, then there may be an exercise of market power and the relevant authorities are aware of what the generator may do.

The Complaint's argument against allowing the exclusion of RMR units' capacity contribution is not aided by its appeal to the threat of the exercise of market power. The PJM Tariff insulates against any such threat, and any unit that retires for non-economic reasons will have been scrutinized well before an RMR agreement is reached.

E. Other RTOs' Capacity Constructs are Irrelevant.

Complainants wrongly rely upon comparisons to other RTOs' capacity constructs to bolster arguments to mandate inclusion of RMR capacity in the BRA. In the case of all three other RTOs the comparisons fail.

[109] *See* 18 C.F.R. § 1c.2 (providing for the prohibition of electric energy market manipulation).

First, RTOs need not be the same. The Commission has long recognized (and encouraged) variation among the RTOs[110] and, regarding generator retirements, the Commission has stated that "[e]ach Regional Transmission Organization and Independent System Operator (RTO/ISO) is developing different systems for handling deactivation, and the Commission is not insisting that exactly the same system be applied in each RTO."[111]

Second, the Complainants' comparisons with other RTOs are simply inapt. The markets' structures and mechanics vary so drastically and face such profoundly different challenges that comparisons are uninstructive.

The NYISO and PJM capacity market constructs are "fundamentally different" in their design and operation.[112] The Commission "has repeatedly noted the differences between the PJM and NYISO markets making different rules appropriate."[113] As the Commission has explained:

> NYISO's capacity market is short-term in nature—with auctions for spot, monthly, and three month (strip) capacity—whereas PJM's auction occurs three years in advance awarding a year-long capacity obligation. In addition, there are other significant differences between the two markets; for instance, . . . NYISO is a single-state ISO while PJM is a multi-state (and the District of Columbia)

[110] *See, e.g.*, *PJM Interconnection, L.L.C.*, 112 FERC ¶ 61,031, at P 21 (2005) ("Each [RTO/ISO] is developing different systems for handling deactivation, and the Commission is not insisting that exactly the same system be applied in each RTO."); *N.Y. Indep. Sys. Operator, Inc.*, 150 FERC ¶ 61,116 at P 12 n.22 (2015) ("[W]e recognize that there may be reasons to allow variation among RTOs/ISOs . . . ."); *IMM for PJM v. PJM Interconnection, L.L.C.*, 178 FERC ¶ 61,121, at 122 n.277 (2022) ("The Commission has permitted regional variation among RTOs/ISOs."); *Regional Transmission Organizations*, Order No. 2000, 89 FERC ¶ 61,285, at 129 (1999) (to be codified at 18 C.F.R. pt. 35) ("[W]e believe that the right balance is a minimally intrusive, solution-oriented approach that provides guidance and specifies only the fundamental RTO characteristics and functions.").

[111] *PJM Interconnection, L.L.C.*, 112 FERC ¶ 61,031 at P 21.

[112] *N.Y. Pub. Serv. Comm'n v. N.Y. Indep. Sys. Operator, Inc.*, 153 FERC ¶ 61,022, at P 38 (2015) ("*NYPSC v. NYISO*").

[113] *Calpine Corp. v. PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,035, at P 351 n.754 ("*Calpine v. PJM*").

> regional transmission organization (RTO). PJM's peak demand is therefore much higher than NYISO's peak demand.[114]

NYISO uses shorter-term auction processes that encourage resource availability during peak periods, emphasizes locational considerations, and—critically—lack PJM's aggressive performance penalties.[115] PJM, in contrast, operates a three-year forward market that relies upon long-term commitments and imposes significant–sometimes extraordinary—performance penalties.[116] Moreover, PJM's market is much larger and more geographically diverse region served by a wider range of generation resources interconnected to a much larger transmission system. NYISO, in contrast, is a single-state RTO with a significantly participating single state regulatory body. Given the region's differences, there is no reason to expect (let alone require) RMR resources to be employed identically between the two, especially given how much greater the liability faced by capacity resources under PJM's penalty regime.

Complainants' comparison to ISO-NE fares no better. While ISO-NE is similar to PJM in that it has a forward capacity auction where "capacity suppliers compete to provide capacity in the RTO/ISO region on a three-year forward basis,"[117] the two RTOs' RMR regimes were designed to solve two different problems. PJM overwhelmingly enters into RMR arrangements in order to relieve local transmission constraints. In contrast, ISO-NE employs RMRs to ensure fuel security: "ISO-NE has long recognized that maintaining fuel security in the New England region—ensuring that power plants have or can obtain the fuel needed to run—is particularly

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[114] *NYPSC v. NYISO*, 153 FERC ¶ 61,022 at P 38.

[115] *See* NYISO Market Administration and Control Area Servs. Tariff §§ 5.13–5.14.

[116] *See* PJM OATT, Attach. DD.

[117] *ISO New England Inc.*, 164 FERC ¶ 61,003, at P 6 (2018).

challenging in winter when natural gas pipeline capacity is generally more constrained than in other seasons."[118]

For example, in March 2018, Constellation Mystic Power, LLC concluded that the Mystic Generating Station—which has liquefied natural gas (LNG) generators—was uneconomic due to increased LNG prices and notified ISO-NE that it intended to retire its generators after satisfying its existing capacity supply obligations.[119] ISO-NE determined that the retirements would cause fuel security problems because the retirements would "deprive the ISO-NE electric system of 1,700 MW of winter generating capacity with on-site fuel but also result in the loss of [the Everett Marine Terminal's (Everett)] biggest customer," "mak[ing] it more likely that Everett would cease operation, thus increasing the region's risks of reserve depletion and load shedding."[120] Constellation Mystic Power, LLC then entered into a cost-of-service agreement with Exelon Generating Company, LLC and ISO New England Inc. for fuel security services from June 1, 2022 to May 31, 2024.[121] This is not how RMRs work in PJM. The comparison fails.

As the Commission has recognized, "there appear to be material differences between retaining resources through cost-of-service agreements for local transmission needs and retaining resources through cost-of-service agreements for regional fuel security concerns."[122] The Commission reasoned that, "unlike reliability must-run resources, the need for a fuel-secure

[118] *Id.* P 4.

[119] *See Constellation Mystic Power, LLC*, 186 FERC ¶ 61,103, at PP 3-5 (2024).

[120] *ISO New England Inc.*, 173 FERC ¶ 61,205, at P 3 (2020).

[121] *See* Filing, Constellation Mystic Power, LLC, Docket No. ER18-1639-000, at Attach. A (May 16, 2018).

[122] *ISO New England Inc.*, 164 FERC ¶ 61,003 at P 57 (2018).

resource is unlikely to be met by local or pool transmission upgrades."[123] As if anticipating Complainants' argument, the Commission went on to state that "local transmission security needs are typically too granular to be handled by [ISO-NE's] current [Forward Capacity Market] design," which is focused on fuel security.[124]

Finally, Complainants make a startling comparison to CAISO—an RTO that does not operate a capacity market. CAISO procures capacity through state regulatory mechanisms and its energy market.[125] It does not employ, as PJM does, a longer term procurement auction "designed to provide long-term forward price signals."[126] PJM and CAISO are so different that the comparison offers nothing to be gleaned about how PJM should treat its RMRs.[127]

It is worth noting that the Midcontinent Independent System Operator, Inc. (MISO)—while different from PJM in other regards—shares PJM's rule that RMR units may voluntarily decide whether or not to offer into the capacity auction. Yet Complainants make no mention of MISO or its treatment of RMR generators.[128]

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[123] *ISO New England Inc.*, 165 FERC ¶ 61,202 at P 54 (2018).

[124] *ISO New England Inc.*, 164 FERC ¶ 61,003 at P 57 n.154.

[125] *See*, *e.g.*, *Cal. Indep. Sys. Operator Corp.*, 168 FERC ¶ 61,199 at P 72 (2019) (stating that RMR units must participate in the energy market so that CAISO can "predict with certainty the specific times when an RMR resource will be needed").

[126] *PJM Interconnection, L.L.C.*, 126 FERC ¶ 61,275 at P 150 (2009).

[127] *See* CAISO, Fifth Replacement Electronic Tariff, Appendix G, Pro Forma Reliability Must Run Contract, § 6.1(a) ("All Units are subject to all applicable CAISO Tariff provisions based on resource type and all applicable Resource Adequacy CAISO Tariff provisions, including the must-offer obligation to submit Energy, Ancillary Services, and Residual Unit Commitment bids for all RMR Contract Capacity in all hours as applicable. Consistent with Section 40 of the CAISO Tariff, Units subject to this Agreement will be subject to Resource Adequacy bid generation provisions unless otherwise exempted pursuant to CAISO Tariff Section 40.").

[128] MISO Tariff, Attachment Y-1, Standard Form System Support Resource ("SSR") Agreement, § 8 (stating that a "[p]articipant may also offer, from the SSR Unit(s), Zonal Resource Credits into the Planning Resource Auction or include the SSR Unit(s) in a Fixed Resource Adequacy Plan pursuant to the terms of the Tariff").

F. Consumer Advocates Echo the Same Misunderstanding of the Market Advanced by Complainants.

Like the Complainants, the Consumer Advocates incorrectly assume that the results of the 2025/26 BRA are inconsistent with the intended operation of the Reliability Pricing Model. Markets do not work only when prices are low. To the contrary, prices in a competitive market fluctuate with supply and demand.

The Consumer Advocates implore the Commission to focus on the "realities" of the market.[129] We agree. The reality of this market is that it is short on capacity. Another reality of this market is that the scarcity of capacity has made capacity more valuable. Yet another reality is that the short-term RMR fix will disappear with its supply as soon as the transmission constraints are relieved. A final reality, not just of this market, but of every market, is that, all things being equal, valuable things are more expensive. Facing these realities and the further fact that participants in competitive markets respond to price signals, everyone—Consumer Advocates included—should embrace higher prices as the means by which the ratepayers they represent will be able to obtain capacity. As Dr. Shanker explains at length, the realities of the market show nothing more than the normal and expected ebb and flow of prices in response to supply and demand.

The Consumer Advocates lament the 2025/26 BRA's results which they state showed "the lowest overall reserve margin PJM has had in the past decade."[130] But that is hardly a historic event and the Installed Reserve Margin was slightly higher than "target."[131] PJM had a lower

[129] Comments and Answer of Consumer Advocates ("Consumer Advocates' Comments") at 6 (Oct. 17, 2024).

[130] *Id.* at 9.

[131] PJM, *2025/2026 Base Residual Auction Report* 4 tbl.2 (July 30, 2024), https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.ashx; Shanker at P 51 & tbl.1.

overall reserve margin in four of the Reliability Pricing Model's first five years.[132] Like the 2025/26 BRA, these years were accompanied by prices closer to CONE.[133] What, then, was done in the early days of the market to treat the same symptoms that the Complainants and Consumer Advocates now believe to be a sign of the failure of the Reliability Pricing Model? Nothing. The market was allowed to operate as intended. Supply increased in the following years, and prices decreased.[134] The 2025/26 BRA produced relatively elevated prices, but we have seen similar prices before, both in the simulations filed in support of the Commission-approved Reliability Pricing Model[135] and "market realities."[136] Now, after several years of accelerating retirements and decreasing capacity offered into the market, prices have increased—exactly as intended and exactly as expected.[137]

Perhaps understanding that simply parroting the Complaint would be unpersuasive, Consumer Advocates seek to expand this case far beyond the issue at hand. They ask the Commission to require PJM to "subject[] other currently exempt eligible resources—intermittent, storage and hydro—to PJM's capacity must offer requirement" and "subject[] Demand Response resources to an offer cap,"[138] promising that they "plan to file a separate

[132] Shanker at tbl.1.

[133] *Ibid.*

[134] *Ibid.*; IMM, *2012 Annual State of the Market Report*, at 146 tbl. 4-9 (Mar. 14, 2013), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2012/2012-som-pjm-volume2-sec4.pdf (showing increased cleared capacity).

[135] Shanker at P 11

[136] *Id.* at tbl.1.

[137] *Id.* at P 56.

[138] Consumer Advocates' Comments at 6.

complaint expanding on these issues."[139] There is no reason for the Commission to address any of these questions here. The Commission should wait for this separate complaint, if indeed it is filed, when it will have the benefit of a full briefing on those issues.

Even so, the Consumer Advocates ask for these additional remedial measures to establish "a genuine interplay of supply and demand."[140] But they, like the Complainants, fail to recognize (or, perhaps, ignore) the fact that the current Reliability Pricing Model already reflects that "genuine interplay." In 2006, the Commission found that the Reliability Pricing Model "permits competitive entry in the event that existing generators are seeking to raise prices above competitive levels."[141] The basic structure of that just and reasonable Reliability Pricing Model remains in place today.[142] A single year of high prices does not mean that the Reliability Pricing Model is broken, and it certainly cannot stand—in itself, alone—as sufficient evidence to make such a finding. And there is no reason to think that the basic economic principles upon which the Reliability Pricing Model was designed, and in conformity with which it has performed, somehow no longer apply.

III. Complainants Fail at Step Two: The Complainants' Requested Replacement Rate is Not Just and Reasonable.

In addition to the burden of demonstrating that an existing tariff is unjust and unreasonable,[143] Complainants bear the additional burden of demonstrating that their proposed

[139] *Id.*

[140] *Id.* at 8

[141] *PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,331 at P 101.

[142] Shanker at P 48.

[143] *Constellation Mystic Power, LLC v. FERC*, 45 F.4th 1028, 1035 (D.C. Cir. 2022) ("A negatively affected party may challenge a Commission-approved rate by filing a complaint with the Agency, and it carries the burden of demonstrating that the rate is unjust or unreasonable." (citation omitted)).

replacement rate is just and reasonable.[144] Complainants fail at the first step because PJM's current Tariff is just and reasonable. Complainants fail at the second step because their proposed replacement rate would be unjust and unreasonable: it will distort market prices and the inevitable price suppression that would result from its implementation would all but ensure that PJM would fail to procure sufficient capacity to remedy scarcity.

A. Complainants' Request for a Replacement Rate is Based on a False Premise—There is No "Inconsistency."

Complainants approach the Commission with what seems like a reasonable request—"consistency," they say, is all they are asking for. Complainants state that they seek a replacement rate that will "consistently account for RMR units' resource adequacy contributions."[145] Complainants will be pleased to know that their wish is already granted—RMR units' resource adequacy contributions *are* consistently accounted for because there is no inconsistency in the inclusion or exclusion of a generator's capacity value when that value is being used to calculate two completely different values.

The Complaint states that there is an inconsistency in how RMR resources are treated by PJM because:

> [a]lthough PJM does not require RMR units to offer into the capacity auction, it does include these units when modeling the PJM system for purposes of determining the amount of capacity that can be transferred into constrained LDAs under peak load emergency conditions, and how much capacity is available within each LDA.[146]

[144] 16 U.S.C. § 824e(a).

[145] Complaint at 1.

[146] *Id*. at 9.

The IMM has also claimed (only recently and in direct opposition to his *decades*-long position on the matter)[147] that it is inconsistent for PJM to include "RMR units in the reliability analysis for RPM auctions" while it "does not include the RMR units in the supply curves."[148]

There is no inconsistency. Procuring capacity through the Reliability Pricing Model and examining the system to ensure reliability are two completely different functions and a generator need not—in fact, should not—be treated the same for both analyses.

Capacity Emergency Transfer Objective ("CETO") is a reliability metric. It is the "[a]mount of import capability under peak load emergency conditions into a defined area to maintain the [locational deliverability area ("LDA")] reliability criteria."[149] Similarly, the Capacity Emergency Transfer Limit ("CETL") is a different metric which is "measured against CETO to determine system ability to import capacity into and LDA under peak load emergency conditions."[150] Dr. Shanker discusses at length how PJM balances these two different issues and how the treatment of RMR units with respect to the overall supply by exclusion can be completely consistent with the representation of the RMR units when PJM is considering reliability.[151] PJM similarly has explained that the inclusion of RMR units in the CETO calculation and the assessment of local reliability requirements is "appropriate for maintaining

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[147] *See* PJM, DESTF, Package/Proposal Matrix (May 17, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20240517/20240517-item-05---options-and-packages-matrix.ashx; Shanker at PP 69–70. The IMM's prior position for nearly 20 years was that PJM had to exclude the RMR capacity contributions from the auction and the reliability analysis.

[148] PJM IMM, *Analysis of the 2025/2026 RPM Base Residual Auction Part A*, at 6 (Sept. 20, 2024), https://www.monitoringanalytics.com/reports/Reports/2024/IMM_Analysis_of_the_20252026_RPM_Base_Residual_Auction_Part_A_20240920.pdf.

[149] PJM, *PJM CETO/CETL & Load Deliverability*, at 11 (Aug. 19, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20240819/20240819-item-04---ceto-cetl-and-load-deliverability-test.ashx.

[150] *Id.* (emphasis added).

[151] Shanker at PP 11, 47-48, 62.

system reliability" because excluding RMR units from the assessment could distort the "assessment of local reliability needs."[152] This is a reliability issue. The inclusion of RMR units in CETL and CETO reflects the actual ability that the transmission system has to transmit power within the transmission system. The calculations of CETL and CETO are separate and distinct from the establishment of the amount of capacity required to meet load, which is the problem that the BRA is designed to solve through accurate price formation. This is particularly true when PJM has committed to the development of a transmission project to relieve the reliability constraint in the LDA. Performing the calculation this way accurately reflects the reliability conditions in the area and complements the pricing signal by accurately reflecting the sunk action (the commitment to build transmission) which, once it occurs, will afford the opportunity for the RMR units to deactivate. PJM went on to state that:

> Under the current design, risk patterns can vary across LDAs, while resource capacity accreditation is determined based on the RTO-wide risk pattern. Therefore, our reliability analysis must assess the total quantity of system-accredited capacity necessary to meet local reliability needs based on local risks, which inherently includes considering all physical resources expected in the area, including RMR units. Additionally, it is important to be consistent in the modeling of the necessary transmission upgrades associated with an RMR unit. The RMR units are included in the assessment of local reliability requirements, CETO and CETL calculations, but the necessary transmission upgrades are appropriately not included. This consistency removes the potential for distorted price signals that would incent generation where transmission upgrades could have replaced that need. It is of crucial importance to have consistent modeling of resources in the CETO and CETL analysis given that those values are intended to be directly comparable; further, it is necessary that the thermal and voltage analysis underlying the CETL calculation reflects the actual physical system as accurately as possible in order to produce meaningful results. This is consistent with including the RMR units expected to be

[152] PJM, *PJM Response to the 2023 State of the Market Report*, at 3 (Aug. 2024), https://pjm.com/-/media/library/reports-notices/state-of-the-market/20240822-pjm-response-to-the-2023-state-of-the-market-report.ashx (emphasis added).

> operating and impacting power flows on the system during times of reliability need.
>
> Including RMR units in the analysis also ensures that we determine the appropriate total reliability requirement and CETO for each LDA. In some cases, excluding these units could lead to an overestimation of the capacity needed from the market, potentially resulting in over-procurement and inefficient market outcomes. In other cases, excluding RMR units from the analysis could lead to under-procurement of local capacity, potentially creating greater local reliability risks.[153]

In a word: capacity auctions are different from reliability assessments for LDAs—there is no inconsistency here. As explained above, the capacity value of generators operating under an RMR agreement should be excluded from the BRA because the auction must result in a price that accurately reflects the supply shortage caused by the generator's retirement so that *future* investment will occur.[154] In contrast, the RMR generator should be *included* in the reliability assessments because PJM needs to know the reliability requirements of its transmission network *now* and has already committed to develop transmission projects to relieve the transmission constraints.

PJM's explanation for why the RMR value is included in reliability calculations is irrefutable: inclusion of RMR units in reliability calculations is warranted because "RMR units [are] expected to be operating and impacting power flows on the system during times of reliability need."[155]

The RMR generator's capacity value in either case is merely an arithmetic value—its inclusion or exclusion from a particular calculation is only necessary or detrimental depending

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[153] *Id*. at 4.

[154] Shanker at P 11.

[155] *PJM Response to the 2023 State of the Market Report*, *supra* note 151, at 3.

upon what is being calculated and for what purpose. In this case the purposes are clear and distinguishable, the units have been approved to deactivate and that information is needed to set appropriate prices in the Reliability Pricing Model. The transmission upgrades to relieve constraints are committed, and retention of the RMR units for reliability analyses consistently represents the effect of developing that transmission until the transmission is actually in service. There can be no inconsistency in treating different things differently.[156]

B. The Complainants' Suggested Replacement Rate is Not Just and Reasonable.

Their groundless basis for the requested relief notwithstanding, Complainants' suggested replacement rate cannot be approved because it is not just and reasonable. The Complaint requests that the Commission require a change PJM's tariff to "account for the resource adequacy contributions of RMR units" and suggests to do this by either including RMR generators' capacity contributions "as supply or by reducing the amount of capacity procured."[157] Complainants further ask the Commission to "require the RMR units to offer into the capacity market as a price taker" by revising the PJM OATT's exceptions to the must-offer rule.[158]

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[156] Shanker at P 11.

[157] Complaint at 52–53 (emphasis added).

[158] *Id*. at 53 ; *see also* PJM OATT Attach. DD § 6.6(g). Economic infirmities aside, the Complainants' requested relief is most likely impossible as a matter of law. Approved tariffs in other RTOs notwithstanding, it is doubtful that the Commission can require a generator to provide RMR service. *See PJM Interconnection L.L.C.*, 110 FERC ¶ 61,053 at P 137 (2005) ("PJM has not adequately shown that it has the authority to require generators to operate beyond a reasonable notice period."). The FPA provides a process for requiring generators to continue operating, and that process is carried out by the Department of Energy (DOE)—not FERC. FPA section 202(c)(1) provides:

> [W]henever the [DOE] determines that an emergency exists by reason of a sudden increase in the demand for electric energy, or a shortage of electric energy or of facilities for the generation or transmission of electric energy, or of fuel or water for generating facilities, or other causes, the [DOE] shall have authority . . . to require by order such temporary connections of facilities and such generation, delivery, interchange, or

(cont'd)

In the alternative, the Complaint suggests that if RMR units are allowed to retain their option to decline assuming capacity obligations in the BRA, the Commission should require tariff revisions such that the "RMR unit would be represented as a resource with capacity injection rights that is called by PJM when needed for reliability . . . within the resource adequacy modeling"—an approach that the Complaint states could "be expected to reduce the Reliability Requirements in the unit's locational delivery area by roughly the resource adequacy value of the RMR unit in that zone, and also in parent zones" resulting in "roughly the same clearing prices . . . as including the RMR unit as a supply resource in RPM."[159]

None of the Complainants' schemes would be just and reasonable replacement rates. Requiring RMR units to offer into the BRA would not be just and reasonable because it would threaten reliability. Generators that would otherwise enter into an RMR arrangement would likely decline to do so. As the Complaint acknowledges, PJM itself is concerned that a must-offer requirement for RMR resources would result in fewer generators deciding to enter RMR agreements.[160] PJM is right to be concerned. These generators have decided to deactivate for a

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> transmission of electric energy as in its judgment will best meet the emergency and serve the public interest.

16 U.S.C. § 824a(c)(1). This provision empowers the DOE to require generators to operate beyond their desired deactivation dates. FERC cannot claim the same authority. "Agencies have only those powers given to them by Congress, and 'enabling legislation' is generally not an 'open book to which the agency [may] add pages and change the plot line.'" *West Virginia v. EPA*, 597 U.S. 697, 723 (2022) (alteration in original) (citation omitted) . The Commission's authority under the FPA "to assess the justness and reasonableness of practices affecting rates of electric utilities is limited to those methods or ways of doing things on the part of the utility that directly affect the rate or are closely related to the rate, not all those remote things beyond the rate structure that might in some sense indirectly or ultimately do so." *Cal. Indep. Sys. Operator Corp. v. FERC*, 372 F.3d 395, 402–03 (D.C. Cir. 2004). The FPA is clear: DOE has the authority to require a generator to operate to avoid a shortage. And DOE has not delegated this authority to FERC. *See, e.g.*, Dep't of Energy, Order No. 202-24-1 (Oct. 9, 2024) (exercising Section 202(c) authority). The Commission cannot, therefore, read into FPA sections 205 and 206 that it has the authority to require generators to enter into RMRs—nor could it require a replacement rate that does so.

[159] Complaint at 54 (citations omitted).

[160] *Id.*

reason—they are not being compensated by the market at sufficient rates to remain economically viable. When facing an economic retirement, these units may determine that it is not worth it to accept an RMR agreement if accompanied by a capacity supply obligation because that entails serious liabilities, not the least of which are exposure to potential Capacity Performance penalties.[161] The generation owner's calculation is simple: does the potential cost of incurring a continuing obligation as a capacity resource and the liability associated with performance penalties likely outweigh the value of possible RMR payments? The answer, most probably, is yes. Incentivizing retiring generators *not* to accept an RMR contract when those units are required for system reliability is not just and reasonable.

Similarly, requiring an RMR unit to enter the market as a price-taker is not just and reasonable. Requiring a deactivating unit submit an offer of $0 into the capacity auction would distort market price signals and, by suppressing market prices, would fail to create the needed incentives for new market entrants to build the generation needed to overcome scarcity.[162] It is exactly backwards. We know that the generator is undercompensated and likely did not clear the auction to begin with. This action requires both outside compensation *and* the assured reduction of the price we already know to have been too low. Suppressing the market price signal will hasten yet more retirements and impede investment, all of which will ultimately lead to even greater capacity reserve shortfalls. Imposing a "solution" that will accelerate the very retirements that led, in part, to the capacity shortfall that necessitated an RMR agreement in the first place cannot just and reasonable.

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[161] Shanker at P 11 & n.18.

[162] Shanker at P 11; *PJM Interconnection, LLC*, Docket No. EL05-148-000, Affidavit of Dr. Joseph E. Bowring at 15 (Aug. 31, 2005).

Lastly, the Complainants' alternative to treat RMR units "as a resource with capacity injection rights that is called by PJM when needed for reliability," fares no better because it will similarly distort price signals. In times of scarcity, the last thing we want to do is the very thing Complainants suggest: to inaccurately represent the quantity of capacity available long-term in the RMR unit's LDA thereby *ensuring* inaccurate price signals. Misrepresentation is exactly what Complainants propose when they suggest "reduc[ing] the Reliability Requirements in the unit's locational delivery area by roughly the resource adequacy value of the RMR unit."[163] One way or another, by counting the retired generator, or by faking it through a reduction of the Reliability Requirements, the Complainants' objective is either to suppress prices or jeopardize reliability, or both.

We know that this replacement rate must be unjust and unreasonable because of the touted benefit of their proposal: it would result in "roughly the same clearing prices" as if the unit were "a supply resource in RPM" which, as discussed above, inaccurately reflects the actual supply and demand in the market.[164] Any replacement rate that ensures that prices are inaccurate by misrepresenting the quantity of capacity available or needed cannot be just and reasonable.

The Commission should reject the Complaint at Step One, finding that PJM's current rate is just and reasonable. Nevertheless, should the Commission find that the current rate is unjust and unreasonable, it cannot impose the Complainants' proposed replacement rate. The Commission will then be in the unenviable position of having to determine what the replacement rate should be in in the face of rising demand and falling capacity. Any adjustment to the PJM Tariff imposed by the Commission must preserve the market's scarcity price signals by

[163] Complaint at 54 (citation omitted).

[164] *Id*. at 54 (citation omitted).

accurately reflecting long-term market supply or risk inevitable reliability failures that occur when successive years of under-compensation drive retirements and obstruct investment.

IV. The Market Monitor's Comments are Inexplicably Inconsistent with His Long-Held Views.

The IMM's comments in support of the Complaint are baffling. Without explanation, acknowledgment, or analysis, the IMM has completely reversed his long-held and well-reasoned position that RMR units should be excluded from supply in the BRA. In a drastic departure from *decades* of public statements and filings, in this proceeding the IMM, for the first time, recommends that PJM "treat Part V resources as part of supply in the capacity market during the period that the RMR is in effect."[165] Why should anyone heed this recommendation? Until just a few weeks ago, the IMM held the *exact opposite position*.

From the very beginning of the Reliability Pricing Model in 2005, the IMM explained that RMR units should not be treated as supply in the capacity market because:

> [u]nits which are compensated via an RMR contract are indifferent as to the clearing price in the capacity market and have no incentive to make competitive offers or optimal offers in the capacity markets. If a regional shortage of capacity is reflected only in RMR payments and not in capacity market prices, there is no market signal for entry.[166]

But we do not have to go back 20 years to the establishment of the Reliability Pricing Model to see the IMM's view. In May, before PJM's Deactivation Enhancements Senior Task Force ("DESTF"), the IMM reiterated this position that there should be "[n]o must offer requirement"

[165] Comments of the Independent Market Monitor for PJM, at 2 (Oct. 10, 2024) ("IMM Comments").

[166] *PJM Interconnection, LLC*, Docket No. EL05-148-000, Affidavit of Dr. Joseph E. Bowring at 15 (Aug. 31, 2005) ("Bowring Affidavit").

for RMRs.[167] And again in June,[168] again in July,[169] again in August,[170] and again in September.[171]

Then, less than a week after Complainants filed this action, the IMM suddenly and inexplicably signaled his openness to the exact opposite position, offering two options in his proposal: "Option 1: RMR units should not be included in either PJM's CETO/CETL parameter analysis for capacity auctions or in the capacity market supply curve. Option 2: RMR units should be included in both PJM's CETO/CETL parameter analysis for capacity auctions and in the capacity market supply curve at zero price."[172] In his October 10 filing, the IMM advanced Option 2.[173] Two decades of consistent economic analysis explaining why RMR units must be excluded from the capacity market has been upended—the IMM now tells us that "the correct price signals" are *actually* sent when RMR units are treated as supply.[174]

The IMM's October 10 filing offers no explanation for why he changed his mind which leaves us to speculate. Can it be that, for decades, the independent market monitor misunderstood a basic component of the market that has monitored? Can he have so little faith

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[167] PJM, *DESTF, Package/Proposal Matrix* (May 17, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20240517/20240517-item-05---options-and-packages-matrix.ashx; *see also* Shanker at P 75.

[168] PJM, *DESTF, Package/Proposal Matrix* (June 14, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20240614/20240614-item-04---options-and-packages-matrix.ashx.

[169] PJM, *DESTF, Package/Proposal Matrix* (July 19, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20240719/20240719-item-03---options-and-packages-matrix.ashx.

[170] PJM, *DESTF, Package/Proposal Matrix* (Aug. 19, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20240819/20240819-item-03---options-and-packages-matrix.ashx.

[171] PJM, *DESTF, Package/Proposal Matrix* (Sept. 20, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20240920/20240920-item-03---options-and-packages-matrix.ashx.

[172] PJM, *DESTF, Package/Proposal Matrix* (Oct. 2, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20241002/20241002-item-03---options-and-packages-matrix.ashx.

[173] IMM Comments at 6.

[174] *Id.*

in his own analysis that, after having published 19 State of the Market Reports totaling thousands of pages of analysis on nearly every element of PJM's market design, he was persuaded by a couple of PowerPoint presentations in a two-hour stakeholder meeting?[175]

The IMM's flip-flopping—and, worse, his apparent refusal to explain his new position—erodes confidence in his pronouncements because it is hard to see how the results of a single auction—results that the IMM *predicted* in his 2005 comments[176]—could be the cause of a revelation so profound it warranted his complete reversal.

It also erodes confidence in the markets. The IMM is an important figure in the operation of an RTO. The IMM's opinions are taken seriously. We agree that consistency is critical to a stable, functioning market, so we were alarmed by the IMM's abandonment, in a matter of days, of a position that he has publicly held for 19 years. Consistency is necessary in markets to attract capital, and if you do not know what the market's rules are or are going to be, it is impossible to rationally deploy capital. If PJM had followed all of the IMM's advice, RMR units would not have been included in last year's BRA[177] but—for no reason at all—*would* be included in future BRAs.[178] The IMM's unexplained abandonment of his position is irresponsible and destabilizing.

In light of his unexplained flip-flopping, the Commission should accord the IMM's comments little credence.

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[175] *See* PJM, *DESTF, Package/Proposal Matrix* (Oct. 2, 2024) (documenting the IMM's reversal), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20241002/20241002-item-03---options-and-packages-matrix.ashx.

[176] *See* Bowring Affidavit at 15 ("Wholesale energy markets, like other markets, are cyclical. When the markets are long, prices will be lower and when the markets are short, prices will be higher.").

[177] *See* IMM *2023 Annual State of the Market Report for PJM*, at 302 (Mar. 14, 2024), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2023/2023-som-pjm-sec5.pdf.

[178] IMM Comments at 6.

V. FPA Section 206 is the Wrong Vehicle by Which to Make Such Changes to the Capacity Market—Such Tariff Changes Should be Proposed Under FPA Section 205.

FPA Section 206 is an inappropriate vehicle for Complainants' proposed revision of the Reliability Pricing Model. By their own admission, Complainants are here only because they failed in PJM's stakeholder process to garner sufficient support to initiate a FPA Section 205 filing with the Commission.[179]

The Complaint regurgitates the concerns that Complainants have already voiced in PJM's stakeholder processes. On August 30, 2024, several consumer advocates sent a letter to the PJM Board requesting that the Board initiate the Critical Issue Fast Path process to reform PJM's treatment of RMR generators.[180] A week later, Complainants sent a letter in support of the consumer advocates, asking PJM to reform its tariff by "requiring RMR units to participate in the capacity market as supply" and "accounting for the capacity provided by RMR units by adjusting the demand curve to procure less capacity overall."[181] EPSA and P3 offered a letter in opposition, explaining that decades of stakeholder processes have led to the consistent "conclusion that RMRs are out of market solutions and thus should impact markets as little as possible."[182] The Board agreed, concluding that Complainants' proposal would distort price

[179] *See* Complaint at 28.

[180] Complaint, Attachment 2.

[181] *Id*., Attachment 5 at 2.

[182] EPSA & P3, *Opposition to Critical Issue Fast Path Request on Reliability Must Run Arrangements in Capacity Markets and Possible Auction Delay* (Sept. 11, 2024), https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/2024/20240912-epsa-p3-letter-regarding-consumer-advocates-request-for-urgent-reforms-to-the-pjm-capacity-market-regarding-rmr-units.ashx.

signals, have unintended consequences for existing capacity, and discourage future generators to enter RMR agreements.[183]

As the Board explained in its letter, PJM's Deactivation Enhancements Senior Task Force is considering these exact issues, and Complainants' concerns are "best suited for that task force."[184] For over a year, the Task Force has been developing and analyzing potential reforms to PJM's RMR regime and soliciting input from stakeholders, including Complainants. As Complainants are well aware, it takes time to properly consider stakeholder input on highly complex issues. Although the Complaint decries the supposed "inadequacy" of PJM's stakeholder process, one Complainant has not only participated in the Task Force but has offered its own package of reforms, which the Task Force has put on equal footing with proposals from PJM, Calpine, and the Market Monitor.[185] The Task Force voted on these proposals on October 2, and those results are pending.[186] In addition, PJM's Markets & Reliability and Members Committees are considering the Task Force's recommendations and take votes of their own.[187]

Complainants have voiced their concerns about RMR generation in this stakeholder process. They have received substantial opposition. But just because Complainants have not been able to rally sufficient support for their proposal does not mean that PJM's stakeholder

[183] Complaint, Attachment 5 at 6-7.

[184] *Id.* at 8.

[185] Casey Roberts, *Sierra Club Proposal for Deactivation Enhancement Senior Task Force* (Sept. 20, 2024),https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20240920/20240920-item-06---sierra-club-solution-package.ashx.

[186] PJM, *DESTF Meeting Agenda* (Oct. 2, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20241002/20241002-agenda.ashx.

[187] PJM, *Task Forces Work Plan Meeting Schedules* (June 14, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20240614/20240614-item-03---work-plan.ashx.

process is broken. On the contrary, it is well on its way to resolving these issues, and the Commission should let this dispute play out there.

VI. Complainants Complain About a "Problem" They Created.

The irony of the Complainants initiating this proceeding should not be lost upon the Commission. Through the results of this most recent auction, Complainants have been hoist with their own petard.[188] Their settlement with Talen Energy was the precipitating event that led to the RMR agreements of which they now complain.[189] PJM only solicited RMR agreements from Talen's Brandon Shores and H.A. Wagner plants because, in 2018, Complainants settled with Talen to cease coal-fired generation at Brunner Island, a 1,490 MW power plant in Pennsylvania.[190] Worried that another consent decree would force their plants to undergo costly conversions, Talen spent years searching for an economical solution to no avail.[191] Understandably reluctant to risk another round of litigation, Talen opted to retire their Brandon Shores and H.A. Wagner plants.[192] However, PJM informed Talen that these retirements would

[188] *See* William Shakespeare, Hamlet, act 3, sc. 4, l. 230.

[189] Consent Decree, *Sierra Club v. Talen Energy Corp.*, Case No. 1:18-cv-01042, ECF No. 3-1 (M.D. Pa. May 17, 2018).

[190] *Id.*; Complaint at P 39, *Sierra Club v. Talen Energy Corp.*, Case No. 1:18-cv-01042, ECF No. 1 (M.D. Pa. May 17, 2018).

[191] *See* PJM Board of Managers, *Letter to Sierra Club Re: Brandon Shores RMR* (Dec. 5, 2023), https://pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20231205-pjm-board-response-to-sierra-club-letter-regarding-pjm-interconnections-role-in-the-maryland-energy-transition.ashx.

[192] *See* Talen Energy, *Letter to PJM Re: Brandon Shores & H.A. Wagner* (Dec. 7, 2023), https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20231207-talen-letter-re-sierra-club-letter-re-pjms-role-in-md-energy-transition.ashx (detailing rationale for deactivations).

imperil grid reliability, and it requested that Talen enter into RMR agreements until it found a more permanent solution.[193]

Complainants voiced their opposition,[194] blinding themselves to the retirements' effects on reliability and eschewing a compromise that would have kept the lights on for millions of PJM ratepayers footprint while still achieving their goal of seeing Talen's two coal-fired generators retire.[195] And now they complain about how PJM treats those same agreements, which exist only because their settlement with Talen made it too costly for Brandon Shores and H.A. Wagner to otherwise continue operating. By litigating at every turn without regard to the system reliability or consumer impact, Complainants have been instrumental in bringing about the very conditions that necessitate these RMRs.

VII. FERC Should Be Warned: Accepting this Complaint will Imperil Reliability.

The Commission must understand one basic fact: the auction clearing price is the cost paid by ratepayers to ensure reliability. The Reliability Pricing Model depends upon the price signals created in the auction and it was created to ensure that sufficient capacity could be attracted and retained through prices.

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[193] PJM, *Brandon Shores Section 113.2 Notice* (June 1, 2023), https://www.pjm.com/-/media/planning/gen-retire/deactivation-notices/pjm-response-letter-brandon-shores.ashx; PJM, H.A. Wagner Section 113.2 Notice (Jan. 4, 2024), https://www.pjm.com/-/media/planning/gen-retire/deactivation-notices/pjm-response-letter-wagner.ashx.

[194] Sierra Club, *Letter to PJM Board of Managers Re: Brandon Shores RMR* (Nov. 13, 2023), https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20231114-sierra-club-letter-re-pjms-role-in-the-md-energy-transition.ashx.

[195] *See* PJM, *Letter to Sierra Club Re: Brandon Shores RMR*, *supra* n. 193, at 3 ("Brandon Shores will be needed to preserve electric reliability for consumers in Maryland until the required transmission is built. . . . However, as you are aware, Talen is currently prevented from continuing to run without conversion beyond December 31, 2025 under an RMR framework due to a private agreement it entered into with you").

In 2005, PJM filed a proposal for a reliability pricing model under FPA sections 205 and 206.[196] In April 2006, the Commission, in response, found that "PJM's existing capacity construct is unjust and unreasonable as a long-term capacity solution, because it fails to set prices adequate to ensure energy resources to meet its reliability responsibilities."[197] In other words, there was a "fail[ure] [in the capacity construct] to set prices adequate to ensure sufficient resources."[198]

While the Commission did not set a replacement rate in that specific order,[199] the Commission determined that

> PJM has shown that the existing construct will, in the future, fail to achieve the intended goal of ensuring reliable service. It does not enable market participants to see the reliability problems in particular locations, does not provide price signals that would elicit solutions to reliability problems in enough time before the problems occur, and does not allow transmission and demand response to compete on a level playing field with generation to solve reliability problems. These factors, in conjunction with other factors (such as load growth in particular locations, and the lack of price signals sent by the energy markets) render PJM's current construct unreasonable on a long-term basis.[200]

The Commission also explained in its Order Denying Rehearing and Approving Settlement Subject to Conditions that PJM's rules (prior to the implementation of the Reliability Pricing

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[196] 16 U.S.C. §§ 824d, 824e.

[197] *PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079 at P 5.

[198] *PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,331 at P 3 & n.2 (2006) (citing *PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079 at PP 1–6).

[199] *See PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079 at P 6 ("The Commission cannot at this time find that the RPM proposal as filed by PJM is the just and reasonable replacement for the current capacity construct, because certain elements of the proposal need further development and elaboration before the Commission can issue a final order. However, the Commission finds that certain elements of the RPM proposal, with some adjustment and clarification, may form the basis for a just and reasonable capacity market. In this order, the Commission will provide guidance on PJM's RPM proposal, as well as other features that need to be included in a just and reasonable capacity market, and will establish procedures to resolve these issues.").

[200] *Id.* P 29.

Model) "create[d] significant price volatility for electric supply," "[g]enerating units c[ould] easily leave and re-enter the markets, for periods as short as a single day" thereby causing "prices spike as soon as the supply of generation falls below the minimum needed to meet reliability criteria, and then fall to zero as soon as the supply rises above that required minimum"[201] The price volatility caused by the construct in place prior to the Reliability Pricing Model led to a reluctance by generators to invest in new plant generators.

It is necessary to understand how PJM arrived at the Reliability Pricing Model framework because "what's past is prologue"[202] and the instant Complaint must be considered in light of the history of PJM's market reforms. As NERC explained in its 2023 Long-Term Reliability Assessment, "PJM [has] found increasing reliability risks due to the potential for the timing of generator retirements to be misaligned with load growth and the arrival of new generation on the system."[203] NERC recognized that "[t]rends toward higher demand, faster generator retirements, and slower resource entry could expose PJM to decreasing Planning Reserve Margins and reliability challenges from imbalanced resource composition and resource performance characteristics."[204] This means one thing: PJM faces a reliability risk.

"PJM's capacity market, also known as the Reliability Pricing Model (RPM), is designed to secure enough power supplies in a cost-effective manner to maintain resource adequacy three years into the future."[205] This three-year-forward design is intended to "allow[] for competition

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[201] *PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,331 at P 4.

[202] William Shakespeare, The Tempest, act 2, sc. 1, l. 289.

[203] NERC, 2*023 Long-Term Reliability Assessment*, at 76 (Dec. 2023), https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2023.pdf.

[204] *Id*.

[205] PJM, *PJM Capacity Market: Promoting Future Reliability*, at 1 (July 16, 2024), https://www.pjm.com/-/media/about-pjm/newsroom/fact-sheets/pjm-capacity-market-promoting-future-reliability-fact-sheet.ashx.

between existing and new resources while attracting participation from across the PJM region," and it "provides transparent price signals to attract investment and induce less efficient resources to retire."[206] These price signals are important. They are needed to ensure investment is made in new generation when demand exceeds supply. Without these price signals indicating—through scarcity pricing—when further investment in supply is needed, the PJM region will be at risk for a reliability and resource adequacy crisis. The investment, permitting, and construction of generation resources takes time. The three-year forward capacity market allows developers of generation facilities, after clearing the capacity auction, sufficient time to develop the facility and secure financing.[207] And, once a developer clears the auction, the developer is on better footing to secure financing.

If, however, the price signals reflect more supply than can actually be relied upon in the long-term (not-RMR units that intend to retire), then there will be a distortion of the price signal—it will not accurately reflect the need for more investment in generation. In the 2025/2026 BRA, the results were, in large part, affected by a 3,243 MW increase in forecasted load, a targeted Installed Reserve Margin increase from 14.7% to 17.8%, and a "[s]ignificant decrease in overall supply from retirements (actual retirements plus must offer exceptions for future retirements)."[208] In the words of PJM, "the price level across the RTO signals the need for

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[206] *Id*.

[207] Complainants assert that "[a]lthough high capacity prices are intended to serve as a signal for investment in new generation, the rapid pace of the upcoming capacity auctions, combined with the slow pace of PJM's interconnection queue, make it unlikely that new generation will be able to come online quickly enough to change the likely results from the upcoming auctions." Complaint at 48. Complainants completely misunderstand the PJM capacity auction. While it is true that the interconnection queue has constraints, the capacity market was designed as a three-year forward construct in order to afford time for price signals the opportunity to take effect—allowing for investment in, and development of, new generation when price signals reflect rising demand.

[208] PJM, *2025/2026 Base Residual Auction Report*, at 3 (July 30, 2024), https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.ashx; Shanker at P 51 & tbl.1.

investment in generation throughout the footprint."[209] Simply put, there are "reliability concerns associated with reduc[ed] supply and increase[ed] demand."[210] This is basic economics.

The Complainants want the Commission to disregard the fact that RMR units have every intention of retiring and will not be available to provide long-term supply. The Complainants would have the Commission force PJM into a reliability crisis of its own making just to continue pursuing their objective of obtaining price suppression in the PJM capacity market.[211] Entering into an RMR agreement in PJM is voluntary. Should these units not be adequately compensated, they will likely retire instead of agreeing to an RMR. Worse, if they are subject to the must-offer requirement, and are thereby obligated to assume the risks that attend a capacity supply obligation, they most assuredly will.

PJM has already warned of the reliability risks. For example, in assessing the reliability consequences of deactivation of Brandon Shores and Wagner, PJM stated that, in assessing a battery solution, "[t]he analysis [which was extended to the 2027/2028 timeframe] concludes that both Brandon Shores and Wagner are required to be available for operation in order to maintain reliability prior to complete energization of the planned transmission reinforcements in the area," and that without those units, "[t]he reliability violations are pervasive and severe in nature, which

[209] PJM 2025/2026 Delivery Year Auction Results, at 2.

[210] *Id*. at 1.

[211] *See PJM Interconnection L.L.C.*, Docket No. ER21-2582, Comments of Natural Resources Defense Council, Sustainable FERC Project, Sierra Club, and Union of Concerned Scientist, at 2 (Aug. 20, 2021) (advocating for the narrowing of the minimum offer price rule and stating that the "application of a buyer-side mitigation tool is an inappropriate remedy to address a state generation policy").

could lead to a potential voltage collapse in the entire BGE system as well as multiple overloads throughout the BGE system and the larger PJM network."[212]

The Commission should not assume responsibility for creating an unnecessary reliability failure in PJM. It should not countenance any further price suppression. Let the markets work—let them reflect scarcity, let them retain and attract generation, let them drive development, and let the market participants respond to the price signals. Failure to do so all but ensures further loss of capacity and reliability failures for which the Commission will have only itself to blame.

VIII. Conclusion

For the reasons stated above, the Complaint should be dismissed. The Complaint will compound reliability challenges facing PJM, not address them. If the Commission is serious about achieving the promise of reliability through markets, it should send a signal to the market that it will not be open to pressure from parties like the Complainants who advance policies that jeopardize reliability and who then complain about the impacts that those policies have on consumers.

Instead, capacity clearing prices should reflect actual supply and demand and not be suppressed by out-of-market interventions. The results of the 2025/2026 auction are consistent with a market in scarcity. The Commission would be wise, at this precarious moment, to support, and not undermine, the market signals that PJM needs to remain reliable as load increases and consumers continue to demand safe, reliable and affordable power.

[212] PJM, *BESS Technical Viability – Wagner and Brandon Shores Retirements*, at 4 (May 3, 2024), https://www.pjm.com/-/media/library/reports-notices/special-reports/2024/20240503-bess-technical-viability-wagner-and-brandon-shores-retirements-study.ashx.

Respectfully submitted,

On behalf of The PJM Power Providers Group

By*: Glen Thomas*

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610-768-8080

Dated: October 24, 2024

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the Official Service List compiled by the Secretary in this proceeding.

Dated at Washington, D.C., this 24th day of October, 2024.

On behalf of The PJM Power Providers Group

By: *Laura Chappelle*

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ATTACHMENT 1

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Sierra Club, et al.,	)	
	)	
Complainants,	)	
	)	
v.	)	**Docket No. EL24-148-000**
	)	
PJM Interconnection, L.L.C.,	)	
	)	
Respondent.	)	
	)	

Affidavit
Of
Roy J. Shanker Ph.D.

On Behalf
Of
THE PJM POWER PROVIDERS GROUP

October 24, 2024

Qualifications and Purpose of Affidavit

1. My name is Roy J. Shanker. I have a bachelor's degree from Swarthmore College and both a master's degree and a doctorate degree from Carnegie-Mellon University.

2. My resume, attached as **Appendix A**, summarizes my experience in numerous regulatory proceedings before state commissions and FERC. As detailed therein, I have over 50 years of experience covering a broad range of issues in the electric utility industry, and I have worked as an independent consultant for the past 43 years. I have worked extensively in the PJM Interconnection, L.L.C. ("PJM") and New York Independent System Operator, Inc. ("NYISO") markets during their initial development, particularly with respect to the establishment of their capacity markets. In each of those markets, I helped formulate the underlying rationales for the capacity markets designs.[1] In PJM, this experience has included participation in many of the market's incremental changes, including the introduction of the Reliability Pricing Model ("RPM") in 2005,[2] the adoption of the rules for unit deactivation and Reliability Must Run (RMR units) in 2005-6,[3] the subsequent adjustments to limit the role of inferior capacity products, the introduction of the Capacity Performance ("CP") or Pay for Performance ("PfP") rules, and I was an active participant in the proceedings on the Market Seller Offer Cap[4] and the Minimum Offer Price Rule[5] and the evolving elements the ELCC accreditation process. I have also participated in stakeholder discussions related to generator deactivation and the related issues associated with retaining units for reliability services after requests for deactivation of RMR units.[6] I have played a similar role since the beginning of the market in the design of the energy markets. I have appeared before the Commission and other regulatory bodies addressing

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1 *PJM Interconnection, LLC*, 115 FERC ¶ 61,079 (2006), *reh'g denied*, 117 FERC ¶ 61,331 (2006); *N.Y. Indep. Sys. Operator, Inc.*, 133 FERC ¶ 61,030 (2010), *reh'g denied*, 135 FERC ¶ 61,157 (2011).

2 *PJM Interconnection, LLC*, 115 FERC ¶ 61,079 (2006).

3 *See, e.g.*, *PJM Interconnection, L.L.C.,* 115 FERC ¶ 61,079 at P 36 (2006).

4 *See* Docket Nos. EL19-47-000, EL19-63-000.

5 *See* Docket Nos. ER21-2582-000; EL18-169; ER18-1314-000; ER13-535-000; ER11-2875; EL11-20.

6 *See New York Indep. Sys. Operator*, Docket No. ER10-2220-000, Affidavit of Dr. Roy J. Shanker on Behalf of Independent Power Producers of New York, Inc. (Sept. 3, 2010); *PJM Interconnection, L.L.C.*, Docket No. PL04-2-000, Transcript of Technical Conference – Compensation for Generating Unites Subject to Local Market Power Mitigation in Bid-Based Markets (Feb. 4, 2004); *PJM Interconnection, L.L.C.*, Docket Nos. EL03-236, *et al.*, Presentation of Dr. Roy J. Shanker (June 16, 2005).

issues related to the design and function of capacity markets both as an expert witness and as an invited speaker.

3. **Appendix A** summarizes relevant engagements to this report, including not only PJM and NYISO projects focused on capacity in general but also the related market design. It also includes extensive market design work in both the Midcontinent Independent System Operator, Inc. ("MISO") and ISO New England, Inc. ("ISO-NE") markets.

4. In the prior 269 engagements where testimony or an affidavit was submitted, I estimate over 50 engagements were related to RTO/ISO capacity market design issues or the analytics of calculating capacity values, and a similar number of engagements related to energy market design and operations.

5. I have been involved and continue to be involved in virtually all areas of market design and development, and I actively participate in stakeholder activities in PJM on behalf of various market participants.

6. On September 27, 2024 the Sierra Club, Natural Resources Defense Council, Sustainable FERC Project, and the Union of Concerned Scientists ("Complainants") filed a Federal Power Act ("FPA") Section 206 complaint ("Complaint") seeking tariff revisions regarding PJM's treatment of RMR units within PJM's capacity procurement mechanism, the RPM.[7] I was asked by The PJM Power Providers Group ("P3") to review the Complaint and accompanying affidavits and present my findings with respect to the proper treatment of RMR units in PJM's Reliability Pricing Model. I also reviewed the Protest submitted by the Independent Market Monitor ("IMM") in this proceeding that was filed on October 10, 2024.

Summary of Conclusions and Recommendations

7. I reached seven conclusions in my review of the Complaint and its supporting material.

8. **First Conclusion**. My first conclusion is that the elevated prices seen in PJM's recent capacity auction are just and reasonable when viewed correctly as a necessary consequence of

[7] RPM is used to procure Accredited Unforced Capacity (AUCAP) to meet the RTO-wide and locational reliability requirements of PJM. *See* PJM Manual 21A: Determination of Accredited UCAP Using Effective Load Carrying Capability Analysis, at 6 (June 27, 2024), https://www.pjm.com/-/media/documents/manuals/m21a.ashx.

PJM's Commission-approved capacity pricing mechanism.[8] Far from being unjust and unreasonable, the prices that resulted from the last auction are consistent with a well-understood and essential property of RPM—that under RPM, capacity prices were designed to vary from very low to high to achieve a just and reasonable average compensation over an extended business cycle, using market based auctions. Indeed, over the RPM Base Residual Auctions ("BRAs") held to date, the auction prices have only twice exceeded the reference average equilibrium price of the Net Cost of New Entry ("Net CONE") and collectively averaged just 34% of this value, far below most expectations and below the equilibrium prices calculated in analyses of RPM's performance by their outside consultant.[9] By ignoring this central feature of the RPM's design, the Complaint and accompanying affidavit by Mr. Wilson incorrectly identify high prices caused by scarcity[10] as a problem to be remedied. This renders all these comments fundamentally irrelevant. Such an opinion can only be arrived at if one takes a myopic view of the capacity markets by fixating upon the very short term. The Complainants focus on the results of a single capacity auction that was held after scarcity arose. Worse, they see this situation lasting only until some sort of "fix" is put in place by mandate instead of seeing the long-term purpose of RPM's price signals to retain competitive existing generation and attract new generation and / or transmission. This skews and invalidates every conclusion they put forward regarding the "right" price, the "right" price signal, and even what constitutes a "high" price.

9. This is the wrong way to think about RPM. In order to understand it properly, one must begin with the properties and objectives that served as the basis upon which the Commission approved the RPM as just and reasonable in the first place; one must then proceed to determine

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8 *See* PJM, *2025/2026 Base Residual Auction Report* 3 (July 30, 2024), https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.ashx.

9 *See* Fifth Review of PJM's Variable Resource Requirement Curve for Planning Years Beginning 2026/27 **(**Apr. 19, 2022) ("Brattle Study"), https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf

10 The terms "scarce" or "scarcity" are used here consistent with the definition put forward in the protest to indicate auction clearing quantities that are very near to or below target reliability levels such as the Installed Reserve Margin ("IRM"). While not the traditional use of the term which typically indicates demand in excess of supply, this definition is consistent with the original discussions about reliability and acceptable performance of the RPM process and the shape of the Variable Resource Requirement (demand) curve. It will be used in this manner throughout this affidavit.

whether that paradigm was properly implemented or suffered some inherent limitation; one must then examine the reasons why RMRs might be needed under the paradigm understanding that all RMRs are temporary arrangements that will disappear once the longer-term "fix" is implemented, either through the procurement of additional capacity or through PJM-directed or competitive reliability measures like transmission development.

10. This is the same way that PJM conducts its quadrennial reviews of the RPM process and in particular reviews the shape of the demand curve. As part of that process, PJM's contractor (Brattle) conducts large Monte Carlo simulations using variations of the demand curve to predict various outcomes. The statistical summary of these simulations to establish equilibrium pricing under RPM conforms very closely to the results anticipated when the market was first created, and when those results were updated (as they were in the 2022 Quadrennial Review) and reflected in 2026 dollars, they are almost exactly the same as the actual 2025/26 auction results.[11] While forecasts cannot take the place of actual market results, it is worth noting that the similarity between Brattle's predictions and the actual market outcomes is uncanny.

11. **Second Conclusion**. The requested relief is not justified because it blunts the primary, and well accepted, goal of RPM: to signal scarcity and incentivize new entry through higher capacity market prices.

- As approved by the Commission,[12] RPM fully contemplated pricing during periods of relative scarcity, either RTO-wide or within a locality. The fundamental design element was to allow prices to rise as scarcity grew and to rise yet higher still when reliability targets could be violated. Procurement lower than the target IRM was fully contemplated as occurring for as long as three years prior to taking any additional

[11] *See* Brattle Study at 17 tbl.4.

[12] *See PJM Interconnection LLC*, 117 FERC ¶ 61,331 at P 75 (Dec. 22, 2006) ("The Commission finds that the use of the Settlement Curve is just and reasonable. The Commission has previously accepted the use of a downward-sloping demand curve as just and reasonable in the NYISO capacity market, and the reasons that we articulated there for accepting as just and reasonable a downward-sloping demand curve apply for PJM. A downward-sloping demand curve would reduce capacity price volatility and increase the stability of the capacity revenue stream over time. This is because, with a sloped demand curve, as capacity supplies vary over time, capacity prices would change gradually. By contrast, under the current capacity market, capacity prices vary substantially between the deficiency charge and zero even though supply varies only slightly between a slight deficit below the Installed Reserve Margin and a slight surplus above the Installed Reserve Margin. The lower price volatility under the sloped demand curve would render capacity investments less risky, thereby encouraging greater investment and at a lower financing cost." (footnote omitted)).

actions in the form of a Back Stop procurement market-based auction mechanism that is already in the Tariff.[13]

- The current and historic pricing is totally consistent here. The "high" prices being complained about are fully consistent with the approximately average prices anticipated over a full business cycle, approximating the Net CONE, and only appear extreme because recent prices have been depressed to 10–12% of the anchor target price (Brattle's equilibrium price) of Net CONE during the two previous BRAs. Since the beginning of the market, prices for the RTO have averaged only about a third of the Net CONE.[14] This is hardly excessive. Net CONE is in general the expected price of the RPM design over time. This is the price the market expects or, put another way, this is the price the market was designed to achieve—it *cannot* be "high."[15]
- The shape of the demand curve employed in RPM was in large measure designed in light of PJM's evaluation of how often conditions of scarcity and its amplitude might occur. It was designed deliberately to limit periods of scarcity while establishing the correct prices to send the correct signals to attract new entry when those periods occurred. These properties were most recently confirmed in the 2022 Brattle Study.[16]
- PJM explicitly based RPM's design on these criteria both in its initial proposal and subsequently when evaluating alternatives in settlement. RPM's design and its underlying assumptions and rationale were fully disclosed and thoroughly discussed in filings and settlement before the Commission.
- Compensation under RPM was deliberately designed to allow recovery of investments and fixed costs during scarcity when it occurred over an extended period, as, for example, in the course of the 100 year horizon and business cycle simulation that was part of PJM's initial Federal Power Act section 205 filing establishing RPM.

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[13] *See* OATT, Attachment DD § 16 (reliability backstop).

[14] *See infra*, Table 1.

[15] *See* Brattle Study at 17 (e.g., Table 4 showed an average total cost of the Auction at $13.1 billion and an average unit cost of $267/MWD. All costs are in 2026 $. In general in the Brattle Monte Carlo evaluations one would see expected prices near Net CONE.).

[16] *See generally id.*

- RPM intended the demand curve construct to act like a control system: pushing prices up during shortage to incentivize new entry, and reducing prices slowly (but always with aggregate lower total costs) when the system had excess capacity. The objective was for prices—over the long haul—to approximate the cost of new entry, while also keeping the quantity of capacity usually, *but not always*, above reliability targets.
- When the RPM "control" mechanism, coupled with changes in load, modified rules, subsidies, and or locational variation fails to result in adequate capacity, potentially necessitating RMR agreements for generating units that would otherwise retire, it can be for several reasons. One type of omission that causes this happens when relevant constraints are not accounted for in the model. The missing constraint does not allow RPM to properly reflect a particular generator's reliability contribution and therefore cannot adjust the generator's compensation to reward that contribution. I refer to this as the presence of a missing constraint.[17]
- For decades, PJM has acted purposefully to both retain the RPM's price function and simultaneously preserve reliability via Commission-approved procedures related to unit deactivation. PJM's current practice is to retain necessary generators through RMR arrangements while removing them from the offered capacity market supply.[18] This recognizes market realities by acknowledging: first, that the unit has sought to retire, second, that upon scrutiny, the proposed retirement has been found to be consistent with competitive behavior, and third, that continuation of service is fully voluntary and at the discretion of the generation unit. By following these steps when establishing a voluntary RMR arrangement, PJM accomplishes both goals: to ensure reliability while at the same time ensuring that the scarcity caused by a generator's

[17] The potential for this type of under-compensation due to missing elements or constraints in the market models has been repeatedly acknowledged by the PJM Independent Market Monitor ("IMM"). "In a good market design, it should never be the case that a resource does not clear in the capacity market auction and then, when it wants to retire as a result, is deemed critical to reliability and not allowed to retire." Monitoring Analytics, LLC ("PJM IMM"), *2023 Quarterly State of the Market Report for PJM: January through September*, at 2 (Nov. 9, 2023), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2023/2023q3-som-pjm.pdf.

[18] At their discretion, an RMR unit may participate in BRA, but that would be illogical. In general, they would receive no additional compensation while becoming exposed to the material Capacity Performance penalties. To my knowledge no RMR unit has made a choice to participate in the RPM.

planned retirement is *accurately* reflected in the capacity auction, so that price signals can incentivize needed new entry.[19] Were PJM to retain the soon-to-be-deactivated generators in the capacity auction supply of generation, RPM's basic feedback mechanism created by the demand curve and long-term cost recovery would be frustrated, prices suppressed, and the market would fail to achieve its ultimate purpose of ensuring adequate capacity over time. This feedback is the very mechanism that the Commission approved as just and reasonable, and for good reason: it ensures long-term supply adequacy by accurately reflecting the market conditions in capacity prices while ensuring that idiosyncratic and short-duration reliability problems are managed without interfering with the price signals. As noted by the Independent Market Monitor, failing to recognize this balance and consistent representation of reliability in the market models "overstates market supply and suppresses the price signal needed to incent the new entry needed to replace the retiring unit."[20]

- PJM regularly tests these properties with a quadrennial review. In this case, the referenced Brattle Study. Based on the analysis described above, Brattle recommended a candidate demand curve, it was proposed by PJM and approved by the Commission.[21] The market results simulated with the candidate curve resulted in prices that were almost identical to that which actually came out of the auction[22] (i.e., total procurement costs of $13.1 billion and auction price of $267 per MWD). Not a

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[19] *See PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079 at P 36 (2006). The Commission directly rejected mandating RMR agreements, acknowledging "While such an approach might alleviate the situation in the very near term, this stop-gap approach would fail to address the longer-term need to provide sufficient price signals to support development of new resources and the retention of existing resources over the long-term, and the capacity adequacy construct should ensure the presence of financial incentives for resources to voluntarily agree to commit to longer service terms."

[20] 2023 IMM Report, *supra* note 13, at 2–3.

[21] *See PJM Interconnection, L.L.C.*, 182 FERC ¶ 61,073 at P 144 (2023); *see id.* ("Brattle also simulated alternative curves, including a 'candidate curve' with a steeper downward slope based on a combined-cycle Reference Resource with a foot (i.e., point of intersection with the x-axis) shifted to the left (i.e., lower quantity) as compared to the current VRR Curve to address procurement level concerns and to test the performance of the current curve against other curves. PJM proposes to adopt this candidate curve (Proposed VRR Curve)." (footnote omitted)).

[22] Brattle Study at 17 tbl.4.

surprising result for a Monte Carlo Study, but certainly indicative that the actual results were well anticipated, consistent with recent analytic review, consistent with the historic design and function of the demand curve, and deemed just and reasonable by a very recent Commission Order.

- Put simply: explicitly including RMR capacity in the auction would be at odds with the Commission-approved Tariff in which all RMR arrangements within PJM are *voluntary*. Furthermore, the mandatory inclusion of RMR capacity in the auction would completely undermine PJM's efforts—and the Commission-approved Tariff's objective—of balancing reliability with accurate price signals. Including such capacity in supply when it is known to be deactivated, and would have deactivated absent administrative intervention, just obscures the underlying reality of the market supply. False arguments about incorrect price signals or double payments that don't recognize this fundamental function of the market design are either uninformed or purposefully misleading. This is revealed by a simple example. What would be the auction price if the unit in question just deactivated? Under the PJM current paradigm, is it not the exact same price as if the unit were granted an RMR contract? If this is the case, then why all the fuss over having the RMR agreement? This only makes sense if some other value is conveyed or purpose served by the RMR arrangement. And it is—it is the retention of the unit, typically serving as the equivalent of local transmission, during a transition or pendency period that balances the price signal with reliability and respects the fact that RMR arrangements are voluntary. Thus, there are two separate functions. One that appears directly in the auction in which PJM preserves the price signal by properly recognizing that the unit will "disappear" when the problem is solved, and a second in which PJM acts to preserve reliability during the pendency of the RMR agreement, during which the RMR acts like a transmission asset.[23]
- Finally, in contrast to the Complainants' false arguments, one cannot consider the use of an RMR merely during the lifetime of the RMR arrangement. Once PJM has

[23] The transmission equivalence is the general function during pendency. Absolute scarcity RTO-wide in which supply shortages last at least three years is addressed separately via the Reliability Backstop provisions of the Tariff Attachment DD, Section 16.

implemented its reliability "fix," usually in the form of transmission build-out (or competitive entry), the RMR arrangement expires and the generator can deactivate. To include that RMR in the capacity auction during the lifetime of the RMR arrangement would be to send the signal to the marketplace that the capacity is available and is expected to remain available. As stated above, that was considered and explicitly rejected by the Commission. Instead, by removing it, the scarcity (which will exist as soon as the RMR terminates) is signaled to incentivize new investment to upgrade and retain existing units or build totally new units. To do otherwise would send the wrong price signal and would be unjust and unreasonable. This is done openly and transparently so that existing suppliers and new entrants can adjust their behavior to match market conditions during the lifetime of the RMR arrangements.

12. **Third Conclusion**. The single most important requirement of the RPM—described above and recognized by PJM—is to not dilute the price signals for entry and exit by imposing price-warping reliability fixes. RMRs should be avoided to the extent possible. To the extent that RMRs cannot be avoided because they are absolutely necessary for reliability, they should be as short-lived as possible, and they should be excluded from the auction to ensure that price formation is insulated from their effect. This again conforms with the statements previously made by both the IMM and the Commission.

13. **Fourth Conclusion**. PJM's current practices and the RMR unit's response—designating RMRs when a generator has declared retirement and maintaining an RMR arrangement only so long as it takes to implement a reliability solution while *excluding* (based on the RMR unit's commercial decision) the RMR's capacity value from the auction in order to ensure that prices accurately reflect scarcity—are consistent with the market design approved by the Commission for RPM and subsequently for RMR units, and is just and reasonable.

14. **Fifth Conclusion**. Negotiating to voluntarily retain generators critical to reliability under RMR arrangements while excluding their capacity from the auction does *not* misrepresent the true state of supply and demand. There is no double counting or payment. There is also no inconsistency with representing the unit in Capacity Emergency Transfer Limit ("CETL") calculations (as the generator now effectively functions as transmission) while excluding its MWs from the auction. By definition, the designation and retention of an RMR resource is an

out-of-market action designed to artificially increase supply when, but for the RMR arrangement, the generator would have deactivated. Retaining it for reliability, but not recognizing its capacity value in supply minimizes price distortions while maintaining reliability. Including the generator's contribution in the calculation of transfer capability is consistent with its (temporary) reliability function. It acts like transmission, securing the system but not disturbing the price signal that the unit will be deactivated. Effectively, an RMR unit operates like a Qualified Transmission Upgrade ("QTU") and offers enhanced transfer capability, just like a PJM-mandated transmission fix that will ultimately obviate the need for the RMR.

15. **Sixth Conclusion**. PJM has several tools available to resolve the consequences of missing constraints that are not captured or priced into the current RPM, thus undervaluing the reliability contributions of particular generators. Establishing an RMR arrangement is one option that meets these necessary requirements and is just and reasonable. Other options include refining the model to ensure finer resolution so that the constraints are accurately visible and priced, thereby retaining necessary generation by properly compensating them for their previously unrecognized reliability contributions before they are put into financial distress, another could be to actually model the mandated transmission fix and exclude the generator's capacity, effectively treating the RMR unit as the very thing that will shortly replace it—transmission. The availability of these other options does not, of course, mean that the PJM tariff is, as a whole, unjust and unreasonable. It merely means that there are a number of different ways that can deal with the problems that arise when the market does not correctly price a constraint, and one of those is the use of an RMR arrangement and excluding the related capacity from the market supply.

16. **Seventh Conclusion**. The non-RMR options described above could be incorporated into the market before RMR designations become necessary. This would reduce, if not eliminate, the need for RMR arrangements in the first place by properly adjusting compensation to generators on a more granular basis to properly account for their reliability contributions, retaining the generators which would be less likely to deactivate for financial reasons. Some of these options would be simple to introduce to the market and others should be contemplated as general improvements in the RPM process. However, such options are not the subject of this proceeding, and the status quo represents a just and reasonable set of actions consistent with the market design.

17. **Eighth Conclusion:** In the unlikely event of Actionable Scarcity (capacity procurement in the auctions that is lower than the target IRM for at least three years), the Tariff has an existing market-based mechanism to remedy any reliability concerns in the form of a back stop procurement auction. Fortunately, this mechanism has yet to be employed because the RPM has had significant historic reserves, including the exclusion of RMR resources.

The Reliability Pricing Model Depends Upon Accurate Market Signals, Which Require an Accurate Reflection of Supply

18. It is vital for the Commission to "keep its eye on the ball," keeping in mind at all times the underlying objectives of RPM. PJM designed the entire paradigm to compensate generators at sufficient rates to ensure adequate capacity over the course of a very long-duration business cycle, recognizing that at some points in that long-duration business cycle, scarcity and high prices would—and *should*—occur. PJM deliberately included high scarcity prices in RPM because they would ensure price signals that would incentivize both the needed existing and new generation to remain in, or enter the market as, reserves decline and prices increase. The relative "speed" of moving to higher prices versus declining supply was consistent with the recognized need to quickly address, via market actions, additions to generation and/or transmission. The shape of demand curve would address this issue. This was a well-known and well-understood property of the market mechanism that was submitted to the Commission and which the Commission approved as just and reasonable.

19. In order to understand how we have arrived at the current Complaint, a four-step view of the timeline may help illustrate the rules that a generator has been subject to in PJM since RPM was implemented.

a. First, at the beginning, we have PJM's development and adoption of its RPM market, a detailed plan with clearly articulated objectives which were memorialized in detailed documentation. That plan was subjected to a broad review including an initial order from the Commission and then, extensive settlement negotiations.

b. Second, there was an interim period during which the market compensated the generator in accordance with the original rules established in the RPM and innumerable regulatory and policy adjustments.

c. Third, there comes the point at which the generator realizes that, for any of a variety of reasons (most likely it is no longer economically viable to operate), it is going to deactivate. It is subsequently determined by PJM to be needed for reliability and, as a result, a voluntary RMR agreement is negotiated to retain the generation for reliability.

d. Fourth, PJM will select a "fix" to replace the RMR unit either via market action or administrative fiat, and then implement the fix.

20. In its initial RPM filing, PJM fully recognized that its proposal required a long-term outlook[24] and evaluated its design using tools that examined price impacts over very long business cycles, some analyses going out to 100 years, in order to fully capture the expected variations in price over long periods.[25]

21. Prior to the establishment of the RPM, PJM struggled to ensure resource adequacy. PJM's earliest "market" was little more than the daily balancing of obligations that had been established practice before PJM was established as an Independent System Operator ("ISO"). PJM's participating utilities "swapped" capacity rights (for a fee) to meet daily determined capacity obligations (or by default paid a penalty similar to today's Net CONE).[26] This fee (payable in advance or arrears) was based on the monthly and daily Capacity Credit Market rate. At that time, there was no notion of a demand curve (i.e., just a vertical "curve"), and parties simply self-supplied or entered into exchanges to meet their obligations. Not surprisingly, when there were sufficient credits, the price was near zero, and when there was a shortage, prices zoomed to the cap. This large variability is shown in the figure below.[27]

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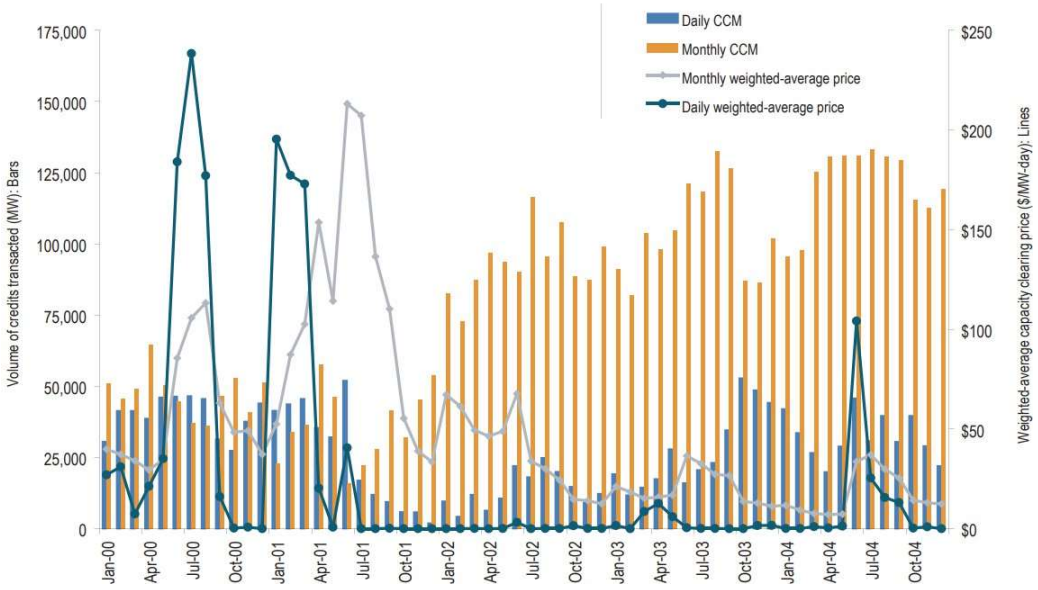
[24] *See* Transmittal Letter, Docket No. ER05-1410, at 9 (Aug. 31, 2005) ("Simply put, the short-term nature of the current PJM capacity adequacy construct is fundamentally inconsistent with the need to preserve system reliability in the longer term.").

[25] *See id.* at 60–69; Affidavit of Professor Benjamin F. Hobbs, Docket No. EL05-148-000 (Aug. 31, 2005) (discussing the results of multiple 100-year simulations to evaluate the RPM proposal and the selection of the final filed curve).

[26] *See* PJM IMM, *2001 State of the Market Report*, at 70–71 (June 2002) (discussing context of original PJM ISO capacity market), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2001/200206-pjmmmusom-2001.pdf.

[27] PJM IMM, *2004 State of the Market Report*, at 159 (Mar. 8, 2005), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2004/pjm-som-2004.pdf.

Figure 4-6 - PJM Daily and Monthly Capacity Credit Market (CCM) performance: Calendar years 2000 to 2004



As can be seen, the prices (right hand vertical axis) were very low with large swings. This led to a lengthy stakeholder process where I participated and suggested many of the major elements of what ultimately became RPM.

22. At the time of the RPM proposal, this volatility was cited by Andrew Ott as a primary reason to adopt the variable resource requirement ("VRR") downward sloping demand curve which has now been a central feature of the RPM market for almost twenty years.[28]

23. As stated by Mr. Ott in his affidavit in ER05-1410:

> This type of price volatility actually experienced in the PJM capacity market corresponds to the price volatility predicted by Professor Hobbs in his long-term dynamic economic simulation of the capacity markets with vertical demand curves such as PJM's current market. As he explains, such volatility creates a significant degree of uncertainty for investors, which increases their perceived risk of attaining an adequate return on investment. Since the current capacity market has exhibited pricing behavior that bounces between two pricing extremes . . . the result has been increased forward uncertainty for generation. Therefore, the PJM market has experienced a period of very low capacity prices, which has resulted in generation

[28] Affidavit of Andrew L. Ott, Docket No. ER05-1410 (Aug. 31, 2005).

retirements and in very little new generation additions in the future, which in turn has created reliability criteria violations.[29]

24. Accordingly, a key element of both the initial RPM filing and the final paradigm as implemented was the use of a "shaped" downward sloping demand curve to reduce this volatility. In the RPM auction, PJM effectively purchases capacity on behalf of load.[30] The shape of the demand curve was an administrative construct designed to reflect the reliability needs of the overall system and localities that would send price signals to dampen the extremes of pricing and volatility, eliminating the "bang/bang" nature of the prior vertical demand curve market in which prices swung violently and frequently.

25. Aside from the downward sloping demand curve, there were several other critical features underpinning RPM. First, the demand curve was "anchored" at the Net CONE. This value was the calculated annual carrying cost of the cheapest form of pure capacity, a combustion turbine, less its energy profits.[31] Over time, prices were expected to oscillate in a "damped" manner around this long-term, steady-state price. Similarly, this anchor was moved left or right over time in relation to the IRM based upon changing preferences for the system to carry a greater or lesser quantity of capacity reserves and concerns about price level. Finally, the slopes at various points on the curve were selected as part of the "dampening" or control tool for volatility. PJM revisits all of these analyses on a regular basis with an outside consultant.

26. The shape/slope of the curve obviously impacts prices, and the speed at which generation would be expected to enter and exit the market. The high prices that occur when the system is short capacity incentivizes new entry, slower reduction of prices when the system is long capacity moderates the rate of exit while still sending the message that the system is long. Changes in the shape of the curve modify these functions.

27. This shape of the demand curve was a vital, thoroughly negotiated element of the RPM submission and has remained critical to the market's design throughout its life. In the initial

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[29] *Id.* at 16.

[30] Load may self-supply, offer such capacity into the auction as price takers, settling via a contract for differences.

[31] The calculation of Net CONE is conducted for the RTO and locational delivery areas. Specific results for adjustments are regularly reviewed and always subject to debate. Similarly, the choice of the specific reference technology is similar to regular review revision. As presented here, this is the original logic that I proposed and was adopted.

2005 RPM transmittal letter, PJM took approximately 20 pages to describe this mechanism, and how its shape and placement influenced the overall procurement of the reliability product and how they weighed the results and selected a curve.[32] Mr. Ott spent considerable effort describing these same properties. Dr. Hobbs similarly went to great lengths in his entire filing to demonstrate how RPM clearing levels would reduce volatility but also described in detail how prices would change when the shape of the demand curve changed, sometimes having excess supply and low prices and sometimes being short capacity and having high prices, but with varying durations and recovery times. He specifically evaluated their performance with primary consideration paid to the percentage of time that any given curve procured capacity below the target IRM reliability criterion.[33] In other words, PJM directly considered how often a particular curve would result in a system that was short of its reliability targets and what the high prices and their duration would be as one approached and reached that scarcity.

28. The Attached Figure from the Hobbs report shows exactly how he tabulated his evaluation of the alternatives.[34] In his recommended demand curve structure, at least 2% of the time it was expected that the system would not meet its Installed Reserve Requirement and price near or above Net CONE. It is important to note that other curves, including those that were shifted more to the right (increasing demand) were estimated to never go below the target IRM, but had higher costs. So even at the outset of the market, a trade-off was made to accept *some* reliability exposure in exchange for lower costs. But in turn, this made the market's higher price signals to support retention of existing supply and encouragement of new entry even more important.

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[32] *See* Transmittal Letter at 60–75.

[33] *See* Hobbs Affidavit at 31–44.

[34] *Id.* at 36 tbl.1.

Table 1. Summary of Results Under Base Case Assumptions (All Curves under Four-Year Ahead Auction)

Curve	Forecast Reserve Indices		Generation Profit, $/kW/yr (standard deviation [s.d.]) /IRR	Components of Generation Revenue			Consumer Payments for Scarcity + ICAP $/Peak kW/yr (s.d.)
	% Years Forecast Reserve Meets or Exceeds IRM	Average % Forecast Reserve over IRM (Standard Deviation)		Scarcity Revenue $/kW/yr (s.d.)	E/AS Fixed Revenue $/kW/yr	ICAP Payment $/kW/yr (s.d.)	
1. No Demand Curve	39	-0.44 (1.92)	66/35.3% (113)	47 (85)	10	70 (57)	129 (121)
2. Original PJM Curve, Based on VOLL	54	-0.06 (0.74)	25/21.2% (73)	37 (70)	10	39 (14)	84 (78)
3. Alternative Curve with New Entry Net Cost at IRM	92	1.23 (0.87)	15/17.5% (53)	26 (52)	10	40 (4)	74 (55)
4. Alternate Curve with New Entry Net Cost at IRM+1%	98	1.79 (0.90)	12/16.6% (46)	21 (44)	10	42 (7)	71 (48)
5. Alternate Curve with New Entry Net Cost at IRM+4%	98	3.40 (1.05)	13/17.0% (41)	14 (31)	10	50 (20)	74 (43)

Source: Hobbs Affidavit at 36 tbl.1.

29. It was always understood, not just by Dr. Hobbs and Mr. Ott, that even with the implementation of the RPM, there would be periods of capacity shortage. Dr. Bowring recognized this in his Affidavit on Behalf of PJM:

> Although it can be expected that in the long run, in a competitive market, net revenue from all sources will cover the fixed costs of investing in new generating resources, including a competitive return on investment, *actual results are expected to vary from year to year. Wholesale energy markets, like other markets, are cyclical. When the markets are long, prices will be lower and when the markets are short, prices will be higher*.[35]

30. Another basic attribute of the RPM structure is its deliberate use of forward auctions. When PJM's proposal was being formulated, I had originally proposed a four to five years' lead

[35] *PJM Interconnection, LLC*, Docket No. EL05-148-000, Affidavit of Dr. Joseph E. Bowring at 15 (Aug. 31, 2005) (emphasis added).

time. PJM eventually settled upon a four-year forward period.[36] Following the settlement, the parties agreed upon a three-year forward auction.

31. This lead time between the auction and the delivery year for which a capacity resource assumes a capacity supply obligation during that auction is a critical feature of PJM's market design. The intent of implementing the forward construct was to ensure sufficient lead time for either a new generator or a QTU to commit to and be prepared to fulfill any capacity supply obligation assumed in the BRA. In principle, the generation developer might have a project in early development, and make an offer into the BRA or to build a QTU or generation unit at a commercially-viable price. Obviously, any decision to commit hundreds of millions of dollars is more complex, but the intent was to have a lead time consistent with (and complementary to) the period necessary to accommodate the new entry of capacity resources.

32. The original PJM filing explicitly identified the lag between the time retirements were expected to slow down due to rising prices and the time when new entry would accelerate. The three-year forward market complemented both the practical requirements for physically developing new facilities and the time it would take for price signals to influence developers' decision making when contemplating new development, whether it would be the new entry of generation, the augmentation of existing generation resources or the development of new QTUs. For example, in the slides below you will notice that the retirements and reduction in new entry precede a rapid escalation in prices as the excess reserves are first reduced by the effect of prolonged low prices, and then, when scarcity arises from the retirements and lack of new entry, investors digest the trend towards higher prices. This same pattern is reflected in the business cycle model built by Dr. Hobbs in which the decision to build is driven by pricing information from both past and present years. He makes explicit the importance of the auction's lead time to the decision to build and the decision to retire.[37]

33. This same theme comes up over and over again. Scarcity and high prices were expected, in fact, they were needed—it was a natural part of the business cycle, where surplus and low prices lead to retirement, retirement leads to scarcity and high prices and new entry, new entry

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[36] *See PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079, at P 72 (2006) ("We find that a four-year-forward procurement period is a reasonable requirement.").

[37] *See* Hobbs Affidavit at 65–74.

then moderates prices and, as they drop further the cycle begins again. There is nothing surprising or actionable about that.

34. Further this concern over the correct price signal did not exist in a vacuum, ignoring the reliability impacts of scarcity for the sake of improved pricing was very important, but not to the exclusion of reliability. Though the pricing information carried in the demand curve and market clearing prices was a direct and important objective, there was also an explicit balancing of the importance of pricing with reliability. Attachment DD of the PJM OATT has all the mechanics and specifications for RPM. Section 16 of Attachment DD (Reliability Backstop) is a clear expression of this intent to balance, pricing is important and is a front-line objective, but reliability in terms of total adequacy must be maintained. Note that prior to the Section 16 backstop actions being implemented to address RTO-wide scarcity (i.e., results below the IRM) the reliability issues must be demonstrated via three years of auction results that are below the reliability target installed reserve margin (thus first allowing pricing to work), but that once demonstrated that there was no market response forthcoming to the these three-year signals of scarcity, PJM's authority to remedy is broad and direct action to procure additional capacity was allowed. So, the world did not end as prices approached or exceeded Net CONE as just happened in the 2025/26 auction, rather it was anticipated that it would require three years of being short of the target reserve margin with the associated higher prices that were the trigger for then taking some out-of-market intervention. While the risks related to local RMR units may be more immediate than the impacts of aggregate scarcity for the RTO as a whole, the concept and associated pricing issues are the same, and as indicated, PJM has reasonably balanced the two concerns.

Section 16 is titled Reliability Backstop.[38] The purpose is clear and succinct:

> **16.1 Purpose**
>
> **The Reliability Backstop provides a mechanism to resolve reliability criteria violations caused by: (a) lack of sufficient capacity committed through the Reliability Pricing Model Auctions; or (b) near-term transmission deliverability violations identified after the Base Residual Auction is conducted. These backstop mechanisms are intended to guarantee that sufficient generation, transmission and demand response solutions will be**

[38] See full detail of Attachment DD Section 16 at https://agreements.pjm.com/oatt/5170.

> **available to preserve system reliability.** The backstop mechanisms are based on specific triggers that signal a need for a targeted solution to a reliability problem that was not resolved by the long-term commitment of Capacity Resources through Self-Supply or the Reliability Pricing Model Auctions.
>
> **16.2 Investigation of Capacity Shortfall**
>
> If the total Unforced Capacity of Capacity Resources committed for a Delivery Year following the Base Residual Auction equates to an installed reserve margin that is more than one percentage point lower than the approved PJM Region Installed Reserve Margin, the Office of the Interconnection shall investigate the cause for the shortage, and recommend corrective action, including, without limitation, adjusting the Cost of New Entry to the extent determined necessary by such investigation, or addressing other barriers to entry identified by such investigation. No Reliability Backstop Auction will be conducted to address such a shortfall unless it occurs in the Base Residual Auctions for three consecutive Delivery Years.
>
> . . . .
>
> In addition to the foregoing events that trigger reliability backstop measures, if a near-term, i.e., later in time than the conduct of the Base Residual Auction for a Delivery Year, transmission criteria violation caused by an announced generation resource deactivation is identified by the regional transmission reliability planning analysis performed by the Office of the Interconnection in accordance with Part V of this Tariff, the Office of the Interconnection will identify the necessary transmission upgrade. In accordance with such rules, such generation resource may remain in service until the transmission upgrade is installed. No Reliability Backstop Auction will be conducted.[39]

35. The rigorous analysis of the demand curve, the review of its shape and function in attracting and retaining generation, the frequency of expected procurements below the IRM, the examination of total procurement costs and market prices continues within PJM to the present day. The Tariff requires a continual review of the properties and performance of the demand curve and requires adjustments to be recommended if necessary. This happened in 2022, the adjustments were approved by Commission Order in 2023, and resulted in expectations that were virtually identical to the actual 2025/26 auction results. Average procurement costs for capacity for the total RTO were estimated to be $13.1 billion, and $267/MWD was the estimated equilibrium capacity auction price.[40]

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[39] *Id.* (emphasis added).

[40] *See PJM Interconnection, L.L.C.*, 182 FERC ¶ 61,073 (2023); Brattle Study at 17 tbl.4.

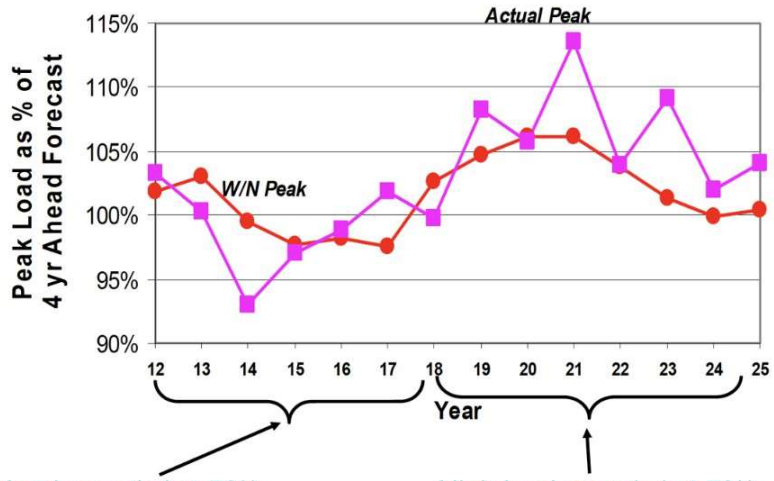
36. To all appearances, Complainants appear to object to nothing more than scarcity price signals in the RPM auction. They certainly have not explained how their dire/hyperbolic statements about "high" can be squared with the fact that these prices were expected. Their view is short sighted. It fails to recognize or acknowledge the balance that PJM has stricken through the limited and temporary employment of RMR agreements while ensuring accurate price signals, thus ensuring both short-term reliability and long-term resource adequacy.

37. In sum, the Complainants ask the Commission to fix a problem that does not exist. The prices in the last capacity auction were "high" (approximating the expected equilibrium Net CONE) and in general anticipated. High prices when supply is short are a vital part of the design of PJM's RPM. While parties continue to debate and adjust the RPM design, the basic feature of capturing price signals over a business cycle via market-based auctions and the shaped demand curve has been maintained and remains a just and reasonable building block of the design. The problem we are seeing today is discontent over the period of the business cycle when prices are high. The complaining parties do not express any concerns that prices in the previous two auctions were only 10% and 12% of the anchor target/average of Net CONE. Yet inevitably these low prices were just as much of an expectation as the higher approximately Net CONE prices that just occurred due to retirements and lack of entry.

38. In retrospect, PJM's initial filing for the RPM and the FERC's order approving settlement were little short of prescient. PJM's filing contained generic models of pricing, scarcity and the business cycle, all of which were borne out in the actual functioning of the market. The initial filing also acknowledged the fact that even with the downward sloping demand curve, there would be periods of excess supply and low prices as well as physical scarcity and high prices. The following series of slides that appeared in Dr. Hobbs's affidavit, and reproduced earlier by PJM demonstrates these cycles. The underlying data for these slides were drawn from a reference 100-year simulation and exhibit the variability of a normal business cycle.[41] The almost 20 years of PJM's market operations show that the anticipated business cycles roughly matched what actually happened.

[41] Bowring et al., *Dynamic Analysis of Demand Curves for PJM Reliability Pricing Model: Update* 14–16 (Jan. 26, 2005), https://www.monitoringanalytics.com/reports/Presentations/2005/20050126-ram-item-2-dynamic-analysis-demand-curves.pdf.

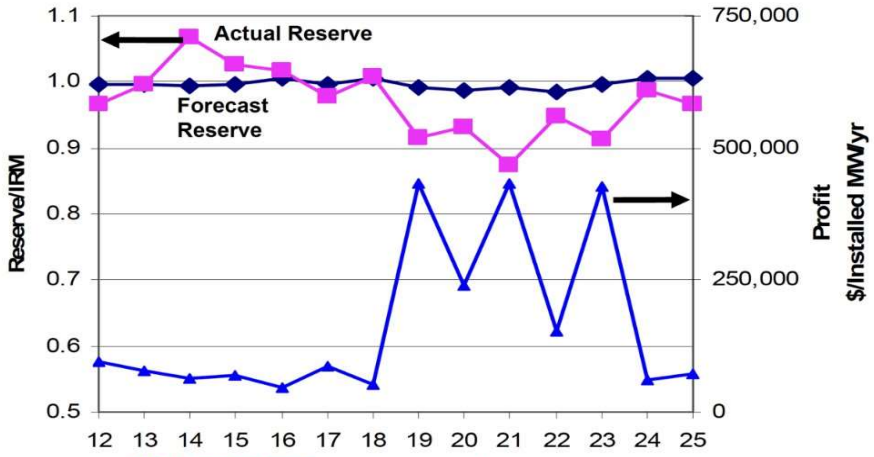
Analysis of Capacity Cycle: W/N and Actual Peaks



Low load growth (<1.7%) & cool weather (so overbuilt)

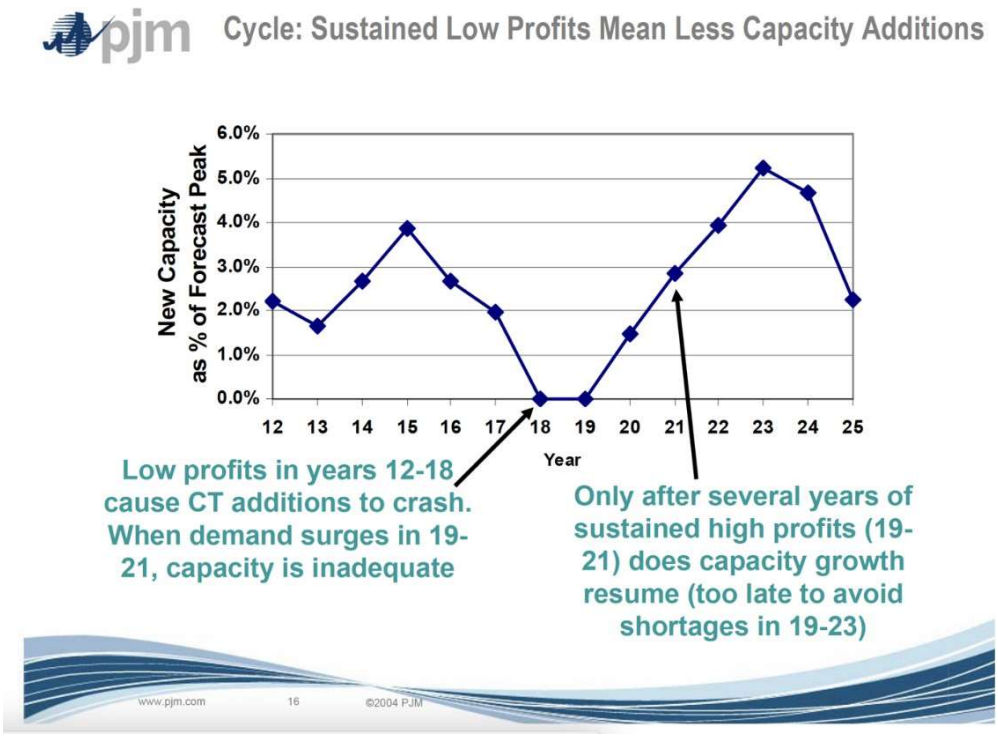
High load growth (>1.7%) & hot weather (so too little capacity)

Cycle: Low Profits in Early Years, High Profits Later



High reserves, Low profits

Low reserves, High profits



39. The business cycle and the varying prices from the capacity market were predicted in a series of slides that appeared in PJM's original RPM filing. The first slide shows the annual peak pattern moving from low to high over 13 years (W/N refers to weather normalized). The second slide shows the calculation by Dr. Hobbs of financial profits, which mirror the periods of excess and scarce capacity. The third slide displays the predicted deceleration of new entry during periods of excess capacity and low prices. The addition of new capacity ultimately comes to a halt, and then restarts as the price signal linked to new entry returns. This is when the system reaches a state of relatively short capacity. There is no mystery here; the shape, if not exact values, was predicted. The process and cycle were fully described, documented, simulated, negotiated in settlement, reviewed by the Commission, and accepted as just and reasonable by Commission order. Everything regarding the RPM's assumption of a multi-year business cycle was transparent and universally understood. Indeed, during the settlement process (without commenting on specific parties and their positions), Mr. Ott continually informed the parties of PJM's evaluations of the various proposals being proffered for the demand curve using the Hobbs model. PJM itself was adamant regarding the reliability criteria it believed were most important in assessing alterations to the initial filing's model. The movement of prices around Net CONE and the duration of high prices and low reserves were the associated key performance

features important to PJM and whose resulting values became the main criteria in the negotiations regarding the RPM demand curve in the settlement process.

40. The actual performance as updated via the reviews (including the most recent Quadrennial Review) echoes exactly the same type of underlying dynamics for equilibrium conditions, but with amazingly similar results to the last auction results.[42]

41. Despite PJM's carefully researched and balanced proposal and the refinement of that proposal in settlement to ensure that the market produces price signals to procure the required quantity of capacity while ensuring reliability, when prices actually do rise during times of scarcity in response to intentionally established market signals, many people feel justified in crying foul. While their specific thought process is unclear to me it seems very much like "heads I win, tails you lose."

42. There is simply no justification for such self-serving arguments. They seem to purposefully ignore the anticipated business cycle, price signals, and variation in procured capacity and prices that were explicitly intended. They also ignore the extensive review of the properties of the business cycle demand curve that PJM continues to conduct, and was confirmed as recently as February 2023 by Commission Order.[43] As also noted, the equilibrium results from Brattle were almost exactly the same as the most recent auction. As I discuss further below, even the underlying consequences for scarcity caused by RMRs were fully anticipated and explained by Dr. Bowring as early as 2005. No one can credibly claim to be surprised by elevated prices in times of scarcity. Parties have been on notice—literally for almost two decades—because RPM was established through an open and widely litigated process and the fundamentals of the design were part of the PJM tariff (and followed) for years. It is hard to see the intended behavior of the market, which was well documented, understood and prepared for, now being credibly characterized as unjust and unreasonable. Yet, the moment we see the fully anticipated uptick in pricing, carefully addressed by PJM to assure reliability and proper price signals necessary to ensure that new capacity will enter the market, all of this forethought gets thrown out the window in favor of short-term self-interest.

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42 *See* Brattle Study at 17 tbl.4.

43 *See PJM Interconnection, L.L.C.*, 182 FERC ¶ 61,073 (2023).

43. It is not enough for Complainants to challenge the justness and reasonableness of PJM's market design by just saying "look, it's great, prices are very low" (celebrating low prices) without also acknowledging that PJM established (in the very same market design) a mechanism that fully intended market participants to also say "look, now finally prices are very high." Indeed, a market that only has low prices is a market that will ultimately fail to procure sufficient capacity. High prices are necessary in scarcity. Market participants and the Commission both must look at this totality, and how these pieces fit together to see that the operation of PJM's market is consistent with the Tariff. If they do so, they will have to come to the conclusion that PJM's Tariff was and is just and reasonable. The actual realized prices have not been excessive and collectively, as shown below in Table 1, have only averaged about one third of the targeted Net CONE. A more reasoned concern, given the increase in retirements and scarcity of new entry, would seem to be that the prices have been too low.

44. Any fair assessment of PJM's Tariff must rightfully consider the fully anticipated episodic periods of scarcity in the RPM compensation scheme, the need for high prices to make the paradigm work, and PJM's objective of balancing the need for preserving accurate signals and the simultaneous actions that PJM must take to preserve reliability. To achieve that balance, PJM should not include RMR units in supply while keeping the units online to relieve a transmission constraint. This would only serve to reinforce the low prices due to excess supply that are causing the problem.

45. A fair evaluation of PJM's Tariff cannot, as Complainants do, myopically select one interval, the interval where a fully anticipated market feature created the necessary scarcity (and prices) of the business cycle. They similarly cannot deny the out-of-market reliability actions taken along with that pricing which were a required intervention to maintain reliability by establishing an RMR agreement during this interval. And no fair evaluation of PJM's Tariff can, based on this sole interval and without consideration of anything else, declare the mechanism unjust and unreasonable (particularly when such analyses ignore the "transmission-like" reliability contribution that PJM is purchasing with the RMR compensation). Yet this is exactly how the Complainants have structured the Complaint. They even choose to completely ignore the fact that the most recent auction results not only support the general business cycle properties of the market design, but almost mirror the equilibrium estimates that were produced by the most

recent Commission-approved demand curve. Over two years ago, PJM told the Commission these would be the prices if supply approximated the target reserve margin.

46. When viewed over the long term, and recognizing the reliability contribution of RMR units independently from the pricing solution and price signal, the pieces fit nicely together. The market's operation under PJM's Tariff appears consistent with and conforms to the original purposes and predictions of the RPM design that the Commission determined to be just and reasonable.

Results After Implementation

> **RPM has performed generally as predicted, sending price signals to market participants regarding the need to enter and exit the market. That said, the RPM has also been confronted with multiple changes that have artificially depressed prices and undermined market signals. Inclusion of RMR resources in RPM will aggravate these conditions and impact on RPM's ability to deliver on its primary objective – incenting the correct amount of supply to meet PJM's reliability requirement.**

47. Though PJM's market has been subject to continuous review, complaint, modification, and revision, the general structure of the RPM auction, including downward sloping demand curve and the market's necessary reliance on a long-term business cycle, has remained in place and largely unchanged since its first Delivery Year auction for 2007. If there has been any constant theme throughout the two decades of the market's operations, it has been the repeated interventions explored by PJM and stakeholders to suppress RPM prices to levels too low to achieve the RPM's objective of incentivizing new entry when necessary. Obviously, this is my perspective, but the Commission should be made aware of the series of debates over the last 19 years and their impact on the RPM's performance. The Market Seller Offer Cap ("MSOC") has been litigated multiple times, with many parties concerned that the parameters by which the cap is set establish a cap that is too low. The result being a failure to allow market participants to offer into the market at prices that reflect their actual business risks.[44] The Minimum Offer Price

[44] *See PJM Interconnection, LLC*, 151 FERC ¶ 61,208 (2015), *order on reh'g*, 155 FERC ¶ 61,157 (2016); *Indep. Mkt. Monitor for PJM v. PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,137 (2021), *reh'g denied*, 177 FERC ¶ 62,066 (2021), *further order on reh'g*, 178 FERC ¶ 61,121 (2022), *aff'd sub nom. Vistra Corp. v. FERC*, 80 F.4th 302 (D.C. Cir. 2023), *cert. denied sub nom. Elec. Power Supply Ass'n v. FERC*, 144 S. Ct. 2578 (May 28, 2024).

Rule ("MOPR") was also litigated.[45] Intended as means by which to protect the market from price suppression by subsidized generators, multiple exceptions and modifications to the MOPR have been made over the years weakening its application, and these exceptions have encouraged a large influx of new intermittent resources with artificially low prices supported by state and federal subsidies. Further, such "favored" resources have been afforded the option to not participate as Capacity Resources even while tying up transmission capacity to assure their deliverability as a Capacity Resource and thus impeding the ability of new entrants to supply capacity due to both increased delays and costs in the interconnection process. This subsidized supply coupled with the uncertainty created by the option not to offer also creates greater obstacles for potential new entry in terms of higher variance in prices and the associated risks. Similarly, there have been material adjustments of the reference technology for calculating Net CONE and for the slope of the variable resource requirement curve. Again, there has been a theme of the potential to decrease prices, which ultimately adds risk.[46]

48. Also, as I myself have repeatedly noted, the accreditation of intermittent resources was inflated for an extended period, exaggerating supply and suppressing prices and, in turn, overstating certain transmission transfer parameters (Capacity Emergency Transfer Limits).[47] These actions all exaggerated the "long" period of the business cycle. Subsequently, perhaps in response to my criticism, PJM adjusted these and other accreditations and lowered overall supply. This is all likely a part of the seemingly abrupt changes to slower new entry, lower reserves, and higher prices.[48] PJM has acted in part to remedy these problems.

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[45] *See PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,331 (2006), *order on reh'g*, 119 FERC ¶ 61,318 (2007), *aff'd sub nom. Pub. Serv. Elec. Gas Co. v. FERC*, 324 F. App'x 1 (D.C. Cir. 2009); *PJM Interconnection, L.L.C.*, 135 FERC ¶ 61,022 (2011), *reh'd denied in part*, 137 FERC ¶ 61,145 (2011), *aff'd sub nom. New Jersey Bd. of Pub. Utils. v. FERC*, 744 F.3d 74 (3d Cir. 2014); *Hughes v. Talen Energy Mktg., LLC*, 578 U.S. 150 (2016); *Calpine Corp. v. PJM Interconnection, L.L.C.*, 169 FERC ¶ 61,239 (2019), *order on reh'g & clarification*, 171 FERC ¶ 61,035 (2020), *order on compliance*, 173 FERC ¶ 61,061 (2020), *order on compliance & clarification*, 174 FERC ¶ 61,036 (2021); *PJM Power Providers Grp. v. FERC*, 88 F.4th 250 (3d Cir. 2023), *cert. denied sub nom. Pub. Utils. Comm'n of Ohio v. FERC*, No. 23-1069, 2024 U.S. LEXIS 3563 (Oct. 7, 2024).

[46] *See generally* Brattle Study.

[47] I would note that belatedly PJM has adopted corrections for almost all of the criticisms I personally presented except for the details of the CETL calculation.

[48] *See* PJM IMM, *Analysis of the 2023/2024 RPM Base Residual Auction*, at 73–74 (Oct. 28, 2022), https://www.monitoringanalytics.com/reports/Reports/2022/IMM_Analysis_of_the_20232024_RPM_Base_Res *(cont'd)*

49. PJM has also materially modified the risk profile for participating as a Capacity Resource in RPM. The introduction of the Capacity Performance rule and its potential for high penalties (e.g., $1.8 billion in penalties for Winter Storm Elliott that was later reduced in settlement) materially increased the risk faced by generators selling into the RPM capacity market.[49] These risks and the difficulty in pricing those risks in the market because of the structure of offer caps have likely discouraged both new entry and the participation of Capacity Resources that have the option not to offer. This risk must be considered given the fact that RMR participation is voluntary once a unit has declared retirement and that retirement has been found to be based on legitimate economics.

50. The bottom line is despite all of these impediments placed on PJM's market, a long-term view of the performance of RPM over the business cycle shows that the market has generally followed PJM's and Dr. Hobbs's predictions. Reserve margins have declined over the recent past from excess in 2007 to approximately "on target" in 2024/25 delivery period.[50] In turn, prices have also been materially lower than the anticipated equilibrium average price of Net CONE, falling to a low of only 10% and 12% of that value in recent years. *See* Table 1:

idual_Auction_20221028.pdf; *PJM Interconnection, L.L.C.*, Docket No. ER18-1314-000, Affidavit of Adam J. Keech on Behalf of PJM Interconnection, L.L.C., ¶¶ 7–13 (Apr. 9, 2018).

[49] PJM: Inside Lines, *FERC Approves Winter Storm Elliot Settlement Agreement* (Dec. 20, 2023), https://insidelines.pjm.com/ferc-approves-winter-storm-elliott-settlement-agreement.

[50] *See* Answer of PJM Interconnection, L.L.C., 12 (Oct. 18, 2024) ("From the establishment of PJM's current capacity market in 2006 through the Base Residual Auction for the 2024/2025 Delivery Year, the PJM region has been long on capacity, often procuring reserve margins of over 20%. But in recent years, PJM has been portending a tightening of the supply and demand balance." (footnote omitted)).

Table 1

RTO RESULTS					
RPM Delivery Year	**Annual Clearing Price ($/MW-day)**	**Net CONE (UCAP, $/MW-Day)**	**Annual Per Cent of RTO Net CONE**	**Target Installed Reserve Margin for the RTO**	**Realized RTO Reserve Margin**
2007/2008	$ 40.80	$ 161.27	25%	15%	19%
2008/2009	$ 111.92	$ 161.71	69%	15%	17%
2009/2010	$ 102.04	$ 161.71	63%	15%	18%
2010/2011	$ 174.29	$ 163.47	107%	16%	16%
2011/2012	$ 10.00	$ 171.40	64%	16%	18%
2012/2013	$ 16.46	$ 276.09	6%	16%	21%
2013/2014	$ 27.73	$ 297.92	9%	15%	20%
2014/2015	$ 125.99	$ 343.23	37%	15%	19%
2015/2016	$ 136.00	$ 320.63	42%	15%	19%
2016/2017	$ 59.37	$ 330.53	18%	16%	20%
2017/2018	$ 120.00	$ 351.39	34%	16%	20%
2018/2019	$ 164.77	$ 300.57	55%	16%	20%
2019/2020	$ 100.00	$ 299.30	33%	17%	22%
2020/2021	$ 76.53	$ 292.92	26%	17%	23%
2021/2022	$ 140.00	$ 321.57	44%	16%	22%
2022/2023	$ 50.00	$ 260.50	19%	15%	20%
2023/2024	$ 34.13	$ 274.96	12%	15%	20%
2024/2025	$ 28.92	$ 293.19	10%	15%	20.4%
2025/2026	$ 269.92	$ 228.81	118%	17.8%	18.5%
Average to 2024-2025	**$ 89.94**	**$ 265.69**	**37%**		
Average Full Range	**$ 99.41**	**$ 263.75**	**42%**		
Average 2025-26			**34%**		
Average as % of 2025 Net CONE			**39%**		
Average as % of Average Net CONE over Range			**34%**		

51. The critical lessons from this chart are clear. From 2007/8 to 2024/5, the annual RPM RTO clearing price only averaged 37% of Net CONE. The 2023/24 and 2024/25 auction results look like the nadir of prices predicted by Dr. Hobbs in PJM's initial 2005 filing.[51] In 2023/24 and 2024/25 auctions, the clearing prices were only 12% and 10% of Net CONE respectively. During these two years new entry was very limited (i.e., supplied offered in the 2024/25 auction declined by 2,192 MW from the year before).[52] The reserve margin for the RTO was 5.4% higher than the target for 2024/2025, while it was reduced to only 0.7% for 2025/26. Due to unanticipated reductions in offers, prices in the DPL South LDA hit the price ceiling "because there was not enough supply to meet the Reliability Requirement."[53] Average $/MW-Day payments under RPM from 2007/8 to the 2025/26 Delivery Years were only $99.41, or 39% of the 2025/26 Net CONE. On a year-by-year basis, the average RTO clearing price was only 34% of each year's Net CONE, hardly consistent with the hyperbole offered by Complainants and others regarding skyrocketing prices.

52. It should not surprise anyone to see regional or local generation scarcity after such a long duration of low prices. This was the very pricing behavior that Dr. Hobbs predicted. During this period, market participants were capturing about 34% of the average steady state price needed to support new entry. And in the last two years immediately before the recent auction that saw such a dramatic price jump, those values were 10% and 12%.

53. The most recent auction also shows a continuation of the net decline in resources offered into the auction (overall change in offers reflecting retirement, new additions, and changes in offers from parties with the option to offer or not and a change in accreditation). In the summary of the 2025/26 Base Residual Auction, PJM stated:

> Supply offered into the RPM capacity market, excluding EE resources, declined 13,252.1 MW from 148,945.7 MW in the 2024/2025 BRA to 135,692.3 MW in the 2025/2026 BRA. This is the fourth BRA in a row where the total capacity offered from non-EE resources has declined..... The total amount of capacity, excluding

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51 *See* Hobbs Affidavit at 36 tbl.1.

52 PJM, *2024/2025 RPM Base Residual Auction Results*, https://pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2024-2025/2024-2025-base-residual-auction-report.ashx.

53 *Id.*

EE Resources, in RPM that cleared decreased by 5,743.6 MW from 140,415.8 MW in the 2024/2025 BRA to 134,672.2 MW in the 2025/2026 BRA.[54]

In terms of ICAP, not accreditation, a long-term trend in PJM has been the decline in capacity offered into the Base Residual Auction. Over 11 years, the amount of capacity eligible to be offered and actually offered has declined materially.[55] Both observations echo the Hobbs simulation showing no new entry prior to prices escalating.

54. Similarly, there were other indicators that parallel the early simulations. Load increased (3,243 MW increase in forecasted load), and the resulting IRM decreased.[56] Overall, these types of indicators coupled with reduced supply show exactly the type of confluence of events/incentives that the market design intended to result in price increases.[57]

55. Despite RPM's demonstrated success, there have been several significant changes. Some of these changes, like the introduction of CP have enhanced the design by incentivizing improved generator performance and discouraging the entry of (and awarding of capacity payments to) resources with relatively low capacity values. But the CP structure also enhanced risk which may not be properly represented in allowed offers. Other changes, which have artificially depressed prices, have undermined RPM's ability to deliver on its core objective of ensuring procurement of the capacity necessary to meet PJM's reliability requirements. Even where changes to RPM's design have largely been positive, such as CP, over-mitigation has undercut resources' ability to fully reflect their risk in taking a capacity obligation and thus undercut RPM's objective. And while the Commission may be tempted to see the inclusion of RMR resources in RPM as just another one of those changes which will test, but not break, RPM's resilience, the clear evidence of scarcity should be reason enough not to grant the Complaint. Elevated prices that are driven by scarcity (as is the case here) are evidence that the market is already stretched, but, if left alone, will respond over time with new entry. Artificially depressing prices by including RMR resources that have been approved to deactivate will

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[54] PJM, *2025/2026 Base Residual Auction Report*, 3 (July 30, 2024), https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.ashx.

[55] *Id*. at 9 tbl.4.

[56] *Id.* at 3–4.

[57] *See* Bowring et al., *supra* note 43, at 14–16 (showing expected price increases).

undermine that necessary price signal, and while it may produce what might be viewed as a short-term win, it will come at the cost of the long-term objectives (i.e., making sure there is enough capacity) RPM is designed to achieve.

56. Thus, despite the series of external interventions and subsidies, and likely in part because of them, we witnessed a period of low prices followed by a bounce in the RPM price as the low prices suppressed new entry and capacity retired prematurely. This is exactly what was supposed to happen. At some point after a prolonged period of excess reserves and low prices, reality has to set in and necessary revenues will again be reflected in capacity prices as entry drops, exit increases, and prices rise. No surprises here, except perhaps for market participants that chose to speculate on continued low prices and failed to hedge their capacity requirements.

57. And again, there is no mention of the eerily similar equilibrium results that were predicted when PJM filed its new demand curve in 2022, which was approved by the Commission in 2023. On an RTO-wide basis these numbers are basically identical. Not surprising when the condition of the system was pretty much at design and reflected prices consistent with that condition. Complainants simply hope to grab on the variation from very low prices to prices close to equilibrium estimates to frighten the Commission and stakeholder into believing the predictable (and desired) result was somehow unjust and unreasonable.

58. Finally, it is worth noting that the rise in capacity prices to levels that are closer to what was envisioned has *already* led to the very responses that RPM was designed to elicit. For example,

a. On August 22, 2024, Calpine announced an acceleration of its PJM development program,[58]

b. On September 4, 2024, Middle River Power announced that it was withdrawing the deactivation notices for its four plants at the Elgin facility,[59]

[58] https://www.calpine.com/calpine-accelerates-pjm-development-program/

[59] https://www.pjm.com/-/media/planning/gen-retire/deactivation-notices/elgin-deactivation-withdrawal.ashx

c. On September 20, 2024, Constellation announced that it struck a deal with Microsoft that would return Three Mile Island back to the grid,[60] and

d. In October, Longview Power announced it was seeking an extension to build a gas plant in West Virginia citing constructive capacity pricing as the reason to continue this project.[61]

Reconciling High Prices, Scarcity and Reliability-RMR and Available Actions

59. As stated earlier, Dr. Bowring also commented on the use of market-based reliability tools in situations where out-of-market actions might be necessary. Dr. Bowring's comments stand as another full recognition of the current conditions anticipated and predicted in PJM's filing 19 years ago:

> [Submitted August 31, 2005] While net revenue in PJM has been sufficient to cover the costs of new peaking units in some years, net revenue has been below the level required to cover the full costs of new generation investment for several years, and below that level on average for new peaking units for the entire period PJM has operated an energy market. (See Figure 2.) While to some degree this reflects cyclical fluctuations in supply and demand, this generally low level of revenues, coupled with the fact that some units needed for reliability in PJM are retiring because they are not receiving enough revenue to cover annual going forward costs, suggests that market price signals and reliability, or resource adequacy, needs are not fully synchronized. While retirements are a normal part of the operation of markets, the desire of generators to retire due to inadequate revenues raises a concern when such generators are critical to maintaining regional grid reliability. This suggests that market price signals and reliability needs are not fully synchronized and that the revenue inadequacy observed in PJM is not merely the result of expected cyclical fluctuations. *The fact that the retirement of units with low net revenues would lead to unreliable operations in the absence of out of market actions suggests that market conditions in the region where these units are located are not reflected in the capacity market prices.*
>
> Moreover, when PJM determines that a retirement will result in reliability issues, the PJM market rules permit out of market payments to the units to keep them in service. While making such payments is an appropriate short run response to maintain reliability, this response is a symptom of the underlying investment incentive issue and cannot resolve the issue in the long term, consistent with markets. The logical end result of this approach would be out of market contracts

[60] https://www.constellationenergy.com/newsroom/2024/Constellation-to-Launch-Crane-Clean-Energy-Center-Restoring-Jobs-and-Carbon-Free-Power-to-The-Grid.html

[61] https://www.dominionpost.com/2024/10/11/longview-power-daughter-companies-ask-psc-for-extensions-to-build-and-begin-operating-gas-fired-power-plant/

> with a significant number of peaking units in affected regions. This creates an incentive to declare unit retirements which in turn has a detrimental effect on the dynamics of the capacity market If a regional shortage of capacity is reflected only in RMR payments and not in capacity market prices, there is no market signal for entry. The fact that RMR contracts continue to be needed to protect local reliability indicates that the market is not solving the regional reliability problem. The continued use of RMR contracts will simultaneously undermine the ability of the market to solve the reliability problem.[62]

60. Dr. Bowring's almost 20-year-old statement is still completely accurate. It offers four important insights. First, PJM is doing the right thing by entering into RMR contracts to preserve reliability while removing RMR capacity from the RPM auctions. Second, PJM should be more focused on the *ex ante* identification of potential RMRs before they become necessary and, per Dr. Bowring and my own estimation, PJM should act proactively to compensate generators for their reliability contributions that are not currently recognized in the market in order to retain them. Third, despite the repeated histrionics that parties are paying for capacity but not receiving it, there are no double payments going on. Because PJM can only direct transmission and not new generation, the proper view of an RMR is that when PJM establishes an RMR, it is procuring transmission services not capacity. What is happening is that market participants are paying only once for such transmission during the pendency of a PJM-directed adjustment that will maintain reliability, but will not distort the fact that actual scarcity does exist as properly represented by the reduction of supply in the auction. They will continue to pay for the transmission solution when it is in place and the capacity is retired. This is independent of the anticipated scarcity and the associated prices. Such a conceptualization also comports with the scenario in which an RMR is required: a shortage in capacity accompanied by a required change in transmission. Fourth, there are several refinements to PJM's current procedures that would result in better price signals while also achieving the same reliability objectives.[63]

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[62] Bowring Affidavit at 15 (emphasis added) (footnote omitted).

[63] PJM noted several changes in the IMM's positions regarding RMR pricing and scarcity in rebuttal to a very recent IMM report. PJM estimated that the IMM's initial recommendations would have resulted in approximately a $6 billion increase in RPM costs. PJM, *Response to Independent Market Monitor Report on 2025/2026 Base Residual Auction* 1–2 (Oct. 11, 2024), https://www.pjm.com/-/media/library/reports-notices/reliability-pricing-model/20241011-response-to-imm-25-26-bra-report.ashx.

> PJM's analysis shows that if core capacity market changes the IMM recommended less than a year ago had been implemented instead of the risk modeling and accreditation frameworks that PJM

(cont'd)

61. The Commission concurred with Dr. Bowring in a separate proceeding, stating:

> While such an approach might alleviate the situation in the very near term, this stop-gap approach would fail to address the longer-term need to provide sufficient price signals to support development of new resources and the retention of existing resources over the long-term, and the capacity adequacy construct should ensure the presence of financial incentives for resources to voluntarily agree to commit to longer service terms.[64]

62. PJM's RPM is working in general as anticipated. The choice to balance price signals and reliability concerns under a tariff in which RMR arrangements are voluntary was intentional and well understood by the Commission and was found just and reasonable. Obviously, as the Commission has seen, there are continual adjustments, mostly due to market power, subsidies, accreditation of sellers, and undue preference issues. But the anticipation of a business cycle and associated high and low pricing has never been contested to my knowledge. The continued refinements of the key demand curve design by PJM and the associated supporting studies confirm that the general and local scarcity is real, the Complainants have not suggested that PJM really is "sitting" on surplus generation and failing to include it as Capacity Resources. The question, as framed above, is how to accurately convey a price signal that demonstrates the need for new generation (in response to years of low prices, low entry, and retirements) while preserving reliability. PJM's solution has been to keep the necessary generation for reliability but exclude it from participating as a Capacity Resource in the RPM auction so that price formation can occur unimpeded.

63. To all appearances, Complainants appear to object to nothing more than scarcity price signals in the RPM auction. This is short sighted. It fails to recognize or acknowledge the precise balance that PJM has stricken through the limited and temporary employment of RMR

> filed and FERC approved, the 2025/2026 BRA would have cleared at the market cap across the RTO. For the IMM to ignore some of its own recent recommendations stemming from its assessment of alleged "core flaws" in the PJM market and now claim that market prices should have cleared lower than they did creates a serious credibility challenge to the IMM's report. This is not a small gap: the 2025/2026 capacity market cost if the IMM's prior recommendations had been implemented would have been $20.8 billion. The market cleared at a cost of $14.7 billion. The IMM now presents sensitivities reflecting different recommendations with total costs ranging from $6.7 billion to $12.0 billion.

Id. (footnote omitted).

64 *PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079 at P 36 (2006).

agreements while ensuring accurate price signals, thus ensuring both short-term reliability and long-term resource adequacy.

64. In sum, the Complainants ask the Commission to fix a problem that does not exist. The high prices in the last capacity auction were anticipated, pricing at or above Net CONE is a vital part of the design of PJM's RPM. While parties continue to debate and adjust the RPM design, the basic feature of capturing price signals over a business cycle via market-based auctions and the shaped demand curve has been and remains a just and reasonable building block of the design. The problem we are seeing today is discontent over the period of the business cycle when prices are high; the Complainants do not express any concerns that prices in the previous two auctions were only 10% and 12% of the anchor target/average of Net CONE.

Response to the IMM's Comments

65. On October 10, 2024, Dr**.** Joseph Bowring, the IMM for PJM, submitted comments in this proceeding expressing conditioned support for the Complaint. In response, I have included these short observations to his filing. Notably, Dr. Bowring's filing contains a number of alternative forms of relief that he considered, but that list of considerations omitted some very obvious and compelling options. Also, notably, the filing is inconsistent with multiple statements and positions that the IMM took—in the role of IMM—regarding the treatment of RMR projects. The filing unaccountably ignored the IMM's repeated (and recent) support for PJM's current practice of excluding RMR units from supply. The filing is also directly at odds with the IMM's repeated and well-articulated positions taken in PJM's initial RPM filing in 2005.

66. There are similar inconsistencies in recent State of the Market reports: "The MMU recommends that units that are paid under Part V of the OATT (RMR) not be included in the calculation of CETO or reliability in the relevant LDA, in order to ensure that the capacity market price signal reflects the appropriate supply and demand conditions."[65]

[65] PJM IMM, *2023 Annual State of the Market Report for PJM*, at 302 (Mar. 14, 2024), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2023/2023-som-pjm-sec5.pdf. The comment is referencing that if the RMR units are not in the supply, the IMM is supporting removing them from the planning parameter calculations.

67. Also consider this comment: "The definitions of reliability for the capacity market and transmission planners should be the same. That will require a change to the capacity market rules that do not now define reliability as stringently as the transmission planning criteria. In addition, RMR units are included in the supply of capacity for auctions after the unit has declared the intent to retire. Such inclusion overstates market supply and suppresses the capacity market price signal needed to incent the new entry needed to replace the retiring unit."[66]

68. These are material inconsistencies. In support of PJM's initial RPM filing, the IMM unambiguously stated that the shortage of capacity that would be caused by the establishment of an RMR arrangement must be reflected in the capacity market prices by excluding that capacity from the auction otherwise the market would not send the right price signal. The position taken by the IMM back then was logical—and 180 degrees opposite the position taken in the current filing. A portion of the IMM's statement in support of the initial RPM filing bears repeating:

> Moreover, when PJM determines that a retirement will result in reliability issues, the PJM market rules permit out of market payments to the units to keep them in service. While making such payments is an appropriate short run response to maintain reliability, this response is a symptom of the underlying investment incentive issue and cannot resolve the issue in the long term, consistent with markets. The logical end result of this approach would be out of market contracts with a significant number of peaking units in affected regions. This creates an incentive to declare unit retirements which in turn has a detrimental effect on the dynamics of the capacity market If a regional shortage of capacity is reflected only in RMR payments and not in capacity market prices, there is no market signal for entry. The fact that RMR contracts continue to be needed to protect local reliability indicates that the market is not solving the regional reliability problem. The continued use of RMR contracts will simultaneously undermine the ability of the market to solve the reliability problem.[67]

69. But we do not have to go back to 2005 to find the IMM's inconsistency. RMR arrangements have been discussed extensively in the PJM stakeholder process in the Deactivation Enhancements Senior Task Force. In the course of those discussions, parties were afforded the opportunity to identify their positions on variance issues. The IMM's adopted

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[66] PJM IMM, *2024 Quarterly State of the Market Report for PJM: January through June*, at 5 (Aug. 8, 2024), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2024/2024q2-som-pjm.pdf. Again challenging that given the inclusion of the RMR units in reliability calculations while recognizing the units are not in the supply.

[67] Bowring Affidavit at 15 (footnote omitted).

positions in May of 2024—a mere five months ago—were perfectly coincident with PJM's current practice of excluding the capacity of RMR units from the capacity auction. The only articulated difference between the IMM and PJM's positions was that the IMM wanted the reliability parameters (specifically CETO and CETL) to also exclude the RMR units in order to establish consistency in calculating the reliability value of the market's resources and ensure an accurate "count" of actually available generation in the auction.[68] These positions are recorded in the PJM stakeholder matrix:

[68] Only very recently did the IMM modify his position to include an option similar to that which he now supports. This change was not explained in the IMM's filing.

PJM Deactivation Enhancements Senior Task Force May 17, 2024 Package / Proposal Matrix[69]					
				Packages	
#	**Design Components**	**Priority**	**Status Quo**	**PJM (Package A)**	**IMM (Package B)**
23	Capacity Market Must offer requirement		RMR units qualify for an exemptions to the must offer requirement into the RPM capacity market.	Status Quo	No must offer requirement.
24	Energy Market Must Offer requirement		Since RMR units qualify for a capacity must offer exceptions and therefore are not committed Capacity Resources, they do not have a must offer into the energy markets.	Status Quo	Must be available in the energy market to provide energy when needed.
25	Ancillary Markets Must Offer requirement		Reserves - Since RMR units qualify for a capacity must offer exceptions and therefore are not committed Capacity Resources, they do not have a must offer into the reserve markets. Regulation- there is no Must offer requirement in the Regulation market.	Status Quo	Must be available to provide reserves when needed.
26	PJM's Capacity Market Modeling of the RMR units		RMR units are modeled in CETO and CETL calculations until necessary transmission solutions are in place that allow the RMR units to deactivate	Discussions Needed	RMR units should not be included in CETO/CETL.

[69] PJM, Deactivation Enhancements Senior Task Force ("DESTF"), Package/Proposal Matrix (May 17, 2024), https://www.pjm.com/-/media/committees-groups/task-forces/destf/2024/20240517/20240517-item-05---options-and-packages-matrix.ashx.

70. This prior position is inconsistent with the IMM's recent filing. Compare this with the position of the IMM in the current filing in which the IMM expresses concern that removing the RMR units' capacity value from the auction would be inconsistent with physical reality.[70] The current PJM representation has always been the case and as discussed above is consistent and reasonable, open and disclosed for almost two decades. The IMM has not explained what has changed.

71. This concludes my affidavit.

[70] Comments of the Independent Market Monitor for PJM (Oct. 10, 2024).

UNTTF.D STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY CO IMISSION

Sierra Club, et at.,	)	
	)	
Complainants,	)	
	)	
v.	)	**Docket No. EL24-148-000**
	)	
PJM Interconnection, L.L.C.,	)	
	)	
Respondent.	)	
	)	

AFFIDAVIT

I, Roy J. Shanker, do hereby swear and affirm under penalty of law that the statements in the foregoing Affidavit of Roy J. Shanker, Ph.D are true to the best of my knowledge, information and belief.

Executed this 20th day of October, 2024.

Roy J. Shanker

ATTACHMENT A

QUALIFICATIONS AND EXPERIENCE OF

DR. ROY J. SHANKER

EDUCATION:

Swarthmore College, Swarthmore, PA
A.B., Physics, 1970

Carnegie-Mellon University, Pittsburgh, PA
Graduate School of Industrial Administration
MSIA Industrial Administration, 1972
Ph.D., Industrial Administration, 1975

Doctoral research in the development of new non-parametric multivariate techniques for data analysis, with applications in business, marketing and finance.

EXPERIENCE:

1981 - Present — Independent Consultant
P.O. Box 1480
Pebble Beach, CA 93953

Providing management and economic consulting services in natural resource-related industries, primarily electric and natural gas utilities.

1979-81 — Hagler, Bailly & Company
2301 M Street, N.W.
Washington, D.C.

Principal and a founding partner of the firm; director of electric utility practice area. The firm conducted economic, financial, and technical management consulting analyses in the natural resource area.

1976-79 — Resource Planning Associates, Inc.
1901 L Street, N.W.
Washington, D.C.

Principal of the firm; management consultant on resource problems, director of the Washington, D.C. utility practice. Direct supervisor of approximately 20 people.

1973-76 Institute for Defense Analysis
Professional Staff
400 Army-Navy Drive
Arlington, VA

Member of 25 person doctoral level research staff
conducting economic and operations research analyses of military and resource problems.

RELEVANT EXPERIENCE:

2024

269—On behalf of Constellation Energy Generation LLC, Before the Federal Energy Regulatory Commission Dockets No. ER24-2172-000 Affidavit addressing the proper comparison of impacts of co-located load behind a generator to Network Load or behind the meter generation in the PJM Interconnection markets. Conclusions addressing the specific business configuration of interest.

268—On behalf of Constellation Energy Generation LLC, Before the Federal Energy Regulatory Commission Dockets No. El24-2888 et al. Affidavit addressing the proper comparison of impacts of co-located load behind a generator to Network Load or behind the meter generation in the PJM Interconnection markets. Conclusions addressing the specific business configuration of interest.

267—On behalf of Kiewit Power Constructors. AAA CASE NO. 01-23-0000-2706. Analyses of the proper comparison of alternatives to estimate damages related to the performance of an electric generator during Winter Storm Elliott.

2023

266—On behalf of the PJM Power Providers. Before the Federal Energy Regulatory Commission. Docket No. EL 23-19-000 and Docket ER23-729 Affidavit regarding the calculation of the Capacity Emergency Transfer Objective and model properties and how they interact with the Reliability Requirements for a Locational Deliverability Area. Explanation of the role of offer options in degrading information in the Capacity Auctions.

265—On Dr. Shanker's own behalf. Before the Federal Energy Regulatory Commission, Docket EL23-13. Answering statements to intervenors regarding Dr. Shanker's complaint.

2022

264—On Dr. Shanker's own behalf. Before the Federal Energy Regulatory Commission, Docket EL23-13. An FPA Section 206 complaint for violating its Tariff via over accreditation of certain Variable Capacity Resources.

263—On Dr. Shanker's own behalf. Before the Federal Energy Regulatory Commission, Docket RM22-14. Comments and reply comments regarding the Notice of Proposed Rulemaking Improvements to Generator Interconnection Procedures and Agreements.

262—On behalf of the Energy Trading Institute. Before the Federal Energy Regulatory Commission, Docket No. ER22-797. Affidavit in support of PJM LLC proposals for modifications to the Auction Revenue Rights/Financial Transmission Rights Market. Preparation of extensive general regulatory and PJM history regarding the formation of such rights over time.

2021

261—On behalf of the PJM Power Producers Group (P3) before the Federal Energy Regulatory Commission Docket No. ER21-2582-000. Affidavit addressing PJM's proposed modification of the Minimum Offer Price Rule and problems related to the economic justification of the proposed narrowing of the applicability of the rule.

260—On behalf of LS Power Associates L.P. before the Federal Energy Regulatory Commission Docket No. ER21-2043. Affidavit discussing PJM's revised Effective Load Carrying Capability proposal, its limitations and associated PJM responses to previous comments regarding its initial proposal.

259—On behalf of Indicated Suppliers before the Federal Energy Regulatory Commission in Dockets No. EL19-47-000 and EL19-63-000 comments regarding the PJM proposed modification to its Market Seller Offer Cap in the Reliability Planning Model Base Residual Auction for Capacity Resources.

258—Written post conference comments in Federal Energy Commission Docket No. AD21-10. Discussion of the appropriate scope and range of actions for the Commission with respect to the PJM Minimum Offer Price Rate. Similar considerations of the legal scope of the Commission under the Federal Power Act.

257—Invited Speaker before the Federal Energy Regulatory Commission Docket No. AD21-10. Comments before the Commissioners related to the role of subsidies and their impact in terms of the determination of satisfaction of just and reasonable rates under the Federal Power Act.

256—On behalf of LS Power Associates L.P. before the Federal Energy Regulatory Commission Docket No. ER21-278-001. Affidavit discussing PJM's Effective Load Carrying Capability proposal, its limitations and associated PJM responses to the Commission's deficiency notice.

2020

256—On behalf of Cricket Valley Energy Center and Empire Generating Company before the Federal Energy Commission Docket EL21-7. Affidavit addressing the appropriate design of offer price floors in the NYISO Capacity market and associated mitigation and extension of the related rules to the entire state.

255—Invited speaker and written submission before the Federal Energy Regulatory Commission Docket AD20-14. Comments about the legal issues under the Federal Power Act relevant to the implementation of carbon pricing within the wholesale regional transmission organizations.

254—On behalf of Shell Energy North America before the Federal Energy Regulatory Commission, Docket EL20-49. Affidavit addressing bilateral trading of FTRs, associated agreements and the interaction with PJM's FTR Center reporting and Tariff.

2019

253—On behalf of White Oak Power Constructors before the United States District Court for the Eastern District of Virginia (Richmond Division). Expert report on proper calculation of damages and costs associated with the delay in commercial operations of a new electric power generation facility.

252—On behalf of the Public Service Companies before the Federal Energy Regulatory Commission, Docket ER19-1486. Affidavit regarding the PJM proposed operating reserve demand curve and other modifications to the reserve products market. Comments on missing elements within the proposal.

251—On behalf of Indicated Parties, (Calpine, Vestra, and Electric Power Supply Association) before the Federal Energy Regulatory Commission. Docket EL19-63. Affidavit regarding the complaint of the Joint Consumer Advocates regarding PJM's market seller offer cap, the potential exercise of market power in the capacity market and appropriate market design adjustments under the Capacity Performance paradigm.

250—On behalf of Indicated Parties, (Calpine, Vestra, and Electric Power Supply Association) before the Federal Energy Regulatory Commission. Docket EL19-47. Affidavit regarding the appropriate adjustment of penalties and the Market Seller Offer Cap within the PJM Capacity Performance paradigm.

249—Supreme Court of the United States. Brief of Energy Economists as Amici Curiae in Support Of Petitioners, Nos. 18-868 & 18-879. Discussion of the impact of subsidies in electric energy market structures and the relationship of the instant cases where a Writ of Certiorari is being sought to previous Supreme Court precedent regarding state actions that effect Federal Energy Regulatory Commission jurisdictional rates.

2018

248—On behalf of PJM Power Providers (P3). Federal Energy Regulatory Commission. Docket EL18-178. Affidavit addressing the appropriate mechanisms to address state/public policy subsidies in the PJM Reliability Planning Model capacity construct. Related comments with respect to a "Clean" Minimum Price Offer Rule.

247—On behalf of Calpine Corporation, Eastern Generating and CPV Power Holdings. Federal Energy Regulatory Commission. Docket No. EL18-169. Affidavit addressing the the establishment of a "clean" Minimum Offer Price Rule for capacity offers in the PJM markets.

246—On behalf of DC Energy LLC and Vitol Inc. Federal Energy Regulatory Commission. Docket No. ER18-1334. Affidavit on the CAISO proposals to limit source and sink pairs in its annual and monthly CRR auctions, as well as comments addressing appropriate coordination of transmission outage and constraint information.

245—On behalf of the PJM Power Providers. Federal Energy Regulatory Commission Docket No. ER18-1314-000. Affidavit on the PJM proposed mitigation alternatives for addressing out of market subsidies either by Repricing or a modified Minimum Offer Price Rule.

244—On behalf of Joint Commentors. Federal Energy Regulatory Commission Docket EL18-34. Participation in the preparation of comments addressing PJM's proposed fast start pricing modifications and related price formation issues.

243—On behalf of the PJM Power Providers Group. Federal Energy Regulatory Commission Dockets EL17-32 and EL17-36. Pre-Technical Conference Comments and participant technical conference regarding seasonal capacity products and specific related reliability and forecasting questions from Commission Staff.

2017

242—On behalf of the PSEG Companies. Federal Energy Regulatory Commission Docket No. ER13-535-000. Affidavit regarding implementation of Court of Appeals remand to FERC of the PJM capacity market Minimum Offer Price Rule.

241-- In the United States Court of Appeals for the Second Circuit. Case No. 17-2654. Co-writer/sponsor of the Brief of Energy Economists as Amici Curiae in Support of Plaintiffs-Appellants-Reversal. Comments regarding the impacts of subsidies on the operation of organized electric markets.

240—In the United States Court of Appeals for the Seventh Circuit. No. 17-2433.Co-writer/sponsor of the Brief of Energy Economists as Amici Curiae in Support of Plaintiffs-Appellants. Comments regarding the impacts of subsidies on the operation of organized electric markets.

239—Invited speaker Federal Energy Regulatory Commission technical session, Docket AD17-11. Comments on the appropriate incorporation of state policies in wholesale electric markets. Submission of post technical session comments.

238—On behalf of PJM Power Providers. Federal Energy Regulatory Commission Dockets EL17-36 and EL17-32 addressing the current Capacity Performance design and criticisms related to the exclusion of an inferior seasonal capacity product. Explanation of how PJM establishes its adequacy targets and whether or not the asserted criticisms were valid.

2016

237- On behalf of DC Energy, Vitol, Intertia Power, Saracen Energy East. Federal Energy Regulatory Commission Dockets EL16-6, ER16-121. Submission of post technical session statement regarding PJM FTR market "netting" proposal.

236-On behalf of DC Energy, Vitol, Intertia Power, Saracen Energy East. Federal Energy Regulatory Commission Dockets EL16-6, ER16-121. Participant in two Technical Session Panels addressing PJM FTR market design and deficiency in the pending proposal to remove netting in the market settlement.

2015

235- On behalf of the Electric Power Supply Association. Federal Energy Regulatory Commission Dockets EL15-70, 71, 72, 82. Affidavit regarding MISO capacity market design and also addressing use of opportunity costs in offers.

234-On behalf of the Electric Power Supply Association. Federal Energy Regulatory Commission Dockets EL15-70, 71, 72, 82. Discussant in technical session addressing the establishment of opportunity costs as the basis for capacity reference pricing in the MISO Planning Resource Auctions.

233-On behalf of Dominion Virginia Power. Federal Energy Regulatory Commission Docket ER15-1966. Affidavit regarding changing economic incentives for suppliers associated with the modification of PJM's calculation of Lost Opportunity Costs.

232-On behalf of "Indicated Suppliers" Federal Energy Regulatory Commission Docket No. EL15-64-000. Testimony addressing the appropriateness of proposed changes to the NYISO buyer side mitigation exemptions.

231-On behalf of Hydro Quebec, Energy Services U.S. Federal Energy Regulatory Commission Docket No. ER15-623. Affidavit addressing the consistent treatment of energy imports under PJM's Capacity Performance proposal.

230-Before the Supreme Court of the United States, No. 14-995, On Petition for a Writ of Certiorari to the United States Court of Appeals for the Third Circuit. Brief of electrical engineers, scientists and economists as amici curiae in support of petitioners. Metropolitan Edison et al. versus Pennsylvania Public Utility Commission et al., http://www.americanbar.org/content/dam/aba/publications/supreme_court_preview/briefs_2015_2016/14-840_Borlick_et_al.pdf.

2014

229-On behalf of Benton County Wind Farm. United States District Court Southern District of Indiana, Indianapolis Division, Civil Action No. 1:13-cv-1984-SEB-TAB. Expert Reports addressing custom and practice in electric power purchase agreements.

228-On behalf of FirstEnergy Services. FERC Docket EL14-55. Affidavit related to the appropriate characterization of Demand Response in Capacity Markets reflecting performance as the reduction of retail energy consumption.

227-Federal Energy Regulatory Commission. Docket RM10-17. On my own behalf, a statement regarding the ability of the PJM capacity and energy markets to clear in the transition from any determination that demand response would be excluded jurisdictionally from wholesale markets. This could in turn result in a more appropriate representation of retail demand response.

226-Illinois Commerce Commission. Matter: No. 13-0657. On behalf of Commonwealth Edison Company. Testimony regarding the operation of the PJM

regional transmission expansion planning process in general and particularly with regards to the preservation of long-term transmission rights (Stage 1A Auction Revenue Rights), and the consequences that occur when such mandated rights are infeasible.

225-Federal Energy Regulatory Commission. Docket ER14-1579. On behalf of H-P Energy. Affidavit explaining importance of property rights and associated contracts within the PJM transmission planning process, particularly as they pertain to Upgrade Construction Service Agreements.

2013

224-Federal Energy Regulatory Commission. Docket No. ER14-456. On behalf of NextEra Energy to analyze a proposed modification to the PJM Tariff allowing for "easily resolved constraints" to be address by transmission upgrades without any analyses of benefits.

223-Federal Energy Regulatory Commission. Docket No. ER14-504. Affidavit on behalf of PJM Power Producers addressing the interaction between the PJM adequacy planning processes and the formulation of saturation constraints on Limited and Extended Summer Demand Response products.

222-Federal Energy Regulatory Commission. Docket AD13-7. Invited speaker on the Commission's technical session regarding capacity markets in RTO's. Comments addressed basic principles of market design, market features, and consequences of market failures and deviations from design principles.

221-Federal Energy Regulatory Commission. Docket No. EL13-62 on behalf of TC Ravenswood LLC. Two affidavits addressing the treatment of reliability support services agreements and associated capacity in the NYISO capacity market design.

2012

220-Federal Energy Regulatory Commission. Docket No. ER12-715-003. On behalf of First Energy Services Company. An affidavit and testimony addressing the appropriateness of the application of a proposed new MISO tariff provision after the fact to a withdrawing MISO member.

219-Federal Energy Regulatory Commission. Docket ER13-335. On behalf of Hydro Quebec U.S. Affidavit addressing appropriate application of ISO-NE Market Rule 1/ Tariff with respect to the qualification of new external capacity to participate in the Forward Capacity Market.

218-Federal Energy Regulatory Commission. Docket IN12-4. On behalf of Deutsche Bank Energy Trading. Affidavit regarding a review of specific

transactions, related congestion revenue rights, and deficiencies in CAISO tariff implementation during periods when market software produces multiple feasible pricing solutions.

217-Federal Energy Regulatory Commission. Docket No. ER12-715-003. On behalf of FirstEnergy Services Company. Affidavit regarding implementation of the MISO Tariff with respect to the determination of appropriate exit fees and charges related to certain transmission facilities.

216-Federal Energy Regulatory Commission. Docket No. IN12-11. On behalf of Rumford Paper Company. Affidavit regarding free riding behavior in the design of demand response programs, and its relationship to accusations of market manipulation.

215-Federal Energy Regulatory Commission. Docket No. IN12-10. On behalf of Lincoln Paper and Tissue LLC. Affidavit regarding relationship of demand response behavior and value established in Order 745 to claimed market impacts associated with accusations of market manipulation.

214-Federal Energy Regulatory Commission. Docket No. AD12-16-000. On behalf of PJM Power Providers, testimony regarding deliverability of capacity between the MISO and PJM RTO's and associated basic adequacy planning concepts.

213-United States Court Of Appeals, District of Columbia Circuit. Electric Power Supply Association, et al. (Petitioners) v. Federal Energy Regulatory Commission et al. (Respondents) Nos. 11-1486. Amici Curiae brief regarding the appropriate pricing of demand reduction services in wholesale markets vis a vis the FERC determinations in Order 745.

212-United States Supreme Court. Metropolitan Edison Company and Pennsylvania electric Company (Petitioners), Pennsylvania Public Utility Commission (Respondent) (No. 12-4) Amici Curiae brief regarding the nature of physical losses in electric transmission and relationship to proper marginal cost pricing of electric power and the marginal cost of transmission service.

2011

211-Federal Energy Regulatory Commission Docket No. ER12-513-000. On behalf of PJM Power Providers, testimony regarding the establishment of system wide values for the net cost of new entry related to modifications of the Reliability Planning Model.

210-Federal Energy Regulatory Commission Docket No. EL11-56-000, on behalf of First Energy Services. Affidavit regarding the appropriateness of proposed

transmission cost allocation of Multi-Value Projects to an exiting member of the Midwest Independent System Operator.

209-Federal Energy Regulatory Commission Docket No. ER11-4081-000, on behalf of "Capacity Suppliers." Affidavit addressing correct market design elements for Midwest Independent System Operator proposed resource adequacy market.

208-Public Utility Commission of Ohio, Case Nos. 11-346-EL-SSO,11-348-EL-SSO, Nos. 11-349-EL-AAM, 11-350-EL-AAM, on behalf of First Energy Services. Testimony regarding the interaction between the capacity default rates for retail access under the PJM Fixed Resource Requirement and the PJM Reliability Planning Model valuations.

207-Federal Energy Regulatory Commission Dockets No. ER11-2875, EL11-20, Staff Technical Conference on behalf of PJM Power Providers, addressing self supply and the Fixed Resource Requirement elements of PJM's capacity market design.

206-New Jersey Board of Public Utilities, Docket Number EO11050309 on behalf of PSEG Companies. Affidavit addressing the implications of markets and market design elements, and regulatory actions on the relative risk and trade-offs between capital versus energy intensive generation investments.

205-Federal Energy Regulatory Commission Docket No. ER11-2875. Affidavit and supplemental statement on behalf of PJM Power Providers addressing flaws in the PJM tariff's Minimum Offer Price Rule regarding new capacity entry and recommendations for tariff revisions.

204-Federal Energy Regulatory Commission Docket No. EL11-20. Affidavit on behalf of PJM Power Providers addressing flaws in the PJM tariff's Minimum Offer Price Rule regarding new capacity entry.

203-Federal Energy Regulatory Commission Docket Nos. ER04-449. Affidavit and supplemental statement on behalf of New York Suppliers addressing the appropriate criteria for the establishment of a new capacity zone in the NYISO markets.

2010

202-New Jersey State Assembly and Senate. Statements on behalf of the Competitive Supplier Coalition addressing market power and reliability impacts of proposed legislation, Assembly Bill 3442 and Senate Bill 2381.

201-Federal Energy Regulatory Commission. Docket ER11-2183. Affidavit on behalf of First Energy Services Company addressing default capacity charges for

Fixed Resource Requirement participants in the PJM Reliability Pricing Model capacity market design.

200-Federal Energy Regulatory Commission. Docket ER11-2059 Affidavit on behalf of First Energy Services Company addressing deficiencies and computational problems in the proposed "exit charges" for transmission owners leaving the MISO RTO related to long term transmission rights.

199-Federal Energy Regulatory Commission Docket RM10-17. Invited panelist addressing metrics for cost effectiveness of demand response and associated cost allocations and implications for monopsony power.

198-Federal Energy Regulatory Commission Consolidated Dockets ER10-787-000, EL10-50-000, and EL10-57-000. Two affidavits on behalf of the New England Power Generators Association regarding ISO-NE modified proposals for alternative price rule mitigation and zonal definitions/functions of locational capacity markets.

197-Federal Energy Regulatory Commission Docket No. ER10-2220-000. Affidavit on behalf of the Independent Energy Producers of New York. Addressing rest of state mitigation thresholds and procedures for adjusting thresholds for frequently mitigated units and reliability must run units.

196-Federal Energy Regulatory Commission Docket PA10-1. Affidavit on behalf of Entergy Services related to development of security constrained unit commitment software and its performance.

195-Federal Energy Regulatory Commission Docket No. ER09-1063-004. Testimony on behalf of the PJM Power Providers Group (P3) regarding the proposed shortage pricing mechanism to be implemented in the PJM energy market. Reply comments related to a similar proposal by the independent market monitor.

194-PJM RTO. Statement regarding the impact of the exercise of buyer market power in the PJM RPM/Capacity market. Panel discussant on the issue at the associated Long Term Capacity Market Issues Symposium.

193-Federal Energy Regulatory Commission Docket No. ER10-787-000. Affidavit on behalf of New England Power Generators Association addressing proper design of the alternative price rules (APR) for the ISO-NE Forward Capacity Auctions. Second affidavit offered in reply. Supplemental affidavit also submitted

192-Federal Energy Regulatory Commission Docket No. RM10-17-000. Affidavit on behalf of New England Power Generators Association addressing proper

pricing for demand response compensation in organized wholesale regional transmission organizations.

191-Federal Energy Regulatory Commission Docket No. RM10-17-000, Affidavit on my behalf regarding inconsistent representations made between filings in this docket and contemporaneous materials presented in the PJM stakeholder process.

2009

190-Federal Energy Regulatory Commission Docket No. ER09-1682. Two affidavits on behalf of an un-named party regarding confidential treatment of market data coupled with specific market participant bidding, and associated issues.

189-American Arbitration Association, Case No. 75-198-Y-00042-09 JMLE, on behalf of Rathdrum Power LLC. Report on the operation of specific pricing provision of a tolling power purchase agreement.

188-Federal Energy Regulatory Commission. Docket No. IN06-3-003. Analyses on behalf of Energy Transfer Partners L.P. regarding trading activity in physical and financial natural gas markets.

187-Federal Energy Regulatory Commission. Docket No. ER08-1281-000. Analyses on behalf of Fortis Energy Trading related to the impacts of loop flow on trading activities and pricing.

186-American Arbitration Association. Report on behalf of PEPCO Energy Services regarding several trading transactions related to the purchase and sale of Installed Capacity under the PJM Reliability Pricing Model.

185-Federal Energy Regulatory Commission Docket No. EL-0-47. Analyses on behalf of HQ Energy services (U.S.) regarding pricing and sale of energy associated with capacity imports into ISO-NE.

184-Federal Energy Regulatory Commission Docket No. ER04-449 019, Affidavit on behalf of HQ Energy Services (U.S.) regarding the implementation of the consensus deliverability plan for the NYISO, and associated reliability impacts of imports.

183-Federal Energy Regulatory Commission Docket ER09-412-000, ER05-1410-010, EL05-148-010. Affidavit and Reply Affidavit on behalf of PSEG Companies addressing proposed changes to the PJM Reliability Pricing Model and rebuttal related to other parties' filings.

2008

182-Pennsylvania Public Service Commission. *En Banc* Public Hearing on "Current and Future Wholesale Electricity Markets," comments regarding the design of PJM wholesale market pricing and state restructuring.

181-Maine Public Utility Commission. Docket No. 2008-156. Testimony on behalf of a consortium of energy producers and suppliers addressing the potential withdrawal of Maine from ISO New England and associated market and supplier response.

180-Federal Energy Regulatory Commission. Docket No. EL08-67-000. Affidavit on behalf of Duke Energy Ohio and Reliant Energy regarding criticisms of the PJM reliability pricing model (RPM) transitional auctions.

179-Federal Energy Regulatory Commission. Docket AD08-4, on behalf of the PJM Power Providers. Statement and participation in technical session regarding the design and operation of capacity markets, the status of the PJM RPM market and comments regarding additional market design proposals.

178-Federal Energy Regulatory Commission. Docket ER06-456-006, Testimony on behalf of East Coast Power and Long Island Power Authority regarding appropriate cost allocation procedures for merchant transmission facilities within PJM.

2007

177-FERC Docket No. EL07-39-000. Testimony on behalf of Mirant Companies and Entergy Nuclear Power Marketing regarding the operation of the NYISO In-City Capacity market and the associated rules and proposed rule modifications.

176-FERC Dockets: RM07-19-000 and AD07-7-000, filing on behalf of the PJM Power Providers addressing conservation and scarcity pricing issues identified in the Commission's ANOPR on Competition.

175-FERC Docket No. EL07-67-000. Testimony and reply comments on behalf of Hydro Quebec U.S. regarding the operation of the NYISO TCC market and appropriate bidding and competitive practices in the TCC and Energy markets.

174-FERC Docket Nos. EL06-45-003. Testimony on behalf of El Paso Electric regarding the appropriate interpretation of a bilateral transmission and exchange agreement.

2006

173-United States Bankruptcy Court for the Southern District of New York. Case No. 01-16034 (AJG). Report on Behalf of EPMI regarding the properties and operation of a power purchase agreement.

172-FERC Docket No. EL05-148-000. Testimony regarding the proposed Reliability Pricing Model settlement submitted for the PJM RTO.

171-FERC Docket No. ER06-1474-000, FERC. Testimony on behalf of the PSEG Companies regarding the PJM proposed new policy for including "market efficiency" transmission upgrades in the regional transmission expansion plan.

170-FERC Docket No. EL05-148-000, FERC. Participation in Commission technical sessions regarding the PJM proposed Reliability Pricing Model.

169-FERC Docket No. EL05-148-000, FERC. Comments filed on behalf of six PJM market participants concerning the proposed rules for participation in the PJM Reliability Pricing Model Installed Capacity market, and related rules for opting out of the RPM market.

168-FERC Docket No. ER06-407-000. Testimony on behalf of GSG, regarding interconnection issues for new wind generation facilities within PJM.

2005

167-FERC Docket No. EL05-121-000, Testimony on behalf of several PJM Transmission Owners (Responsible Pricing Alliance) regarding alternative regional rate designs for transmission service and associated market design issues.

166-FERC Technical Conference of June 16, 2005. (Docket Nos. PL05-7-000, EL03-236-000, ER04-539-000). Invited participant. Statement regarding the operation of the PJM Capacity market and the proposed new Reliability Pricing Model Market design.

165-American Arbitration Association Nos. 16-198-00206-03 16-198-002070. On behalf of PG&E Energy Trading. Analyses related to the operation and interpretation of power purchase and sale/tolling agreements and electrical interconnection requirements.

164-Arbitration on behalf of Black Hills Power, Inc. Expert testimony related to a power purchase and sale and energy exchange agreement, as well as FERC criteria related to the applicable code and standards of conduct.

2004

163-Federal Energy Regulatory Commission Docket No. EL03-236-003. Testimony on behalf of Mirant companies relating to PJM proposal for compensation of frequently mitigated generation facilities.

162-Federal Energy Regulatory Commission. Docket No. ER03-563-030. Testimony on behalf of Calpine Energy Services regarding the development of a locational Installed Capacity market and associated generator service obligations for ISO-NE. Supplemental testimony filed 2005.

161-Federal Energy Regulatory Commission. Docket No. EL04-135-000. Testimony on behalf on the Unified Plan Supporters regarding implications of using a flow based rate design to allocate embedded costs.

160-Federal Energy Regulatory Commission. Docket No. ER04-1229-000. Testimony on behalf of EME Companies regarding the allocation and recovery of administrative charges in the NYISO markets.

159-Federal Energy Regulatory Commission. Dockets No. EL01-19-000, No. EL01-19-001, No. EL02-16-000, EL02-16-000. Testimony on behalf of PSE&G Energy Resources and Trade regarding pricing in the New York Independent System Operator energy markets.

158-Federal Energy Regulatory Commission. Invited panelist regarding performance based regulation (PBR) and wholesale market design. Comments related to the potential role of PBR in transmission expansion, and its interaction with market mechanisms for new transmission.

157-Federal Energy Regulatory Commission. Docket No. ER04-539-000 Testimony on behalf of EME Companies regarding proposed market mitigation in the energy and capacity markets of the Northern Illinois Control Area.

156-Federal Energy Regulatory Commission. Standardization of Generator Interconnection Agreements and Procedures Docket No. RM02-1-001, Order 2003-A, Affidavit on Behalf of PSEG Companies regarding the modifications on rehearing to interconnection crediting procedures.

155-Federal Energy Regulatory Commission. Dockets ER03-236-000, ER04-364-000,ER04-367-000,ER04-375-000. Testimony on behalf of the EME Companies regarding proposed market mitigation measures in the Northern Illinois Control Area of PJM.

154-Federal Energy Regulatory Commission. Dockets PL04-2-000, EL03-236-000. Invited panelist, testimony related to local market power and the appropriate levels of compensation for reliability must run resources.

2003

153-American Arbitration Association. 16 Y 198 00204 03. Report on behalf of Trigen-Cineregy Solutions regarding an energy services agreement related to a cogeneration facility.

152-Federal Energy Regulatory Commission. Docket No. EL03-236-000. Testimony on behalf of EME Companies regarding the PJM proposed tariff changes addressing mitigation of local market power and the implementation of a related auction process.

151-Federal Energy Regulatory Commission. Docket No. PA03-12-000. Testimony on behalf of Pepco Holdings Incorporated regarding transmission congestion and related issues in market design in general, and specifically addressing congestion on the Delmarva Peninsula.

150-Federal Energy Regulatory Commission. Docket Nos. ER03-262-007, Affidavit on behalf of EME Companies regarding the cost benefit analysis of the operation of an expanded PJM including Commonwealth Edison.

149-Supreme Court of the State of New York, Index No. 601505/01. Report on behalf of Trigen-Syracuse Energy Corporation regarding energy trading and sales agreements and the operation of the New York Independent System Operator.

148-Federal Energy Regulatory Commission. Docket No. ER03-262-000. Affidavit on behalf of the EME Companies regarding the issues associated with the integration of the Commonwealth Edison Company into PJM.

147-Federal Energy Regulatory Commission. Docket No. ER03-690-000. Affidavit on behalf of Hydro Quebec US regarding New York ISO market rules at external generator proxy buses when such buses are deemed non-competitive.

146-Federal Energy Regulatory Commission. Docket RT01-2-006,007. Affidavit on behalf of the PSEG Companies regarding the PJM Regional Transmission Expansion Planning Protocol, and proper incentives and structure for merchant transmission expansion.

145-Federal Energy Regulatory Commission. Docket No. ER03-406-000. Affidavit on behalf of seven PJM Stakeholders addressing the appropriateness of the proposed new Auction Revenue Rights/Financial Transmission Rights process to be implemented by the PJM ISO.

144-Federal Energy Regulatory Commission. Docket No. ER01-2998-002. Testimony on behalf of Pacific Gas and Electric Company related to the cause and allocation of transmission congestion charges.

143-Federal Energy Regulatory Commission. Docket No. RM01-12-000. On behalf of six different companies including both independent generators, integrated utilities and distribution companies comments on the proposed resource adequacy requirements of the Standard Market Design.

142-United States Bankruptcy Court, Northern District of California, San Francisco Division, Case No. 01-30923 DM. On behalf of Pacific Gas and Electric Dr. Shanker presented testimony addressing issues related to transmission congestion, and the proposed FERC SMD and California MD02 market design proposals.

2002

141-Arbitration. Testimony on behalf of AES Ironwood regarding the operation of a tolling agreement and its interaction with PJM market rules.

140-Federal Energy Regulatory Commission. Docket No. RM01-12-000. Dr. Shanker was asked by the three Northeast ISO's to present a summary of his resource adequacy proposal developed in the Joint Capacity Adequacy Group. This was part of the Standard Market Design NOPR process.

139-Federal Energy Regulatory Commission. Docket No. ER02-456-000. Testimony on behalf of Electric Gen LLC addressing comparability of a contract among affiliates with respect to non-price terms and conditions.

138-Circuit Court for Baltimore City. Case 24-C-01-000234. Testimony on behalf of Baltimore Refuse Energy Systems Company regarding the appropriate implementation and pricing of a power purchase agreement and related Installed Capacity credits.

137-Federal Energy Regulatory Commission. Docket No. RM01-12-000. Comments on the characteristics of capacity adequacy markets and alternative market design systems for implementing capacity adequacy markets.

2001

136-Federal Energy Regulatory Commission. Docket ER02-456-000. Testimony on behalf of Electric Gen LLC regarding the terms and conditions of a power sales agreement between PG&E and Electric Generating Company LLC.

135-Delaware Public Service Commission. Docket 01-194. On behalf of Conectiv et al. Testimony relating to the proper calculation of Locational Marginal Prices in the PJM market design, and the function of Fixed Transmission Rights.

134-Federal Energy Regulatory Commission. Docket No. IN01-7-000 On behalf of Exelon Corporation. Testimony relating to the function of Fixed Transmission Rights, and associated business strategies in the PJM market system.

133-Federal Energy Regulatory Commission. Docket No. RM01-12-000. Comments on the basic elements of RTO market design and the required market elements.

132-Federal Energy Regulatory Commission. Docket No. RT01-99-000. On behalf of the One RTO Coalition. Affidavit on the computational feasibility of large scale regional transmission organizations and related issues in the PJM and NYISO market design.

131-Arbitration. On behalf of Hydro Quebec. Testimony related to the eligibility of power sales to qualify as Installed Capacity within the New York Independent system operator.

130-Virginia State Corporation Commission. Case No. PUE000584. On behalf of the Virginia Independent Power Producers. Testimony related to the proposed restructuring of Dominion Power and its impact on private power contracts.

129-United States District Court, Northern District of Ohio, Eastern Division, Case: 1:00CV1729. On behalf of Federal Energy Sales, Inc. Testimony related to damages in disputed electric energy trading transactions.

128-Federal Energy Regulatory Commission. Docket Number ER01-2076-000. Testimony on behalf of Aquila Energy Marketing Corp and Edison Mission Marketing and Trading, Inc. relating to the implementation of an Automated Mitigation Procedure by the New York ISO.

2000

127-New York Independent System Operator Board. Statement on behalf of Hydro Quebec, U.S. regarding the implications and impacts of the imposition of a price cap on an operating market system.

1. 126-Federal Energy Regulatory Administration. Docket No. EL00-24-000. Testimony on behalf of Dayton Power and Light Company regarding the proper characterization and computation of regulation and imbalance charges.

125-American Arbitration Association File 71-198-00309-99. Report on behalf of Orange and Rockland Utilities, Inc. regarding the estimation of damages associated with the termination of a power marketing agreement.

124-Circuit Court, 15th Judicial Circuit, Palm Beach County, Florida. On behalf of Okeelanta and Osceola Power Limited Partnerships et al. Analyses related to commercial operation provisions of a power purchase agreement.

1999

123-Federal Energy Regulatory Commission. Docket No. ER00-1-000. Testimony on behalf of TransEnergie U.S. related to market power associated

with merchant transmission facilities. Also related analyses regarding market based tariff design for merchant transmission facilities.

122-Federal Energy Regulatory Commission. Docket RM99-2-000. Analyses on behalf of Edison Mission Energy relating to the Regional Transmission Organization Notice of Proposed Rulemaking.

121-Federal Energy Regulatory Commission. Docket No. ER99-3508-000. On behalf of PG&E Energy Trading, analyses associated with the proposed implementation and cutover plan for the New York Independent System Operator.

120-Federal Energy Regulatory Commission. Docket No. EL99-46-000. Comments on behalf of the Electric Power Supply Association relating to the Capacity Benefit Margin.

119-New York Public Service Commission, Case 97-F-1563. Testimony on behalf of Athens Generating Company describing the impacts on pricing and transmission of a new generation facility within the New York Power Pool under the new proposed ISO tariff.

118-JAMS Arbitration Case No. 1220019318 On behalf of Fellows Generation Company. Testimony related to the development of the independent power and qualifying facility industry and related industry practices with respect to transactions between cogeneration facilities and thermal hosts.

117-Court of Common Pleas, Philadelphia County, Pennsylvania. Analyses on behalf of Chase Manhattan Bank and Grays Ferry Cogeneration Partnership related to power purchase agreements and electric utility restructuring.

1998

116-Virginia State Corporation Commission. Case No. PUE 980463. Testimony on behalf of Appomattax Cogeneration related to the proper implementation of avoided cost methodology.

115-Virginia State Corporation Commission. Case No. PUE980462 Testimony on behalf of Virginia Independent Power Producers related to an application for a certificate for new generation facilities.

114-Federal Energy Regulatory Commission. Analyses related to a number of dockets reflecting amendments to the PJM ISO tariff and Reliability Assurance Agreement.

113-U.S. District Court, Western Oklahoma. CIV96-1595-L. Testimony related to anti-competitive elements of utility rate design and promotional actions.

112-Federal Energy Regulatory Commission Dockets No. EL94-45-001 and QF88-84-006. Analyses related to historic measurement of spot prices for as available energy.

111-Circuit Court, Fourth Judicial Circuit, Duval County, Florida. Analyses related to the proper implementation of a power purchase agreement and associated calculations of capacity payments. (Testimony 1999)

1997

110-United States District Court for the Eastern District of Virginia, CA No. 3:97CV 231. Analyses of the business and market behavior of Virginia Power with respect to the implementation of wholesale electric power purchase agreements.

109-United States District Court, Southern District of Florida, Case No. 96-594-CIV, Analyses related to anti-competitive practices by an electric utility and related contract matters regarding the appropriate calculation of energy payments.

108-Virginia State Corporation Commission. Case No. PUE960296. Testimony related to the restructuring proposal of Virginia Power and associated stranded cost issues.

107-Federal Energy Regulatory Commission. Dockets No. ER97-1523-000 and OA97-470-000, Analyses related to the restructuring of the New York Power Pool and the implementation of locational marginal cost pricing.

106-Federal Energy Regulatory Commission Dockets No. OA97-261-000 and ER97-1082-000 Analyses and testimony related to the restructuring of the PJM Power Pool and the implementation of locational marginal cost pricing.

105-Missouri Public Service Commission. Case No. ET-97-113. Testimony related to the proper definition and rate design for standby, supplemental and maintenance service for Qualifying facilities.

104-American Arbitration Association. Case 79 Y 199 00070 95. Testimony and analyses related to the proper conditions necessary for the curtailment of Qualifying Facilities and the associated calculations of negative avoided costs.

103-Virginia State Corporation Commission. Case Number PUE960117 Testimony related to proper implementation of the differential revenue requirements methodology for the calculation of avoided costs.

102-New York Public Service Commission. Case 96-E-0897, Analyses related to the restructuring of Consolidated Edison Company of New York and New York

Power Pool proposed Independent System Operator and related transmission tariffs.

1996

101-Florida Public Service Commission. Docket No. 950110-EI. Testimony related to the correct calculation of avoided costs using the Value of Deferral methodology and its implementation.

100-Federal Energy Regulatory Commission Dockets No. EL94-45-001 and QF88-84-006. Testimony and Analyses related to the estimation of historic market rates for electricity in the Virginia Power service territory.

99-Circuit Court of the City of Richmond Case No. LA-2266-4. Analyses related to the incurrence of actual and estimated damages associated with the outages of an electric generation facility.

98-New Hampshire Public Utility Commission, Docket No. DR96-149. Analyses related to the requirements of light loading for the curtailment of Qualifying Facilities, and the compliance of a utility with such requirements.

97-State of New York Supreme Court, Index No. 94-1125. Testimony related to system planning criteria and their relationship to contract performance specifications for a purchased power facility.

96-United States District Court for the Western District of Pennsylvania, Civil Action No. 95-0658. Analyses related to anti-competitive actions of an electric utility with respect to a power purchase agreement.

95-United States District Court for the Northern District of Alabama, Southern Division. Civil Action Number CV-96-PT 0097-S. Affidavit on behalf of TVA and LG&E Power regarding displacement in wholesale power transactions.

1995

94-American Arbitration Association. Arbitration No. 14 198 012795 H/K. Report concerning the correct measurement of savings resulting from a commercial building cogeneration system and associated contract compensation issues.

93-Circuit Court City of Richmond. Law No. LX-2859-1. Analyses related to IPP contract structure and interpretation regarding plant compensation under different operating conditions.

92-Federal Energy Regulatory Commission. Case EL95-28-000. Affidavit concerning the provisions of the FERC regulations related to the Public Utility

Regulatory Policies Act of 1978, and relationship of estimated avoided cost to traditional rate based recovery of utility investment.

91-New York Public Service Commission, Case 95-E-0172, Testimony on the correct design of standby, maintenance and supplemental service rates for qualifying facilities.

90-Florida Public Service Commission, Docket No. 941101-EQ. Testimony related to the proper analyses and procedures related to the curtailment of purchases from Qualifying Facilities under Florida and FERC regulations.

89-Federal Energy Regulatory Commission, Dockets ER95-267-000 and EL95-25-000. Testimony related to the proper evaluation of generation expansion alternatives.

1994

88-American Arbitration Association, Case Number 11 Y198 00352 94 Analyses related to contract provisions for milestones and commercial operation date and associated termination and damages related to the construction of a NUG facility.

87-United States District Court, Middle District Florida, Case No. 94-303 Civ-Orl-18. Analyses related to contract pricing interpretation other contract matters in a power purchase agreement between a qualifying facility and Florida Power Corporation.

86-Florida Public Service Commission Docket 94037-EQ. Analyses related to a contract dispute between Orlando Power Generation and Florida Power Corporation.

85-Florida Public Service Commission Docket 941101-EQ. Testimony and analyses of the proper procedures for the determination and measurement for the need to curtail purchases from qualifying facilities.

84-New York Public Service Commission Case 93-E-0272, Testimony regarding PURPA policy considerations and the status of services provided to the generation and consuming elements of a qualifying facility.

83-Circuit Court for the City of Richmond. Case Number LW 730-4. Analyses of the historic avoided costs of Virginia Power, related procedures and fixed fuel transportation rate design.

82-New York Public Service Commission, Case 93-E-0958 Analyses of Stand-by, Supplementary and Maintenance Rates of Niagara Mohawk Power Corporation for Qualifying Facilities.

81-New York Public Service Commission, Case 94-E-0098. Analyses of cost of service and rate design of Niagara Mohawk Power Corporation.

80-American Arbitration Association, Case 55-198-0198-93, Arbitrator in contract dispute regarding the commercial operation date of a qualifying small power generation facility.

1993

79-U.S. District Court, Southern District of New York Case 92 Civ 5755. Analyses of contract provisions and associated commercial terms and conditions of power purchase agreements between an independent power producer and Orange and Rockland Utilities.

78-State Corporation Commission, Virginia. Case No. PUE920041. Testimony related to the appropriate evaluation of historic avoided costs in Virginia and the inclusion of gross receipt taxes.

77-Federal Energy Regulatory Commission. Docket ER93-323-000. Evaluations and analyses related to the financial and regulatory status of a cogeneration facility.

76-Federal Energy Regulatory Commission. Docket EL93-45-000; Docket QF83-248-002. Analyses related to the qualifying status of cogeneration facility.

75-Circuit Court of the Eleventh Judicial Circuit, Dade County, Florida. Case No. 92-08605-CA-06. Analyses related to compliance with electric and thermal energy purchase agreements. Damage analyses and testimony.

74-Board of Regulatory Commissioners, State of New Jersey. Docket EM 91010067. Testimony regarding the revised GPU/Duquesne 500 MW power sales agreement and associated transmission line.

73-State of North Carolina Utilities Commission. Docket No. E-100 Sub 67. Testimony in the consideration of rate making standards pursuant to Section 712 of the Energy Policy Act of 1992.

72-State of New York Public Service Commission. Cases 88-E-081 and 92-E-0814. Testimony regarding appropriate procedures for the determination of the need for curtailment of qualifying facilities and associated proper production cost modeling and measurement.

71-Pennsylvania Public Utility Commission. Docket No. A-110300f051. Testimony regarding the prudence of the revised GPU/Duquesne 500 MW power sales agreement and associated transmission line.

1992

70-Pennsylvania Public Service Commission. Dockets No. P-870235, C-913318,P-910515,C-913764. Testimony regarding the calculation of avoided costs for GPU/Penelec.

69-Public Service Commission of Maryland. Case No. 8413,8346. Testimony on the appropriate avoided costs for Pepco, and appropriate procedures for contract negotiation.

1991

68-Board of Regulatory Commissioners, State of New Jersey. Docket EM-91010067. Testimony regarding the planned purchase of 500 MW by GPU from Duquesne Light Company.

67-Public Service Commission of Wisconsin. Docket 05-EP-6. State Advance Plan. Testimony on the calculation of avoided costs and the structuring of payments to qualifying facilities.

66-State Corporation Commission, Virginia. Case No. PUE910033. Testimony on class rate of return and rate design for delivery point service. Northern Virginia Electric Cooperative.

65-State Corporation Commission, Virginia. Case No. PUE910048 Testimony on proper data and modeling procedures to be used in the evaluation of the annual Virginia Power fuel factor.

64-State Corporation Commission, Virginia. Case No. PUE910035. Evaluation of the differential revenue requirements method for the calculation of avoided costs.

63-Public Service Commission of Maryland. Case Number 8241 Phase II. Testimony related to the proper determination of avoided costs for Baltimore Gas and Electric.

62-Public Service Commission of Maryland. Case Number 8315. Evaluation of the system expansion planning methodology and the associated impacts on marginal costs and rate design, PEPCO.

1990

61-Public Utility Commission, State of California, Application 90-12-064. Analyses related to the contractual obligations between San Diego Gas and Electric and a proposed QF.

60-Montana Public Service Commission. Docket 90.1.1 Testimony and analyses related to natural gas transportation, services and rates.

59-State Corporation Commission, Virginia. Case No. PUE890075. Testimony on the calculation of full avoided costs via the differential revenue requirements methodology.

58-District of Columbia Public Service Commission. Formal Case 834 Phase II. Analyses and development of demand side management programs and least cost planning for Washington Gas Light.

57-State Corporation Commission, Virginia. Case No. PUE890076. Analyses related to administratively set avoided costs. Determination of optimal expansion plans for Virginia Power.

56-State Corporation Commission, Virginia. Case No. PUE900052. Analyses supporting arbitration of a power purchase agreement with Virginia Power. Determination of expansion plan and avoided costs.

55-Public Service Commission of Maryland. Case Number 8251. Analyses of system expansion planning models and marginal cost rate design for PEPCO.

54-State Corporation Commission, Virginia. Case No. PUE900054. Evaluation of fuel factor application and short term avoided costs.

53-Federal Energy Regulatory Commission. Northeast Utilities Service Company Docket Nos. EC90-10-000, ER90-143-000, ER90-144-000, ER90-145-000 and El90-9-000. Analyses of the implications of Northeast Utilities and Public Service Company of New Hampshire merger on electric supply and pricing.

52-Public Service Commission of Maryland. Re: Southern Maryland Electric Cooperative Inc. Contract with Advanced Power Systems, Inc. and PEPCO.

51-Puerto Rico Electric Power Authority, Office of the Governor of Puerto Rico. Independent evaluation for PREPA of avoided costs and the evaluation of competing QF's.

50-State Corporation Commission, Virginia. Case No. PUE890041. Testimony on the proper determination of avoided costs with respect to Old Dominion Electric Cooperative.

1989

49-Oklahoma Corporation Commission. Case Number PUD-000586. Analyses related to system planning and calculation of avoided costs for Public Service of Oklahoma.

48-Virginia State Corporation Commission. Case Number PUE890007. Testimony relating to the proper determination of avoided costs to the certification evaluation of new generation facilities.

47-Federal Energy Regulatory Commission. Docket RP85-50. Analyses of the gas transportation rates, terms and conditions filed by Florida Gas Transmission.

46-Circuit Court of the Fifth Judicial Circuit, Dade County, Florida. Case No. 88-48187. Analyses related to compliance with electric and thermal energy purchase agreements.

45-Florida Public Service Commission. Docket 880004-EU. Analysis of state wide expansion planning procedures and associated avoided unit.

1988

44-Virginia State Corporation Commission. Case No. PUE870081. Testimony on the implementation of the differential revenue requirements avoided cost methodology recommended by the SCC Task Force.

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13-Northern Virginia Electric Cooperative. Case No. PUE840041. Testimony on class cost-of-service procedures, class rate of return and rate design.

12-BPA 1985 Wholesale Rate Proceedings. Analysis of Power 1985 Rate Directives. Testimony on theory and implementation of marginal cost rate design.

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3-PEPCO, Washington Gas Light. DCPSC-743. Financial evaluation of conservation activities; procedures for cost classification, allocation; rate design.

2-PEPCO, Maryland PSC Case Nos. 7597-I, 7597-II, and 7652. Testimony on class rates of return, cost classification and allocation, power pool operations and sales.

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