UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, LLC	**)**	**Docket No. ER24-98**
	)	

PROTEST OF THE SIERRA CLUB, NATURAL RESOURCES DEFENSE COUNCIL, AND THE SUSTAINABLE FERC PROJECT

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INTRODUCTION

Pursuant to Rule 211 of the Federal Energy Regulatory Commission ("the Commission" or "FERC") Rules of Practice and Procedure, the Sierra Club, Natural Resources Defense Council, and the Sustainable FERC Project (collectively "Public Interest Organizations") respectfully submit this protest of PJM Interconnection, LLC's ("PJM") proposal titled "Proposed Enhancements to PJM's Capacity Market Rules – Market Seller Offer Cap, Performance Payment Eligibility, and Forward Energy and Ancillary Service Revenues" ("MSOC Filing").[1]

The reforms PJM proposes in this MSOC Filing will create excessive costs for consumers that are not justified by a commensurate increase in reliability. Hence, PJM's proposal runs afoul of Commission precedent emphasizing that consumers should not be forced to pay for capacity without receiving commensurate reliability benefits. PJM proposes several changes that could substantially increase consumers' costs by forcing consumers to bear all the risk the generators face for failing to perform as promised in their capacity offers. Similarly, PJM proposes to give generators greater discretion in defining purported risks and to reduce the rigor of independent review of those risk assessments. In combination with PJM's existing tariff and other proposed reforms, this proposal significantly increases the possibility that unreliable power plants may earn substantial capacity market revenues without fear of losing that revenue when they fail to perform. Additionally, PJM's proposed changes to its Capacity Performance sysstem would mean that, although consumers fund the capacity market in order to procure reliability, capacity

[1] PJM, Proposed Enhancements to PJM's Capacity Market Rules – Market Seller Offer Cap, Performance Payment Eligibility, and Forward Energy and Ancillary Service Revenues, Docket No. ER24-98 (Oct. 13, 2023) ("MSOC Filing"), Accession No. 20231013-5141. Because reforms to the Market Seller Offer Cap ("MSOC") are a core component of this filing, PIOs abbreviate this filing as PJM's "MSOC Filing." In another docket, PIOs will also protest PJM's simultaneous proposal titled "Capacity Market Reforms to Accommodate the Energy Transition While Maintaining Resource Adequacy." Because capacity accreditation is a core component of that filing, PIOs will abbreviate that filing as PJM's "Accreditation Filing."

market revenues will not actually flow to the resources that provide reliability during emergencies.

Because PJM's MSOC Filing thus saddles consumers with excessive costs without providing commensurate reliability benefits, the Commission should reject this filing.

BACKGROUND

I. PJM BEARS THE BURDEN OF PROVING THAT ITS PROPOSED TARIFF IS JUST AND REASONABLE.

Under section 205 of the Federal Power Act ("FPA"), the Commission is responsible for ensuring that "[a]ll rates and charges . . . by any public utility for or in connection with the transmission or sale of electric energy" are "just and reasonable."[2] The Commission must also ensure that utilities do not "make or grant any undue preference or advantage to any person or subject any person to any undue prejudice or disadvantage" or "maintain any unreasonable difference in rates."[3] When a utility proposes to change its existing rates, the utility bears "the burden of proof to show that the increased rate . . . is just and reasonable."[4]

Under this standard, where PJM proposes tariff changes to "better align prices" and risks, "PJM must show that any such proposed methodology produces just and reasonable rates."[5] If PJM "fail[s] to substantiate that its proposed [methodology] will achieve that purpose," the Commission will find that PJM has failed to carry its burden under section 205 of the FPA and will reject PJM's proposal.[6] To "show that [a proposed change] is just and reasonable," PJM must do more than merely show "an improvement over the [existing] approach," especially

[2] 16 U.S.C. § 824d(a).
[3] *Id.* § 824d(b).
[4] *Id.* § 824d(e).
[5] *PJM Interconnection, LLC*, 180 FERC ¶ 61,809 at P 51 (2022).
[6] *Id.*

where the PJM grid "will remain reliable without implementing the [new] proposal."[7] Instead, PJM must demonstrate that that its proposal does not "result in artificially inflated prices and thus prevent PJM from achieving a least cost [] solution" to the issues before it.[8]

II. MARKET SELLER OFFER CAPS ARE CRUCIAL TO JUST AND REASONABLE MARKET-BASED RATES.

The Market Seller Offer Cap ("MSOC") is the limit on prices that sellers such as power plants may offer into the capacity market. In general, capping offer prices is necessary "because the PJM capacity market is structurally non-competitive."[9] Due to the non-competitive nature of the market, the offer cap is necessary to "enable[] the appropriate review of offers and imposition of mitigation in order to ensure competitive market outcomes"[10] and to prevent the exercise of market power. The exercise of market power includes the artificial inflation of market prices, as occurs when sellers make offers higher than their costs warrant.[11] Hence, maintaining a rigorous MSOC is an essential element of market-based rates that are just and reasonable,[12] and that protect consumers against the artificial inflation of capacity prices.

How to set the MSOC has been the subject of a great deal of recent controversy. Indeed, litigation over the current MSOC rules concluded only two months ago, when the Court of Appeals for the D.C. Circuit affirmed the Commission's decision to institute the rules that currently govern the review of sellers' offers.[13] Under the current rules, any seller with market

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[7] *Id.* at P 47.
[8] *Id.*
[9] *PJM Interconnection, LLC*, 151 FERC ¶ 61,208 at P 12 (2015) ("*CP Order*").
[10] *Independent Market Monitor for PJM v. PJM Interconnection, LLC*, 174 FERC ¶ 61,212 at P 67 (2021) ("*MSOC Order*").
[11] *See Vistra Corp. v. FERC*, 80 F.4th 302, 306 (D.C. Cir. 2023) (noting that the Commission's "oversight remains ever concerned about energy suppliers exerting market power, which is the ability of an energy supplier with a large market share to significantly control or affect [the] price of energy") (internal quotation omitted).
[12] *See California ex rel. Lockyer v. FERC*, 383 F.3d 1006, 1012 (9th Cir. 2004) (explaining Commission precedent that the approval of market-based rate tariffs "was conditioned on the existence of a competitive market," which requires mitigation of any buyer and seller market power.").
[13] *See generally Vistra Corp.*, 80 F.4th 302.

power must undergo a unit-specific review of its offer to ensure that the offer does not constitute an exercise of market power.[14] The Commission instituted the current unit-specific review after finding that a prior, default MSOC, which allowed any offer under the default cap to elude review for market power, was unjust and unreasonable.[15] Critically, the prior default MSOC was high enough that the vast majority of capacity offers evaded review, which "create[d] a serious risk of widespread exercise of market power."[16] The Commission intended the current system of unit-specific review to help ensure that "the resource whose offer would set the market clearing price would be subject to mitigation if the seller had market power, and have its offer set at [the net avoidable cost rate]."[17]

The Commission instituted the current unit-specific review system only after a lengthy administrative process that included a paper hearing in which all parties, including PJM, had ample opportunity to propose alternative approaches.[18] First, in response to a challenge to the prior, default MSOC brought by the Independent Market Monitor for PJM ("IMM" or "Market Monitor"), the Commission determined that the default MSOC was unjust and unreasonable because it did not "enable[] the appropriate review of offers and imposition of mitigation in order to ensure competitive market outcomes."[19] The Commission then provided all parties an opportunity to suggest a replacement rate, carefully weighed the pros and cons of the suggested alternatives, and found that the IMM's suggested unit-specific review was superior because it "addresses supplier market power by reviewing the marginal offer while the proposals made by

[14] *Id.* at 311.
[15] *Id.* at 310–11.
[16] *Id.* at 312 (internal quotation omitted).
[17] *Id.* at 312 (citing *Independent Market Monitor for PJM v. PJM Interconnection, LLC*, 178 FERC ¶ 61,121 (2022) ("*MSOC Rehearing Order*") (internal quotation omitted)).
[18] *See Independent Market Monitor for PJM v. PJM Interconnection, LLC*, 176 FERC ¶ 61,137 (2021) ("*MSOC Remedy Order*") (considering all suggested approaches before approving the unit-specific review system).
[19] *MSOC Order*, 174 FERC ¶ 61,212 at P 67.

PJM and other parties may not."[20] The Commission sustained this decision against a bevy of objections upon rehearing,[21] and the D.C. Circuit upheld the Commission's decision.[22]

Although PJM does not propose to eliminate the existing system of unit-specific review, the changes it proposes would tend to increase MSOCs. Therefore, some core principles from the MSOC proceedings should continue to guide the Commission's review here. First, remaining "ever concerned about energy suppliers exerting market power"[23] means that the Commission should be wary of any proposal that may artificially inflate costs to consumers. Second, throughout the MSOC proceedings, the Commission consistently stressed that "independent evaluation by PJM and the Market Monitor of the components of capacity offers, including risks, 'is a fundamental and critical component of market power mitigation and therefore must continue.'"[24] And third, the Commission should remain as vigilant in this matter as it was in the MSOC proceedings against speculative arguments about ostensible defects in the independent review by the Market Monitor and PJM for the exercise of market power.[25]

III. BACKGROUND ON PJM'S CAPACITY PERFORMANCE INCENTIVES.

In this filing, PJM also proposes two significant changes to its Capacity Performance ("CP") system, which aims to provide incentives for capacity resources to perform during emergencies. In brief, the CP system assesses penalties against resources that fail to perform during emergencies, and those penalties fund payments to resources that actually do perform during emergencies. In approving the CP system, the Commission reasoned that PJM needed

[20] *MSOC Remedy Order*, 176 FERC ¶ 61,137 at P 64.
[21] *See generally MSOC Rehearing Order*, 178 FERC ¶ 61,121.
[22] *Vistra Corp*, 80 F.4th at 320.
[23] *Id.* at 306.
[24] *MSOC Rehearing Order*, 178 FERC ¶ 61,121 at P 84 (quoting *MSOC Remedy Order*, 176 FERC ¶ 61,137 at P 69).
[25] *See*, *e.g.*, *MSOC Remedy Order*, 176 FERC ¶ 61,137 at P 69 (rejecting as speculative "concerns that the Market Monitor will not entertain alternative expectations of risk").

penalties steep enough to create the possibility "of zero or negative net capacity revenues" for unreliable resources to provide "a strong incentive for performance."[26] Likewise, the Commission reasoned that using penalties to fund payments to all overperforming resources is necessary because "[t]he redistribution of capacity revenues from under-performing resources to over-performing resources provides appropriate incentives for all resources to perform when they are most needed."[27] PIOs' limited protest of PJM's Accreditation Filing in Docket No. ER24-99 contains a more detailed summary of PJM's adoption of the CP system. For brevity's sake, PIOs incorporate that summary by reference here.

<u>DISCUSSION</u>

I. PJM'S PROPOSAL UNREASONABLY RAISES CONSUMERS' COSTS BY ALLOWING INFLATION OF PENALTY RISKS AND FORCING CONSUMERS TO PAY MORE TO GENERATORS THAT ARE ALREADY PROFITABLE.

PJM proposes several significant changes to how offers into the capacity market may reflect the risk of penalties that may be levied under the CP structure for failure to perform during emergencies. Fond of acronyms, PJM refers to this assessment of penalty risk as Capacity Performance Quantifiable Risk ("CPQR"). First, PJM proposes to increase the deference to sellers' assessment of risks by allowing sellers to hire their own experts to authoritatively define the level of risk they face. Second, PJM proposes to allow sellers to use a default method of calculating CPQR that would incorporate a very extreme measure of risk. And third, PJM proposes to make CPQR a "stand alone" figure that would not account for resources' revenues from PJM's energy and ancillary services markets in cases where a resource would continue operating even without a capacity commitment. Each of these changes would tend to increase the assessed level of risk to sellers, thus driving the MSOC upward. The net effect of these changes

[26] *PJM Interconnection, LLC*, 155 FERC ¶ 61,157 at P 72 (2016) ("*CP Rehearing Order*").
[27] *CP Order*, 151 FERC ¶ 61,208 at P 182.

would be to increase the prices that consumers pay for capacity and to force consumers, rather than generators, to bear most of the risk of generators' unreliable performance during emergencies. As economist James Wilson concludes in the attached testimony, "PJM's proposals with regard to CPQR values would afford capacity sellers too much flexibility to raise their offers as an exercise of market power to raise capacity prices."[28]

PJM's proposals to weaken review for the exercise of market power are particularly unjust and unreasonable given the widespread degree of market power endemic to the PJM capacity market. As PJM notes, "in practice all Capacity Market Sellers fail" the "three pivotal supplier test,"[29] which is a key test for market power in the capacity market.[30] The Market Monitor has likewise explained that the capacity market's aggregate structure and local market structure are "not competitive."[31] Indeed, the fact that "the PJM capacity market failed the three pivotal supplier test" in "almost all auctions" in its history reveals that "[s]tructural market power is endemic to the capacity market."[32] As the Market Monitor notes, market power mitigation is essential given this backdrop of pervasive market power: "Although structural market power exists in the capacity market, a competitive outcome can result from the application of market

[28] Affidavit of James F. Wilson in Support of the Protest of the Public Interest Entities, at P 8, Docket No. ER24-98-000 (Nov. 8, 2023) ("Wilson MSOC Aff.").
[29] MSOC Filing, *supra* note 1 at 10.
[30] *See* Monitoring Analytics, 2023 Quarterly State of the Market Report for PJM: January through June, at 311 (2023) ("2023 Quarterly State of the Market Report"), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2023/2023q2-som-pjm-sec5.pdf (explaining that due to the inelastic nature of demand for capacity, "any supplier that owns more capacity than the typically small difference between total supply and the defined demand is individually pivotal and therefore has structural market power," while "[a]ny supplier that, jointly with two other suppliers, owns more capacity than the difference between supply and demand either in aggregate or for a local market is jointly pivotal and therefore has structural market power"). Excerpts from this document are also attached in Volume 2 of Attachments to this protest; *see* ATT-463.
[31] *Id.* at 304.
[32] *Id.*

power mitigation rules."[33] The problem is even more stark in local deliverability areas ("LDAs"), as James Wilson explains:

> [LDAs] are already susceptible to high capacity prices and potential withholding to raise prices. As the energy transition progresses reserve margins may decline in larger LDAs and in the [Regional Transmission Organization ("RTO")] region as a whole; if so, these larger areas will see higher capacity prices and will also become more susceptible to withholding to raise them further. Several entities have quite large generation portfolios in PJM; especially these entities have the ability and the incentive to economically withhold capacity to raise prices if the MSOC rules provide opportunities to do so.[34]

As explained below and in the attached testimony, PJM's proposal would undermine effective market power mitigation and reduce the odds of competitive outcomes from the capacity market.[35]

A. PJM's Proposed Approach to Seller-Submitted CPQR Estimates Will Undermine Market Power Mitigation.

1. Allowing sellers to hire contractors to value the risk of penalties reduces the rigor of independent review of market power.

Citing vague concerns about "differences of opinion" as to the appropriate methods for measuring penalty risks,[36] PJM proposes to revise its tariff to be more deferential to sellers' own definitions of the risks they face. As PJM recognizes, the existing tariff already provides sellers' offers with "latitude to sufficiently allow Capacity Market Sellers to include the company-specific nature of valuing non-performance risk so long as they can be supported and justified to the satisfaction of PJM and the Market Monitor."[37] In other words, under the current system,

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[33] *Id.*
[34] Wilson MSOC Aff., *supra* note 28 at P 8.
[35] *See, e.g.*, Wilson MSOC Aff., *supra* note 28 at P 15 ("[T]he proposed changes to the CPQR rules will result in excessive values that allow economic withholding to raise prices.").
[36] MSOC Filing, *supra* note 1 at 11.
[37] MSOC Filing, *supra* note 1 at 10–11.

sellers are already free to provide their own risk assessments, but must also provide a justification that can withstand rigorous, independent review by the Market Monitor and PJM.

PJM's proposed revision would significantly reduce the rigor of the independent review of sellers' assessment of risks. PJM proposes to add the following language to its tariff:

> CPQR shall also be considered reasonably supported if a Capacity Market Seller provides supporting documentation, along with an officer certification, that their risk model, inputs, and costs of CPQR have undergone a review by an independent third party entity with experience in evaluating capacity performance insurance policies to confirm that the proposed valuation of risk is consistent with actuarial practices in the industry.[38]

This proposed language significantly narrows the scope of independent review by the Market Monitor and PJM. Under the existing tariff, the role of the Market Monitor's and PJM's independent reviews is to ensure that sellers' risk assessments are "reasonably supported" by valid methodologies.[39] In contrast, by specifying that a sellers' risk assessment "*shall* [] be considered reasonably supported" if it is accompanied by a review from an ostensibly "independent third party," PJM's proposed tariff language would remove the Market Monitor's and PJM's ability to scrutinize sellers' chosen methods of assessing risk. Instead, PJM's proposal would require deference to the methods chosen by sellers and their contractors. As James Wilson observes, "no bounds are placed on what a market participant and its consultants might put forward."[40]

PJM's proposal to defer to sellers' own assessment of their risks is unjust and unreasonable in several ways. First, it defies Commission precedent. As the Commission

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[38] *Id.*, Proposed Tariff, Attachment DD Section 6.8(a), PDF p. 250. PJM's MSOC Filing contains several attachments, some of which are individually paginated and some of which are not. To minimize confusion, our citations to PJM's attachments also identify the cited page of the PDF document as "PDF p. X."

[39] *See id.* at 11 (discussing how independent review may consider whether a seller's cited "actuarial practices" or "other methods or forms of support" (citation omitted) provide reasonable support for its assessment of risk).

[40] Wilson MSOC Aff., *supra* note 28 at P 26. In the following section, PIOs explain why PJM's suggestion that an insurance quote might be a permissible method is especially concerning.

repeatedly stressed during the MSOC proceedings, "independent evaluation by PJM and the Market Monitor of *the components of capacity offers, including risks*, 'is a fundamental and critical component of market power mitigation and therefore *must continue*.'"[41] Indeed, the Commission also specifically found that "[p]ermitting sellers with market power to include their own assessments of costs and risks . . . without oversight would defeat the purpose of market power mitigation."[42] Eliminating the Market Monitor's—and PJM's own—ability to scrutinize sellers' chosen risk-assessment methodologies is flatly inconsistent with these principles.

Second, no record evidence indicates any need to undermine independent review for market power by deferring to sellers' risk-assessment methods. While PJM cites "a significant increase in unit-specific offer cap reviews in recent years,"[43] the recent increase in unit-specific review is precisely what the Commission intended when it put the current rules in place. The Commission specifically found that PJM's prior default MSOC resulted in an unacceptably large portion of offers evading review and enacted the Market Monitor's proposed replacement rate to increase the number of offers that would undergo meaningful, independent review.[44] Rather than indicating any problem warranting a change to PJM's tariff, the increase in unit-specific reviews is evidence that the rules the Commission put in place are operating as intended. Indeed, the Commission specifically rejected arguments that the increase in unit-specific reviews would be unduly burdensome,[45] and PJM offers no record evidence to undermine the Commission's determination on that issue.

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[41] *MSOC Rehearing Order*, 178 FERC ¶ 61,121 at P 84 (quoting *MSOC Remedy Order*, 176 FERC ¶ 61,137 at P 69) (emphases added)).
[42] *Id.* at P 47.
[43] MSOC Filing, *supra* note 1 at 10.
[44] *See Vistra Corp.*, 80 F.4th at 310–312.
[45] *MSOC Rehearing Order*, 178 FERC ¶ 61,121 at P 84.

Similarly, while PJM suggests that the valuation of risk is "becoming unduly contentious in the unit-specific review process,"[46] a rigorous, independent review of risk valuations is precisely what the Commission intended.[47] PJM does not explain what it means by the vague term "unduly contentious"; instead, the closest PJM comes to an explanation is the statement that "many Capacity Market Sellers withdraw or revise their unit-specific [MSOC] after the Market Monitor's review and before PJM makes a determination."[48] However, this statement is not evidence of a problem requiring a tariff change. Instead, sellers withdrawing or revising their proposed offers after the Market Monitor's review shows that this independent review is identifying offers that are not reasonably supported and thus may reflect an exercise of market power. In other words, this pattern shows that the Market Monitor's independent review is working as the Commission intended.

Third, deferring to risk assessments by sellers' contractors is inappropriate because those contractors are not truly independent. While PJM suggests that sellers' contractors would be "independent third parties," in reality, third parties are not likely to weigh in on sellers' offers unless sellers pay them to do so. Indeed, sellers and their contractors have incentives to overstate risks. Sellers may wish to inflate risks to raise their MSOC and thus to sell their capacity product for more money.[49] And third parties such as companies that sell capacity performance insurance policies have an incentive to overstate the risk of penalties to make their insurance products more

[46] MSOC Filing, *supra* note 1 at 9.
[47] *See MSOC Rehearing* Order, 178 FERC ¶ 61,121 at P 84 (noting that "independent evaluation by PJM and the Market Monitor of the components of capacity offers, including risks, 'is a fundamental and critical component of market power mitigation and therefore must continue'").
[48] MSOC Filing, *supra* note 1 at 9, n.21.
[49] While PJM may argue that an individual seller's desire to clear the capacity auction may mitigate the incentive to raise the seller's offer price, PJM's proposed language would allow *all sellers* to inflate their stated risks and thus raise offer prices. Because the desire to sell at higher prices is common to all sellers, a system that allows all sellers to inflate their stated risks would tend to raise all sellers' offer prices, which would mean that any individual seller would have less reason to limit its offer price in order to clear the auction.

valuable, or may quote a price for CP risk insurance that is quite high to address moral hazard, adverse selection, and lack of risk diversification, as discussed further below. In contrast, the Independent Market Monitor has no structural incentive to overstate sellers' risks.[50] While PJM suggests that third parties are somehow "better positioned" to evaluate sellers' risk valuation methods,[51] PJM offers zero evidence to indicate that the Market Monitor or PJM lacks the requisite skills, whereas market participants themselves have indicated that they only "have limited data to evaluate the risks."[52] To the contrary, the Market Monitor's review has been effective in recent auctions at preventing exercises of market power from unreasonably increasing prices for consumers.[53] Eliminating the Market Monitor's genuinely independent review in favor of risk assessments by entities with incentives to overstate risks would thus significantly undermine the independent nature of the review for the exercise of market power.

For all these reasons, the Commission should reject PJM's proposal to undermine the independent review of offers into the capacity market. However, if the Commission accepts PJM's proposal, it should condition that acceptance on PJM ensuring consistency between the assessment of risk that PJM allows in sellers' offers and the assessment of risk that underlies PJM's accreditation of capacity resources.[54] PJM does not explain whether it views these risk assessments as linked, which raises the prospect that a resource could argue for a unit-specific increase in its accreditation based on a purported reduction in outage risk, but simultaneously

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[50] Wilson MSOC Aff., *supra* note 28 PP 28–32.
[51] MSOC Filing, *supra* note 1 at 12.
[52] *See* Vistra Energy, Perspectives on CPQR Post-Winter Storm Elliott, at Slide 2 (Feb. 14, 2023), https://www.pjm.com/-/media/committees-groups/task-forces/rastf/2023/20230214/20230214-item-05a---vistra-msoc-discussion.ashx.
[53] 2023 Quarterly State of the Market Report, *supra* note 30 at 304 (noting that during a recent auction, "[m]arket power mitigation measures were applied when the capacity market seller failed the market power test for the auction, the submitted sell offer exceeded the defined offer cap, and the submitted sell offer, absent mitigation, would increase the market clearing price.").
[54] *See infra* § I(C)(2).

obtain an increase in its offer caps based on an inflated assessment of those same risks. The Commission should ensure that such gamesmanship is not possible in the PJM market.

2. Allowing sellers and their consultants to base estimates of cost to mitigate CP risk on insurance quotes is inappropriate.

In addition to the deeply problematic procedure PJM proposes of deferring to the opinions of seller-hired third parties about the amount of CP risk a seller faces, PJM also proposes an inappropriate conceptual basis upon which such opinions might be based. PJM's proposed tariff language would enable sellers to submit insurance quotes as the basis for the cost of mitigating CPQR.[55] Yet, in all of PJM's filing "no evidence is provided that there are any such CP risk insurance policies in force, or any identified actuarial practices for pricing them, or any such consultants that know about these practices."[56] Mr. Wilson notes numerous problems with relying on insurance quotes:

- "To price such a specialty insurance product, a potential insurer would need to understand the range of performance challenges the specific generation in question might face, the likelihood of various resource adequacy events on the PJM system, and the PJM CP rules (and other rules) that apply when such events occur, among other knowledge necessary to develop even a very rough understanding of the risk and its potential cost.[57]
- "Adverse selection: Potential insurers would be well aware that owners will most likely seek CP risk insurance for relatively poor-performing plants that would face substantial CP risk. And a potential insurer would know that the plant owner knows much, much

[55] MSOC Filing, *supra* note 1, at Proposed Tariff, Attachment DD Section 6.8(a), PDF p. 250.
[56] Wilson MSOC Aff., *supra* note 28 at P 27.
[57] *Id.* at P 28.

more about the condition of the plant and its potential weaknesses than the insurer will ever know."[58]

- "Moral hazard: Potential insurers would also be well aware that a CP risk insurance policy, by transferring the risk, would greatly weaken the owner's incentive to take available actions to mitigate risk (such as, to fully winterize, to acquire fuel when it probably isn't needed, to fully staff the plant on weekends and holidays, etc.)."[59]
- Using insurance quotes for individual units will also inaccurately inflate CPQR. Entities that own portfolios of resources, as is common in PJM, can offset their penalties for one unit with bonuses or other revenues from other units. Allowing a unit-specific insurance value ignores this economic reality in PJM, benefiting entities that own portfolios for no reason at consumers' expense.[60]

Because of the adverse selection and moral hazard issues, "a potential insurer, if willing to offer a quote for CP risk insurance at all, would likely state a price comfortably above what the information provided might suggest."[61] The cost of such a policy would likely be further inflated because the insurer is unlikely to have a large portfolio of CP risk policies, which would provide some risk diversification.[62]

For all these reasons, CP insurance quotes provided by sellers will tend to support exaggerated CPQR risk premiums. Given that PJM's proposed tariff language would require PJM and IMM to defer to these kinds of estimates, without exercising independent judgment, the

[58] *Id.* at P 29 (emphasis omitted).
[59] *Id.* at P 30 (emphasis omitted).
[60] *See id.* at PP 26–28.
[61] *Id.* at P 31.
[62] *See id.* at P 32.

Commission must reject PJM's proposal as insufficient to protect against the exercise of seller market power in the capacity market.

The Commission should also be reluctant to endorse the use of CP insurance because the moral hazard associated with such policies could undermine the performance incentives created by CP. "PJM put the CP rules in place to create incentives for resources to perform when needed the most. However, CP risk insurance policies undermine these incentives by transferring the risk and muting the impact of the non-performance penalties."[63]

B. PJM's Proposal to Give Itself Greater Authority with Respect to Particular Components of the MSOC Should Be Rejected.

PJM also proposes to revise its tariff to allow it to edit a seller's proffered unit-specific MSOC rather than being restricted to either approving or disapproving the seller's proffer.[64] PJM notes that while the tariff empowers the Market Monitor to "reach agreement" through negotiation with the seller, PJM must "accept or reject" the seller's proposed MSOC in its entirety.[65] Under the revised tariff language, PJM would be able to "calculate an alternative unit-specific Market Seller Offer Cap based on the submitted documentation,"[66] While PJM portrays this as a minor change, it would in fact significantly reduce the ability of the Independent Market Monitor to prevent the exercise of market power, and "give PJM substantial discretion to approve high CPQR values, and market sellers would no longer be motivated to reach agreement with the IMM anticipating that PJM may be more generous."[67] PJM currently has a limited role in determining legitimate capacity market offers: it must either accept or reject the offer submitted by a seller that has been reviewed by the IMM. This limited role is appropriate under

[63] *Id.* at P 33.
[64] MSOC Filing, *supra* note 1 at 32.
[65] *Id.* at 31 (quoting Proposed Tariff, Attachment M-Appendix, section E.2).
[66] *Id.* at 32 (quoting Proposed Tariff, Attachment DD, section 6.4(b)).
[67] Wilson MSOC Aff., *supra* note 28 at P 36.

the current tariff, given that "[t]he IMM is charged with market power mitigation; PJM's core responsibility is reliability, and PJM will generally prefer higher prices that attract and retain more resources, bolstering reliability."[68]

Furthermore, PIOs are concerned that this system lacks transparency and accountability. Although the Market Monitor would retain an ability to elevate disputes to the Commission over a PJM-approved MSOC,[69] the confidential nature of sellers' offers and of the negotiations between sellers, the Market Monitor, and PJM would leave all other stakeholders without sufficient information to determine whether PJM's new discretion to amend sellers' offers may lead to unjust, unreasonable, or unduly discriminatory outcomes. While PIOs urge the Commission to reject PJM's proposed changes to provide itself the ability to override the IMM in more granular ways, in the event the Commission concludes a greater role for PJM is consistent with robust market power mitigation, PIOs respectfully request that the Commission condition any acceptance of PJM's MSOC Filing on PJM periodically providing anonymized reports regarding how frequently it amends sellers' offers (e.g., what percentage of submitted offers PJM amends), what resource types have their offers amended, what methodology PJM uses to amend offers, and the degree to which PJM's amendments increase or decrease offer prices. This information would enable stakeholders and the Commission to better evaluate whether PJM is using its discretion to amend capacity market offers in a manner that is just, reasonable, and not unduly discriminatory.

[68] *Id.* at P 37.
[69] MSOC Filing, *supra* note 1 at 32.

C. PJM Fails to Carry Its Burden of Demonstrating That Its Proposed Standard Capacity Performance Quantifiable Risk Is Just and Reasonable.

PJM proposes to establish a standard methodology in the tariff for calculating CPQR, which a seller could use instead of submitting its own estimate.[70] The CPQR established under this method would still be unit-specific, but the level of risk would be determined "based on a probabilistic analysis conducted by the Office of the Interconnection that models the resource's performance under a range of simulated system conditions to measure the distribution of potential annual total net over- and underperformance of the resource."[71] PJM would then take the 95th percentile of the distribution of that risk for multiplication by the estimated cost of managing that risk.[72]

The cost of managing this risk would be determined using one of two methods. The seller could opt into PJM's defined method based on after-tax weighted average cost of capital, which it contends is consistent with actuarial practices used in the industry.[73] Alternatively, "[c]apacity Market Sellers may substitute their own estimate of a unit-specific risk cost and provide supporting documentation for such estimate."[74]

PIOs support PJM's development of a standardized method to calculate CPQR, which can reduce the burden on smaller market participants to develop and support their own CPQR estimates. It can also potentially bring more consistency to how CPQR is determined across a range of market participants, thus ensuring that participants are competing in part on who has the lowest risk. However, we have concerns about PJM's proposed methodology, which is not

[70] *Id.* at 12–13.
[71] *Id.* at 13 (quoting Proposed Tariff, Attachment DD, section 6.8(a)).
[72] *Id.* at 16.
[73] *Id.* at 14.
[74] *Id.*

adequately supported in light of the pervasive structural market power that exists in the PJM region.[75]

1. PJM's proposed use of the 95th percentile of modeled Capacity Performance risk is unsupported.

PJM does not adequately explain its decision to take the 95th percentile of the risk distribution as the basis for its standard CPQR calculation.[76] This assumption is based on finance concepts that are inapplicable here, where sellers are offering into the capacity market "based on their costs, [rather than] choosing between investments" based on which is less risky.[77] A seller that reflects a risk premium in its cost-based offer would have lower expected profits, "because it loses a profitable capacity payment whenever the price exceeds its cost but is less than its offer raised for a risk premium."[78] Only extremely risk averse sellers would be willing to lower expected profits by including the risk premium in their offers. As Mr. Wilson explains, many sellers in PJM are not so risk averse, because they are offering assets that are part of large portfolios that enable the seller to mitigate capacity performance risks or otherwise absorb them without significant problem.[79] For these sellers, the CPQR should be much smaller than the 95th percentile assumption made by PJM in the standard approach. Mr. Wilson concludes that "[i]t is a serious flaw in the Standard Approach that the calculation is unit-specific, and in no way requires consideration of the size and structure of the market participant's generation portfolio."[80] This "will lead to greatly overstating CPQR for most market participants, given that "market participants with large portfolios . . . also have much greater ability and incentive to

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[75] *See* 2023 Quarterly State of the Market Report, *supra* note 30 at 304 (discussing pervasive market power in PJM's capacity market).
[76] *See* MSOC Filing, *supra* note 1 at Attachment D, Affidavit of Dr. Walter Graf on Behalf of PJM Interconnection, L.L.C. ("Graf Aff.") PP 100–102, PDF pp. 313–314.
[77] Wilson MSOC Aff., *supra* note 28 at P 20.
[78] *Id.*
[79] *Id.* at PP 20–22.
[80] *Id.* at P 21.

exercise market power by economically withholding a portion of their portfolio, to the extent they are able to through, for instance, overly flexible MSOC rules that allow adding Standard Approach CPQR to all offers."[81]

PJM has also failed to explain how its proposed use of the 95th percentile of risk is consistent with prior Commission orders regarding the proper allocation of risk between buyers and sellers.[82] In its 2021 order establishing a replacement rate regarding PJM's seller-side market power rules, the Commission rejected arguments by sellers that additional risks should be loaded into capacity market offers, explaining that "[i]t is not appropriate for a cost-based offer to allow sellers to price every possible adverse outcome, because, as the Market Monitor states, such an approach would unreasonably shift all risk from the investors to consumers."[83] PJM's approach of taking the nearly worst-case scenario in terms of capacity performance risks enables sellers to transfer nearly all of their capacity performance risk to consumers through higher capacity prices, which does not strike an appropriate balance between allowing sellers a reasonable opportunity to cover their costs (including risks) and protecting consumers against excessive rates.[84]

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[81] *Id.* at P 23.

[82] *See* MSOC Filing, *supra* note 1 at 16; *id.* at Graf Aff. P 100, PDF p. 313 ("Establishing the threshold at the 95th percentile is commonly accepted as a reasonable measure of a typical extreme value that is placed at risk (with some small probability) when facing the distribution of potential outcomes."). PJM asserts that "the 95th percentile was also used as an example of a reasonable choice of extreme value in the similar framework proposed by PJM Independent Market Monitor." *Id.* at Graf Aff. P 100, PDF p. 313. But the Market Monitor presentation referred to suggests the 30th percentile alongside the 95th percentile, making it more likely these values were examples, rather than endorsements. *See* Monitoring Analytics, CPQR Simulation Example, at 4 (June 10, 2022), https://www.pjm.com/-/media/committees-groups/task-forces/rastf/2022/20220613/item-03---cpqr-methodology-and-examples---imm.ashx.

[83] *MSOC Remedy Order*, 176 FERC ¶ 61,137 at P 72.

[84] *See, e.g., ISO New England Inc. & New England Power Pool Participants Comm.*, 158 FERC ¶ 61,138 at P 54 (2017) (in approving a renewable energy resource exemption to the Minimum Offer Price Rule in ISO-NE, holding that "the Commission is only required to ensure that Generators have an opportunity to recover their costs—it need not guarantee recovery of costs."); *Pac. Gas & Elec. Co.*, 91 FERC ¶ 63,008, 65,112 (2000) ("[E]ven in a pure cost-of-service environment, *Hope* and *Carolina Power* do not unconditionally guarantee return of/on investment. Those cases stand for the more limited ratemaking principle that rates must provide an *opportunity* for return of/on

2. *PJM fails to Ensure That Risk Assessments Under Its Standard CPQR Approach Are Consistent with Accreditation.*

It is unclear whether the resource performance modeling that PJM conducts as part of the Standard CPQR approach will account for unit-specific adjustments to the seller's capacity accreditation. As noted in PIOs' limited protest filed in ER24-99, PJM's proposed Reliability Assurance Agreement ("RAA") additions include some less-than-clear procedures for Resource Performance Adjustments to the Class Effective Load Carrying Capability ("ELCC") Rating.[85] In the context of accreditation, suppliers may have an incentive to seek upward adjustments based on claims of additional flexibility, better performance, and the like. Any representations made to PJM about resource availability in the context of accreditation must be reflected in PJM's modeling of the resource's performance for CPQR purposes. Note that these representations are also an essential check where the seller supplies its own CPQR estimate, rather than availing itself of the standard methodology PJM advances here. Otherwise, sellers could game the system by arguing their performance is merely average or below-average when seeking a higher MSOC, while elsewhere arguing for a higher accreditation (and therefore the ability to offer additional capacity into the auction).

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investment."); *Fed. Power Comm'n v. Hope Nat. Gas Co. City of Cleveland*, 320 U.S. 591, 603 (1944) ("[R]egulation does not [e]nsure that the business shall produce net revenues") (quoting *Fed. Power Comm'n v. Nat. Gas Pipeline Co. of Am.*, 315 U.S. 575, 590 (1942)) (internal quotation omitted); *Xcel Energy Servs. Inc. v. FERC*, 815 F.3d 947, 952 (D.C. Cir. 2016) ("[T]he primary aim [of the FPA] is the protection of consumers from excessive rates and charges."); *Wis. Pub. Power Inc. v. FERC*, 493 F.3d 239, 262 (D.C. Cir. 2007) ("[S]etting a just and reasonable rate necessarily involves a balancing of the investor and the consumer interests.") (internal quotation omitted).

[85] *See* Limited Protest of Public Interest Organizations, ER24-99, at Section II(A).

3. PJM fails to account for potential risk-mitigation benefits from its own proposed PAI Obligation-Transfer mechanism.

PJM's standard approach to estimating the cost of managing risk does not appear to account for the risk mitigation benefits of the Performance Assessment Intervals ("PAI") Obligation Transfers that PJM proposes in this same filing.[86] According to Dr. Graf:

> By allowing for more granular transfers of the PAI obligations associated with committed UCAP, Capacity Market Sellers are granted increased flexibility to adjust their positions and manage their exposure to Capacity Performance risk in response to both unexpected and expected events. Capacity Market Sellers can mitigate their exposure to Capacity Performance risk by reacting promptly to unforeseen changes in their expected availability, such as when they face a higher probability of forced outages, and transacting the PAI obligation with a different market participant who is available and able to essentially offer insurance against under-performance during potential PAIs.[87]

Given that PJM is creating a new mechanism for obligation transfers specifically to help suppliers manage and mitigate their CP risk, it is inexplicable that PJM does not account for this mechanism in its own standardized formula for the cost of managing CP risk. Perhaps PJM lacks confidence that the transfer obligation mechanism will work or cannot anticipate the degree to which it will be used, but this is not an excuse to entirely fail to account for a mechanism that has the potential to reduce capacity market offers and therefore protect consumers against excessive rates.

4. PJM's standard approach provides little transparency or reassurance regarding CPQR risk premiums and impacts on capacity prices.

Dr. Graf asserts that the standard methodology "helps to improve transparency regarding the CPQR calculation for all market participants, including suppliers as well as load interests with cost concerns."[88] But the standard approach that PJM has proposed provides very little

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[86] MSOC Filing, *supra* note 1 at 40–42.
[87] *Id.* at Graf Aff. P 73, PDF p. 305.
[88] *Id.* at P 92, PDF pp. 310–311.

transparency for those with cost concerns. As noted above, PJM does not explain how it will model resources (based on seller-supplied performance characteristics, or PJM's default?), nor does it explain how its probabilistic assessment will work in terms of what kinds of unexpected circumstances will be tested in the model, such that consumers could understand how closely these relate to actual events on PJM's system or those likely to be experienced. While PJM asserts that its approach is similar to a simulation-based estimate presented by the Independent Market Monitor,[89] PJM fails to make clear whether this is true only at a conceptual level, or whether the amount of risk resulting from these two approaches is similar.

Overall, PJM provides little reassurance regarding the potential costs of the CPQR risk premium, even under its default methodology. PIOs, among other stakeholders, made such requests during the lengthy stakeholder process, but the information was never provided.[90] The closest this filing comes to quantifying the CPQR is a single, sparse paragraph in Dr. Graf's affidavit suggesting that the upper limit on the standard approach to CPQR will be 10% of the expected auction clearing price.[91] However, this explanation is not only abbreviated and unclear, but also provides no reassurance that PJM's proposed new rules will prevent sellers from exercising market power. First and foremost, the standard CPQR approach is only one path available to sellers, who can always opt for a seller-supplied CPQR instead, which is problematic for the reasons PIOs provide above. Second, even 10% of the expected auction clearing price can be substantial, especially given the possibility for prices to rise to Net CONE, which "for the most recent base residual auction was close to $300/MW-day for the RTO and some zones."[92] PJM has not established that a 10% increase in the capacity market clearing price attributable to

[89] *Id.* at P 95, PDF p. 311.
[90] Wilson MSOC Aff., *supra* note 28 at P 13.
[91] MSOC Filing, *supra* note 1 at Graf Aff. P 105, PDF p. 314.
[92] Wilson MSOC Aff., *supra* note 28 at P 24.

the CPQR risk premium is just and reasonable, especially as PJM is also proposing to weaken the Capacity Performance rules in this filing and the Accreditation Filing.

D. PJM's Proposal for a Stand-Alone CPQR Ignores the Fundamental Relationship Between the Capacity Market and Energy and Ancillary Services Markets.

A significant change in PJM's filing, versus the status quo, is to make CPQR a stand-alone component of certain capacity market offers that cannot be offset by expected revenues from the energy and ancillary service ("EAS") markets. PJM's rationale for this is that sellers who expect to earn energy and ancillary service revenues regardless of their capacity obligation status, require a capacity payment at least as high as the risk they assume for taking on the obligation. While PJM defends this view as consistent with economic theory and the notion that "the purpose of the market power mitigation framework is to return the market to competitive outcomes,"[93] this view misses the forest for the trees and would result in consumers overpaying for capacity.

1. Offsetting CPQR with EAS revenues appropriately ensures that capacity market offers recover only "missing money" not already earned in EAS markets.

The capacity market exists to supply the revenue needed to attract investment in generation and demand-side resources, which cannot be sufficiently recovered through the EAS markets due to price caps.[94] The purpose of the capacity market is to supply resource adequacy

[93] MSOC Filing, *supra* note 1 at Graf Aff. P 85, PDF p. 308.

[94] *See, e.g.*, Monitoring Analytics, 2022 State of the Market Report for PJM, at 398 (Sept. 3, 2023) ("2022 State of the Market Report for PJM"), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2022/2022-som-pjm-sec7.pdf ("A basic purpose of the capacity market is [to] allow all cleared capacity resources the opportunity to cover their net avoidable costs on an annual basis to ensure the economic sustainability of the reliable energy market."). Excerpts from this document are also attached in Volume 2 of Attachments to this protest; *see* ATT-458. *See also* James F. Wilson, "Missing Money" Revisited: Evolution of PJM's RPM Capacity Construct, at 1 (Sept. 2016), https://www.publicpower.org/system/files/documents/markets-rpm_missing_money_revisited_wilson.pdf (discussing the concept of "missing money" and the origin of capacity markets in the eastern RTOs).

to consumers at least cost. If a capacity resource makes adequate money to justify operation during a particular delivery year without receiving any capacity revenues, as many do,[95] then a capacity payment is excessive from the standpoint of consumers.[96] The resource doesn't need an extra "missing money" payment to justify contributing to the resource adequacy that consumers need. As PJM notes elsewhere, EAS markets send an important price signal for noncommitted resources to perform at times of system stress.[97]

PJM's approach to offsetting CPQR would decouple capacity prices and EAS prices, which is contrary to the broadly understood design of these markets to be aligned to the greatest extent possible. As the Commission has noted, "[t]he energy and capacity markets are designed to work together to ensure that PJM can meet its reserve targets in each delivery year and that competitive resources have an opportunity to earn sufficient revenues to cover their costs."[98] Enabling EAS revenues to offset CPQR does not deprive generators of the opportunity to earn sufficient revenue to cover their avoidable cost including risks, whereas eliminating that offset would, by definition, pay capacity resources more than their avoidable costs, including their risks of taking on a capacity obligation. Given PJM's simultaneous efforts to loosen the rules around how CPQR can be calculated, the lack of EAS offset has the potential to shift an enormous amount of risk from suppliers to consumers, even if those consumers are already paying sufficient sums through the energy market to cover the suppliers' avoidable costs including risks.

[95] The median combined cycle gas plant in PJM (PJM's largest category of generation on an installed capacity basis), recovered 250% of its avoidable costs from EAS revenues alone. *See* 2022 State of the Market Report for PJM, *supra* note 94 at 417, Tbl. 7-41.
[96] *Id.* at 415 ("It is rational for an owner to continue to operate a unit on an annual basis rather than retire the unit if the unit is covering or is expected to cover its avoidable costs and therefore contributing to covering fixed costs.").
[97] MSOC Filing, *supra* note 1 at Graf Aff. P 59, PDF p. 301 (contending that non-committed resources are incentivized to perform by energy and ancillary service revenues, and thus don't need capacity performance bonus payments).
[98] *PJM Interconnection, LLC*, 171 FERC ¶ 61,153 at P 309 (2020), *rev'd on voluntary remand on other grounds*, 177 FERC ¶ 61,209 (2021).

Importantly, the context of rising energy market revenues also shows why it is unreasonable to ignore those revenues when setting CPQR. Real-time energy market prices in PJM more than doubled between 2021 and 2022.[99] In an environment where energy prices are high enough to offset capacity performance risks that generators take on, this means that generators are already making sufficient revenue to justify staying in the market.

2. *PJM inappropriately proposes to rely solely on seller representations of their intention to continue operating absent a capacity obligation when determining whether or not EAS revenues should offset CPQR.*

PJM's proposal makes a critical distinction between resources that need capacity revenues to continue operating and resources that will continue operating without capacity revenues. In PJM's view, whether EAS revenues should offset the CPQR in a seller's offer depends on whether the unit will mothball or continue operating during the delivery year absent a capacity obligation for that year. Dr. Graf describes the difference in the competitive offer for a resource that would be economic based on energy market revenues alone (and would continue operating), versus a resource that needs capacity revenues to justify staying in operation (and would mothball or retire without a capacity payment).[100] For the former resource, PJM maintains that the competitive offer should reflect the price level at which the resource is indifferent as to whether it clears the capacity market. For these resources, PJM would not offset the CPQR component of the Avoidable Cost Rate ("ACR") by expected EAS revenues, which the resource would expect to earn during the delivery year in any case. For the latter resource, which would mothball or retire if it did not clear the capacity market, PJM would offset all components of ACR by expected EAS revenues.

[99] 2022 State of the Market Report for PJM, *supra* note 94 at 399 ("The real-time load-weighted average LMP in 2022 increased 101.4 percent from 2021, from $39.78 per MWh to $80.14 per MWh.").
[100] MSOC Filing, *supra* note 1 at Graf Aff. PP 80–83, PDF pp. 307–308.

After describing the importance of this distinction, PJM proposes tariff language that provides little accountability about which framework would be used to review a particular generator offer. PJM states that it "is proposing a targeted amendment to allow resources that would continue to participate in the EAS markets even if they do not receive a capacity commitment to utilize a unit-specific Market Seller Offer Cap that is based on incremental costs that would be avoided only in the absence of a capacity obligation, such as CPQR, without an offsetting [of] such costs with the resource's expected net EAS revenues."[101] The proposed tariff language that PJM would add eliminates the offset of CPQR "*in the case that the Capacity Market Seller has indicated in their submission* of a unit-specific Market Seller Offer Cap that the resource will continue to operate and participate in the energy and ancillary services markets during the Delivery Year if not cleared in the capacity market."[102] In other words, PJM proposes to rely solely on the seller's representation as to its intention to keep operating, despite the seller's obvious motivation to make the representation that would lead to a higher allowable capacity market offer.

The proposed tariff language does not include, and PJM does not discuss, any method to hold a seller accountable to the representation that it would make regarding intentions to keep operating in the absence of a capacity obligation. This hands-off approach contrasts with how PJM previously assured that generators did not misrepresent their plans when asserting that they would retire, rather than mothball, for purposes of utilizing default ACRs.[103] In that context, sellers wishing to utilize the retirement default bid would need to submit a sworn, notarized statement concerning their intention to retire, which PJM asserted would "deter any effort to

[101] *Id.* at 22.
[102] *Id.* at 22, n.43 (quoting Proposed Tariff, Attachment DD, section 6.8(d-1)) (emphasis added).
[103] *PJM Interconnection LLC*, 124 FERC ¶ 61,065 at P 10 (2008) (citing PJM compliance filing).

misrepresent a company's intention regarding the retirement of a unit."[104] Given the emphasis that PJM has placed here on the retirement/mothball versus continued-operation distinction, it is concerning that PJM does not discuss any means that it will use to ensure that sellers do not misrepresent their plans.[105] Given the benefits that a seller would receive for indicating its intention to keep operating absent a capacity obligation (no EAS offset to CPQR), and the impact on consumers, further accountability is necessary here.

3. *PJM articulates no clear principle for distinguishing costs that may be offset by EAS revenues from costs that may not be offset.*

While PJM's filing discusses the rationale for EAS revenues to no longer offset CPQR, it includes statements indicating that it may take a concerningly broader view of avoided cost types that cannot be offset. In describing the competitive offer for a capacity seller that would continue operating even if it did not clear, and therefore what ACR components should not be offset, Dr. Graf states: "CPQR is clearly avoidable if not committed for capacity; all or parts of other ACR components may also be avoidable in certain circumstances (for example, a resource that incurs costs to arrange firm fuel that they would not incur absent a capacity obligation)."[106] Likewise, PJM's transmittal letter suggests that "if a Capacity Market Seller decides to make an investment and make a resource dual fuel capable to mitigate against the potential risks of non-performance

[104] *Id.* The Commission approved PJM's proposed safeguard, concluding that the required affidavit, "together with the Market Monitor and the Commission's ability to investigate the claims made in the affidavit is sufficient protection against abuse." *Id.* at P 19. The Commission also found reasonable additional suggestions made by a group of consumers, which PJM had agreed to, which would require generators availing themselves of the retirement default bid to state a particular retirement date, and for PJM to publish data on the use of this default rate. *Id.*

[105] General prohibitions on making false statements may be difficult to enforce in this context, given that circumstances could change after a capacity offer is submitted, which would affect the seller's decision to operate during the delivery year.

[106] MSOC Filing, *supra* note 1 at Graf Aff. P 81.

during a Performance Assessment Interval, then such associated costs would be deemed incremental costs that would be avoided in the absence of a capacity obligation."[107]

These statements suggest that PJM believes that other components of a seller's ACR are avoidable in the sense that they would not be incurred but for a capacity obligation, and thus should not be offset by expected EAS revenues. PJM does not explain its reasoning as to these other ACR components further, but PIOs contend that expenses like firm fuel transportation contracts that provide demonstrable energy market performance benefits should not be viewed as avoidable if the seller does not take on a capacity market obligation, and therefore must be offset by expected EAS revenues. PJM should clarify its interpretation of its own proposed rules on this matter, so that the Commission and stakeholders can consider the proposed changes with a full understanding of the consequences for consumers.

II. PJM'S PROPOSAL TO RESTRICT BONUS ELIGIBILITY TO CLEARED CAPACITY RESOURCES UNREASONABLY FAILS TO ACCOMPLISH THE CAPACITY MARKET'S CORE GOAL OF USING CONSUMERS' FUNDS TO PAY FOR RELIABILITY.

A. Eliminating Payments to Resources That Actually Provide Reliability Is Unreasonable and Inconsistent with the Capacity Market's Purpose.

PJM proposes to significantly change its CP system by making many resources that provide reliability during emergencies ineligible to receive payments that are funded by penalties assessed against unreliable capacity resources. Under PJM's existing CP structure, during emergencies, or PAIs, capacity resources that fail to perform receive penalties known as Non-Performance Charges. These penalties then fund a pool of Performance Payments that are divided among all resources whose performance during the emergency exceeds their capacity obligations. As the Commission summarized, "[t]he penalty holds capacity resources

[107] *Id.* at 20, n.41.

accountable for delivering on their capacity commitments, while the bonus payments redistribute capacity revenues from resources that cannot perform to those that can."[108]

As the Commission found, the existing system of penalties and bonuses "provide[s] greater certainty that consumers will receive the service for which they paid through PJM's capacity market."[109] In approving the CP structure, the Commission found that "[t]he redistribution of capacity revenues from under-performing resources to over-performing resources provides the appropriate incentives for all resources to perform when they are most needed."[110] On rehearing, the Commission sustained this finding against a challenge suggesting that bonus payments were unnecessary to incent resources to perform during emergencies, reasoning that this system both "provides a robust performance incentive" during emergencies and "increases the probability that ratepayers receive the capacity service for which they are paying from one resource or another."[111]

Fundamentally, the product that consumers buy in the capacity market is reliability. As PJM explains, the capacity "product itself is generation or load curtailment capability to provide enough supply to, at a minimum, meet the desired level of reliability."[112] Hence, "[t]o ensure that the region maintains an adequate energy supply, PJM hosts capacity market auctions and acquires capacity commitments."[113] A capacity commitment, in turn, "entails 'a commitment to produce electricity or forgo the consumption of electricity when required.'"[114] Hence, in theory, during emergencies when demand surges or power plants fail, PJM should be able to call on cleared capacity resources to provide all the energy necessary to keep the grid operating reliably.

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[108] *CP Rehearing Order*, 155 FERC ¶ 61,157 at P 18.
[109] *Id.*
[110] *CP Order*, 151 FERC ¶ 61,208 at P 182.
[111] *CP Rehearing Order*, 155 FERC ¶ 61,157 at PP 132–33.
[112] MSOC Filing, *supra* note 1 at Keech Aff. P 5.
[113] *Vistra Corp.*, 80 F.4th at 307.
[114] *Id.*

In practice, however, many capacity resources have repeatedly proven unreliable during emergencies in PJM. For example, during Winter Storm Elliott, when roughly 47,000 MW of power plants failed to perform, capacity resources reflected "95–96% of units that experienced unplanned outages."[115] Capacity resources that fail to perform do not provide the product that consumers bought in the capacity market—reliability. Instead, when capacity resources fail, PJM must rely on non-capacity resources, such as power plants that participate solely in the energy market, to provide "critical supply" necessary to maintain reliability.[116] Under PJM's current CP structure in which penalties for non-performing capacity resource fund payments for all resources that do perform, the money that consumers pay for reliability appropriately flows to resources that actually provide reliability.[117]

In contrast, PJM's proposal to limit Performance Payments solely to cleared capacity resources means that during emergencies, the money that consumers pay for reliability will instead flow to a limited subset of capacity resources—regardless of whether the recipients of those funds actually kept the lights on. Put plainly, sending the money consumers pay for reliability to resources that are not sufficient to provide reliability—rather than sending those funds to resources that actually do provide reliability—is unreasonable and unfair.

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[115] PJM, Winter Storm Elliott: Frequently Asked Questions, at 6 (Apr. 12, 2023) ("Winter Storm Elliott FAQs"), https://www.pjm.com/-/media/markets-ops/winter-storm-elliott/faq-winter-storm-elliott.ashx. This document is also attached in Volume 1 of Attachments to this protest; *see* ATT-139.

[116] *See* Letter from PJM to Kimberly D. Bose, Secretary, FERC, Offer of Settlement in the Winter Storm Elliott Complaints, at 4 (Sept. 29, 2023), https://pjm.com/-/media/documents/ferc/filings/2023/20230929-er23-2975-000.ashx (noting that recipients of Performance Payments during Winter Storm Elliott included resources "that did not clear the capacity market or receive capacity revenues in the first instance, *yet performed when needed and ultimately provided PJM with critical supply*") (emphasis added).

[117] *See CP Rehearing Order*, 155 FERC ¶ 61,157 at PP 132–33 (approving the CP structure in part because it "increases the probability that ratepayers receive the capacity service for which they are paying from one resource or another").

B. PJM's Rationales for Eliminating Payments to Resources that Actually Provide Reliability Cannot Withstand Scrutiny.

PJM's purported justifications for its proposal lack merit. For example, effectively conceding that rendering energy-only resources ineligible for Performance Payments reduces the incentive for these resources to perform during emergencies, PJM asserts that if this reform leaves energy-only resources with "inadequate incentives to perform," there should be "further enhancements"—i.e., increased prices—in the energy market rather than payment of any share of capacity revenues.[118] However, increasing costs in the energy market would double charge consumers for reliability, when the tariff already in place fairly distributes the money that consumers pay for reliability to the resources that actually provide reliability.

Additionally, PJM argues that limiting eligibility for Performance Payments would better align with current MSOC rules[119]—but simultaneously proposes to change its MSOC rules. And while PJM notes that its proposal to limit Performance Payment eligibility is severable from its other tariff changes,[120] PJM makes no effort to explain how these two sets of tariff changes would work together. In this manner, PJM fails to carry its burden of demonstrating that all of its proposed tariff changes are just and reasonable.

PJM also places excessive reliance on distinguishing capacity resources from non-capacity resources. As PJM notes, capacity resources face extra obligations that aim to ensure that they are reliable, "including deliverability, recallability, energy and reserve market must-offer requirements and performance obligations."[121] However, the question here is what PJM should do with the money consumers spend on reliability when capacity resources *still fail*

[118] MSOC Filing, *supra* note 1 at 49.
[119] *Id.* at 49–50.
[120] *Id.* at 43.
[121] *Id.* at 49.

despite these extra obligations. The mere fact that capacity resources have some distinguishing features does not justify keeping all revenues in the capacity market when the capacity market fails to deliver the product that consumers have purchased.

PJM also mistakenly asserts that limiting Performance Payments to only cleared capacity resources would improve reliability because PJM would purportedly "be able to better count on a known pool of committed Capacity Resources to meet its resource adequacy needs."[122] However, penalties are only assessed when capacity resources fail to perform. Because the pool of cleared capacity resources is theoretically already providing resource adequacy, when failures cause PJM to assess penalties, the remaining capacity resources—the only resources eligible for Performance Payments under PJM's proposal—*will very likely be insufficient to provide resource adequacy*. Instead, because the portion of a capacity resource that is eligible for bonuses is "the installed capacity equivalent of the committed megawatts of unforced capacity,"[123] the remaining pool of capacity resources eligible for Performance Payments could only maintain resource adequacy if the increment between their expected performance and their installed capacity were equal to the deficient performance of the capacity resources that failed. PJM offers no evidence to suggest that this would be the case, and the whopping 47,000 MW of generator outages during Winter Storm Elliott, 95% of which were cleared capacity resources, makes this prospect quite implausible. Instead, PJM's proposal would make the grid less reliable by removing a performance incentive from a pool of resources that actually is sufficient to keep the lights on and instead diverting that incentive to a more limited subset of resources that is not.

Finally, PJM provides no actual evidence to support its proposal to limit eligibility for Performance Payments. For example, PJM states—but does not provide any evidence—that

[122] *Id.* at 48.
[123] *Id.* at 45.

scarcity pricing in the energy market would be sufficient to incentivize performance of energy-only resources if those resources are no longer eligible for Performance Payments. However, actual evidence points the other way; the fundamental justification for the capacity market is that it needs to supply "missing money" because the energy market does not provide sufficient funds to ensure resource adequacy.[124] Similarly, PJM does not provide any evidence to suggest that the current system of allocating Performance Payments to all performing resources meaningfully diminishes the incentive for cleared capacity resources to perform—particularly since the prospect of non-performance penalties already provides cleared capacity resources with strong incentives to perform.

Finally, PJM argues that its proposal to limit eligibility for Performance Payments will incentivize more resources to offer into the capacity market. While this goal is reasonable—because the capacity market will function better when all resources in PJM participate—PJM's chosen methods are not. Under PJM's current tariff, certain resources are not obligated to offer into the capacity market. These resources include energy-only resources that lack Capacity Interconnection Rights ("CIR") and intermittent and storage resources, which are exempted from the requirement to offer into the capacity market. Limiting Performance Payments to cleared capacity resources is not an effective method of enticing participation by either type of resource. Energy-only resources that lack CIRs cannot obtain them quickly, but must instead go through PJM's years-long interconnection queue; hence, even if PJM's current proposal provides some incentive to become a capacity resource, it will be many years before that incentive yields any results. As to renewable resources that have CIRs, PJM exempts these resources from offering into the capacity market because the capacity market exposes them to unreasonable penalties.

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[124] *Id.* at Keech Aff. P 4.

For example, during Winter Storm Elliott, PJM assessed penalties against solar resources for not generating electricity at night,[125] despite recognizing that "solar resources performed as the near-term forecasts projected, based upon . . . solar irradiance throughout the RTO."[126] Because PJM's proposal to limit Performance Payment eligibility to cleared capacity resources would not alleviate the threat of unreasonable penalties, it is not likely to entice renewables to offer into the capacity market. Hence, PJM's proposal is not likely to achieve its stated goal.

Moreover, even if PJM's proposal were to attract more renewables into the capacity market, it would do so in a manner that artificially inflates these resources' prices and is thus harmful to consumers. Under PJM's proposal, renewables would still face unreasonable penalties, such as penalties against solar resources for not generating electricity at night, and would likely factor these unreasonable penalties into their capacity market offers. Hence, PJM's proposal would have the effect of making capacity from renewable energy more expensive than it has any actual reason to be, which puts these resources at an unfair competitive disadvantage and unnecessarily raises costs for consumers.

III. THE COMMISSION SHOULD REJECT PJM'S FILING AND DIRECT PJM TO CONTINUE WORKING WITH STAKEHOLDERS ON CAPACITY MARKET REFORMS.

For all the reasons discussed above, PJM's MSOC Filing would increase costs to consumers, make the capacity market more vulnerable to the exercise of market power, and diminish incentives for reliable performance of all resources—all of which represent unjust and unreasonable outcomes. According to an analysis that PJM produced for members on August 14, 2023, adding a higher CPQR to all seller offers would not only force consumers to pay $600

[125] *See generally* Complaint of SunEnergy1, LLC, Docket No. EL23-58 (April 5, 2023), Accession No. 20230405-5181.
[126] Winter Storm Elliott FAQs, *supra* note 115 at 6.

million more annually for capacity, but would actually worsen reliability as compared to a scenario with just PJM's accreditation and risk modeling changes.[127] With such evidence, it is hard to conclude that consumers will receive any benefit in exchange for the increased costs associated with loosening protections against the exercise of market power. Hence, PIOs respectfully request that the Commission disapprove PJM's MSOC Filing.

Nevertheless, PIOs recognize that PJM's capacity market needs reform. As mentioned above, PIOs generally support PJM's goal of enticing greater participation by all resource types in the capacity market. While PIOs maintain that PJM's current proposal to do so by limiting eligibility for Performance Payments is not a just and reasonable approach, PIOs believe that some common-sense reforms would help. For example, aligning resources' obligations in the capacity market with the characteristics that inform their accreditation would mean that PJM would focus penalties on genuinely underperforming resources and no longer penalize resources that perform as designed.[128] Eliminating unreasonable penalties, such as those assessed against solar power for not generating electricity at night, would be a much simpler mechanism for bringing resources into the capacity market and would do so without artificially inflating their cost. Hence, PIOs respectfully request that the Commission direct PJM to continue working with its stakeholders on reforms to make the capacity market genuinely open to all resource types.

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[127] PJM, Simulation Analysis of PJM CIFP-RA Proposals (Aug. 14, 2023) at slide 10, https://www.pjm.com/-/media/committees-groups/cifp-ra/2023/20230814/20230814-item-05d---2023-08-14-market-simulation-analysis.ashx. (showing EUE of 283.2 MWh under the "CIFP Annual + CPQR" scenario but only 258.5 MWh of EUE under the "CIFP Annual" scenario). For this analysis, PJM added a $15/MW-day CPQR adder to each offer. *Id.* at 3-4. This document is also attached in Volume 2 of Attachments to this protest. *See* ATT-466.

[128] *See* Combined Protest and Answer of Sierra Club to Complaints Regarding Nonperformance Penalties During Winter Storm Elliott, at 21–25, Docket No. EL23-58 (May 26, 2023), Accession No. 20230526-5234. This document is also attached in Volume 3 of Attachments to this protest; *see* ATT-590.

Respectfully submitted this 9th day of November, 2023.

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SUSTAINABLE FERC PROJECT

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CERTIFICATE OF SERVICE

I hereby certify that the foregoing has been served in accordance with 18 C.F.R. § 385.2010 upon each party designated in the official service list compiled by the Secretary in this proceeding, by email.

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Dated: November 9, 2023

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)))	Docket No. ER24-98-000

AFFIDAVIT OF JAMES F. WILSON
IN SUPPORT OF THE PROTEST OF
THE PUBLIC INTEREST ENTITIES

Contents

AFFIDAVIT OF JAMES F. WILSON
IN SUPPORT OF THE PROTEST OF
THE PUBLIC INTEREST ENTITIES

I. Introduction

1. My name is James F. Wilson. I am an economist and independent consultant doing business as Wilson Energy Economics. My business address is 4800 Hampden Lane Suite 200, Bethesda, MD 20814.

2. I have forty years of consulting experience in the electric power and natural gas industries. Many of my past assignments have focused on the economic and policy issues arising from the introduction of competition into these industries, including restructuring policies, market design, market analysis and market power. Other recent engagements have included resource adequacy and capacity markets, contract litigation and damages, forecasting and market evaluation, pipeline rate cases and evaluating allegations of market manipulation. I also spent five years in Russia in the early 1990s advising on the reform, restructuring, and development of the Russian electricity and natural gas industries for the World Bank and other clients. I have submitted affidavits and presented testimony in proceedings of the Federal Energy Regulatory Commission ("Commission"), state regulatory agencies, and U.S. district court. I hold a B.A. in Mathematics from Oberlin College and an M.S. in Engineering-Economic Systems from Stanford University. My curriculum vitae, summarizing my experience and listing past testimony, is Attachment JFW-1 attached hereto.

3. I have been involved in electricity restructuring and wholesale market design for over twenty years in PJM, New England, Ontario, California, MISO, Russia, and other regions. With regard to the PJM system, I have also been involved in a broad range of market design and planning issues over the past several years.

4. With regard to the capacity market issues that are the subject of this proceeding, I have been involved in these issues in PJM, New England, New York, California, the Midwest, and other regions. Since PJM Interconnection, L.L.C. ("PJM") proposed the Reliability Pricing Model ("RPM") capacity construct in 2005, I have prepared numerous affidavits, reports, and analyses of RPM and RPM-related issues.

5. On October 13, 2023, PJM filed proposed changes to the Market Seller Offer Cap and other capacity market provisions in this docket ("PJM Filing"). In a second filing on the same date, Docket No. ER24-99, PJM filed other capacity market changes that I address in a separate affidavit.

6. This affidavit was prepared at the request of Sierra Club and Earthjustice. My assignment was to evaluate certain of the tariff changes proposed by PJM and to make recommendations.

7. Sellers into PJM's Reliability Pricing Model ("RPM") capacity construct are subject to Market Seller Offer Caps ("MSOC") to prevent exercise of market power. The MSOCs are presently established based on resources' gross Avoidable Cost Rate minus an estimate of net revenues from energy and ancillary services markets. One component of the MSOC is Capacity Performance Quantifiable Risk ("CPQR"), intended to represent the expected value of net penalties under Capacity Performance plus the cost of the risk associated with these penalties, or the cost of mitigating this risk.[1] PJM notes that its tariff is rather vague about how CPQR is determined.[2] The high Capacity Performance penalties resulting from Winter Storm Elliott

[1] Graf Affidavit P 93.

[2] PJM Filing p. 10.

brought new attention to the CPQR component of the MSOC. My affidavit focuses on PJM's proposals with regard to CPQR. My findings and recommendations are summarized in the next section of my affidavit and explained in greater detail in the remainder of my affidavit.

II. Summary and Recommendations

8. I generally find that PJM's proposals with regard to CPQR values would afford capacity sellers too much flexibility to raise their offers as an exercise of market power to raise capacity prices. Locational Deliverability Areas ("LDAs"), especially small ones, are already susceptible to high capacity prices and potential withholding to raise prices. As the energy transition progresses reserve margins may decline in larger LDAs and in the RTO region as a whole; if so, these larger areas will see higher capacity prices and will also become more susceptible to withholding to raise them further. Several entities have quite large generation portfolios in PJM; especially these entities have the ability and the incentive to economically withhold capacity to raise prices if the MSOC rules provide opportunities to do so.

9. PJM's proposals rely on concepts from finance whose applicability to capacity market offer prices is questionable, as I will explain; and some concepts from finance are used while other, related and relevant concepts (such as diversification within a portfolio) are ignored. Allowing CPQR values to be calculated based on this flawed conceptual framework will allow some sellers to raise their offer prices by amounts well in excess of the true CP risk they face.

10. The proposed "Standard Approach" to CPQR calculation is structured based on questionable concepts and contains arbitrary parameters, such as a "95%" value. The biggest flaw in the approach is that it is unit-specific; it does not in any way reflect the size of a participant's PJM generation portfolio. Participants with larger portfolios face much less CPQR

risk, because they have substantial risk mitigation through the diversification within their portfolios. When in a performance assessment event one of a participant's plants fails and incurs a penalty, others in the portfolio are earning high energy prices and bonuses, offsetting the sting of the penalty. I also note that participants with large portfolios of generation assets have much greater incentive to exercise market power if lax CPQR rules allow, because the entire portfolio can gain from any increase in auction prices.

11. Under PJM's proposal, sellers are also permitted to seek higher CPQR values than the Standard Approach. The proposed language suggests this could be based on the cost of a CP insurance policy quote, and I will explain why such policies, if they exist, do not shed light on appropriate CPQR values, due to adverse selection and moral hazard problems with this specialty insurance product.

12. Concerns about the unit-specific process are exacerbated by the proposal for PJM, whose focus is reliability not market power mitigation, to have authority to override the Independent Market Monitor ("IMM") and approve a seller's request for a higher CPQR value.

13. Potential changes to the CPQR rules and calculations were under discussion in PJM stakeholder processes in 2022,[3] and the discussions gained additional attention following the high penalties resulting from Winter Storm Elliott ("WSE"). I have repeatedly asked what magnitude of CPQR adders to the MSOC might result from various proposed changes ($5/MW-day? $50/MW-day?), but PJM has not provided any meaningful answers, in the stakeholder process or in this proceeding. I note that it is really only the CPQR values in the offers of relatively high-

[3] See, for instance, PJM Resource Adequacy Senior Task Force meeting, June 23, 2022, Item 2.

cost resources that matter, because these plants' offers will most likely set the RPM clearing prices. If most resources have low CPQR values, but a small number of higher-cost, likely price-setting plants have high CPQR, the impact of CPQR on capacity clearing prices and costs could be high. Again, PJM has not provided information about the magnitude of the CPQR values PJM or the IMM might approve under the proposed rules.

14. In stakeholder meetings I also suggested that representatives of consumers might be more comfortable with the proposed changes if they included a cap on the magnitude of the CPQR adder, but this proposal was not adopted. With PJM's filing, we still lack a meaningful estimate of how large the CPQR values might be, and what impact the proposed changes might have on capacity prices and costs. If the potential impact of CPQR rules on capacity prices and costs to consumers is substantial, it calls into question whether the reliability value resulting from the CP rules is commensurate with its cost.

15. In summary, I find that the proposed changes to the CPQR rules will result in excessive values that allow economic withholding to raise prices, primarily due to the following issues:

1. The "Standard Approach" formula contains arbitrary parameters and does not in any way consider the risk diversification within a portfolio of generation assets.
2. The proposed language suggests a higher CPQR could be justified based on highly questionable information, such as a quote for CP insurance.
3. The proposed rules would allow PJM to override the IMM and approve higher CPQR and MSOC values.

16. The remainder of my affidavit is organized as follows. Section III elaborates my concerns about the CPQR Standard Approach formula. Section IV discusses concerns about

unit-specific CPQR determinations. The final section explains my concerns about PJM having authority to override the market monitor and approve MSOC and CPQR values.

III. Concerns about the CPQR "Standard Approach" Formula

17. The proposed tariff language allows sellers to have PJM calculate their CPQR based on a Standard Approach simulation of plant-specific CP risk. The CPQR would be calculated as the 95th percentile of CP net penalty outcomes according to a probabilistic simulation, multiplied by Risk Cost, assumed equal to the After Tax Weighted Average Cost of Capital ("ATWACC"; 10% in PJM's examples).[4]

18. The "95%" value is arbitrary. The Graf Affidavit justifies it as follows (P. 100):

> Establishing the threshold at the 95th percentile is commonly accepted as a reasonable measure of a typical extreme value that is placed at risk (with some small probability) when facing the distribution of potential outcomes.

19. The Graf Affidavit also describes the 95% parameter as "the maximum loss a participant is likely to incur once in 20 years," which would be estimated based on a simulation model. In arguing that concepts from finance can be applied here, the Graf Affidavit states as follows (P. 102):

> Investors put their money in various assets with the expectation of a return. But all investments come with some level of risk. The riskier an investment is perceived to be, the higher the return investors will demand to compensate for that risk. This is known as the risk-return tradeoff.

[4] Proposed Tariff Attachment DD Section 6.8a.

20. It is true that an investor would seek a higher return in a riskier investment, and will compare candidate investments considering both risk and return. But that is not the game that is being played here. There is only one capacity market, and sellers are offering into it based on their cost; they are not choosing between investments. If a seller raises its offer above cost to reflect a risk premium, its expected profit is reduced, because it loses a profitable capacity payment whenever the price exceeds its cost but is less than its offer raised for a risk premium. And note that raising the offer by a risk premium does not mitigate the risk – this is not like insurance, or like switching to a lower risk investment. The seller is still subject to the same potentially high penalties. So why would a seller add a risk premium and sacrifice expected profit? Some market participants might do so because they may feel that when the profit is low, it is not worthwhile to bear the risk. But this will depend a lot on the nature of the market participant:

1. The risk may be small compared to the overall financial size of the entity together with affiliates, in which case risk aversion should be minimal.
2. The entity may have a portfolio of generation assets of various resource types with largely uncorrelated outcomes (largely independent forced outage risks), in which case there can be substantial diversification of risk within the generation portfolio.[5]

21. In either of these cases, the CPQR should be much smaller than for an entity with just one or a few power plants in the market. It is a serious flaw in the Standard Approach that the calculation is unit-specific, and in no way requires consideration of the size and structure of the market participant's generation portfolio. While the 95th percentile is an arbitrary threshold, this level will be much lower (relative to mean outcomes) for a portfolio than for a single unit. Ignoring portfolios will lead to greatly overstating CPQR for most market participants.

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[5] See, for instance, Investopedia, *What Is Diversification? Definition as Investing Strategy,* available at https://www.investopedia.com/terms/d/diversification.asp.

22. Most of the generation in the PJM footprint is held in large portfolios. According to one recent assessment, 60% of the PJM capacity is held in portfolios of 3,000 MW or larger.[6] About half of the total generation is held by seven companies who, with affiliates, have portfolios over 8,000 MW. CPQR calculations must reflect the diversification of risk that results from holding many generation assets in a portfolio.

23. I also note that market participants with large portfolios, in addition to having substantial diversification of CP risk within their portfolios, also have much greater ability and incentive to exercise market power by economically withholding a portion of their portfolio, to the extent they are able to through, for instance, overly flexible MSOC rules that allow adding Standard Approach CPQR to all offers.

24. The Graf Affidavit claims that the proposed stop-loss limit on Capacity Performance penalties[7] limits the CPQR component under the "Standard Approach" to 10% of the expected RPM base residual auction clearing price.[8] This is the closest PJM has come to estimating the potential magnitude of CPQR, but this is only the Standard Approach calculation – the owners of the higher-cost, likely price-setting plants may apply for higher CPQR values. And 10% of the auction price is not an insignificant amount; Net CONE for the most recent base residual auction was close to $300/MW-day for the RTO and some zones.

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[6] Application for Authorization of Transaction under Federal Power Act Section 203 (Energy Harbor and Vistra), FERC Docket No. EC23-74, page 277 of 982, PJM Destination Market Economic Capacity, Top 1% Peak Hours, pre-transaction capacity; available at https://elibrary.ferc.gov/eLibrary/filedownload?fileid=09FFC965-5577-CEC5-B938-87947CA00000.

[7] Proposed Tariff Attachment DD Section 10A.f.

[8] Graf Affidavit P. 105. The argument refers to stop loss at 1.5 times the auction price and an estimated cost of risk of 10%; it is unclear how this leads to CPQR no greater than 10% of the auction price.

25. To summarize this section, the Standard Approach calculation is flawed primarily in that it does not take into account the risk mitigation that occurs through a market participant's portfolio of generation assets. As a result, the Standard Approach CPQR values will be substantially higher than a more accurate estimate of CP risk, and will allow sellers to economically withhold to raise capacity prices.

IV. Concerns about Unit-Specific CPQR Determinations

26. PJM proposes new tariff language allowing a market seller to gain approval of a higher CPQR value by presenting a risk model, along with supporting documentation; this can include "insurance quotes."[9] The market seller would show that its proposed CPQR value has been "review[ed] by an independent third party entity with experience in evaluating capacity performance insurance policies to confirm that the proposed valuation of risk is consistent with actuarial practices in the industry."[10] PJM suggests this is appropriate "given that independent third party entities that have experience in evaluating capacity performance insurance policies, such as consultants who evaluate capacity performance insurance or an insurance carrier that issues capacity performance insurance policies, are better positioned to confirm whether a Capacity Market Seller's risk valuation is consistent with actuarial practices used in this industry."[11] While the proposed "Standard Approach" would appear to be an example of such a risk model, no bounds are placed on what a market participant and its consultants might put forward.

27. With regard to the reference to insurance, no evidence is provided that there are any such CP risk insurance policies in force, or any identified actuarial practices for pricing them, or

[9] Proposed Tariff Attachment DD Section 6.4a.

[10] PJM Filing p. 12.

[11] PJM Filing p. 12.

any such consultants that know about these practices. I am very skeptical about such CP risk insurance policies, and what any such policy reveals about CP risk, for the following reasons.

28. To price such a specialty insurance product, a potential insurer would need to understand the range of performance challenges the specific generation in question might face, the likelihood of various resource adequacy events on the PJM system, and the PJM CP rules (and other rules) that apply when such events occur, among other knowledge necessary to develop even a very rough understanding of the risk and its potential cost. And a potential insurer would take into account two well-known problems often associated with insurance that would be significant in this context, "adverse selection" and "moral hazard":

29. ***Adverse selection:*** Potential insurers would be well aware that owners will most likely seek CP risk insurance for relatively poor-performing plants that would face substantial CP risk. And a potential insurer would know that the plant owner knows much, much more about the condition of the plant and its potential weaknesses than the insurer will ever know.

30. ***Moral hazard:*** Potential insurers would also be well aware that a CP risk insurance policy, by transferring the risk, would greatly weaken the owner's incentive to take available actions to mitigate risk (such as, to fully winterize, to acquire fuel when it probably isn't needed, to fully staff the plant on weekends and holidays, etc.).

31. Accordingly, a potential insurer, if willing to offer a quote for CP risk insurance at all, would likely state a price comfortably above what the information provided might suggest.

32. Note also that for most insurance products, insurers are able to offer reasonable prices, despite potential adverse selection and moral hazard problems, because they generally hold a large portfolio of similar policies (automobile, home, etc.), and there is risk diversification within the portfolio. At any time, some of the insurer's policies are paying out while the vast majority

are not. But insurers would not have much of a portfolio of CP risk policies, as there are likely very few parties seeking to insure this risk; and the risks would be considered somewhat correlated, as was seen in WSE.

33. I also observe that in light of the moral hazard issue, PJM may be making a mistake in inviting and encouraging market sellers to bring it CP risk insurance policies or policy quotes as a path to higher CPQR and MSOC values. PJM put the CP rules in place to create incentives for resources to perform when needed the most. However, CP risk insurance policies undermine these incentives by transferring risk and muting the impact of the non-performance penalties. Rather than encouraging CP risk insurance policies as a means to gaining a higher MSOC, PJM should consider prohibiting them to protect reliability.

34. To summarize, the proposed tariff changes would appear to allow market sellers to support high unit-specific CPQR values based on questionable information such as a very high CP insurance quote. As with the Standard Approach, the review of these applications by the Independent Market Monitor and PJM should take into account the risk mitigation that occurs through the applicant's portfolio of generation assets.

V. Concerns about PJM Discretion to Approve CPQR Values, Overriding IMM

35. PJM also proposes a change to the tariff that would allow it to calculate and approve MSOC values, including CPQR values, over the objection of the Independent Market Monitor.[12] PJM describes the current rules as follows:

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[12] Tariff Attachment DD Section 6.4.b ("a Capacity Market Seller .. may submit an offer up to .. (3) an alternative unit-specific Market Seller Offer Cap calculated by the Office of the Interconnection based on the submitted documentation.")

> Under these existing Tariff rules, in reviewing a requested unit-specific Market Seller Offer Cap, the Market Monitor is allowed to "reach agreement with the Capacity Market Seller on the appropriate level of the Market Seller Offer Cap" while PJM's review and determination is limited to "accept or reject the requested unit-specific Market Seller Offer Cap." These rules confine PJM's ability to accept a unit-specific Market Seller Offer Cap that differs from any level that is requested by the Capacity Market Seller. [citations omitted]

36. PJM proposes to change this arrangement, so PJM will be free to accept a unit-specific offer cap that the IMM has rejected. This would give PJM substantial discretion to approve high CPQR values; and market sellers would no longer be motivated to reach agreement with the IMM, anticipating that PJM may be more generous.

37. There is no need or rationale for this inappropriate authority. The IMM is charged with market power mitigation; PJM's core responsibility is reliability, and PJM will generally prefer higher prices that attract and retain more resources, bolstering reliability. Mitigating market power is secondary for PJM. As discussed above, the proposed tariff language refers to "insurance quotes," and I consider it questionable that any such quotes would reflect reasonable estimates of CPQR risk. The fact that PJM proposes to include this language in the tariff suggests that PJM does not appreciate how questionable such information is likely to be, or the moral hazard that would result from any CP risk insurance policies. The IMM is more experienced in protecting consumers by recognizing attempts to exercise market power when they occur, and PJM should not have authority to override the IMM in this regard.

38. This concludes my affidavit.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

	)	
PJM Interconnection, L.L.C.	)	Docket No. ER24-98-000
	)	

VERIFICATION

I, James F. Wilson, pursuant to 28 U.S.C. § 1746, state, under penalty of perjury, that I am the same James F. Wilson referred to in the foregoing document entitled "Affidavit of James F. Wilson in Support of the Protest of the Public Interest Entities," that I have read the same and am familiar with the contents thereof, and that the facts set forth therein are true and correct to the best of my knowledge, information, and belief.

James F. Wilson

James F. Wilson

Dated: November 8, 2023

James F. Wilson
Principal, Wilson Energy Economics

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SUMMARY

James F. Wilson is an economist with over 35 years of consulting experience, primarily in the electric power and natural gas industries. Many of his assignments have pertained to the economic and policy issues arising from the interplay of competition and regulation in these industries, including restructuring policies, market design, market analysis and market power. Other recent engagements have involved resource adequacy and capacity markets, contract litigation and damages, forecasting and market evaluation, pipeline rate cases and evaluating allegations of market manipulation. Mr. Wilson has been involved in electricity restructuring and wholesale market design for over twenty years in California, PJM, New England, Russia and other regions. He also spent five years in Russia in the early 1990s advising on the reform, restructuring and development of the Russian electricity and natural gas industries.

Mr. Wilson has submitted affidavits and testified in Federal Energy Regulatory Commission and state regulatory proceedings. His papers have appeared in the *Energy Journal*, *Electricity Journal*, *Public Utilities Fortnightly* and other publications, and he often presents at industry conferences.

Prior to founding Wilson Energy Economics, Mr. Wilson was a Principal at LECG, LLC. He has also worked for ICF Resources, Decision Focus Inc., and as an independent consultant.

EDUCATION

MS, Engineering-Economic Systems, Stanford University, 1982

BA, Mathematics, Oberlin College, 1977

RECENT ENGAGEMENTS

- Analysis of provisions to enhance resource fuel security in day-ahead and real-time wholesale electricity markets.
- Evaluated peak electric load forecasts and enhancements to load forecasting methodologies.
- Evaluated a probabilistic analysis to determine the electric generating capacity reserve margin to satisfy resource adequacy criteria.
- Evaluated the potential impact of an electricity generation operating reserve demand curve on a wholesale electricity market with a capacity construct.
- Developed wholesale capacity market enhancements to accommodate seasonal resources and resource adequacy requirements.
- Evaluation of wholesale electricity market design enhancements to accommodate state initiatives to promote state environmental and other policy objectives.
- Evaluation of proposals for natural gas distribution system expansions.
- Various consulting assignments on wholesale electric capacity market design issues in PJM, New England, the Midwest, Texas, and California.
- Cost-benefit analysis of a new natural gas pipeline.
- Evaluation of the impacts of demand response on electric generation capacity mix and emissions.

- Panelist on a FERC technical conference on capacity markets.
- Affidavit on the potential for market power over natural gas storage.
- Executive briefing on wind integration and linkages to short-term and longer-term resource adequacy approaches.
- Affidavit on the impact of a centralized capacity market on the potential benefits of participation in a Regional Transmission Organization (RTO).
- Participated in a panel teleseminar on resource adequacy policy and modeling.
- Affidavit on opt-out rules for centralized capacity markets.
- Affidavits on minimum offer price rules for RTO centralized capacity markets.
- Evaluated electric utility avoided cost in a tax dispute.
- Advised on pricing approaches for RTO backstop short-term capacity procurement.
- Affidavit evaluating the potential impact on reliability of demand response products limited in the number or duration of calls.
- Evaluated changing patterns of natural gas production and pipeline flows, developed approaches for pipeline tolls and cost recovery.
- Evaluated an electricity peak load forecasting methodology and forecast; evaluated regional transmission needs for resource adequacy.
- Participated on a panel teleseminar on natural gas price forecasting.
- Affidavit evaluating a shortage pricing mechanism and recommending changes.
- Testimony in support of proposed changes to a forward capacity market mechanism.
- Reviewed and critiqued an analysis of the economic impacts of restrictions on oil and gas development.
- Advised on the development of metrics for evaluating the performance of Regional Transmission Organizations and their markets.
- Prepared affidavit on the efficiency benefits of excess capacity sales in readjustment auctions for installed capacity.
- Prepared affidavit on the potential impacts of long lead time and multiple uncertainties on clearing prices in an auction for standard offer electric generation service.

EARLIER PROFESSIONAL EXPERIENCE

LECG, LLC, Washington, DC 1998–2009.
<u>Principal</u>

- Reviewed and commented on an analysis of the target installed capacity reserve margin for the Mid Atlantic region; recommended improvements to the analysis and assumptions.
- Evaluated an electric generating capacity mechanism and the price levels to support adequate capacity; recommended changes to improve efficiency.
- Analyzed and critiqued the methodology and assumptions used in preparation of a long run electricity peak load forecast.
- Evaluated results of an electric generating capacity incentive mechanism and critiqued the mechanism's design; prepared a detailed report. Evaluated the impacts of the mechanism's flaws on prices and costs and prepared testimony in support of a formal complaint.
- Analyzed impacts and potential damages of natural gas migration from a storage field.
- Evaluated allegations of manipulation of natural gas prices and assessed the potential impacts of natural gas trading strategies.
- Prepared affidavit evaluating a pipeline's application for market-based rates for interruptible transportation and the potential for market power.
- Prepared testimony on natural gas industry contracting practices and damages in a contract dispute.
- Prepared affidavits on design issues for an electric generating capacity mechanism for an eastern US regional transmission organization; participated in extensive settlement discussions.

- Prepared testimony on the appropriateness of zonal rates for a natural gas pipeline.
- Evaluated market power issues raised by a possible gas-electric merger.
- Prepared testimony on whether rates for a pipeline extension should be rolled-in or incremental under Federal Energy Regulatory Commission ("FERC") policy.
- Prepared an expert report on damages in a natural gas contract dispute.
- Prepared testimony regarding the incentive impacts of a ratemaking method for natural gas pipelines.
- Prepared testimony evaluating natural gas procurement incentive mechanisms.
- Analyzed the need for and value of additional natural gas storage in the southwestern US.
- Evaluated market issues in the restructured Russian electric power market, including the need to introduce financial transmission rights, and policies for evaluating mergers.
- Affidavit on market conditions in western US natural gas markets and the potential for a new merchant gas storage facility to exercise market power.
- Testimony on the advantages of a system of firm, tradable natural gas transmission and storage rights, and the performance of a market structure based on such policies.
- Testimony on the potential benefits of new independent natural gas storage and policies for providing transmission access to storage users.
- Testimony on the causes of California natural gas price increases during 2000-2001 and the possible exercise of market power to raise natural gas prices at the California border.
- Advised a major US utility with regard to the Federal Energy Regulatory Commission's proposed Standard Market Design and its potential impacts on the company.
- Reviewed and critiqued draft legislation and detailed market rules for reforming the Russian electricity industry, for a major investor in the sector.
- Analyzed the causes of high prices in California wholesale electric markets during 2000 and developed recommendations, including alternatives for price mitigation. Testimony on price mitigation measures.
- Summarized and critiqued wholesale and retail restructuring and competition policies for electric power and natural gas in select US states, for a Pacific Rim government contemplating energy reforms.
- Presented testimony regarding divestiture of hydroelectric generation assets, potential market power issues, and mitigation approaches to the California Public Utilities Commission.
- Reviewed the reasonableness of an electric utility's wholesale power purchases and sales in a restructured power market during a period of high prices.
- Presented an expert report on failure to perform and liquidated damages in a natural gas contract dispute.
- Presented a workshop on Market Monitoring to a group of electric utilities in the process of forming an RTO.
- Authored a report on the screening approaches used by market monitors for assessing exercise of market power, material impacts of conduct, and workable competition.
- Developed recommendations for mitigating locational market power, as part of a package of congestion management reforms.
- Provided analysis in support of a transmission owner involved in a contract dispute with generators providing services related to local grid reliability.
- Authored a report on the role of regional transmission organizations in market monitoring.
- Prepared market power analyses in support of electric generators' applications to FERC for market-based rates for energy and ancillary services.
- Analyzed western electricity markets and the potential market power of a large producer under various asset acquisition or divestiture strategies.
- Testified before a state commission regarding the potential benefits of retail electric competition and issues that must be addressed to implement it.

- Prepared a market power analysis in support of an acquisition of generating capacity in the New England market.
- Advised a California utility regarding reform strategies for the California natural gas industry, addressing market power issues and policy options for providing system balancing services.

ICF RESOURCES, INC., Fairfax, VA, 1997–1998.
Project Manager

- Reviewed, critiqued and submitted testimony on a New Jersey electric utility's restructuring proposal, as part of a management audit for the state regulatory commission.
- Assisted a group of US utilities in developing a proposal to form a regional Independent System Operator (ISO).
- Researched and reported on the emergence of Independent System Operators and their role in reliability, for the Department of Energy.
- Provided analytical support to the Secretary of Energy's Task Force on Electric System Reliability on various topics, including ISOs. Wrote white papers on the potential role of markets in ensuring reliability.
- Recommended near-term strategies for addressing the potential stranded costs of non-utility generator contracts for an eastern utility; analyzed and evaluated the potential benefits of various contract modifications, including buyout and buydown options; designed a reverse auction approach to stimulating competition in the renegotiation process.
- Designed an auction process for divestiture of a Northeastern electric utility's generation assets and entitlements (power purchase agreements).
- Participated in several projects involving analysis of regional power markets and valuation of existing or proposed generation assets.

IRIS MARKET ENVIRONMENT PROJECT, 1994–1996.
Project Director, Moscow, Russia

Established and led a policy analysis group advising the Russian Federal Energy Commission and Ministry of Economy on economic policies for the electric power, natural gas, oil pipeline, telecommunications, and rail transport industries (*the Program on Natural Monopolies,* a project of the IRIS Center of the University of Maryland Department of Economics, funded by USAID):

- Advised on industry reforms and the establishment of federal regulatory institutions.
- Advised the Russian Federal Energy Commission on electricity restructuring, development of a competitive wholesale market for electric power, tariff improvements, and other issues of electric power and natural gas industry reform.
- Developed policy conditions for the IMF's $10 billion Extended Funding Facility.
- Performed industry diagnostic analyses with detailed policy recommendations for electric power (1994), natural gas, rail transport and telecommunications (1995), oil transport (1996).

Independent Consultant stationed in Moscow, Russia, 1991–1996

Projects for the WORLD BANK, 1992-1996:

- Bank Strategy for the Russian Electricity Sector. Developed a policy paper outlining current industry problems and necessary policies, and recommending World Bank strategy.
- Russian Electric Power Industry Restructuring. Participated in work to develop recommendations to the Russian Government on electric power industry restructuring.
- Russian Electric Power Sector Update. Led project to review developments in sector restructuring, regulation, demand, supply, tariffs, and investment.
- Russian Coal Industry Restructuring. Analyzed Russian and export coal markets and developed forecasts of future demand for Russian coal.
- World Bank/IEA Electricity Options Study for the G-7. Analyzed mid- and long-term electric power demand and efficiency prospects and developed forecasts.

- Russian Energy Pricing and Taxation. Developed recommendations for liberalizing energy markets, eliminating subsidies and restructuring tariffs for all energy resources.

Other consulting assignments in Russia, 1991–1994:

- Advised on projects pertaining to Russian energy policy and the transition to a market economy in the energy industries, for the Institute for Energy Research of the Russian Academy of Sciences.
- Presented seminars on the structure, economics, planning, and regulation of the energy and electric power industries in the US, for various Russian clients.

DECISION FOCUS INC., Mountain View, CA, 1983–1992
Senior Associate, 1985-1992.

- For the Electric Power Research Institute, led projects to develop decision-analytic methodologies and models for evaluating long term fuel and electric power contracting and procurement strategies. Applied the methodologies and models in numerous case studies, and presented several workshops and training sessions on the approaches.
- Analyzed long-term and short-term natural gas supply decisions for a large California gas distribution company following gas industry unbundling and restructuring.
- Analyzed long term coal and rail alternatives for a midwest electric utility.
- Evaluated bulk power purchase alternatives and strategies for a New Jersey electric utility.
- Performed a financial and economic analysis of a proposed hydroelectric project.
- For a natural gas pipeline company serving the Northeastern US, forecasted long-term natural gas supply and transportation volumes. Developed a forecasting system for staff use.
- Analyzed potential benefits of diversification of suppliers for a natural gas pipeline company.
- Evaluated uranium contracting strategies for an electric utility.
- Analyzed telecommunications services markets under deregulation, developed and implemented a pricing strategy model. Evaluated potential responses of residential and business customers to changes in the client's and competitors' telecommunications services and prices.
- Analyzed coal contract terms and supplier diversification strategies for an eastern electric utility.
- Analyzed oil and natural gas contracting strategies for an electric utility.

TESTIMONY AND AFFIDAVITS

In the Matter of the Application of Ohio Edison Company, the Cleveland Electric Illuminating Company, and the Toledo Edison Company for Authority to Establish a Standard Service Offer Pursuant to R.C. 4928.143 in the Form of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 23-301-EL-SSO, Direct Testimony on behalf of the Office of the Ohio Consumers’ Counsel, October 23, 2023.

In the Matter of the Application of Pacific Gas and Electric Company for Adoption of Electric Revenue Requirements and Rates Associated with its 2024 Energy Resource Recovery Account, California Public Utilities Commission Application 23-05-012, Direct Testimony on behalf of Small Business Utility Advocates, September 6, 2023.

Virginia Electric and Power Company’s 2023 Integrated Resource Plan filing, Virginia State Corporation Commission Case No. PUR-2023-00066, Direct Testimony on behalf of Appalachian Voices, August 8, 2023; testimony at hearings, September 19, 2023.

In the Matter of the Application of Ohio Power Company for Authority to Establish a Standard Service Offer in the Form of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 23-23-EL-SSO, Direct Testimony on Behalf of the Office of the Ohio Consumers’ Counsel, June 9, 2023; Testimony Recommending Modification of the Stipulation, September 20, 2023; testimony at hearings, October 11, 2023.

Essential Power OPP, LLC, et al. v. PJM Interconnection, L.L.C, FERC Docket No. EL23-53 (Winter Storm Elliott complaint cases), Affidavit in Support of the Comments of Sierra Club, May 26, 2023.

PJM Interconnection, L.L.C., FERC Docket No. ER23-1609 (RPM auction delay), Affidavit in Support of the Comments of Sierra Club, May 2, 2023.

In the Matter of the Application of The Dayton Power and Light Company d/b/a AES Ohio for Approval of Its Electric Security Plan, Public Utilities Commission of Ohio Case No. 22-900-EL-SSO, Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, April 21, 2023; deposition, April 26, 2023; testimony at hearings May 3, 2023.

PJM Interconnection, L.L.C., FERC Docket No. ER22-2984 (RPM Quadrennial Review), Affidavit in Support of the Comments of the Public Interest Entities, October 21, 2022; Reply Affidavit in Support of the Reply Comments of the Public Interest Entities, November 4, 2022.

In the Matter of the Application of Pacific Gas and Electric Company for Adoption of Electric Revenue Requirements and Rates Associated with its 2023 Energy Resource Recovery Account, California Public Utilities Commission Application 22-05-029, Direct Testimony on behalf of Small Business Utility Advocates, September 7, 2022.

In the Matter of the Application of DTE Electric Company for Approval to Implement a Power Supply Cost Recovery Plan for the 12 months ending December 31, 2022, Michigan Public Service Commission Case No. U-21050, Direct Testimony on behalf of Michigan Environmental Council, August 3, 2022.

In Re: Washington Utilities and Transportation Commission v. Avista Corporation d/b/a Avista Utilities; In the Matter of the Electric Service Reliability Reporting Plan of Avista Corporation d/b/a Avista Utilities; Dockets UE-220053, UG-220054, and UE-210854 (Consolidated), Joint Testimony in Support of the Full Multiparty Settlement on behalf of Small Business Utility Advocates, July 8, 2022; Supplemental Joint Testimony in Support of the Colstrip Tracker and Schedule 99, July 29, 2022; Testimony at hearings September 21, 2022.

In Re: Georgia Power Company's 2022 Integrated Resource Plan and 2022 Application for the Certification, Decertification, and Amended Demand- Side Management Plan; Georgia Public Service Commission Docket Nos. 44160 and 44161; Direct Testimony on behalf of Georgia Interfaith Power & Light and the Partnership For Southern Equity, May 6, 2022; testimony at hearings May 26, 2022.

Clean Air Council et al. v. Pennsylvania Department of Environmental Protection, Environmental Hearing Board Docket No. 2021-055, *Review and Evaluation of the Need for and Alternatives to the Proposed Renovo Energy Center Power Plant*, report prepared on behalf of Clean Air Council, Citizens for Pennsylvania's Future, and the Center for Biological Diversity, filed March 30, 2022; additional affidavit, June 29, 2022.

Appalachian Power Company and Wheeling Power Company, Petition for Commission Consent and Approval to Enter into Ownership and Operating Agreements for the Mitchell Plant, Public Service Commission of West Virginia Case No. 21-0810-E-PC, Direct Testimony on Behalf of West Virginia Citizen Action Group, Solar United Neighbors, and Energy Efficient West Virginia, March 28, 2022.

In the matter of the Application of DTE Electric Company for Reconciliation of its Power Supply Cost Recovery Plan for the 12-month Period Ending December 31, 2020, Michigan Public Service Commission Case No. U-20528, Direct Testimony on behalf of Michigan Environmental Council, November 23, 2021.

In the Matter of the Application of San Diego Gas & Electric Company for Approval of its 2022 Electric Sales Forecast, California Public Utilities Commission Application 21-08-010, Direct Testimony on behalf of Small Business Utility Advocates, October 1, 2021.

In the Matter of the Nova Scotia Power Inc. 2021 Load Forecast Report, Nova Scotia Utility and Review Board Matter No. M10109, Evidence on behalf of the Nova Scotia Consumer Advocate, July 21, 2021.

In the Matter of the Application of DTE Electric Company for Approval to Implement a Power Supply Cost Recovery Plan for the 12 months ending December 31, 2021, Michigan Public Service Commission Case No. U-20826, Direct Testimony on behalf of Michigan Environmental Council, June 6, 2021; Surrebuttal Testimony September 8, 2021.

Independent Market Monitor for PJM v. PJM Interconnection, LLC, FERC Docket No. EL19-47-000, and Office of the People's Counsel for District of Columbia et al v. PJM Interconnection, LLC, FERC Docket No. Docket No. EL19-63-000, Affidavit in Support of the Reply Brief of the Joint Consumer Advocates, June 9, 2021.

In Re: Application for the issuance of a certificate of public convenience and necessity for the internal modifications at coal fired generating plants necessary to comply with federal environmental regulations, Appalachian Power Company and Wheeling Power Company, Public Service Commission of West Virginia Case No. 20-1040-E-CN, Direct Testimony on behalf of West Virginia Citizens Action Group, Solar United Neighbors, and Energy Efficient West Virginia, Direct Testimony May 6, 2021; Rebuttal Testimony May 20, 2021; testimony at hearings June 9, 2021; Supplemental Direct Testimony September 24, 2021; testimony at additional hearings September 24, 2021.

In the Matter of the 2020 Biennial Integrated Resource Plans and Related 2020 REPS Compliance Plans of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC, *Review and Evaluation of the 2020 Resource Adequacy Studies Relied Upon for the Duke Energy Carolinas and Duke Energy Progress 2020 Integrated Resource Plans,* Attachment 5 to the Partial Initial Comments of Southern Alliance for Clean Energy, Sierra Club, and Natural Resources Defense Council, North Carolina Utilities Commission Docket No. E-100 Sub 165, March 1, 2021.

In the Matter of South Carolina Energy Freedom Act (House Bill 3659) Proceeding Related to S.C. Code Ann. Section 58-37-40 and Integrated Resource Plans for Duke Energy Carolinas, LLC and Duke Energy Progress, LLC, South Carolina Public Service Commission Docket Nos. 2019-224-E and 2019-225-E, Direct Testimony on behalf of Natural Resources Defense Council, Southern Alliance for Clean Energy, Sierra Club, South Carolina Coastal Conservation League, and Upstate Forever, February 5, 2021; Surrebuttal Testimony April 15, 2021.

In the matter of the Application of DTE Electric Company for Reconciliation of its Power Supply Cost Recovery Plan for the 12-month Period Ending December 31, 2019, Michigan Public Service Commission Case No. U-20222, Direct Testimony on behalf of Michigan Environmental Council, October 27, 2020.

Virginia Electric and Power Company’s 2020 Integrated Resource Plan filing, Virginia State Corporation Commission Case No. PUR-2020-00035, Direct Testimony on behalf of Environmental Respondent, September 15, 2020; testimony at hearings, October 27, 2020.

PJM Interconnection, L.L.C., FERC Docket Nos. ER19-1486 and EL19-58-003, Affidavit in Support of the Public Interest and Customer Organizations’ Partial Protest of and Comments on PJM’s Compliance Filing Regarding Energy and Ancillary Service Offset, September 2, 2020.

In the Matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery Plan in its Rate Schedules for 2020 Metered Jurisdictional Sales of Electricity, Michigan Public Service Commission Case No. U-20527, Direct Testimony on behalf of Michigan Environmental Council, June 17, 2020.

ISO New England Inc., FERC Docket Nos. EL18-182, ER20-1567 (New England Energy Security), Prepared Testimony in Support of the Protest of the New England States Committee on Electricity, May 15, 2020.

Proceedings on Motion of the Commission to Consider Resource Adequacy Matters, New York Public Service Commission Case No. 19-E-0530, Reply Affidavit on behalf of Natural Resources Defense Council, Sustainable FERC Project, Sierra Club, New Yorkers for Clean Power, Environmental Advocates of New York, and Vote Solar, January 31, 2020.

In the Matter of the Application of DTE Electric Company for Reconciliation of its Power Supply Cost Recovery Plan for the 12-month Period Ending December 31, 2018, Michigan Public Service Commission Case No. U-20203, Direct Testimony on behalf of Michigan Environmental Council, January 17, 2020.

In Re: Joint Application of Longview Power II, LLC and Longview Renewable Power, LLC to Authorize the Construction and Operation of Two Wholesale Electric Generating Facilities and One High-Voltage Electric Transmission Line in Monongalia County, Public Service Commission of West Virginia Case No. 19-0890-E-CS-CN, Direct Testimony on behalf of Sierra Club, January 3, 2020; testimony at hearings January 30, 2019.

In Re: Alabama Power Company Petition for a Certificate of Convenience and Necessity, Alabama Public Service Commission Docket No. 32953, Direct Testimony on Behalf of Energy Alabama and Gasp, December 4, 2019; testimony at hearings March 11, 2020; declaration (re COVID-19 impact) September 11, 2020.

In the Matter of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC Standard Offer, Avoided Cost Methodologies, and Form Contract Power Purchase Agreements, South Carolina Public Service Commission Docket Nos. 2019-185-E and 2019-186-E, Direct Testimony on behalf of the South Carolina Coastal Conservation League and Southern Alliance for Clean Energy, September 11, 2019; surrebuttal testimony, October 11, 2019; direct and surrebuttal testimony at hearings, October 22, 2019.

In the Matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery Plan in its Rate Schedules for 2019 Metered Jurisdictional Sales of Electricity, Michigan Public Service Commission Case No. U-20221, Direct Testimony on behalf of Michigan Environmental Council, May 28, 2019.

PJM Interconnection, L.L.C., FERC Docket Nos. EL19-58 and ER19-1486 (Reserve Pricing - ORDC), Affidavit in Support of the Protest of the Clean Energy Advocates, May 15, 2019.

PJM Interconnection, L.L.C., FERC Docket Nos. EL19-58 and ER19-1486 (Reserve Pricing - Transition), Affidavit in Support of the Protests of the PJM Load/Customer Coalition and Clean Energy Advocates, May 15, 2019.

In Re: Georgia Power Company's 2019 Integrated Resource Plan, Georgia Public Service Commission Docket No. 42310, Direct Testimony on Behalf of Georgia Interfaith Power & Light and the Partnership For Southern Equity, April 25, 2019; testimony at hearings May 14, 2019.

PJM Interconnection, L.L.C., FERC Docket No. EL19-63 (RPM Market Supplier Offer Cap), Affidavit in Support of the Complaint of the Joint Consumer Advocates, April 15, 2019.

In the Matter of 2018 Biennial Integrated Resource Plans and Related 2018 REPS Compliance Plans, North Carolina Utilities Commission Docket No. E-100 Sub 157, Review and Evaluation of the Load Forecasts, and Review and Evaluation of Resource Adequacy and Solar Capacity Value Issues, with regard to the Duke Energy Carolinas and Duke Energy Progress 2018 Integrated Resource Plans, Attachments 3 and 4 to the comments of Southern Alliance for Clean Energy, Sierra Club, and the Natural Resources Defense Council, March 7, 2019; presentation at technical conference, January 8, 2020.

In the Matter of Biennial Determination of Avoided Cost Rates for Electric Utility Purchases from Qualifying Facilities – 2018, North Carolina Utilities Commission Docket No. E-100 Sub 158, Review and Evaluation of Resource Adequacy and Solar Capacity Value Issues with regard to the Duke Energy Carolinas and Duke Energy Progress 2018 Integrated Resource Plans and Avoided Cost Filing, Attachment B to the Initial Comments of the Southern Alliance for Clean Energy, February 12, 2019.

PJM Interconnection, L.L.C., FERC Docket No. ER19-105 (RPM Quadrennial Review), Affidavit in Support of the Limited Protest and Comments of the Public Interest Entities, November 19, 2018.

PJM Interconnection, L.L.C., FERC Docket No. EL18-178 (MOPR and FRR Alternative), Affidavit in Support of the Comments of the FRR-RS Supporters, October 2, 2018; Reply Affidavit on behalf of Clean Energy and Consumer Advocates, November 6, 2018.

Virginia Electric and Power Company's 2018 Integrated Resource Plan filing, Virginia State Corporation Commission Case No. PUR-2018-00065, Direct Testimony on behalf of Environmental Respondents, August 10, 2018; testimony at hearings September 25, 2018; Supplemental Testimony, April 16, 2019.

In the Matter of the Application of Duke Energy Ohio for an Increase in Electric Distribution Rates, etc., Public Utilities Commission of Ohio Case No. 17-32-EL-AIR et al, Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, June 25, 2018; deposition, July 3, 2018; testimony at hearings, July 19, 2018.

In the Matter of the Application of DTE Gas Company for Approval of a Gas Cost Recovery Plan, 5-year Forecast and Monthly GCR Factor for the 12 Months ending March 31, 2019, Michigan Public Service Commission Case No. U-18412, Direct Testimony on behalf of Michigan Environmental Council, June 7, 2018.

Constellation Mystic Power, L.L.C., FERC Docket No. ER18-1639-000 (Mystic Cost of Service Agreement), Affidavit in Support of the Comments of New England States Committee on Electricity, June 6, 2018; prepared answering testimony, August 23, 1018.

New England Power Generators Association, Complainant v. ISO New England Inc. Respondent, FERC Docket No. EL18-154-000 (re: capacity offer price of Mystic power plant), Affidavit in Support of the Protest of New England States Committee on Electricity, June 6, 2018.

PJM Interconnection, L.L.C., FERC Docket No. ER18-1314 (Capacity repricing or MOPR-Ex), Affidavit in Support of the Protests of DC-MD-NJ Consumer Coalition, Joint Consumer Advocates, and Clean Energy Advocates, May 7, 2018; reply affidavit, June 15, 2018.

In the Matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery Plan in its Rate Schedules for 2018 Metered Jurisdictional Sales of Electricity, Michigan Public Service Commission Case No. U-18403, Direct Testimony on behalf of Michigan Environmental Council and Sierra Club, April 20, 2018.

Virginia Electric and Power Company's 2017 Integrated Resource Plan filing, Virginia State Corporation Commission Case No. PUR-2017-00051, Direct Testimony on behalf of Environmental Respondents, August 11, 2017; testimony at hearings September 26, 2017.

Ohio House of Representatives Public Utilities Committee hearing on House Bill 178 (Zero Emission Nuclear Resource legislation), Opponent Testimony on Behalf of Natural Resources Defense Council, May 15, 2017.

In the Matter of the Application of Atlantic Coast Pipeline, Federal Energy Regulatory Commission Docket No. CP15-554, Evaluating Market Need for the Atlantic Coast Pipeline, Attachment 2 to the comments of Shenandoah Valley Network *et a*l, April 6, 2017.

In the Matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery Plan in its Rate Schedules for 2017 Metered Jurisdictional Sales of Electricity, Michigan Public Service Commission Case No. U-18143, Direct Testimony on behalf of Michigan Environmental Council and Sierra Club, March 22, 2017.

In the Matter of the Petition of Washington Gas Light Company for Approval of Revised Tariff Provisions to Facilitate Access to Natural Gas in the Company's Maryland Franchise Area That Are Currently Without Natural Gas Service, Maryland Public Service Commission Case No. 9433, Direct Testimony on Behalf of the Mid-Atlantic Propane Gas Association and the Mid-Atlantic Petroleum Distributors Association, Inc., March 1, 2017; testimony at hearings, May 1, 2017.

In the Matter of Integrated Resource Plans and Related 2016 REPS Compliance Plans, North Carolina Utilities Commission Docket No. E-100 Sub 147, Review and Evaluation of the Peak Load Forecasts and Reserve Margin Determinations for the Duke Energy Carolinas and Duke Energy Progress 2016 Integrated Resource Plans, Attachments A and B to the comments of the Natural Resources Defense Council, Southern Alliance for Clean Energy, and the Sierra Club, February 17, 2017.

In the Matter of the Tariff Revisions Designated TA285-4 filed by ENSTAR Natural Gas Company, a Division of SEMCO Energy, Inc., Regulatory Commission of Alaska Case No. U-16-066, Testimony on Behalf of Matanuska Electric Association, Inc., February 7, 2017, testimony at hearings, June 21, 2017.

PJM Interconnection, L.L.C., FERC Docket No. ER17-367 (seasonal capacity), Prepared Testimony on Behalf of Advanced Energy Management Alliance, Environmental Law & Policy Center, Natural Resources Defense Council, Rockland Electric Company and Sierra Club, December 8, 2016; Declaration in support of Protest of Response to Deficiency Letter, February 13, 2017.

Natural Resources Defense Council, Sierra Club, and Union of Concerned Scientists v. Federal Energy Regulatory Commission, U.S. District Court of Appeals for the D.C. Circuit Case No. 16-1236 (Capacity Performance), Declaration, September 23, 2016.

Mountaineer Gas Company Infrastructure Replacement and Expansion Program Filing for 2016, West Virginia Public Service Commission Case No. 15-1256-G-390P, and Mountaineer Gas Company Infrastructure Replacement and Expansion Program Filing for 2017, West Virginia Public Service Commission Case No. 16-0922-G-390P, Direct Testimony on behalf of the West Virginia Propane Gas Association, September 9, 2016.

Application of Chesapeake Utilities Corporation for a General Increase in its Natural Gas Rates and for Approval of Certain Other Changes to its Natural Gas Tariff, Delaware P.S.C. Docket No. 15-1734, Direct Testimony on behalf of the Delaware Association Of Alternative Energy Providers, Inc., August 24, 2016.

Virginia Electric and Power Company's 2016 Integrated Resource Plan filing, Virginia State Corporation Commission Case No. PUE-2016-00049, Direct Testimony on behalf of Environmental Respondents, August 17, 2016; testimony at hearings October 5, 2016.

In the Matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery Plan in its Rate Schedules for 2016 Metered Jurisdictional Sales of Electricity, Michigan Public Service Commission Case No. U-17920, Direct Testimony on behalf of Michigan Environmental Council and Sierra Club, March 14, 2016.

In the Matter of the Application Seeking Approval of Ohio Power Company's Proposal to Enter into an Affiliate Power Purchase Agreement for Inclusion in the Power Purchase Agreement Rider, Public Utilities Commission of Ohio Case No. 14-1693-EL-RDR: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, September 11, 2015; deposition, September 30, 2015; supplemental deposition, October 16, 2015; testimony at hearings, October 21, 2015; supplemental testimony December 28, 2015; second supplemental deposition, December 30, 2015; testimony at hearings January 8, 2016.

Indicated Market Participants v. PJM Interconnection, L.L.C., FERC Docket No. EL15-88 (Capacity Performance transition auctions), Affidavit on behalf of the Joint Consumer Representatives and Interested State Commissions, August 17, 2015.

ISO New England Inc. and New England Power Pool Participants Committee, FERC Docket No. ER15-2208 (Winter Reliability Program), Testimony on Behalf of the New England States Committee on Electricity, August 5, 2015.

Joint Consumer Representatives v. PJM Interconnection, L.L.C., FERC Docket No. EL15-83 (load forecast for capacity auctions), Affidavit in Support of the Motion to Intervene and Comments of the Public Power Association of New Jersey, July 20, 2015.

In the Matter of the Tariff Revisions Filed by ENSTAR Natural Gas Company, a Division of SEMCO Energy, Inc., Regulatory Commission of Alaska Case No. U-14-111, Testimony on Behalf of Matanuska Electric Association, Inc., May 13, 2015.

In the Matter of the Application of Ohio Edison Company et al for Authority to Provide for a Standard Service Offer Pursuant to R.C. 4928.143 in the Form of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 14-1297-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel and Northeast Ohio Public Energy Council, December 22, 2014; deposition, February 10, 2015; supplemental testimony May 11, 2015; second deposition May 26, 2015; testimony at hearings, October 2, 2015; second supplemental testimony December 30, 2015; third deposition January 8, 2016; testimony at hearings January 19, 2016; rehearing direct testimony June 22, 2016; fourth deposition July 5, 2016; testimony at hearings July 14, 2016.

PJM Interconnection, L.L.C., FERC Docket No. ER14-2940 (RPM Triennial Review), Affidavit in Support of the Protest of the PJM Load Group, October 16, 2014.

In the Matter of the Application of Duke Energy Ohio for Authority to Establish a Standard Service Offer in the Form of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 14-841-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, September 26, 2014; deposition, October 6, 2014; testimony at hearings, November 5, 2014.

In the Matter of the Application of Ohio Power Company for Authority to Establish a Standard Service Offer in the Form of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 13-2385-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, May 6, 2014; deposition, May 29, 2014; testimony at hearings, June 16, 2014.

PJM Interconnection, L.L.C., FERC Docket No. ER14-504 (clearing of Demand Response in RPM), Affidavit in Support of the Protest of the Joint Consumer Advocates and Public Interest Organizations, December 20, 2013.

New England Power Generators Association, Inc. v. ISO New England Inc., FERC Docket No. EL14-7 (administrative capacity pricing), Testimony in Support of the Protest of the New England States Committee on Electricity, November 27, 2013.

Midwest Independent Transmission System Operator, Inc., FERC Docket No. ER11-4081 (minimum offer price rule), Affidavit In Support of Brief of the Midwest TDUs, October 11, 2013.

ANR Storage Company, FERC Docket No. RP12-479 (storage market-based rates), Prepared Answering Testimony on behalf of the Joint Intervenor Group, April 2, 2013; Prepared Cross-answering Testimony, May 15, 2013; testimony at hearings, September 4, 2013.

In the Matter of the Application of The Dayton Power and Light Company for Approval of its Market Rate Offer, Public Utilities Commission of Ohio Case No. 12-426-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, March 5, 2013; deposition, March 11, 2013.

PJM Interconnection, L.L.C., FERC Docket No. ER13-535 (minimum offer price rule), Affidavit in Support of the Protest and Comments of the Joint Consumer Advocates, December 28, 2012.

In the Matter of the Application of Ohio Edison Company, et al for Authority to Provide for a Standard Service Offer in the Form of an Electric Security Plan, Public Utilities Commission of Ohio Case No. 12-1230-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, May 21, 2012; deposition, May 30, 2012; testimony at hearings, June 5, 2012.

PJM Interconnection, L.L.C., FERC Docket No. ER12-513 (changes to RPM), Affidavit in Support of Protest of the Joint Consumer Advocates and Demand Response Supporters, December 22, 2011.

People of the State of Illinois *ex rel*. Leon A. Greenblatt, III v Commonwealth Edison Company, Circuit Court of Cook County, Illinois, deposition, September 22, 2011; interrogatory, Feb. 22, 2011.

In the Matter of the Application of Union Electric Company for Authority to Continue the Transfer of Functional Control of Its Transmission System to the Midwest Independent Transmission System Operator, Inc., Missouri PSC Case No. EO-2011-0128, Testimony in hearings, February 9, 2012; Rebuttal Testimony and Response to Commission Questions On Behalf Of The Missouri Joint Municipal Electric Utility Commission, September 14, 2011.

PJM Interconnection, L.L.C., and PJM Power Providers Group v. PJM Interconnection, L.L.C., FERC Docket Nos. ER11-2875 and EL11-20 (minimum offer price rule), Affidavit in Support of Protest of New Jersey Division of Rate Counsel, March 4, 2011, and Affidavit in Support of Request for Rehearing and for Expedited Consideration of New Jersey Division of Rate Counsel, May 12, 2011.

PJM Interconnection, L.L.C., FERC Docket No. ER11-2288 (demand response "saturation"), Affidavit in Support of Protest and Comments of the Joint Consumer Advocates, December 23, 2010.

North American Electric Reliability Corporation, FERC Docket No. RM10-10, Comments on Proposed Reliability Standard BAL-502-RFC-02: Planning Resource Adequacy Analysis, Assessment and Documentation, December 23, 2010.

In the Matter of the Reliability Pricing Model and the 2013/2014 Delivery Year Base Residual Auction Results, Maryland Public Service Commission Administrative Docket PC 22, Comments and Responses to Questions On Behalf of Southern Maryland Electric Cooperative, October 15, 2010.

PJM Interconnection, L.L.C., FERC Docket No. ER09-1063-004 (PJM compliance filing on pricing during operating reserve shortages): Affidavit In Support of Comments and Protest of the Pennsylvania Public Utility Commission, July 30, 2010.

ISO New England, Inc. and New England Power Pool, FERC Docket No. ER10-787 (minimum offer price rules): Direct Testimony On Behalf Of The Connecticut Department of Public Utility Control, March 30, 2010; Direct Testimony in Support of First Brief of the Joint Filing Supporters, July 1, 2010; Supplemental Testimony in Support of Second Brief of the Joint Filing Supporters, September 1, 2010.

PJM Interconnection, L.L.C., FERC Docket No. ER09-412-006 (RPM incremental auctions): Affidavit In Support of Protest of Indicated Consumer Interests, January 19, 2010.

In the Matter of the Application of Ohio Edison Company, et al for Approval of a Market Rate Offer to Conduct a Competitive Bidding Process for Standard Service Offer Electric Generation Supply, Public Utilities Commission of Ohio Case No. 09-906-EL-SSO: Direct Testimony on Behalf of the Office of the Ohio Consumers' Counsel, December 7, 2009; deposition, December 10, 2009, testimony at hearings, December 22, 2009.

Application of PATH Allegheny Virginia Transmission Corporation for Certificates of Public Convenience and Necessity to Construct Facilities: 765 kV Transmission Line through Loudon, Frederick and Clarke

Counties, Virginia State Corporation Commission Case No. PUE-2009-00043: Direct Testimony on Behalf of Commission Staff, December 8, 2009.

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