

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

PJM Interconnection, L.L.C.

)

Docket No. ER26-3515-000

PROTEST OF THE ELECTRIC POWER SUPPLY ASSOCIATION

Pursuant to Rule 211 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission (“FERC” or the “Commission”),¹ the Electric Power Supply Association (“EPSA”)² submits this protest to the August 13, 2026, filing by PJM Interconnection, L.L.C. (“PJM”) proposing to establish Interim Resource Adequacy Service (“IRAS”).³ EPSA’s members stand ready to supply the power necessary to meet surging demand in PJM and to support the development of data centers in the region. Regrettably, however, PJM’s IRAS proposal⁴ will hinder, rather than advance, those goals and undermine reliability and competition in the PJM footprint. While the IRAS proposal suffers from numerous legal defects, any number of which would, on

¹ 18 C.F.R. § 385.211 (2025).

² EPSA is the national trade association representing competitive power suppliers in the U.S. EPSA members provide reliable and competitively priced electricity from environmentally responsible facilities using a diverse mix of fuels and technologies. EPSA seeks to bring the benefits of competition to all power customers. This filing represents the position of EPSA as an organization, but not necessarily the views of any particular member with respect to any issue. EPSA has separately moved to intervene in this proceeding. See (doc-less) Motion to Intervene of the Electric Power Supply Association, Docket No. ER26-3515-000 (filed Aug. 14, 2026).

³ Proposal of PJM Interconnection, L.L.C. to Establish Interim Resource Adequacy Service and a Large Load Registry to Address System Reliability, Docket No. ER26-3515-000 (filed Aug. 13, 2026) (the “August 13 Filing”). Capitalized terms not defined herein have the meaning set forth in the August 13 Filing or, if not therein defined, the Reliability Assurance Agreement Among Load Serving Entities (the “RAA”) and the PJM Open Access Transmission Tariff (the “Tariff”), as applicable.

⁴ The August 13 Filing also proposes to establish a Large Load Registry. EPSA does not object to this aspect of the August 13 Filing.

their own, compel rejection of that proposal, EPSA is particularly concerned about the blatantly discriminatory element of the IRAS proposal that would only allow new capacity resources (referred to as “Bring Your Own New Capacity” or “BYONC”) to be used to serve New Large Loads without interruption. This aspect of PJM’s proposal is not only legally defective but also represents the type of market design choice that undermines confidence in PJM and the durability of its market structures, precisely at a time when PJM needs to be rebuilding investor confidence for the long-term benefit of consumers.

Fortunately, there are alternatives, including one described below, to the flawed approach put forth by PJM that would address the policy concerns underlying the IRAS proposal. And importantly, the alternative approach described below avoids the serious harm to the Reliability Pricing Model (“RPM”) construct and the undermining of its ability to ensure reliability and the illegal discrimination against existing resources that would result from the IRAS proposal.

I. PROTEST

As detailed herein and in the affidavit of Paul M. Sotkiewicz, Ph.D., provided as Attachment A hereto (the “Sotkiewicz Affidavit”), the IRAS proposal set forth in the August 13 Filing is unduly discriminatory and preferential and otherwise unlawful and must therefore be rejected in its entirety.

A. PJM’s BYONC Requirement for New Large Loads is Unduly Preferential and Discriminatory, and Otherwise Unlawful under Section 205 of the FPA

The IRAS proposal and, in particular, the BYONC requirement, would, by design, drive a wedge between new and existing load, and between new and existing capacity

resources in the RPM market. Under PJM’s IRAS proposal, a New Large Load will be “eligible to provide IRAS as [an] Eligible New Large Load,” unless it has obtained BYONC sufficient to meet its capacity needs.⁵ While PJM attempts to soft pedal the nature of its proposal by describing these new loads as “eligible” to provide the new “service” (IRAS), Eligible New Large Loads will, in fact, be required to provide IRAS, and the “service” they will be providing is to be put at the front of the line for curtailment.⁶ The only way a New Large Load can avoid becoming “eligible” is to contract for sufficient *new* capacity (*i.e.*, BYONC) in advance.⁷ On its face, this restriction unduly discriminates against existing resources and New Large Loads and grants an undue preference to new resources and loads other than New Large Loads, in direct contravention of the FPA.⁸ Equally importantly, and as explained by Dr.

⁵ August 13 Filing, Transmittal Letter at 36.

⁶ See *id.*, Proposed Tariff, Attachment DD-4, § IV(a) (“All Eligible New Large Loads shall be available to be requested to provide Interim Resource Adequacy Service by [PJM].”).

⁷ This requirement suggests that PJM is seeking to dictate the terms of retail sales that are the exclusive provenance of the states under the FPA. See 16 U.S.C. § 824(b); *FERC v. Electric Power Supply Ass’n*, 577 U.S. 260, 279-80 (2016) (stating that the FPA “reserv[es] regulatory authority over retail sales (as well as intrastate wholesale sales) to the States,” such that “FERC cannot take an action transgressing that limit no matter how direct, or dramatic, its impact on wholesale rates,” and that any rule that “specifies terms of sale at retail . . . is a job for the States alone”). Critically, however, even assuming that the Commission has the authority to approve a new PJM “service” that seeks to dictate the purchasing practices of customers and curtailment priorities of load-serving entities (“LSEs”), the IRAS proposal is being implemented in a way that is unduly preferential to new generation and unduly discriminatory to existing generation as described herein.

⁸ See 16 U.S.C. § 824d(b) (2024); 16 U.S.C. § 824e(a) (2024). See also, *e.g.*, *FPC v. Conway Corp.*, 426 U.S. 271, 277 (1976) (“Section 205(b) forbids the maintenance of any ‘unreasonable difference in rates’ or service ‘with respect to any . . . sale subject to the jurisdiction of the Commission.’” (quoting 16 U.S.C. § 824d(b))); *Wisconsin Pub. Power, Inc. v. FERC*, 493 F.3d 239, 246 (D.C. Cir. 2007) (“Section 205 . . . prohibits undue discrimination in rates, charges, or terms of service.” (citation omitted)).

Sotkiewicz, the unlawful discrimination will not help achieve PJM's goals and will instead result in higher costs for all consumers and lower reliability over the long term.⁹

To begin, PJM's distinctions between New Large Loads and other loads are utterly arbitrary and highly discriminatory. PJM has articulated no valid reason why a new 49.9 MW load will not be subject to IRAS, while load that crosses the 50 MW threshold set by PJM must obtain new capacity. Nor has it explained why load that goes into service on May 31, 2027, should be treated differently from load that goes into service just one day later, on June 1, 2027, or why the load that enters service after June 1, 2027, should be considered "new" when it was presumably being developed for years. This arbitrary deadline is impossible to reconcile with PJM's statement that pre-existing commercial arrangements will not be impacted. In fact, the arbitrary nature of PJM's proposal is highlighted by its statement that "the relevant in-service date for a Large Load to qualify as New Large Load will fluctuate based on whether or not IRAS is needed"¹⁰ That is, new load coming into service in one year could be subject to IRAS, while load that comes into service a year later would not, even though any capacity shortfall or surplus in each of those years could be the result of system conditions as a whole, rather than being solely attributable to new load. PJM's proposal to single out loads arbitrarily defined as New Large Loads violates not only the prohibition against undue discrimination in Section 205(b) of the FPA¹¹ but also the

⁹ See Sotkiewicz Affidavit at ¶ 6.

¹⁰ August 13 Filing, Transmittal Letter at 39 (also stating that "IRAS applies in Delivery Years when the amount of Capacity Resources committed falls short of the PJM Region Reliability Requirement").

¹¹ 16 U.S.C. § 824d (2024).

requirements of Section 202(g)(3)(B) of the FPA.¹² The latter provision expressly provides that in the case of “any anticipated shortage of electric energy or capacity which would affect [a public] utility’s capability of serving its wholesale customers,”¹³ the public utility must accommodate such shortage in a manner that assures that “all persons served directly or indirectly by such public utility will be treated, without undue prejudice or disadvantage.”¹⁴

The unlawfully preferential and discriminatory treatment under the IRAS proposal is not limited to load but, because of the BYONC aspect of the IRAS proposal, extends to capacity resources. The RPM market is designed to procure one product: Unforced Capacity (“UCAP”). As PJM itself explains:

[A]t a basic level, BYONC is “megawatts of Unforced Capacity.” This is consistent with how Capacity Resources under PJM’s capacity market design are also MW and not the underlying physical resource that supports a Capacity Resource. RPM Auctions clear MW of UCAP; that is the traded product.¹⁵

Similarly, the Commission has described RPM as procuring “a single capacity product,”¹⁶ whereby there are “the same expectations for all Capacity Performance Resources without regard to technology type.”¹⁷ Indeed, RPM is premised on an understanding of

¹² 16 U.S.C. § 824a(g)(1) (2024).

¹³ 16 U.S.C. § 824a(g)(1) (2024).

¹⁴ 16 U.S.C. § 824a(g)(3) (2024).

¹⁵ August 13 Filing, Transmittal Letter at 51 (footnotes omitted).

¹⁶ *Old Dominion Elec. Coop. v. PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,149 at P 76 (2020) (“ODEC”). See also, e.g., *PJM Interconnection, L.L.C.*, 170 FERC ¶ 61,256 at P 25 (2020) (“The capacity offered in PJM Base Residual Auctions is the same product offered in PJM Incremental Auctions.”); *PJM Interconnection, L.L.C.*, 162 FERC ¶ 61,159 at P 4 (2018) (explaining that PJM had moved to “a single annual capacity product”).

¹⁷ *ODEC*, 171 FERC ¶ 61,149 at P 76. See also Sotkiewicz Affidavit at ¶¶ 19-26 (discussing role of UCAP in PJM’s RPM market).

capacity as a fungible product that can be provided by various different types of resources, regardless of their vintage.¹⁸ Accordingly, since its inception, the RPM market has been designed to “permit generation, demand response, and transmission a reasonable opportunity to compete in solving reliability concerns,”¹⁹ whereby each Base Residual Auction (“BRA”) was intentionally held sufficiently in advance to “allow new entry by resources to compete with existing capacity.”²⁰ The Commission has therefore rejected calls for rules that would favor existing resources over future resources, given that “the two resources are similarly situated in their ability to meet PJM’s resource adequacy needs during a given Delivery Year”²¹ and likewise rejected a PJM proposal that would have “grant[ed] more favorable treatment to resources the earlier they enter the capacity market.”²² The Commission also rejected a proposal that would have “provide[d] additional payments to new generators but not to existing generators,” finding that this would not “support our objective of achieving an efficient market overall” and would “not treat all capacity suppliers equally.”²³ Instead, the Commission made clear that “[i]n a competitive market, all suppliers will be paid the same price.”²⁴

¹⁸ See Sotkiewicz Affidavit at ¶ 20.

¹⁹ *PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079 at P 6, *reh’g denied*, 117 FERC ¶ 61,331 (2006) (“December 2006 Order”), *on reh’g*, 119 FERC ¶ 61,318, *reh’g denied*, 121 FERC ¶ 61,173 (2007).

²⁰ *Id.* at P 72.

²¹ *PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,056 at P 36 (2021).

²² *PJM Interconnection, L.L.C.*, 175 FERC ¶ 61,084 at P 108 (2021) (“April 2021 Order”).

²³ December 2006 Order, 117 FERC ¶ 61,331 at P 77.

²⁴ *Id.*

Nonetheless, PJM now proposes to exclude existing resources from satisfying the capacity needs of New Large Load.²⁵ Under PJM's proposal, even if a New Large Load has purchased sufficient **existing** capacity to meet its needs, PJM would treat the New Large Load as "eligible" (meaning: "required") to provide IRAS (meaning: first to be curtailed after non-firm transmission and before demand response). The effect of this requirement will be to force New Large Loads to purchase capacity only from new resources, such that "one set of resources will be effectively barred from selling capacity to New Large Loads while the other will have that opportunity, despite both providing the exact same service."²⁶ To make matters worse, because PJM proposes to exclude New Large Loads that do not have sufficient BYONC from its Variable Resource Requirement ("VRR") Curve, the VRR Curve will not reflect "the true supply-demand balance in the RPM market," which will "all other things equal, . . . result in differential pricing between Existing Capacity Resources and BYONC Resources."²⁷ As Dr. Sotkiewicz observes, there is no reliability justification for this exclusion.²⁸ This means that existing resources "will presumably face lower prices and will never get the benefit of price formation that will price in new entry in the market as it is needed."²⁹ Accordingly, the BYONC requirement can be expected to result in lower rates for

²⁵ See August 13 Filing, Transmittal Letter at 49-69. See also Sotkiewicz Affidavit at ¶ 48 ("Existing Capacity Resources are, *de facto*, precluded from contracting with New Large Load as PJM is mandating that New Large Load will not be excused from IRAS unless it contracts with BYONC alone.").

²⁶ Sotkiewicz Affidavit at ¶ 33.

²⁷ *Id.* at ¶ 32.

²⁸ See *id.* at ¶¶ 30-31.

²⁹ *Id.* at ¶ 80.

existing capacity, even though this type of “unjustifiable difference in rates for substantially similar service works an unlawful discrimination.”³⁰

Of course, because RPM only procures “a single capacity product,”³¹ existing resources are no less capable of meeting the capacity needs of New Large Loads than new resources. That is, PJM could easily have designed its IRAS proposal to require New Large Loads to “Bring Your Own Capacity,” rather than “Bring Your Own **New** Capacity.” PJM’s decision not to do so appears to stem from a misplaced belief that existing load has some preferential right to the capacity provided by existing resources, such that new load must be served with new capacity. But this makes no sense in the context of PJM’s RPM market, which only provides year-to-year compensation. Indeed, the notion that existing loads enjoy some sort of preferential right to capacity from existing resources is contrary to the fundamental economic principles underlying commodity markets³² and ignores the fact that RPM was designed to allow new and existing resources to compete for the benefit of consumers.³³ In fact, the undue preferential treatment of new resources and undue discrimination against existing

³⁰ *Towns of Alexandria, Minn. v. FPC*, 555 F.2d 1020, 1028 (D.C. Cir. 1977). *Cf. United States v. Illinois Cent. R. R. Co.*, 263 U.S. 515, 524 (1924) (“[R]ates may lie within the zone of reasonableness and yet result in undue prejudice.”); *Arkansas Elec. Energy Consumers v. FERC*, 290 F.3d 362, 365 (D.C. Cir. 2002) (finding that the Commission properly rejected calls for Gulf States to implement a “hold harmless” provision, finding that “it would unduly discriminate against Gulf States ‘because it requires Gulf States to contribute to the . . . energy pool on the same basis as [other entities], but it ranks Gulf States last in line of priority for taking energy from the [energy] pool.’” (citation omitted)).

³¹ *ODEC*, 171 FERC ¶ 61,149 at P 76.

³² See Sotkiewicz Affidavit at ¶¶ 62-72

³³ See, e.g., *PJM Interconnection, L.L.C.*, 138 FERC ¶ 61,062 at P 6 (2012) (report conducted by the Brattle Group found that “RPM has greatly facilitated competition among various types of capacity resources by attracting commitments from new generation and new demand response resources, retaining existing generation, and supporting the upgrade of existing plants at prices below the cost of new generation”).

resources can be expected to “lead to even greater churn and uncertainty in the PJM markets resulting in higher costs to electricity consumers overall.”³⁴

PJM nonetheless attempts to rationalize the BYONC requirement by claiming that:

[t]his aspect of the IRAS framework is consistent with the Ratepayer Protection Pledge introduced in March 2026 and recently expanded in July 2026, which recognizes that New Large Loads “will voluntarily negotiate new, separate rate structures with their utilities and relevant State governments wherever they build data centers.”³⁵

While the goals and requirements of the Ratepayer Protection Pledge are laudable, the Ratepayer Protection Pledge in no way justifies or necessitates PJM’s BYONC requirement. As an initial matter, by its terms, the Ratepayer Protection Pledge only commits the signatory companies to “voluntarily negotiate new, separate rate structures with their utilities and relevant State governments”³⁶ While the signatory companies are free to voluntarily negotiate purchases of capacity only from new resources in furtherance of this commitment, there is nothing in the pledge that even remotely suggests that PJM should be allowed to refuse firm service to signatories, much less to non-signatories, or that otherwise contemplates anything like the IRAS proposal. As PJM acknowledges, the signatory companies are only “[a] representative class of the[] New

³⁴ Sotkiewicz Affidavit at ¶ 9.

³⁵ August 13 Filing, Transmittal Letter at 7 (footnotes omitted) (quoting The White House, *Ratepayer Protection Pledge* (Mar. 4, 2026) (the “Ratepayer Protection Pledge”), <https://www.whitehouse.gov/releases/2026/03/ratepayer-protection-pledge/>). See also The White House, *President Trump’s Ratepayer Protection Pledge Secures American AI Dominance, Protects Consumers* (July 23, 2026), <https://www.whitehouse.gov/releases/2026/07/president-trumps-ratepayer-protection-pledge-secures-american-ai-dominance-protects-consumers/>.

³⁶ Ratepayer Protection Pledge.

Large Loads are signatories to the Ratepayer Protection Pledge,”³⁷ and even if this representative class could somehow be understood to have bound all New Large Loads (and they cannot be), the Ratepayer Protection Pledge provides no legal basis for fulfilling New Large Loads’ commitments at the expense of existing resources, as PJM’s IRAS proposal would do.³⁸

More fundamentally, the Ratepayer Protection Pledge does not and cannot rewrite the FPA or override the FPA’s prohibition against unduly discriminatory or preferential rates and rate classifications. Accordingly, even if the Ratepayer Protection Pledge could be reimagined as supporting PJM’s IRAS proposal, the Commission would still be statutorily bound to reject that proposal.

B. The Sotkiewicz Affidavit Identifies Other Unjust, Unreasonable, and Unduly Preferential and Discriminatory Aspects of the IRAS Proposal

As discussed above, the IRAS proposal clearly results in undue discrimination against existing resources and New Large Loads and undue preference in favor of new resources and existing loads and new loads other than New Large Loads. As Dr. Sotkiewicz explains in detail, however, the discrimination inherent in the IRAS proposal extends beyond the eligibility requirements and has numerous unjust, unreasonable and unduly discriminatory side effects.

First, the IRAS proposal grants BYONC resources unduly preferential treatment with respect to Effective Load Carrying Capability (“ELCC”) accreditation. Under PJM’s

³⁷ August 13 Filing, Transmittal Letter at 101. See also The White House, *Data centers pay their way. Ratepayers pay theirs*. <https://www.whitehouse.gov/ratepayer-protection-pledge/> (identifying signatories).

³⁸ See, e.g., August 13 Filing, Transmittal Letter at 23 (stating that IRAS allows PJM to “call[] for load reductions from those New Large Loads that do not adhere to the Ratepayer Protection Pledge”).

rules, capacity resources are only permitted to offer their Accredited UCAP into the RPM auctions, where such Accredited UCAP may vary from year to year based on each resource's performance as well as system conditions.³⁹ By contrast, the August 13 Filing proposes to shelter BYONC resources from ELCC variability and lets them lock-in the Accredited UCAP for the RPM Auction in which they first clear.⁴⁰ Similarly, New Large Load that has contracted with BYONC also benefits from this unduly preferential treatment, given that it is “insulated from ELCC volatility while other loads must face the market implications of that year-to-year volatility.”⁴¹ The Commission previously rejected a similar proposal that would have “discriminate[d] between resources in a class based on vintage”⁴² It is vital that the Commission likewise reject this vintaging proposal, because the proposed preferential treatment of BYONC will likely to result in its capacity contribution being overstated in RPM Auctions, which will “further erode[] the fidelity of the RPM BRA or IA price signal”⁴³ This will undermine RPM's ability to maintain reliability, because it will “mask[] potential resource adequacy shortfalls in the future and send[] price signals that no new entry is needed.”⁴⁴

Second, the IRAS proposal also unduly discriminates against BYONC resources through 10-year offer requirements, which reflect unsupported assumptions regarding

³⁹ See Sotkiewicz Affidavit at ¶ 39.

⁴⁰ See *id.* at ¶¶ 40-41.

⁴¹ *Id.* at ¶ 42.

⁴² April 2021 Order, 175 FERC ¶ 61,084 at P 108. See also *PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,056 at P 33 (2021) (rejecting arguments that ELCC should not be allowed to reduce a resource's Accredited UCAP below its interconnection rights and noting that PJM rejected just such a proposal to “place a floor on ELCC value for earlier vintages of resources”).

⁴³ Sotkiewicz Affidavit at ¶ 43.

⁴⁴ *Id.* at ¶ 45.

BYONC arrangements and bad market design. Specifically, PJM proposes that BYONC will be required to “participate, as a price taker (i.e., \$0/MW offer) in RPM Auctions for 10 consecutive Delivery Years,”⁴⁵ and cannot seek any exception to the capacity must-offer requirement during that period.⁴⁶ As Dr. Sotkiewicz explains, this requirement assumes that any contracts between the BYONC resource and New Large Load will be sufficient to completely cover the going forward costs of the BYONC.⁴⁷ Such an assumption is unsupported, and PJM fails to explain why BYONC should be subject to a price-taker obligation when other contracted resources are not. Moreover, while PJM proposes to lift these offer requirements if IRAS is not needed for three consecutive years, PJM fails to explain why there is no exemption if, for example, the underlying BYONC contract is no longer in effect (e.g., the New Large Load fails to materialize or breaches the contract).

Third, PJM also proposes not to apply IRAS to load within the service area of load-serving entities (“LSEs”) that use the Fixed Resource Requirement (“FRR”) alternative. That is, FRR Entities may “potentially use existing resources to meet New Large Loads while other LSEs can only use existing resources to serve existing loads.”⁴⁸ While the BYONC requirement is, as discussed in detail above, unduly preferential and discriminatory and must be rejected, it makes no sense for PJM to apply this requirement only in some areas and not others.

⁴⁵ August 13 Filing, Transmittal Letter at 55.

⁴⁶ See *id.* at 56.

⁴⁷ See Sotkiewicz Affidavit at ¶ 36.

⁴⁸ *Id.* at ¶ 28.

Finally, PJM proposes to compensate Eligible New Large Load for providing IRAS at a rate equal to 50 percent of the Non-Performance Charge Rate,⁴⁹ which would equate to a rate of \$1,565.24/MWh for the 2028/2029 Delivery Year, higher than the generally applicable \$1,000/MWh offer cap for energy.⁵⁰ As Dr. Sotkiewicz observes, “[n]o other loads on the PJM system that are curtailed, including those voluntarily doing so as Economic Demand Response or for peak load shaving purposes, are compensated in the same manner for energy reductions as Eligible New Large Loads, though the load reductions will have the same reliability benefit.”⁵¹

C. The IRAS Proposal Should be Rejected in Its Entirety

To be clear, EPSA understands and appreciates the need for PJM to make market changes to address the capacity shortfall and reliability concerns in its region. But the solution to these problems cannot be to violate the FPA and embed undue discrimination in PJM’s market rules. Even aside from being forbidden by the FPA, such discriminatory treatment simply slaps a band-aid on the problem while potentially making the underlying wound worse. Indeed, Dr. Sotkiewicz explains that the incentives created by IRAS may aggravate the problems that are already plaguing the region.⁵² As has been made clear by PJM’s experiences over the last few years, consumers are the ones that will be ultimately harmed if PJM fails to ensure that existing resources are treated fairly. FTI Consulting recently cautioned that, while “[d]iscriminatory capacity markets can in some circumstances result in short-run reductions in consumer

⁴⁹ See August 13 Filing, Transmittal Letter at 102.

⁵⁰ See Sotkiewicz Affidavit at ¶ 52.

⁵¹ *Id.* at ¶ 50.

⁵² See Sotkiewicz Affidavit at ¶¶ 73-84.

payments,” any consumer benefits evaporate over the longer term because, “as more existing capacity inefficiently exits as a result of the artificially low capacity price, and is replaced with high-cost new capacity, the short-run consumer savings will tend to turn into higher costs for future consumers.”⁵³ Moreover, costs “will be further increased by the changed expectations of investors in such a market, which will tend to raise the price at which investment in new capacity occurs and likely require more shifting of risks from investors to consumers.”⁵⁴

In the August 13 Filing, PJM states that it consents to the Commission modifying or severing any element of the proposed revisions to the RAA and the Tariff to the extent permitted under the FPA and *NRG Power Marketing, LLC v. FERC*,⁵⁵ and provided “such modification and/or severance is consistent with PJM’s overarching objectives in this filing.”⁵⁶ While elements of the August 13 Filing relating to the establishment of the Large Load Registry may be severable from the IRAS-related elements, the IRAS proposal is so fundamentally flawed as to be unsalvageable under *NRG-PML*, because the changes necessary to make the IRAS proposal lawful under Section 205 of the FPA⁵⁷ would require the Commission to “transform the proposal into an entirely new rate of [its] own making.”⁵⁸ Such a transformation of the IRAS proposal would violate FPA

⁵³ Scott Harvey, *et al.*, FTI Consulting, *Discriminatory capacity market pricing designs*, at 3 (New York ISO ICAP Working Group, May 22, 2025), <https://www.nyiso.com/documents/20142/51574954/2%20Workshop%20on%20Discriminatory%20Capacity%20Auction%20Design%20-%20052225%20icap.pdf/9d71f2ba-cd0c-08be-3851-5da9a26769a1>.

⁵⁴ *Id.* at 5.

⁵⁵ 862 F.3d 108 (D.C. Cir. 2017) (“*NRG-PML*”).

⁵⁶ August 13 Filing, Transmittal Letter at 9.

⁵⁷ 16 U.S.C. § 824d (2024).

⁵⁸ *NRG-PML*, 862 F.3d at 110.

Section 205, as interpreted in *NRG-PML*.⁵⁹ That being the case and given the fatal legal defects in the IRAS proposal described above, the Commission can, should and must, as a legal matter, reject the IRAS proposal in its entirety.

D. There Are Alternatives Available to PJM and the Commission that Would Preserve the Integrity of the RPM Construct While Protecting Existing Loads

While EPSA appreciates the policy concerns that PJM is attempting to address through the IRAS proposal, it is well-established that “policy interests . . . cannot override the statute.”⁶⁰ As discussed above, the IRAS proposal is inherently discriminatory and otherwise unlawful and must be rejected. Importantly, however, it does not follow that PJM, the Commission and state regulators are powerless to protect other loads from the resource adequacy issues presented by new large loads, as there are alternative approaches to address the concerns underlying the IRAS proposal. For example, PJM could require LSEs that are deficient capacity to designate load – either their own load or contracted demand response – that will be curtailed in the event PJM is in a load shed event. This requirement will achieve the same goals as the IRAS proposal: generation-deficient LSEs will have an incentive to contract for capacity, including new capacity, and load shed designations can be structured to protect

⁵⁹ See *id.* See also *City of Winnfield v. FERC*, 744 F.2d 871, 875-76 (D.C. Cir. 1984) (suggesting that a utility acquiescing to a Commission proposal that “involved the Commission’s own original notion of a new form of rate” could “remove[] the Commission from an essentially passive and reactive role envisioned by § 205 and place[] it in a more active role of the sort it occupies under § 206”).

⁶⁰ *National Fuel Gas Supply Corp.*, 167 FERC ¶ 61,007 at P 20 (2019). See also, e.g., *El Paso Elec. Co. v. FERC*, 76 F.4th 352, 361 (5th Cir. 2023) (stating that “statutory mandates . . . can [not] be sacrificed . . . for some separate policy interest”); *Southern Cal. Edison Co. v. FERC*, 195 F.3d 17, 18-19 (D.C. Cir. 1999) (stating that “[w]hile there is a certain appeal to FERC’s [position], neither FERC nor the court can ignore the plain terms of the statute”).

residential customers. And this alternative approach would position state regulators to protect other loads without the serious harms to the RPM construct and undermining of its ability to ensure reliability or the discrimination against existing resources that would result from the IRAS proposal as described above.

II. CONCLUSION

WHEREFORE, for the foregoing reasons, EPSA respectfully requests that the Commission reject the August 13 Filing.

Respectfully submitted,

ELECTRIC POWER SUPPLY ASSOCIATION

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On behalf of the
Electric Power Supply Association

Dated: September 3, 2026

CERTIFICATE OF SERVICE

I hereby certify that I have this day caused the foregoing document to be served upon each person designated on the official service list compiled by the Secretary of the Federal Energy Regulatory Commission in this proceeding.

Dated at Washington, D.C., this 3rd day of September 2026.

/s/ David G. Tewksbury

David G. Tewksbury

Attachment A
The Sotkiewicz Affidavit

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

PJM Interconnection, L.L.C.

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Docket No. ER26-3515-000

**AFFIDAVIT OF PAUL M. SOTKIEWICZ, PH.D.
ON BEHALF OF ELECTRIC POWER SUPPLY ASSOCIATION**

I. INTRODUCTION AND SUMMARY

1. My name is Dr. Paul M. Sotkiewicz. I am the President and Founder of E-Cubed Policy Associates, LLC (“E-Cubed”) and formerly served as the Chief Economist in the Market Service Division of PJM Interconnection, L.L.C. (“PJM”). I have been retained by the Electric Power Supply Association (“EPSA”) to submit this affidavit in support of its protest to PJM’s Interim Resource Adequacy Service (“IRAS”) proposal in Docket No. ER26-3515-000.¹
2. The IRAS Filing proposes to establish new criteria for the participation of New Large Loads,² associated new capacity that enters to serve New Large Loads called BYONC or

¹ *Proposal of PJM Interconnection, L.L.C. To Establish Interim Resource Adequacy Service and Large Load Registry to Address System Reliability* in Docket No. ER26-3515-000, August 13, 2026 (“IRAS Filing”)

² New Large Loads are defined as being greater than or equal to 50 MW and coming into service on or after June 1, 2027. Proposed PJM Tariff, Definitions L-M-N “New Large Load”, Proposed RAA, Definitions, “Large Load”, Transmittal Letter at 31-36.

“Bring Your Own New Capacity”³ in the PJM Reliability Pricing Model (“RPM”) market and for Fixed Resource Requirement (“FRR”) entities in the RPM construct and the PJM Reliability Assurance Agreement among Load Serving Entities in the PJM Region (“RAA”).⁴

3. PJM’s IRAS proposal, by design, creates an unjust, unreasonable and unduly discriminatory and preferential treatment of loads and Capacity Resources within PJM that heretofore did not exist within the PJM RPM rules and RAA. Currently, RPM and the RAA treats all capacity as a fungible commodity regardless of the source of supply and treats all Load Serving Entities (“LSE”) identically regardless of the size or type of load.
4. The IRAS proposal is replete with broad categories of undue discrimination and preferential treatment. These include:
 - a. Differential treatment of the supply of capacity based on its 1) In-service date, and 2) Contractual arrangements.
 - b. Differential treatment of loads and LSEs based upon the 1) Size of the individual loads, and 2) In-service dates of Large Loads.
5. Examples of this kind of unduly discriminatory treatment include:
 - a. The implicit restrictions on the LSEs and loads with whom Existing Capacity Resources can contract relative to Planned Capacity Resources;⁵
 - b. Differential capacity accreditation between BYONC resources and all other

³ BYONC is defined as new Accredited UCAP that enters service on or after June 1, 2027 and is specifically designated to serve New Large Loads. Proposed Tariff, Definitions, A-B and Proposed Tariff, Attachment DD-4, Section IV. Transmittal Letter at 49-53.

⁴ *PJM Reliability Assurance Agreement among Load Serving Entities in the PJM Region* (“RAA”).

⁵ See Proposed Tariff, Attachment DD-4, Section V which states the only way of IRAS is through contracting with BYONC and no other Capacity Resources.

resources;⁶

- c. Offer requirements into RPM Base Residual Auctions (“BRA”) or Incremental Auctions (“IA”) that differ between BYONC and Existing Capacity Resources;⁷
- d. Different treatment of loads by size, category, and in-service date for compensation for load reductions;⁸
- e. Inclusion or exclusion of loads from the Variable Resource Requirement⁹ (“VRR”) Curve in the RPM BRAs or IAs based on size and in-service date.

- 6. The kind of undue discrimination and preferential treatment proposed by PJM in IRAS will have deleterious effects on the efficiency and liquidity of trading of UCAP in PJM’s RPM capacity market¹⁰ leading to higher overall costs over time as well as eroding reliability and creating a cycle of “bust and boom” periods with capacity shortfalls and capacity surpluses if/when new loads do not materialize, and back to shortfalls when differentially treated Existing Capacity Resources in service prior to June 1, 2027 exit the market.
- 7. Further, PJM’s IRAS proposal (particularly in conjunction with the Reliability Backstop Procurement (“RBP”)) also raises serious concerns about the future viability of PJM’s

⁶ See Proposed Tariff, Attachment DD-4, Section VII (i)(i). See in contrast to the current RAA Schedule 9.2 Section D in conjunction with Schedule 4, Section C. To further examine the disparate treatment of BYONC versus other Capacity Resources see “Preliminary ELCC Class Ratings For Use in the Reliability Procurement Backstop (RBP)” available at <https://www.pjm.com/-/media/DotCom/committees-groups/cifp-rbp/postings/preliminary-elcc-class-ratings-for-period-dy28-dy42.pdf>.

⁷ See Proposed Tariff, Attachment DD-4, Section VIII (e). Examine this in contrast to current PJM Tariff, Attachment DD, Section 6.6 for Existing and Planned Generation Capacity Resources.

⁸ See Proposed Tariff, Attachment DD-4, Section X(a).

⁹ See Proposed Tariff, Definitions, E-F for “Excludable LDA New Large Load Amounts” and “Excludable RTO New Large Load Amounts” and Attachment DD, Sections 5.4(c), 5.10(a)(i), 5.10(a)(vi)(B), 5.11(a)(iii), 5.12(b)(ii)-(iii).

¹⁰ RPM capacity market refers to transactions for UCAP done bilaterally and through RPM BRAs and IAs.

wholesale markets in general. Markets are made possible due to the clear assignment and recognition of property rights as discussed by Nobel Laureate Ronald Coase.¹¹ Absent well-defined property rights, the ability to buy or sell commodities is hindered as there is no clear chain of ownership or possession that can be transferred at a price that is amenable to both sides of the transaction.

8. PJM IRAS Proposal implicitly expropriates and reallocates the property rights to capacity from Existing Capacity Resources to the existing loads in PJM and/or to future new loads that are not New Large Loads without the benefit of any kind of contractual arrangements through rules that are intended to give New Large Loads and their LSEs credit for BYONC only. Further, in its implementation of IRAS for New Large Loads without BYONC, there is the implicit assignment of property rights to energy to serve New Large Loads, as they would be paid 50% of the PAI Penalty rate for their load reduction.
9. For the above reasons, the Commission must reject PJM's IRAS Filing as it will not solve the immediate reliability or long-term problem and will lead to even greater churn and uncertainty in the PJM markets resulting in higher costs to electricity consumers overall. The better approach would be simply to allow markets to work and reflect the actual cost of capacity rather than attempting to control prices below the marginal cost of new capacity additions.¹²

¹¹ R. H. Coase, "The Problem of Social Cost," *Journal of Law and Economics*, Volume III, October 1960. Pages 1-44. Available at <https://www.law.uchicago.edu/sites/default/files/file/coase-problem.pdf>.

¹² See *Comments and Protest of E-Cubed Policy Associates, L.L.C. and Motion to File One Day Out of Time*, in Docket No. ER26-3380 ("RBP Docket"), August 22, 2026. ("E-Cubed Protest") This protest uses publicly available data to construct the possible Gross Cost of New Entry ("CONE") and Net CONE required for new entry in PJM under varying assumptions. See also *Limited Protest of NRG Companies*, in Docket No. ER26-3380 ("RBP Docket"), August 21, 2026. ("NRG Limited Protest"). NRG also provides evidence regarding the Gross CONE is assumed to be far too low as assumed by PJM.

10. Following the statement of my qualifications in Section II, the remainder of my affidavit is organized as follows. Section III provides a short overview of how fungible commodity markets operate and why the current PJM RPM capacity market reflects a fungible commodity known as Unforced Capacity (“UCAP”). Section IV discusses the unduly discriminatory aspects of PJM’s IRAS proposal.
11. Section V explains how the unduly discriminatory nature of IRAS splits the once fungible commodity into two different UCAP commodities that will all be priced differently and have different requirements and treatments despite providing identical services. Section VI discusses the implied property rights transfers that IRAS creates and how this ties back to the differential and unduly discriminatory and preferential treatment of different forms of UCAP.
12. Section VII outlines the near-term and longer-term market inefficiencies and reliability implications of PJM’s IRAS proposal and why this will not solve the near-term or long-term reliability problems PJM hopes to address. Section VIII concludes offering a path forward to allow markets to work and with a historical example of what has gone wrong through differential treatments of “old gas” and “new gas” which is comparable to what PJM has proposed with IRAS.

II. QUALIFICATIONS

13. Prior to founding E-Cubed, I worked as a contractor and directly for PJM in Audubon, Pennsylvania from February 2008 until October 2016. In my time at PJM, I first served as a Senior Economist until March 2010 and subsequently as the Chief Economist in the Market Service Division until June 2015. From July 2015 until October 2016, I worked as a contractor for PJM under the title of Senior Economic Policy Advisor. Prior to joining PJM, I served as the Director of Energy Studies at the Public Utility Research Center

(“PURC”), University of Florida from August 2000 until February 2008 and I was an Economist at FERC from September 1998 until August 2000. I have a B.A. in History and Economics from the University of Florida (1991), and an M.A. (1995) and Ph.D. (2003) in Economics from the University of Minnesota.

14. I have 30 years of experience in matters at the intersection of utility regulatory policy, power system economics, and environmental economics. In my current role, I advise private- and public-sector clients on a range of economic issues related to electricity market design and performance, power generation economics, utility regulatory policy, and the economic impacts of state and federal environmental policies. At PJM, I provided expert analysis, advice, and support for PJM initiatives related to market design changes in, and performance of, PJM’s energy, ancillary service, and capacity markets. As an economist at FERC, I worked on market design issues and filings related to the newly formed independent system operator/regional transmission organization (“RTO”) markets concentrating primarily on the New York Independent System Operator, Inc. and the California Independent System Operator Corporation markets.
15. More details on my experience and work history can be found in my CV and Bio attached as Attachment 1.

III. THE CURRENT RPM CAPACITY MARKET TRADES A FUNGIBLE COMMODITY IN THE SAME WAY OTHER COMMODITY MARKETS OPERATE

A. Commodity Markets Trade Fungible Commodities

16. A commodity is fungible when it can be replaced with an identical commodity, regardless of source of the original or replacement commodity.¹³

¹³ See <https://www.merriam-webster.com/dictionary/fungible>.

17. Commodity fungibility is a core requirement for markets to reach efficient outcomes as the fungibility of the commodity allows buyers and sellers to find suitable, creditworthy counterparties with whom to transact on a bilateral basis, and to understand what is being transacted in centralized auction frameworks.
18. Commodity fungibility gives a party who has sold a commodity the option to replace that commodity on a one-for-one basis should it fail to deliver on its original commitment, and the purchasing counterparty is assured that what it receives is what it paid for. In this sense, commodity fungibility helps provide liquidity, which is the ability to quickly buy or sell the underlying commodity, at going market prices without incurring significant transaction costs such as the cost for searching for the “appropriate counterparty” to meet a specific one-of-a-kind requirement.

B. UCAP as a Fungible Commodity

19. The RAA defines Accredited UCAP as
“the quantity of Unforced Capacity, as denominated in Effective UCAP, that an ELCC Resource is capable of providing in a given Delivery Year.”¹⁴
20. An ELCC Resource is any generation Capacity Resource, Demand Resource, or DER Capacity Aggregation Resource.¹⁵ That is, *Accredited UCAP is not dependent upon the generation technology, fuel type, size, or age (in-service date) but simply on what the ELCC Resource can provide.* This satisfies one part of what is needed for fungibility of UCAP.
21. Accredited UCAP is denominated in Effective UCAP terms according to the RAA and is

¹⁴ RAA, Article 1-Definitions.

¹⁵ *Id.*

defined as:

“a unit of measure that represents the capacity product transacted in the Reliability Pricing Model and included in FRR Capacity Plans. One megawatt of Effective UCAP has the same capacity value of one megawatt of Unforced Capacity.”¹⁶

22. UCAP is the product being transacted in the RPM market and is fungible across any entity that wishes to buy or sell UCAP to satisfy its obligation under the RAA and Attachment DD of the PJM Tariff.¹⁷ This can be done bilaterally with trades registered in PJM’s Capacity Exchange¹⁸ application or through the centralized auctions such as such as the RPM BRAs or IAs.¹⁹ If anything, it is the fungibility that allows the use of the BRA and IA in RPM to transact UCAP.
23. Under the current market rules, there is no restriction regarding who suppliers of UCAP can sell their available UCAP to. Similarly, there is no restriction on LSEs regarding who they may purchase UCAP from to satisfy their obligations under the RAA.²⁰
24. In this way RPM is no different than a commodity market for agricultural products (such as corn, wheat or soybeans) or basic energy products (such as oil, natural gas, coal). UCAP is no different than electricity that is bought and sold forward and then delivered across the PJM system in real-time operations. The contractual relationships underlying the supply and demand for electricity in real-time are irrelevant to RTOs such as PJM so long as energy balance, transmission security, and reserve levels are maintained.

¹⁶ *Id.*

¹⁷ PJM Tariff Attachment DD, Sections 5.1 to 5.4

¹⁸ PJM Manual 18: PJM Capacity Market Revision: 62 Effective Date: December 17, 2025, Section 10. Available at <https://www.pjm.com/-/media/DotCom/documents/manuals/m18.pdf>.

¹⁹ PJM Tariff, Attachment DD, Section 5.4.

²⁰ RAA, Schedule 8 and Schedule 8.1.

25. Historically, RPM auctions transacted UCAP as the fungible commodity without regard to bilateral contractual relationships between the suppliers of UCAP and the LSEs with UCAP obligations under the RAA.²¹
26. Further, LSE obligations did not depend on when the LSE load went into commercial operation, or when the load may have switched to the LSE in the case of competitive LSEs, or the size of any individual load being served by an LSE.²²

IV. UNDULY DISCRIMINATORY AND PREFERENTIAL ASPECTS OF IRAS.

27. What PJM is proposing with IRAS goes against every concept of UCAP being a fungible commodity. In effect, PJM is proposing to bifurcate UCAP into “vintages” based on the in-service date of the resource providing UCAP with differing responsibilities and obligations. Further, PJM is proposing to create multiple types of loads (Large Loads 50 MW or greater)²³ based on in-service time (New Large Loads on or after June 1, 2027)²⁴ whereby an LSEs must procure a specific type of UCAP depending on the size of the load and the load’s online date.²⁵ These loads will also be treated differently in PJM’s markets.
28. PJM also proposes to treat FRR entities differently from other LSEs in that they can potentially use existing resources to meet New Large Loads while other LSEs can only use

²¹ PJM Tariff, Attachment DD showing that all Existing Generation Capacity Resources have a must offer requirement into RPM auctions. No exceptions are provided for anything regarding contractual arrangements between the Existing Generation Capacity Resource and LSEs.

²² RAA, Schedule 8.

²³ Proposed RAA Definitions

²⁴ *Id.*

²⁵ Proposed PJM Tariff, Attachment DD-4 Section IV, V. VI, and VII. Proposed RAA, Article 7, Section 7.8

existing resources to serve existing loads.²⁶

**A. Inclusion or Exclusion of Loads from the VRR Curve in the RPM BRAs or IAs
Based on Size and In-Service Date**

29. PJM proposes to exclude all New Large Loads that are not contracted with BYONC resources, defined by PJM as “Eligible New Large Loads,”²⁷ from the VRR Curve that represents the demand for UCAP in the BRAs and IAs.²⁸ Yet other loads, including other incremental loads, will be included in the VRR Curve. From a reliability standpoint, the overall size of the total load impacts resource adequacy reliability and thus should be reflected in PJM’s RPM market.
30. Eligible New Large Loads under the IRAS Proposal cause the same reliability issues as other loads, but they are excluded from the VRR Curve. A simple example illustrates the point. Suppose there is 8,000 MW of Eligible New Large Loads. With the 8,000 MW taken out of the VRR Curve, the price that results is \$300/MW-day and signals that PJM “meets its reliability target.” Yet, if the 8,000 MW were included in the VRR Curve, the price would be \$555/MW-day, the estimated current maximum price on the VRR Curve,²⁹ and the RTO would show it is short its reliability target by 8,000 MW. This is unduly discriminatory and differential treatment of loads by their size and vintage.
31. What PJM fails to address is the cumulative effect of new load growth that is not Eligible

²⁶ Proposed RAA, Schedule 8.1, Section D, 1.1. FRR entities can potentially sign contracts by June 1, 2027 with Existing Capacity Resources, but may not have New Large Load come in service until later years and the contracts not begin until later years, so long as it is “under contract.”

²⁷ Proposed PJM Tariff, Definitions E-F.

²⁸ *Id.* “Excludable LDA New Large Load Amounts” and “Excludable RTO New Large Load Amounts” and Attachment DD, Sections 5.4(c), 5.10(a)(i), 5.10(a)(vi)(B), 5.11(a)(iii), 5.12(b)(ii)-(iii).

²⁹ *PJM Interconnection, L.L.C.*, 194 FERC ¶ 61,049 at PP 44-45.

New Large Load could be just as impactful on reliability yet is treated differently for no reliability reason at all. Use the same numerical example from the previous paragraph but assume the 8,000 MW is new load growth that does not fall under the definition of New Large Loads. All 8,000 MW would be included in the VRR Curve showing a resource adequacy shortfall and a price at the VRR Curve maximum. Observationally and in reality, the load growth has the same impact regardless of where it comes from, yet the unduly discriminatory and preferential treatment results in very different market outcomes and signals different reliability conditions.

32. On the supply side of the equation, PJM's proposal that a New Large Load can only avoid being classified as an Eligible New Large Load by procuring BYONC results in undue discrimination against Existing Capacity Resources and undue preference for BYONC Resources.³⁰ Rather than Existing Capacity Resources facing a VRR Curve that is reflective of the true supply-demand balance in the RPM market as shown in the simple example above, they are facing a lower demand for capacity that, all other things equal, will result in differential pricing between Existing Capacity Resources and BYONC Resources.³¹
33. Both types of resources are providing UCAP, but one set of resources will be effectively barred from selling capacity to New Large Loads while the other will have that opportunity, despite both providing the exact same service. Such disparate treatment of the resources equally capable of supplying UCAP is unduly discriminatory and preferential.

³⁰ Proposed PJM Tariff, Attachment DD-4, Sections IV, V, VI, and VII.

³¹ *See supra* note 12.

B. The Offer Requirements into RPM Auctions that Differ Between BYONC, RBP, and Planned and Existing Capacity Resources

34. PJM proposes that BYONC Resources contracted with New Large Load have must offer requirements into the RPM BRA and IA as price takers (offers equal to \$0/MW-day UCAP) as such New Large Load will also be included in the VRR Curve.³² This raises issues regarding the treatment of BYONC versus Planned Capacity Resources that have the ability to offer as they see fit, and once clearing an RPM auction, have the ability to choose a non-zero Market Seller Offer Cap that reflects their going forward costs under the Avoidable Cost Rate (“ACR”).
35. Both BYONC and Planned Capacity Resources enter as new resources yet are treated differently for no valid reason. And going forward, once clearing an RPM auction, both BYONC and Planned Capacity Resources become Existing Capacity Resources, but continue to be treated differently.
36. The price taker requirement for BYONC implicitly assumes contracts between BYONC and New Large Load that will cover the BYONC resource’s going forward costs are automatically covered by the contract terms and conditions. There is no assurance that this would be so.
37. In contrast, Existing Capacity Resources that are not BYONC will retain the ability to make offers that reflect their ability to cover going forward costs and any associated risk with failure to perform during a Performance Assessment Interval (“PAI”). There is only one interpretation of this disparate treatment, and that is to artificially drive prices in the RPM Auctions down for Existing Capacity Resources to that are serving existing load and new

³² Proposed Tariff, Attachment DD-4, Section VIII (e).

load that does not qualify as New Large Loads.

38. There is no harm in allowing BYONC Resources to make non-zero offers into RPM Auctions to reflect their going forward costs and risks of PAI non-performance that may not be covered under the contracts between BYONC and New Large Loads. To the contrary, this will ensure that RPM prices properly reflect the costs of all Existing Capacity Resources, whether BYONC or otherwise. And in the event BYONC contracts have accounted for PAI performance risk and cover ACR, the offers may be zero into RPM Auctions. The key is that contract terms and conditions for BYONC cannot be assumed in developing market rules.

C. Differential Capacity Accreditation Between BYONC Resources and All Other Resources

39. Capacity Resources face ELCC risk from one Delivery Year (“DY”) to the next based upon PJM’s updated load forecasts, changes in fleetwide generator configuration and mix, and any updates. Table 1 shows the variation in ELCC values for all resource types from the 2025/2026 BRA through the upcoming 2029/2030 BRA.

Table 1: Variation in ELCC Values for RPM Auctions for the 2025/2026 Delivery Year through the 2029/2030 Delivery Year³³

	25/26 BRA ³⁴	25/26 3rd IA ³⁵	26/27 BRA ³⁶	26/27 3rd IA ³⁷	27/28 BRA ³⁸	28/29 BRA ³⁹	29/30 BRA ⁴⁰
Date Published	Feb-24	Jan-25	Mar-25	Jan-26	Jul-25	Feb-26	Jul-26
Onshore Wind	35%	38%	41%	38%	41%	34%	37%
Offshore Wind	60%	62%	69%	64%	67%	60%	64%
Solar Fixed Panel	9%	10%	8%	10%	7%	7%	6%

³³ Waste to Energy and Oil-Fired CT categories were not recognized until the start of the 2027/2028 Delivery Year, and therefore do not appear in data for earlier years.

³⁴ “Installed Reserve Margin (IRM) and Forecast Pool Requirement (FPR) for 2025/26 BRA.” Josh Bruno, Planning Committee February 6, 2024, at 4. Available at <https://www.pjm.com/-/media/DotCom/committees-groups/committees/pc/2024/20240206/20240206-item-05---fpr-and-irm-update.pdf>.

³⁵ “Installed Reserve Margin (IRM), Forecast Pool Requirement (FPR), and Effective Load Carrying Capability (ELCC) for 2025/2026 3IA.” Josh Bruno, Markets and Reliability Committee January 23, 2025 at 5. Available at <https://www.pjm.com/-/media/DotCom/committees-groups/committees/mrc/2025/20250123/20250123-item-05---1-irm-fpr-and-elcc-for-25-26-3ia---presentation.pdf>.

³⁶ “2026/27 BRA IRM, FPR, and ELCC Class Ratings Shift Towards More Winter Risk.” Josh Bruno, Molly Mooney, Patricio Rocha Garrido Special Planning Committee March 13, 2025 at 6. Available at <https://www.pjm.com/-/media/DotCom/committees-groups/committees/pc/2025/20250313-special/2026-2027-irm-fpr-elcc-and-winter-risk.pdf>.

³⁷ “Installed Reserve Margin (IRM), Forecast Pool Requirement (FPR), and Effective Load Carrying Capability (ELCC) for 2026/2027 3rd IA.” Josh Bruno Members Committee January 22, 2026 at 7. Available at <https://www.pjm.com/-/media/DotCom/committees-groups/committees/mc/2026/20260122/20260122-item-02---1-2026-2027-3rd-ia-fpr-and-irm-results---presentation.pdf>.

³⁸ “Installed Reserve Margin (IRM), Forecast Pool Requirement (FPR), and Effective Load Carrying Capability (ELCC) for 2027/2028 BRA.” Josh Bruno Members Committee July 23, 2025 at 7. Available at <https://www.pjm.com/-/media/DotCom/committees-groups/committees/mc/2025/20250723/20250723-item-02---2027-2028-bra-fpr-and-irm---presentation.pdf>.

³⁹ “Installed Reserve Margin (IRM), Forecast Pool Requirement (FPR), and Effective Load Carrying Capability (ELCC) for 2028/2029 BRA.” Special Markets and Reliability Committee February 13, 2026 at 9. Available at <https://www.pjm.com/-/media/DotCom/committees-groups/committees/mrc/2026/20260213-special/item-01---2028-2029-bra-fpr--irm---presentation.pdf>.

⁴⁰ “Installed Reserve Margin (IRM), Forecast Pool Requirement (FPR), and Effective Load Carrying Capability (ELCC) for 2029/2030 BRA.” Patricio Rocha-Garrido Markets and Reliability Committee July 28, 2026 at 7. Available at <https://www.pjm.com/-/media/DotCom/committees-groups/committees/mrc/2026/20260728/20260728-item-06---2029-2030-bra-fpr-irm-results---presentation.pdf>.

Solar Tracking Panel	14%	14%	11%	13%	8%	10%	7%
Landfill Gas Intermittent	54%	51%	50%	49%	48%	50%	50%
Hydro Intermittent	37%	37%	38%	38%	39%	35%	35%
4-hr Storage	59%	55%	50%	54%	58%	59%	57%
6-hr Storage	67%	65%	58%	61%	67%	68%	67%
8-hr Storage	68%	68%	62%	65%	70%	71%	69%
10-hr Storage	78%	77%	72%	73%	78%	78%	77%
DR	76%	77%	69%	72%	92%	91%	90%
Nuclear	95%	95%	95%	95%	95%	96%	96%
Coal	84%	83%	83%	85%	83%	85%	84%
Gas CC	79%	78%	74%	77%	74%	78%	75%
Gas CT	62%	63%	60%	63%	61%	67%	60%
Gas CT Dual Fuel	79%	79%	78%	79%	77%	79%	77%
Diesel	92%	92%	91%	93%	92%	93%	92%
Steam	75%	74%	73%	75%	72%	75%	75%
Waste to Energy Steam					83%	84%	83%
Oil-Fired CT					80%	83%	81%

40. BYONC resources are treated very differently, even though they change the configuration of the PJM generation fleet which impacts ELCC values.⁴¹ PJM’s proposed tariff language states, “For any generation or storage resource, the Accredited UCAP of any BYONC shall be the Accredited UCAP for the RPM Auction in which the BYONC cleared for the initial Delivery Year the BYONC is in an arrangement with the New Large Load.”⁴² The same is also provided for Demand Resources and DER Capacity Aggregation Resources.⁴³

41. Operationally, and as far as can be determined from PJM’s IRAS Filing, there is no change

⁴¹ See “2025 PJM Effective Load Carrying Capability and Reserve Requirement Study (ELCC/RRS) PJM Resource Adequacy Planning.” October 22, 2025 at 16 and 17 showing how the resource portfolio as an input affects ELCC values. Available at <https://www.pjm.com/-/media/DotCom/planning/resource-adeq/elcc/2025-pjm-elcc-rrs.pdf>. See also <https://www.pjm.com/planning/resource-adequacy-planning/effective-load-carrying-capability> for yearly study results and data files that show assumed generator mix as data inputs.

⁴² PJM proposed Attachment DD-4, Section VII (i) (i)

⁴³ PJM proposed Attachment DD-4, Section VII (i) (ii)

to ELCC modeling to reflect the different treatment of BYONC Resources, which is unduly discriminatory and preferential treatment for BYONC resources versus all other Capacity Resources with regard to ELCC value. Take, for example, a new 4-hour battery energy storage (“BESS”) resource with an ELCC value of 59% of ICAP for 2029/2030 contracts with a New Large Load. This ELCC value is locked in at 59% for the duration of the contract with the New Large Load. Yet, PJM’s estimates of future ELCC values show the ELCC for 4-hour BESS resources declining over time.⁴⁴ The BYONC 4-hour BESS is given more credit than PJM’s own ELCC studies would show. For example, PJM’s studies predict ELCC values will decline 55 percent between 2027/2028 and 2035/2036, yet the BYONC 4-hour BESS would not face this impact. So, even if by 2035/2036 the 4-hour BESS ELCC value is 28%, the BYONC would still get credit for 59% despite being the same technology. Furthermore, adding the new 4-hour BESS leads to a decline in the ELCC value of all 4-hour BESS on the system,⁴⁵ yet the BYONC version of 4-hour BESS will not have to face this consequence which further amplifies the unduly discriminatory and preferential treatment of BYONC versus other similarly situated resource technologies.

42. There is also unduly discriminatory treatment of loads in this regard. Existing loads that do not qualify as New Large Load face the implications of ELCC risk in the RPM BRA and IAs or with any bilateral contracts they may have with Capacity Resources that do not meet the BYONC definition. Those loads face the risk and uncertainty of changing ELCC values

⁴⁴ See “Preliminary ELCC Class Ratings for Period Delivery Year 2027/28 – Delivery Year 2035/36.” Available at <https://www.pjm.com/-/media/DotCom/planning/res-adeq/elcc/preliminary-elcc-class-ratings.pdf>.

⁴⁵ *Id.*

without recourse. In effect, New Large Loads and their associated BYONC are insulated from ELCC volatility while other loads must face the market implications of that year-to-year volatility. From a load perspective this too is unduly discriminatory and preferential treatment of one type of load over all others.

43. Furthermore, given the differential treatment of BYONC and Existing Capacity Resources in their offer requirements into RPM BRAs and IAs, holding the ELCC values of BYONC at the levels of the first DY in which the contract starts misrepresents the “real supply” of capacity based on ELCC values that are changing year-over-year. This is detrimental to reliability. The example of the BYONC version of 4-hour BESS above over-representing the supply of capacity further erodes the fidelity of the RPM BRA or IA price signal by overstating the supply of UCAP and further resulting in undue price discrimination against Existing Capacity Resources.
44. Again, a simple example shows the problem. Suppose in a BRA, that there is BYONC inserted as a price taker under a weighted average ELCC value of 75% based on an ICAP value of 10,000 MW that has been fixed since it entered service in a previous DY. However, the PJM updated ELCC values of those 10,000 MW of BYONC ICAP has a weighted average ELCC value of 60% for the BRA. PJM would nonetheless runs the BRA as if this supply has a 75% ELCC value, resulting in the BRA clearing at \$300/MW-day and indicating the reliability target is met. But if the BYONC had been modeled as the rest of the supply curve at a 60% ELCC value applicable to all other resources, the supply would have been reduced by 1,500 MW, and resulting in the BRA clearing at \$450/MW-day and showing a possible shortfall in meeting the reliability target.
45. The unduly discriminatory and preferential treatment of BYONC thus has effect of

masking potential resource adequacy shortfalls in the future and sending price signals that no new entry is needed.

D. The Implicit Restrictions on the LSEs and Loads with Whom Existing Capacity Resources Can Contract Relative to Planned Capacity Resources and BYONC

46. For New Large Loads to avoid IRAS, they must contract with BYONC. PJM's proposal, by exclusion, forbids New Large Load from contracting with Existing Capacity Resources to cover its capacity requirement. Yet, PJM would permit new loads that are not New Large Loads coming onto the system to contract with Existing Capacity Resources to cover those capacity needs under the RAA.
47. Load growth, regardless of the size of any specific load, requires UCAP to cover its position. Yet, PJM is explicitly engaging in undue discrimination and preferential treatments of loads regarding who they can contract with to satisfy their capacity requirements.
48. The unduly discriminatory treatment of new loads cascades down to undue discrimination and preferential treatment of Capacity Resources based on their in-service date and with whom they may contract to provide UCAP. Existing Capacity Resources are, *de facto*, precluded from contracting with New Large Load as PJM is mandating that New Large Load will not be excused from IRAS unless it contracts with BYONC alone. Existing Capacity Resources and BYONC as defined by PJM in its filing all provide UCAP, yet some UCAP is being treated preferentially while other UCAP is being discriminated against based on the size and in-service dates of the load and generation.

E. Disparate Treatment of Different Loads by Size and In-Service Date for Compensation for Load Reductions in Real-Time Operations

49. Eligible New Large Loads will be required to provide IRAS. That is, they will be required

to be curtailed prior to the deployment of Demand Resources which are Capacity Resources in RPM. As compensation for this “service,” the Eligible New Large Loads will get paid 50% of PAI penalty per MWh.⁴⁶

50. No other loads on the PJM system that are curtailed, including those voluntarily doing so as Economic Demand Response or for peak load shaving purposes, are compensated in the same manner for energy reductions as Eligible New Large Loads, though the load reductions will have the same reliability benefit. In real-time operations, when system conditions are becoming critical, load reductions of any kind are observationally equivalent from an overall energy balance perspective yet will be compensated differently.

F. Eligible New Large Load Providing IRAS is Compensated and Treated Differently from Load Reductions Taken by Economic Load Response, Pre-Emergency Load Response, and Emergency Load Response

51. Economic Load Response, Pre-Emergency Load Response, and Emergency Load Response (collectively Load Response or “LR”) are compensated at the Locational Marginal Price (“LMP”) in the energy market for load reductions.⁴⁷ Further, LR is accounted for in the calculation of LMP based on their offers that are submitted into the energy market.
52. In contrast, Eligible New Large Load under IRAS is compensated for energy reductions mandated by IRAS at 50% of the PAI Penalty Rate. For the RTO in the 2028/2029 DY this is \$1,565.24/MWh⁴⁸ which is higher than the \$1,000/MWh offer cap for supply

⁴⁶ Proposed PJM Tariff, Attachment DD-4, Section X (a).

⁴⁷ PJM Operating Agreement (OA”), Schedule 1, Section 2.5(b) and the same provisions in the PJM Tariff, Attachment K-Appendix.

⁴⁸ PJM OA, Schedule 1, Section 1.10(d).

resources, including LR, that exists except in the most extreme of circumstances.⁴⁹

Additionally, PJM *does not propose* reductions from IRAS to be considered in LMP price formation nor compensating IRAS reductions at LMP.

53. This is unduly discriminatory and preferential treatment of IRAS reductions relative to LR reductions. First, the value of energy at the time of the reduction is LMP, and not any other price, yet IRAS reductions are compensated differently. Second, LR can set the LMP if it is the marginal action taken to maintain energy balance, but IRAS reductions by Eligible New Large Loads cannot.
54. But even worse is that the treatment of IRAS reductions sends the wrong price signal to the energy market regarding system conditions. For example, say there is 2,000 MW of IRAS that is reduced. Prior to this reduction, assume the energy price is \$800/MWh indicating the system is approaching possible reserve shortage conditions and is using up all but the most expensive of resources to maintain energy balance. When 2,000 MW of IRAS load is called off the system, PJM is taking an action that is priced at over \$1,500/MWh. Intuitively, this \$1,500/MWh cost should be setting LMP. However, because IRAS reductions do not set the LMP, this action instead results in prices declining to \$400/MWh. In effect, PJM is declaring an Emergency Action, yet the prices are going down as a result which is signaling to the market that conditions are not so dire.
55. Another implication is that IRAS, which is not a Capacity Resource, is called before LR, which are Capacity Resources but for Economic Load Response, and likely have offers below the rate at which IRAS is compensated. Such a practice violates the simple principles

⁴⁹ *Id.* Offers may go up to \$2000/MWh based on verifiable costs and for LR, depending on response time may include reserve penalty factors in addition to \$1000/MWh.

of economic dispatch upon which PJM's and all other RTO markets are based: lower cost resources should be called first. This unduly discriminatory and preferential treatment of IRAS relative to LR not only sends the wrong real-time reliability signal, but it also impacts real-time pricing upon which many resource owners depend for earning revenues, and sends chilling longer-term signals to investors in potential future generation projects that energy market pricing is being artificially reduced making such investments unattractive.

V. IRAS CREATES MULTIPLE UCAP COMMODITIES OUT OF A ONCE FUNGIBLE COMMODITY

56. The ultimate effect of PJM's IRAS Filing is to take what was once a fungible commodity and artificially distinguish between UCAP based on the load it serves and the in-service dates of Capacity Resources and how those resources have entered the market. As discussed below, PJM has created distinct products that are fundamentally UCAP but differ not based on any reliability considerations but purely for purposes of price discrimination.

A. UCAP from Existing Capacity Resources

57. UCAP from Existing Capacity Resources can only be used to serve existing loads or new loads that do not qualify as New large Load. As described previously, Existing Capacity Resources have, *de facto*, been forbidden from contracting with New Large Loads to help New Large Loads avoid IRAS.
58. UCAP from Existing Capacity Resources cannot be used to replace BYONC or even RBP capacity despite all of them providing UCAP. This clearly breaks the fungibility between Existing Capacity Resources and BYONC and RBP Resources.

B. UCAP from BYONC Resources

59. BYONC Resources are of a different vintage than all other UCAP resource types. By definition, neither RBP Resources nor Existing Capacity Resources can be used to replace BYONC.
60. Furthermore, the language in the IRAS proposal implies that once BYONC is contracted with a New Large Load, it cannot be used to replace other BYONC Resources unless that New Large Load is completely out of service. No considerations are given for New Large Load demands to fluctuate year-by-year that would allow BYONC to be resold to other New Large Loads in search of BYONC to avoid application of IRAS.
61. In short, BYONC resources once contracted to a New Large Load are permanently tied to the New Large Load unless the load permanently goes away and thus different BYONC cannot be used to replace other BYONC thereby making each BYONC unique without any ability to replace one-for-one.

VI. IMPLIED PROPERTY RIGHTS CREATED AND GRANTED BY IRAS

62. A necessary condition for a well-functioning market is well-defined property rights to the underlying commodity that is being bought and sold.⁵⁰ The seller of the commodity has the rights to the commodity up to and until it sells the commodity to a buyer. Upon completing the transaction, the buyer takes title to the commodity and then has the property right to that commodity.
63. Further, well defined property rights imply that the holder of a commodity can sell that commodity to any buyer that is willing to pay for the underlying commodity. It does not

⁵⁰ See *supra* Note 11.

matter if it is “an initial sale” or a “resale” of the commodity.

64. Until now, both the organized and bilateral capacity markets in PJM adhered to these principles: the property rights to the commodity, UCAP, were vested initially in the producer of that commodity (Capacity Resources), which could then sell the commodity to any buyer (LSE). That buyer (LSE) could then use the UCAP to satisfy its own capacity obligations or sell it, bilaterally or through an RPM Auction or bilateral transaction. The IRAS proposal departs from this approach and these principles and effectively reallocates property rights over UCAP from Existing Capacity Resource to existing load.

A. Property Rights of Existing Capacity Resources Have Been Reallocated to Existing Load by Fiat

65. What PJM has proposed with IRAS is a *de facto*, involuntary reallocation of property rights among various parties that is affected without any contractual agreements among the transferees or compensation. The most egregious example of this is that New Large Loads will not be allowed to purchase UCAP from Existing Capacity Resources to meet their capacity obligations.
66. What PJM has indirectly, but unmistakably done, is to expropriate and reallocate the property rights of the owners of Existing Capacity Resources to the UCAP produced by those resources to existing loads and new loads other than New Large Loads. This has been reinforced by taking Eligible New Large Loads out of the VRR Curve for UCAP, and thus, only representing existing load and new load growth that is not New Large Load in the demand for UCAP.
67. This assignment of property rights has been undertaken without any contractual agreement between the Existing Capacity Resources and existing load and new loads. There has been no explicit transaction price that has been agreed upon by Existing Capacity Resources and

the existing and new load. It is simply the expropriation of rights of Existing Capacity Resources by the fiat of a proposed tariff change.

B. Property Rights to Energy In Real-time Operations has Been Assigned to Eligible New Large Load in IRAS without any Upfront Purchase of Energy

68. As noted above PJM has proposed that Eligible New Large Load be compensated for energy reductions mandated by IRAS at 50% of the PAI Penalty Rate.⁵¹ For the RTO in the 2028/2029 DY this is \$1,565.24/MWh which is higher than the \$1,000/MWh offer cap for supply resources that exists except in the most extreme of circumstances.
69. What the IRAS proposal does is to assign to Eligible New Large Loads property rights to the energy they expect to consume without the obligation to purchase that energy up front. Further, by paying Eligible New large Loads a price based on the PAI penalty rate, the IRAS proposal also unduly discriminates against other LR that is paid the prevailing LMP in the market for what is effectively the same actions with the same effect on the energy market.
70. Not only is this a preferential assigning of property rights to energy, but it also flies in the face of the Day-ahead and Real-time two settlement system that is the foundation of all FERC-jurisdictional RTO energy markets. Under the two-settlement system, energy in the Day-ahead market is transacted and load pays for its expected usage, and suppliers are paid for the committed energy. In real-time operations, loads that use less than they purchased in the Day-ahead market sell energy back at the real-time price. That is load has “taken

⁵¹ Proposed PJM Tariff, Attachment DD-4, Section X(a). The penalty rate is defined in the PJM Tariff, Attachment DD, Section 10, Non-Performance Charge Rate is (Net Cost of New Entry (stated in terms of installed capacity) for the LDA and Delivery Year for which such calculation is performed * (the number of days in the Delivery Year / 30) / (the number of Real-Time Settlement Intervals in an hour).

title” to energy Day-ahead and has then sold it back in real-time.

71. What PJM has done is to assign a property right to energy consumption outside of the two-settlement system to provide an additional payment that is not available to any other load for reductions that occur prior to the use of Demand Resources. Who is on the other side of those payments? LSEs in the load zone in which those reductions take place as if those LSEs have purchased that energy directly.
72. The LSEs in the load zone who would pay this compensation are assumed to be taking title to that energy at a “contractual price” that is outside of the Day-ahead and Real-time energy markets. Yet, those LSEs have not necessarily requested such reduction, nor did they necessarily agree to pay for those reductions at a price that differs from LMP. Suppose an LSE in the load zone in which an Eligible New Large Load undertakes the IRAS reduction has already purchased energy in the Day-ahead energy market, but its consumption is unchanged in real-time. That LSE has already purchased its energy and has no real-time settlement. Yet that LSE will be “billed” as if it purchased and “took title” to energy in real-time it did not need nor consume. Implicitly PJM is assigning property rights in the form of an obligation to the other LSEs without Eligible New Large Loads that those LSEs did not need nor request by paying the Eligible New large Loads under IRAS for mandated load reductions.

VII. MARKET INEFFICIENCIES, MISPLACED INCENTIVES, AND POOR RELIABILITY OUTCOMES THAT WILL RESULT FROM IRAS

73. Anytime market rules change, the incentives for market participants are altered. What PJM seems to wish to achieve through the IRAS proposal is to provide incentives to generation and loads to take actions that will help alleviate current UCAP shortfall that are expected

in PJM due to the growth of New Large Loads.

74. Unfortunately, as explained below, the incentives resulting from IRAS are unlikely to close this shortfall, and possibly may make it even worse.

A. The Incentives Under IRAS Likely Will Not Bring the New Entry that PJM Expects

75. As explained above, the treatment of New Large Loads that do not have contracts with BYONC in the RPM BRAs and IAs will result in lower prices in those auctions that do not reflect the actual reliability needs of the system. The immediate implication of this is that any potential new entry of UCAP will not wish to enter through the BRAs or IAs but would rather opt to get a long-term contract as BYONC with a New Large Load.
76. But will New Large Loads wish to contract with BYONC? Given that New Large Loads have a non-zero probability that they will not be called upon at all in any given year to execute on IRAS, they may wish to forego entering into contracts with BYONC as it may be lower cost in expectation given that price formation in the RPM BRAs and IAs will be biased downward by having their own loads excluded. On top of this, Eligible New Large Loads under IRAS will get paid for reductions for energy they have not even purchased in advance which makes BYONC contracting even less attractive.
77. Further, many large loads have installed back-up generation to account for potential issues with disconnection due to problems on the local transmission or distribution system already. New Large Loads could similarly choose to rely on back-up generation to avoid any loss of service. Given all these incentives, New Large Loads may simply find it easier and more economic to forego contracts with BYONC.
78. If that is the case, then the new entry PJM is hoping for to serve New Large Loads will not materialize through BYONC contracts, nor will it occur through an RPM auction structure

that excludes Eligible New Large Loads where prices are not reflective of the costs to bring new entry into service. Thus, PJM will be faced with other load growth, plus existing load while the supply of capacity remains stagnant making the reliability shortfall even more acute.

79. Finally, PJM's RBP filing has already anchored expectations that prices will be artificially kept below competitive levels, further sending signals for New Large Loads to opt to be subject to IRAS rather than entering into BYONC contracts, thereby deterring new entry of generation.⁵²

B. Existing Capacity Resources Will Have Incentives to Exit the Market if New Entry Does Occur.

80. Suppose IRAS does manage to attract new generation entry as PJM expects to happen. This will result in increasingly unduly discriminatory treatment in pricing between Existing Capacity Resources and BYONC Resources. BYONC resources are required to offer their capacity into the RPM auctions as price takers, and the associated demand for UCAP is inserted into the VRR Curve as an offset to that supply with the idea that this should not affect overall price formation. Existing Capacity Resources will presumably face lower prices and will never get the benefit of price formation that will price in new entry in the market as it is needed.
81. Over time, as ELCC values change, going forward costs increase, and most importantly, other opportunities become available, Existing Capacity Resources will look to sell their capacity to other neighboring markets such as MISO, or non-RTO areas at higher prices than they can get in PJM as Existing Generation Capacity Resources. This is not a

⁵² See *supra* Note 12.

theoretical consideration but has already been happening with PJM Resources selling capacity into neighboring NYISO and MISO at higher prices than they can receive in PJM.

82. It is even possible, as has already been witnessed, that generation could deactivate from PJM and be physically taken to other markets where they may be more profitable, and where the proceeds of sales of used generators and associated equipment may be a better financial option than remaining in PJM.

C. New Large Loads Will Have Incentives to Inefficiently Reduce Their Size to Avoid IRAS

83. PJM's proposal to define New Large Loads as being greater than or equal to 50 MW allows certain entities to break up their loads into smaller sizes to avoid the application of having to be in the Large Load Registry and be subject to IRAS.⁵³ Many of the Large Load uses are for data centers or computational needs. While PJM proposes to aggregate affiliated new loads within one mile of each other, there is no reason a load cannot be more widely dispersed to avoid application of IRAS.
84. For those larger loads below 50 MW, they can avoid early curtailment, and also benefit from the artificially low capacity prices to which PJM has anchored market expectations through PJM's most recent Periodic Review and RBP filing.⁵⁴ At a maximum price of \$555/MW-day UCAP, it is lower than the new cost of entry across all resource types, and the "undersized" large loads can pay less than if they contracted with new capacity and avoid IRAS altogether.

⁵³ PJM Proposed RAA Schedule 11, and Proposed PJM Tariff, Definitions E-F.

⁵⁴ See *supra* Note 12 and Note 29.

VIII. CONCLUSIONS AND A WAY FORWARD BY LEARNING THE LESSONS OF HISTORY

85. PJM's IRAS proposal suffers from a multitude of deficiencies that are unduly discriminatory and preferential and that will lead to the erosion of the RPM capacity market construct. One aspect is destroying the fungibility of the UCAP commodity as it exists today, leading to increasing difficulty in transacting UCAP which by itself will increase costs for all market participants.
86. Another major problem with the IRAS concept is the incentives that are provided to Existing Capacity Resources, potential new entry resources, and larger loads are not conducive to achieving the pricing and reliability objectives PJM has stated. If anything, those incentives will work against PJM's stated objectives.
87. A shorter way of describing this goes back to a seemingly forgotten history of the commodity natural gas market following the Natural Gas Policy Act of 1978 ("NGPA") with "old gas" and "new gas."⁵⁵ So-called "old gas" from wells drilled prior to the act remained rate regulated. In contrast, so-called "new gas" was priced at higher prices than "old gas" and would eventually reflect market rates without any price regulation by 1985.⁵⁶ "Old gas" and "new gas" were priced differently yet were really the same commodity placed into the same pipeline system. This is exactly what PJM would do with UCAP in the IRAS proposal. We effectively have "old UCAP" where PJM is proposing to sharply

⁵⁵ See NaturalGas.org, "The History of Regulation" available at <https://naturalgas.org/regulation/history/>. ("NaturalGas.org") "See also Paul L. Joskow, "Natural Gas: From Shortages to Abundance in the United States." *American Economic Review: Papers and Proceedings* 2013, 103(3): 338–343. ("Joskow"). See also Paul L. Joskow and Roger G. Noll, "Economic Regulation: Deregulation and Regulatory Reform in the 1980s" in Chapter 6, "Economic Regulation," Martin Feldstein, editor, *American Economic Policy in the 1980s*, University of Chicago Press, January 1994. Section 6.2.3 Natural Gas ("Joskow and Noll"). Available at <http://www.nber.org/chapters/c7757>.

⁵⁶ NaturalGas.org.

control the price paid to Existing Capacity Resources and “new UCAP” in the form of BYONC that is paid a market driven rate for UCAP.

88. The history of “old gas” and “new gas” tells us that bifurcated pricing of the commodity does not lead to “curing the shortages” that resulted from the old, regulated pricing regime that led to NGPA in the first place.⁵⁷ It was believed that pricing “new gas” on a trajectory to market prices while leaving “old gas” at regulated pricing would help shield natural gas customers from the pricing shock of the price of “new gas” and that eventually all gas would be “new gas” whose price was fully deregulated by 1985.⁵⁸ That did not, in fact, occur. The “old gas”/“new gas” construct failed to cure the ongoing shortage problem and production was unable to keep up with demand for natural gas as consumers switched from oil to natural gas in the wake of the 1979-1980 oil crisis.⁵⁹
89. The current situation in which PJM finds itself is hauntingly similar to that of the natural gas industry from nearly 50 years ago. PJM capped UCAP at prices that were artificially low relative to market prices based on the cost to build akin to the old, regulated pricing regime of natural gas prior to the 1978 NGPA. The shortages of gas were not immediately cured through “old gas” and “new gas”, nor will PJM’s shortfall of UCAP. In fact, what PJM proposes in curtailing certain customers under IRAS goes back to the natural gas industry practices prior to the NGPA in curtailing certain customers.⁶⁰
90. The issue in natural gas was resolved very simply under the Natural Gas Wellhead Decontrol Act in 1989 where natural gas commodity prices would be market driven based

⁵⁷ Joskow and Noll at 385, Joskow at 338.

⁵⁸ Joskow and Noll at 385.

⁵⁹ Joskow and Noll at 386. Joskow at 339.

⁶⁰ Joskow at 338. Joskow and Noll at 385.

on the fungibility of the commodity and were fully deregulated by the end of 1992.⁶¹ The way forward for PJM is moving in the same direction. Let the price of UCAP be market driven based on the real costs of new entry as they are, and not as we wish they would be, and allow prices to rise commensurate with the cost of bringing new UCAP into service. Not only will this provide incentives for the new entry PJM seeks, but it will also likely provide a check on New Large Load growth forcing them to face the true cost of bringing those new loads into service.

⁶¹ Joskow at 339. NaturalGas.org.

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

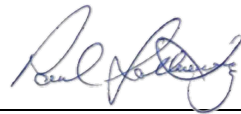
PJM Interconnection, L.L.C.,

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Docket No. ER26-3515-000

AFFIDAVIT

I, Paul M. Sotkiewicz, Ph.D., hereby state, under penalty of perjury, that the statements contained in the foregoing Affidavit on behalf of Electric Power Supply Association are true and correct to the best of my knowledge and belief.



Paul M. Sotkiewicz, Ph.D.

ATTACHMENT 1

PAUL M SOTKIEWICZ, Ph.D.

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EDUCATION

PhD, Economics, University of Minnesota, 2003

M.A., Economics, University of Minnesota, 1995

B.A. (High Honors), History/Economics, University of Florida, 1991

PROFESSIONAL AND ACADEMIC EXPERIENCE

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

- Founded to provide expert advice, testimony, and policy research to private sector and government clients at the intersection of energy, environmental, and economic policy, and regulation.
- Supporting litigation defending market participants against accusations of market manipulation in PJM's markets.
- Worked with the Ontario Independent System Operator (IESO), in conjunction with the Brattle Group, to help implement new settlement logic and protocols in their move to LMP-based market design.
- Assisted Brattle Group and NYISO in developing strategies and analysis to move the NYISO markets toward a less carbon intensive future in response to state climate change initiatives.
- Conducting analysis of recent past and future expected profitability of nuclear power plants under consideration for state subsidies to keep these facilities in commercial operation and providing reports and testimony in front of state legislative bodies.
- Provide capacity market design and expertise to the ENMAX Corp. in Calgary, AB regarding the AESO capacity market proposal filed in late 2018.
- Supporting ENMAX Corp. during the AESO redesign of the energy and ancillary service market in 2024-2025.
- Supported litigation for a reactive power rate case for Panda Stonewall explaining the history behind markets and that the filed rate from Panda Stonewall was consistent with precedent and lost market opportunities.
- Providing PJM expertise to JPower USA Ltd in its development of new combined cycle gas facilities in PJM and help move the project through the PJM interconnection processes as well as advising on existing facilities in the PJM and NYISO market.
- Provide ongoing stakeholder process representation and support in PJM for JPower USA Ltd.
- Provided capacity market design expertise to the Alberta Electric System Operator in 2017 as they started their transition from an energy-only market to a combined energy and capacity market.
- Supporting the Greek Electricity Market authoring, through ECCO International, a whitepaper on market power mitigation with a special look at buyer side market power mitigation in the energy market with the different indices that could be indicative of buyer market power.
- Authored a Meter Data Study for the NYISO encompassing a survey of metering requirements for demand resources and distributed energy resources in key ISO/RTO markets, the current use of demand response baseline methodologies and use of such baselines for distributed energy resources in the context of REV in New York.
- Work with clients in generation and merchant transmission development projects in various parts of PJM related to helping them through the interconnection process, understanding market rules, and regulatory policy and economic advice in the face of changing market rules.
- Supporting clients in docketed proceedings at FERC and at the Florida Public Service Commission providing expert testimony and analysis used in regulatory proceedings. These proceedings include need determinations, rate filings, RTO market design changes, and policy related

proceedings.

- Supporting US government initiatives in exporting knowledge and experience regarding US electric power market and gas market development to the Chinese and Indian governments as they undertake green energy initiatives and look to improve the overall efficiency of the power system.
- Provided expertise and litigation support to LS Power in its FPA Section 206 Complaint regarding the calculation of energy and environmentally limited opportunity costs.
- Developed expert testimony for two different coalitions of generation owners and for EKPC regarding the penalties and bonuses assessed during December 2022.
- Supporting Dairyland Power Cooperative in initiating PJM membership, purchase of exiting generating assets in PJM, and the use of transmission to move the purchased assets to MISO to serve Dairyland loads in MISO.

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

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

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

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

- Led technical and non-technical external outreach efforts to promote PJM markets or explain PJM positions on policy or market design issues of current interest to industry stakeholders including academic audiences and invited presentations at industry sponsored events.
- Provided support in gas/electric coordination discussions within PJM and the between the power and gas industries, as well as operations support during critical operating periods in January 2014 through calls and inquiries to PJM generators and pulling environmental permits to better understand generator operating limitations on back-up fuel.
- Provided periodic reports on market performance and the state of PJM's markets to the PJM Board of Managers Competitive Markets Committee including the relationship between PJM's markets and major fuel market, environmental policy, and macroeconomic trends.
- Acted in the role of an internal consultant and advisor to all PJM departments and divisions, as needed, to address any questions or concerns surround market performance, market design, and general economic or environmental policy questions.
- Supported development and issuance of the PJM Renewable Integration Study by outside vendors.

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

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

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

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

- Provided analysis and research related to filings made by ISO/RTO markets as they commenced operations as centralized wholesale power markets.
- Led the economic analysis and evaluation of the NYISO wholesale power market in its initial filings of its market design and subsequent filings after operations commenced.
- Led economic analysis and evaluation of multiple filings by the California ISO related to requested

market design changes filed after starting operations in 1998.

- Supported analysis and evaluation of other ISO/RTO markets as needed.
- Supported and provided analysis on merger applications as needed.
- Conducted original research while on the staff of the Chief Economic Advisor in the Office of Markets, Tariffs, and Rates related to unit commitment models used in day-ahead electricity markets and pricing in the presence of lumpy decisions and operational characteristics (technically known as non-convexities).

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

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

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

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

PUBLICATIONS AND BOOK CHAPTERS

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

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

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

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

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

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

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

Covino, Susan, Pete Langbein, and Paul Sotkiewicz, “The Fully Integrated Grid: Wholesale and Retail, Transmission and Distribution,” in *Smart Grid: Integrating Renewable, Distributed, and Efficient Energy*, Fereidoon P. Sioshansi, editor, Chapter 17, pp.421-452, 2012.

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

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

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

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

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

J. C. Smith; S. Beuning; H. Durrwachter; E. Ela; D. Hawkins; B. Kirby; W. Lasher; J. Lowell; K. Porter; K. Schuyler; P. Sotkiewicz, "Impact of Variable Renewable Energy on US Electricity Markets," *Power and Energy Society General Meeting*, 2010 *IEEE*

Holt, Lynne, Paul M. Sotkiewicz, and Sanford V. Berg. 2010. "Nuclear Power Expansion: Thinking About Uncertainty" *The Electricity Journal*, 235:26-33.

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

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

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

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

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

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

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

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

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

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

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

O'Neill, Richard P., Helman, Udi, Sotkiewicz, Paul M., Rothkopf, Michael H., and Stewart, William R. Jr., "Regulatory Evolution, Market Design, and the Unit Commitment Problem" The Next Generation of Unit Commitment Models, B. Hobbs, M. Rothkopf, R. O'Neill, and H.P. Chao editors. 2001.

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

SELECTED WORKING PAPERS AND UNPUBLISHED MANUSCRIPTS

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

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

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

CONSULTING AND ADVISING EXPERIENCE PRIOR TO JOINING PJM IN 2008

- | | |
|------|---|
| 2007 | Advisor to the Government of Vietnam regarding the design and experience of wholesale electricity markets as Government looked at the creation of US style ISOs to attract investment in generation assets for IPPs |
| 2007 | Independent Expert in the Matter of the Public Utilities Commission of Belize Initial Decision in the 2007 Annual Review Proceeding for Belize Electricity Limited |
| 2006 | Advisor to the Division of Air Resource Management, Florida Department of Environmental Protection (FDEP) Regarding Implementation the Clean Air Interstate Rule (CAIR) |

HONORS AND AWARDS

- 2007 Fulbright Senior Specialist Grant in Economics with a specific request for expertise in electricity markets, electricity regulation, and distribution tariff design, Universidad de la República, Montevideo, Uruguay.
- 2007 Principal Investigator, PPIAF/World Bank Grant to conduct two on-site training courses on the regulation of the electric power sector and on independent power producers and power purchase agreements for the Electricity Authority of Cambodia. Grant award \$59,900.
- 2006 "Efficient Market Clearing Prices in Markets with Non-Convexities" published in *European Journal of Operational Research* received New Jersey Policy Research Organization Bright Idea Research Award in Decision Sciences.
- 2003 Transportation and Public Utilities Group, Ph.D. Utilities Dissertation Award for "The Impact of State-Level Public Utility Commission Regulation on the Market for Sulfur Dioxide Allowances, Compliance Costs, and the Distribution of Emissions"
- 1992-97 Distinguished Instructor, Department of Economics, University of Minnesota
- 1995-96
1994-95 Walter Heller Award for Outstanding Teaching of Economic Principles, Department of Economics,
1993-94 University of Minnesota
1992-93
- 1991-92 Distinguished Teaching Assistant, Department of Economics, University of Minnesota
- 1991 Phi Beta Kappa, University of Florida

Referee and Review Experience

IEEE Transactions on Power Systems

Integrated Planning Model (IPM) Base Case Version 5.13 Peer Review, Prepared for US EPA Clean Air Markets Division, October 2014, prepared by Anthony Paul, Chair, Meghan McGuinness, Walter Short, Paul Sotkiewicz, John Weyant through RTI International.

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

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

Ecological Economics

Environmental Science and Technology

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

Energy Journal

Journal of Environmental Economics and Management

IEEE PES Letters

IASTED International Journal of Power and Energy Systems

The Next Generation of Unit Commitment Models B. Hobbs, M. Rothkopf, R. O'Neill, and H.P. Chao editors
2001.

Professional Affiliations

American Economic Association
International Association for Energy Economics
Association of Environmental and Resource Economists
IEEE Power and Energy Society
Energy Systems Integration Group (ESIG)

EXPERT TESTIMONY

PJM Interconnection, L.L.C. FERC Docket No. ER09-1063-004, Affidavit in Support of PJM's Compliance Filing with Order No. 719 and Order on Compliance Filing PJM Interconnection, L.L.C., 129 FERC ¶ 61,250 (2009). June 18, 2010

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

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

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

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

in between periodic VRR parameter reviews; and 5) adoption of the labor estimates provided by the PJM Independent Market Monitor ("IMM") to determine Gross CONE values.

Grid Reliability and Resilience Pricing FERC Docket No. RM18-1, Affidavit in Support of the Electric Power Supply Association (EPSA), October 23, 2017. This affidavit provides evidence the Department of Energy Notice of Proposed Rulemaking ("NOPR" or "Proposal") released on September 28, 2017 and appearing in the Federal Register on October 2, 2017, does nothing to enhance reliability or "resiliency" of the bulk power system and will only succeed in distorting wholesale power markets while also raising costs. Consequently, my affidavit supports EPSA's contention the NOPR should be rejected outright by the Commission.

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

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

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

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

Grid Resilience in Regional Transmission Organizations and Independent System Operators, FERC Docket No. AD18-7-000, Affidavit in Support of Comments of the American Petroleum Institute, May 9, 2018. This affidavit focuses of the comments submitted by PJM and: 1) Supports the idea that in the context bulk power system markets and operation resilience and reliability are indistinguishable and that markets and well-designed incentives are the best avenue to achieve a resilient and reliable bulk power system; 2) Explains why market mechanisms rather than suspension of market and command and control regimes are better at achieving resiliency/reliability even during emergency conditions and that PJM has not made a case for being given the authority to suspend markets; 3) That PJM has not made the case that price formation through integer relaxation is linked to resilience/reliability while other price formation that are crucial to reliability/resilience, such as shortage pricing and fast start pricing, be considered concurrently; and 4) So-called “fuel security” is only a minimal contributor to resilience/reliability while transmission and distribution assets are the leading causes for shedding firm load and outages of gas-fired units are not the leading category of generation outages. With respect to generator reliability/resilience, simply providing additional compensation (or minimize penalties) to generators in wholesale markets, without any ties to generator performance, does nothing to enhance reliability/resilience of generators to withstand or minimize the impact of adverse events on the bulk power system. Experience in PJM prior to and following the discussion and implementation of capacity performance has shown this to be the case as generator performance has improved even in the face of lower energy market prices.

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

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

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

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

winter fuel security in the FCA.

Calpine Corporation v. PJM Interconnection, L.L.C. Docket No, EL16-49; PJM Interconnection L.L.C. Docket No. ER18-1314-000, ER18-1314-001, EL18-178 Affidavit in Support of the Electric Power Supply Association, October 2, 2018. This testimony refutes the idea that the Commission proposed remedy a resource specific FRR Alternative equally removes both demand and supply from the market and therefore does no harm. Such a mechanism is the equivalent of an exercise of buyer side market power, artificially reduces price below competitive levels, inefficiently displaces lower cost, economic resources with higher cost resources, shifts cost and benefits between market participants, and reduces overall market efficiency. Additionally, PJM market simulations for scenarios from the 2020/2021 auction show the kind of damage that done to the market through the proposed remedy or equivalently buyer sider market power by showing prospective price decreases and generation displacement, and the level of subsidy that could facilitate a successful exercise of buyer-side market power.

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

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

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

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

In the Matter of the Implementation of L. 2018, c. 16 Regarding the Establishment of a Zero Emission Certificate Program for Eligible Nuclear Power Plants, New Jersey Board of Public Utilities, BPU Docket No. EO 18080899, Response to Staff Questions on Accounting for Risk in Support of PJM Power Providers, March 8, 2019. This is a

response to BPU staff questions regarding market risk. This response discusses the mitigation of overall market risk based on changing conditions, optimal energy market offers and mitigation of energy market operational risk, and optimal offers and risk mitigation in the capacity market that are available to all generation resources including nuclear resources.

In the Matter of the Implementation of L. 2018, c. 16 Regarding the Establishment of a Zero Emission Certificate Program for Eligible Nuclear Power Plants, New Jersey Board of Public Utilities, BPU Docket No. EO 18080899, Reply Testimony in Support of PJM Power Providers, March 19, 2019. This reply testimony responds to PSEG comments regarding the need for ZECs for New Jersey's nuclear units. This reply testimony updates the economic analysis showing New Jersey nuclear units are currently profitable and expected to remain profitable in the future. Furthermore, this reply points out that PSEG did not dispute the costs used in the initial analysis or the idea that new entry of combined cycle gas generation can reduce emissions at zero cost at the margin given these resources will enter the market absent subsidies. The reply argues, contrary to PSEG's position, the threat to retire is not credible given the statements and evidence provided by PSEG in its Securities and Exchange Commission (SEC) filings. This reply also provides evidence that it would be infeasible for PSEG to buy out of its capacity commitments in Incremental Auctions (IAs) given the supply and demand conditions present in IAs to date.

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

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

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

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

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

Alberta Utilities Commission (“AUC”) Distribution System Inquiry Proceeding 24116, Response from Kalina to AUC Information Request Round 2, Jointly with Regulatory Law Chambers, Terradigm Energy, Inc, and Nican International Consulting, Ltd on Behalf of Kalina Distributed Power, June 17, 2020. This response to information requests provides support for an optimal distribution tariff design that rewards resources that reduce the need for additional upgrades and reduce line losses and send price signals regarding the optimal location on the distribution system. This response also argues against tariff policies that would inefficiently charge such resources for costs they do not cause to either the distribution system or the transmission system and argues that efficient pricing is consistent with the competitive objectives of the Alberta energy market.

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

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

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

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

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

Alberta Utilities Commission (“AUC”) Proceeding 26090 DG Credit Module for Fortis’s 2022 Phase II Tariff Application, Evidence in Support of Kalina Distributed Power and Capstone Infrastructure Corporation, December 14, 2020. This expert report discusses the economic and electrical equivalence of distribution connected

generation (DCG) to reduced load on the distribution level and the resulting effects on transmission rates and cost recovery in the Alberta power system. This report also points out that DCG is not the cause of so-called erosion of billing determinants from the transmission system costs, but those are caused by over-forecasting load and transmission overbuild. The report argues for retention of Fortis's DCG Credit based on cost causation principles given DCG helps reduce loading on the transmission system.

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

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

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

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

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

Rebuttal Report Regarding the Review and Evaluation of Alternatives and Benefit Cost Analysis Prepared for Renovo Energy Center in Clean Air Council et al. v. Pennsylvania Department of Environmental Protection, Environmental Hearing Board Docket No. 2021-055, May 2, 2022. This report responds to Appellants refuting

statements regarding benefit-cost analyses, facts regarding the PJM and NYISO markets, and assertions emissions increases of the proposed facility.

Department of Environmental Protection, Environmental Hearing Board Docket No. 2021-055 Affidavit Prepared for Renovo Energy Center, July 18, 2022. This responds to Appellants affidavits regarding emissions data, PA DEP not being responsible for generator entry and exit decisions, and logical flaws in Appellants Expert benefit-cost analysis.

PJM Interconnection, L.L.C., Docket No. ER22-2984-000; Periodic Review of Variable Resource Requirement Curve Shape and Key Parameters, Affidavit in Support of Protest of J-Power USA Development Co. Ltd., October 21, 2022. This affidavit explains why PJM's choice of a 20-year asset life for the Reference Resource Net CONE in the ComEd LDA is in error due to the Climate and Equitable Jobs Act (CEJA) that requires all gas resources reach zero net emissions by 2045. Additionally, the affidavit explains that such LDA specific adjustments for the Energy and Ancillary Service Offset and CONE area differences for labor are common, hence reducing the asset life in ComEd would reasonably be accommodated.

PJM Interconnection, L.L.C., Docket No. ER22-2984-000; Periodic Review of Variable Resource Requirement Curve Shape and Key Parameters, Reply Affidavit in Support of Protest of J-Power USA Development Co. Ltd., November 18, 2022. In response to the answers filed by PJM and the Public Interest Entities to explain why their responses are irrelevant and/or fail to address the concerns J-POWER brought up in its protest with regard to the effect of the Illinois Climate and Equitable Jobs Act on the Commonwealth Edison Company Locational Deliverability Area ("LDA") in the PJM capacity market. I explain here that what PJM proposes to do in its filing is a violation of the spirit and intent of PJM's FERC-approved Tariff and Reliability Assurance Agreement if not a direct failure to follow the plain terms of the governing documents and I provided evidence showing the reliability urgency that is forthcoming in the ComEd LDA requires a shorter asset life for the Reference Resource to be used in developing the Variable Resource Requirement Curve used in PJM's capacity auctions.

PJM Interconnection, L.L.C., Docket No. ER23-729 and EL23-19; Protest of PJM's Filing to Change the Locational Deliverability Area Reliability Requirement in the midst of the 2024/2025 BRA in support of the Electric Power Supply Association, January 20, 2023. This affidavit argues PJM's proposed solution is clearly retroactive rather than prospective, upsets settled expectations, introduces unnecessary uncertainty, and is bad market design, creates a false equivalence between physical reliability needs as determined by PJM's own planning methods with its own ideas of economic supply-demand balance, ignores the real reliability problems that exist in DPL-South as evidenced by historically high prices, tight supply-demand conditions, and the auction outcome PJM seeks to avoid, and the market outcome was easily anticipated.

Aurora Generation, LLC, Elwood Energy LLC, Jackson Generation, LLC, Lee County Generating Station, LLC, Lincoln Generating Facility, LLC, LSP University Park, LLC, Rockford Power, LLC, Rockford Power II, LLC, University Park Energy, LLC, Complainants, v. PJM Interconnection, L.L.C., Respondent. Docket No. EL23-54, April 3, 2023. I show throughout Elliott, PJM power prices and underlying transmission congestion and the ComEd supply-demand balance were inconsistent with the idea that PJM was in any kind of emergency condition in ComEd through the December 23 and 24 PAI intervals. ComEd Zone generators would not have been able to deploy reserves to the rest of PJM. During the final 12 hours of the PAI event on December 24, energy and reserve prices were inconsistent with the idea there were emergency conditions. The lack of timely commitments of generation in ComEd, the cost of gas fired generation in ComEd based on intra-day gas prices were inconsistent with economic dispatch of gas fired resources in ComEd to support the rest of PJM or exports out of PJM. I also showed PJM violated its Tariff, Operating Agreement ("OA"), NERC standards, and PJM Manuals by allowing exports to continue while PJM entered reserve shortages, failing to curtail Non-Firm export transactions prior to and during Emergency Actions, and failing to recall exports supported by PJM Capacity Resources, and in effect employing emergency load management to support non-firm exports.

Coalition of PJM Capacity Resources, Complainants, v. PJM Interconnection, L.L.C., Respondent. Docket No. EL23-55, April 4, 2023. In this testimony I showed how PJM lacked situational and operational awareness leading up to

and during Winter Storm Elliott and violated its Tariff and operating procedures: 1) Despite the clear and consistent weather forecasts as early as seven days prior to Winter Storm Elliott, PJM's demand forecast failed to account for the impending weather conditions. PJM Day-ahead Energy Market commitments were inconsistent with the impending reliability needs that were being signaled by other factors and that were realized in real-time operations. 3) PJM failed to notice that gas pipelines serving PJM gas-fired generation had issued critical notices asking or ordering shippers to avoid gas imbalances and adhere to nomination and flow times and 24-hour ratable takes and failed to understand the timing of gas nominations and flows on pipelines and how that would affect the intra-day scheduling and commitment of gas fired resources to serve the load which had been grossly under-forecast. 4) PJM, ignoring the weather forecast relative to the load forecast and gas pipeline notices, failed to commit sufficient additional resources per its Emergency Operating Procedures to ensure sufficient generation was available. 5) PJM missed the clear signals from the natural gas markets that showed extremely high gas prices throughout PJM indicating the severity of the cold weather coming, contrary to the PJM load forecast. 6) PJM continued to flow non-firm exports and exports that were likely supported by PJM Capacity Resources and while employing emergency load management contrary to the PJM Tariff and emergency operating procedures.

East Kentucky Power Cooperative, Inc., Complainant, v. PJM Interconnection, L.L.C., Respondent. Docket No. EL23-74, May 31, 2023. I supported EKPC's Complaint in an affidavit that builds upon testimony I have already provided in Complaints filed at FERC in Docket Nos. EL23-54 and EL23-55 with the following updates and additions: 1) Identification of 5-minute intervals experiencing Primary or Synchronized Reserve Shortages in which there was also a Maximum Emergency Generation event and/or emergency demand response in place. 2) Matching the identified 5-minute intervals with the volume of Net Scheduled Exports delineated by different levels of transmission service as posted by PJM on its OASIS. 3) A description of why PAIs should not be triggered by a PJM emergency declaration alone such as the call for Pre-Emergency and Emergency Demand Response and/or Maximum Generation Emergency Actions but should also be accompanied by evidence of a Primary and/or Synchronized Reserve Shortages. 4) Assessed what Primary or Synchronized Reserve Shortages would have existed had all Non-Firm (on a transmission reservation basis) exports to the Tennessee Valley Authority and Duke Energy Carolinas and Duke Progress been curtailed as is required under NERC EOP 011-12. I also provided a background history regarding PJM's Capacity Performance ("CP") design explaining that CP did not envision or contemplate exports to neighboring control areas because it was assumed PJM, if it were in emergency conditions, would have been a net importer of energy, and why exports to support external loads during a PAI is inconsistent with cost causation principles. I also showed why the current Penalty Charge Rate based on Net CONE results in undesirable reliability outcomes as it can lead to a loss of multiple years of capacity revenue within the span of only two days, and the loss of capacity that occurred during Elliott.

LS Power Development, Inc., Complainant, v. PJM Interconnection, L.L.C. and Monitoring Analytics, LLC, as the Independent Market Monitor for PJM, Respondents. Docket No. EL24-91, March 20, 2024. I supported LS Power's Complaint in an affidavit that provided a background history of the Opportunity Cost methodology in PJM. I also explained why the Market Monitor calculation remained undocumented, undefined and potentially flawed based on my experience in developing the original Opportunity Cost calculation methodology in 2009 while I was at PJM.

Protest of the Electric Power Supply Association in Sierra Club, et.al., Complainant, v. PJM Interconnection, L.L.C., Respondent. Docket No. EL24-148, October 24, 2024. Based on my experience and knowledge of Part V of the PJM Tariff, I showed why reliability must run ("RMR") are retained as transmission assets and have never been considered Capacity Resources in PJM and thus have no obligation to be included in the RPM Capacity Market. I also demonstrated the market inefficiencies and distortions that would be created by inserting RMR units into the RPM Capacity market as requested in the Complaint. The end results would be further reliability problems as the prices on the RPM Capacity Market would not be consistent with the reliability needs of the system. This affidavit was also cited and included in Docket Nos. EL25-18 and ER25-1357.

Answer of the Electric Power Supply Association in Sierra Club, et.al., Complainant, v. PJM Interconnection, L.L.C., Respondent. Docket No. EL24-148, October 31, 2024. This affidavit responded to the Comments of the Independent Market Monitor for PJM ("IMM") explaining how the IMM's proposed solutions were inefficient, how the IMM's statements were logically inconsistent with the treatment of RMR units in the PJM Energy Market, and how the IMM's

arguments regarding the calculation of certain parameters (CETO and CETL) were inconsistent with standard practice.

Comments of the Electric Power Supply Association in PJM Interconnection, L.L.C., Docket No. ER25-682, January 6, 2025. My affidavit in EL24-148 on October 24, 2024 is included in support of EPA's comments. Filing proposes to insert RMR units into the RPM Capacity Market Supply stack, the problem of which I addressed in my affidavit in EL24-148.

Protest of the Electric Power Supply Association in Governor Josh Shapiro and The Commonwealth of Pennsylvania, Complainants, v. PJM Interconnection, L.L.C., Respondent. Docket No. EL25-46, January 21, 2025. This affidavit counters the arguments made in the Complaint that a cap of prices in the RPM Capacity Market is needed. I argue that such a policy would be economically inefficient and contrary to achieving reliability in PJM. As part of the core argument I provide historic data, explain that there are potential resources available in the form of demand response, and the overall background for the RPM Capacity Market that was designed to periodically hit the maximum price as originally intended as well as occasionally not meeting the reliability requirements in all years.

Protest of Indicated Merchant Generators in PJM Interconnection, L.L.C., Docket No. ER25-1357, March 17, 2025. This affidavit explains the filing PJM makes in this docket to place a hard cap and floor on capacity market prices for the 2026/2027 and 2027/2028 Base Residual Auctions would be economically inefficient, harm reliability, ignore market realities and transforms financial risk into reliability risk for consumers. I also explain, contrary to PJM's assertions, that the RPM Capacity Market was designed with volatility in demand and supply conditions in mind as well as showing that PJM capacity prices had historically been low relative to other surrounding markets resulting in capacity wishing to leave PJM for other markets.

POLICY WHITEPAPERS and Reports

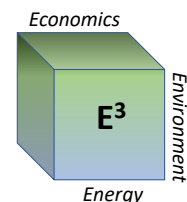
NYISO Meter Data Study-Final Report, December 8, 2017. Available at <https://www.nyiso.com/documents/20142/1391862/NYISO-Meter-Data-Study-Report.pdf/db0de386-04b1-8818-3f77-194bc71a8c37>. This report examines the meter data policies in the NYISO in comparison to similar policies in PJM, CAISO, and ISO-NE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

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

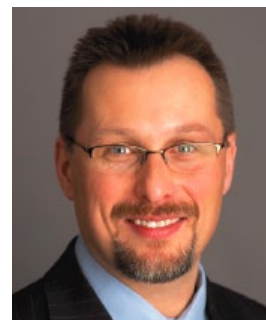
The Market and Financial Position of Nuclear Resources in Ohio, May 13, 2019. Available at <https://img1.wsimg.com/blobby/go/30b6d3a5-dffd-4a1b-9b4d-0bf3451282cd/downloads/OH%20Nuclear%20Analysis%2020190513-final.pdf?ver=1559092681975>. This paper shows that nuclear resources in Ohio, Davis-Besse and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

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

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



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Paul M. Sotkiewicz, Ph.D.

President and Founder, E-Cubed Policy Associates, LLC

Paul M. Sotkiewicz, Ph.D. is the President and Founder of E-Cubed Policy Associates, LLC (“E-Cubed”), an energy and environmental economic consultancy based in Gainesville, Florida that started in 2016. Dr. Sotkiewicz brings nearly 30 years of experience across parts of four decades at the intersection of utility regulatory policy, power system economics, and environmental economics to provide analysis and advice to private and public sector clients on a range of economic issues related to electricity market design and performance, power generation economics, market power mitigation, utility regulatory policy, distributed energy resources and the economic impacts of state and federal environmental policies on the power and gas industries. Dr. Sotkiewicz also supports law firms in litigation proceedings including rate cases, need determinations, rate design and market power/manipulation cases.

Clients have included:

Market and system operators

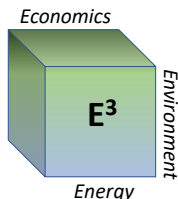
- Alberta Electric System Operator
- New York Independent System Operator
- Electric Reliability Council of Texas
- Independent Electric System Operator (Ontario)

Trade associations such as the

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

Merchant generation and transmission developers and operators in North American power markets

- ITC Holdings,
- JPower USA Ltd.
- Panda Power Funds
- Vistra Energy
- ENMAX
- Rockland Capital



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- Kalina Distributed Power
- Capstone Infrastructure Corporation
- Pine Gate Renewables
- NextEra Energy Resources
- PVOne
- Bechtel
- Tenaska
- Earthrise Energy, PBC
- LS Power
- Coalition of PJM Capacity Resources which included resources owned by GenOn, Talen Energy, Tyr Energy, Clean Energy Futures, and Competitive Power Ventures among others.

Generation and transmission cooperatives

- Intermountain Rural Electric Association
- Buckeye Power
- East Kentucky Power
- Dairyland Power Cooperative

Non-Governmental Entities

- Natural Resources Defense Council
- Southern Environmental Law Center

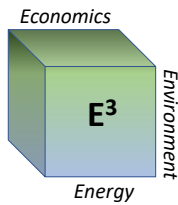
Regulatory Agencies/Governmental Entities

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

Natural Gas Industry Customers

- Blue Racer Midstream

Prior to founding E-Cubed, Dr. Sotkiewicz worked for PJM Interconnection, LLC in the role of Chief Economist and as a Senior Economic Policy Advisor. At PJM, Dr. Sotkiewicz provided analysis and advice regarding all aspects of PJM's markets and supported regulatory filings and implementation of market design changes. At PJM Dr. Sotkiewicz led initiatives related to shortage pricing and real-time dispatch co-optimization of energy and reserves, integration of demand response in PJM's markets including price formation and compensation of demand resources. At PJM Dr. Sotkiewicz supported PJM's regulatory position with respect to the application of the Three Pivotal Supplier Test supplier market power, helped develop an opportunity cost calculator for run-limited resources used for market mitigation purposes, and administered implementation of the minimum offer price rule (MOPR) to curb buyer-side



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market power in the PJM capacity market. Dr. Sotkiewicz also authored or co-authored a series of policy analyses and whitepapers on ranging from transmission cost allocation to gas-electric coordination to the effects of environmental rules on PJM's markets. While at PJM, Dr. Sotkiewicz was a frequent speaker at FERC Computation Technical Conferences related to advances in unit commitment models and computation methods that could be applied in ISO/RTO markets.

As an economist at the United States Federal Energy Regulatory Commission (FERC) in the Office of Economic Policy and later, on the Chief Economic Advisor's staff at Dr. Sotkiewicz conducted research and provided analysis and advice on market design issues related to the ISO/RTO markets, in particular the California ISO and New York ISO, as they were being formed and implemented and worked on merger cases to analyze any potential for market power. As part of this work, Dr. Sotkiewicz has co-authored peer review articles related to unit commitment models and price formation to account for discrete decisions related to start-up, shut-down, and minimum run conditions.

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

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