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

Governor Josh Shapiro and The	)
Commonwealth of Pennsylvania	)
	)
V.	)
	)
PJM Interconnection, L.L.C.	)

Docket No. EL25-46-000

#### PROTEST OF THE PJM POWER PROVIDERS GROUP

The PJM Power Providers Group hereby protests<sup>1</sup> Pennsylvania's Complaint<sup>2</sup> seeking to lower the price cap in the next two capacity auctions by more than the thirty percent reduction that would already result from PJM's pending market reforms.<sup>3</sup> By doing so, Complainants calculate a \$20.4 billion price reduction this year over two auctions. But it comes at great cost: it disregards that most of the PJM region is staring at a reliability shortfall; it chills investment in new and existing supply; and it prolongs market volatility. Delaying the signals that the capacity market is *trying to send today* inevitably results in *higher prices* and *increased costs* to consumers in the long run. While P3 appreciates Complainants' objective to ensure just and reasonable rates for consumers, there is no free pass that avoids the infrastructure costs of ensuring electric reliability.

P3 also appreciates Governor Shapiro's desire to address PJM's resource adequacy challenges through market-based solutions. Governor Shapiro and the complaint recognize the value that markets have provided to PJM's consumers and would like that to continue. The

<sup>&</sup>lt;sup>1</sup> The PJM Power Providers Group ("P3") is a non-profit organization dedicated to advancing federal, state, and regional policies that promote properly designed and well-functioning electricity markets in the PJM Interconnection, L.L.C. ("PJM") region. These comments represent the position of P3 as an organization but not necessarily the views of any particular member with respect to any issue. For more information on P3, visit <u>www.p3powergroup.com</u>. P3 submits this protest pursuant to Rule 211, 18 C.F.R. § 385.211.

<sup>&</sup>lt;sup>2</sup> Shapiro v. PJM Interconnection, L.L.C., Docket No. EL25-46-000 (filed Dec. 30, 2024) ("Complaint") (Governor Shapiro and the Commonwealth of Pennsylvania, collectively, "Pennsylvania" or "Complainants").

<sup>&</sup>lt;sup>3</sup> Complaint at 2; see also infra at 6 (discussing PJM's pending proposal to change the reference resource).

Governor is correct about that. But P3 and its member companies have already agreed to a thirty percent reduction to the capacity market offer cap that he complains about and P3 members have done so in the face of capacity prices clearing at unsustainably low prices in three of the last four auctions. This is while P3 members are being asked to invest billions of dollars of at-risk capital in order to answer the call of the PJM CEO who said, "We need capacity—a lot of capacity."<sup>4</sup> Again, P3 appreciates the Governor's enthusiasm for wholesale power market issues; however, it is important that the broader impact of granting the complaint and its reliability and cost implications be understood. And it that context, the complaint must be rejected.

#### INTRODUCTION AND SUMMARY

Pennsylvania is right that "record load growth is making it *plainly evident that new capacity is needed* in the marketplace and *the capacity market is responding as designed with a strong build signal.*"<sup>5</sup> But this admission requires a Commission finding dismissing the Complaint. Pennsylvania cannot meet its Federal Power Act section 206 burden to demonstrate that the existing capacity construct is unjust and unreasonable while simultaneously arguing that "the capacity market is responding as designed" to a "plainly evident" reliability shortfall.

Complainants seek an outlet from these "strong build signals," claiming they essentially are too "strong" because of interconnection queue challenges and because—according to its assumptions—no one has enough time to respond. Complainants begin by criticizing the signals themselves, claiming prices were "arbitrarily high" in the July 2024 auction.<sup>6</sup> In support,

<sup>&</sup>lt;sup>4</sup> See PJM Inside Lines, "Asthana at OPSI: 'We Need Capacity'" (Oct. 22, 2024), https://insidelines.pjm.com/asthana-to-opsi-we-need-capacity/.

<sup>&</sup>lt;sup>5</sup> Complaint at 23 (emphasis added).

<sup>&</sup>lt;sup>6</sup> Id., Att. 1, Declaration of Kris Aksomitis ("Aksomitis Declaration"), at P 34.

Complainants' witness, Kris Aksomitis, provides this comparison of PJM capacity prices against the net Cost of New Entry over the past 14 years:<sup>7</sup>

**PJM Capacity Auction Evaluation** 

POWER

ADVISORY

#### Figure 3: Base Auction RTO Resource Clearing Price and Net CONE<sup>45</sup> \$400 \$351 \$342 \$331 \$350 \$322 \$318 \$31 \$301 \$299 \$293 \$293 \$275 \$300 \$276 \$270 \$26 \$250 \$200 \$165 \$140 \$136 \$126 \$150 \$119 \$100 \$77 \$100 \$50 \$34 \$2 \$50 \$16 \$∩ 2025/2026 2012/2013 2013/2014 2017/2018 2020/2021 2021/2022 2022/2023 2023/2024 20242025 2016/2017 Resource Clearing Price Net CONE (UCAP Terms, \$/MW-Day)

Complainants' analysis demonstrates that for the first 13 of these 14 years, prices on average and over time were barely more than *one quarter* of the net cost of new entry.<sup>8</sup> In the capacity auction *for the current delivery year* (2024/2025)—as a supply crisis loomed—prices were *less than ten percent of Net CONE*. Pennsylvania also is right when it states that "True Net CONE itself is sufficient (and theoretically exactly correct)"<sup>9</sup> as the price in the capacity market. Indeed, "a legion of prior Commission orders hold[] that the purpose of capacity markets is to attract and retain sufficient capacity to maintain reliability requirements, and to do so, prices need to average out over time to the cost of new entry."<sup>10</sup>

<sup>&</sup>lt;sup>7</sup> Aksomitis Declaration, Exh. A, "PJM Capacity Auction Evaluation" (Dec. 23, 2024), at 21, Figure 3.

<sup>&</sup>lt;sup>8</sup> Clearing prices were 26.7 percent of Net CONE in the thirteen years between the 2012/2013 and 2024/2025 capacity auction. Clearing prices were 32.1 percent of Net CONE over the entire fourteen-year period.

<sup>&</sup>lt;sup>9</sup> Complaint at 29.

<sup>&</sup>lt;sup>10</sup> Calpine Corp. v. PJM Interconnection, L.L.C., 171 FERC ¶ 61,035, at P 157 (2020) (citing, *e.g.*, *ISO New England Inc.*, 158 FERC ¶ 61,138, at P 52 (2017) ("[T]he purpose of the FCM is to enable [the RTO] to procure sufficient capacity to ensure reliability.... [T]o do so, the FCM will need to clear, on average, over time, at or near Net CONE."); *N.Y. Indep. Sys. Operator, Inc.*, 144 FERC ¶ 61,126, at P 26 (2013) ("In order to encourage new resources to be built

One cannot look at Complainants' analysis and graphic and conclude that capacity prices are too high on average and over time. Too low? Yes, unequivocally. And in the July 2024 auction—the single auction where prices *were anywhere near Net CONE*—they were only 18 percent above it at a time when the market is calling for new capacity. The reliability challenge did not happen overnight. It has been building for years as the market kept clearing at low prices.<sup>11</sup>

Yet Complainants conclude that the July 2024 auction prices went "through the roof without a concomitant benefit" and this is its primary evidentiary showing in support of its claim that the capacity market is unjust and unreasonable.<sup>12</sup> Complainants' error is that while its *analysis* correctly examines long term prices, its *conclusion* focuses on a snapshot from a single year without any consideration for long-term investment signals. This is not how to analyze a market designed to achieve Net CONE *on average and over time*.<sup>13</sup> Or, as Zachary Ming, P3's witness and expert in the economics of electric market design, testifies, "[t]he relevant aspect upon which to assess prices is their absolute level, not on year-to-year changes in prices."<sup>14</sup>

in the new capacity zone when they are needed, capacity prices on average over time must approximate the net cost of new entry in the new capacity zone. Otherwise, developers will be reluctant to build the new capacity that will be needed as load grows and resources retire over time."); *PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,331, at P 91 (2006) ("If capacity prices approximate the Cost of New Entry in some years and fall significantly below the Cost of New Entry in the other years, the average capacity price over time would be less than the Cost of New Entry. Such a result would not encourage new entry, since a potential new entrant would not expect to receive revenues over time that covered its fixed costs." The Commission further concluded that the new entry price adjustment provision at issue, "encourage[d] new entry by ensuring that new entrants do not see a precipitous decline in prices after entry, [while] also encourage[ing] existing generators not to retire prematurely.")).

<sup>&</sup>lt;sup>11</sup> See, e.g., Reliability Technical Conference, Resource Adequacy and Expected Load Growth, Statement of Aftab Khan on Behalf of PJM Interconnection, L.L.C., Docket No. AD24-10-000 (Oct. 15, 2024), at 2 ("PJM currently projects a potential shortfall in generation supply by the end of this decade.").

<sup>&</sup>lt;sup>12</sup> Complaint at 17.

<sup>&</sup>lt;sup>13</sup> In the worst year (2012/2013), capacity prices were 5.7 percent of the cost of new entry (*i.e.*, 94.3% below Net CONE), or *17.25 times lower than required to sustain reliability* over the long term. Pennsylvania's Complaint is based on prices from a single year at 18 percent above Net CONE.

<sup>&</sup>lt;sup>14</sup> See Exhibit 1 hereto, Testimony of Zachary Ming ("Ming Testimony") at 20.

Complainants also charge that the existing capacity market is unjust and unreasonable because it allegedly "was not built for this environment"<sup>15</sup> and ill-equipped to handle "unforeseen market changes"—primarily "[d]ramatic increases in load growth forecasts,"<sup>16</sup> that it characterizes as "record load growth," "explosive load growth," and "growing load growth."<sup>17</sup> To the contrary, these high growth scenarios are among the exact scenarios that PJM studied and accommodated in the design—and the Commission considered in the approval of—the existing demand curve and capacity market.<sup>18</sup> The "strong build signal" is by design given supply and demand fundamentals.

After attacking prices in the last auction, Complainants next assume that prices will be high in the upcoming July 2025 and December 2025 auctions, averring that the twelve months between the July 2024 and the July 2025 auctions is insufficient time to build new resources to resolve the ongoing reliability shortfall. This also fails as probative evidence that the current capacity market is unjust and unreasonable. *First*, no one knows what prices will be in future auctions. This is why *all sophisticated market participants routinely hedge* their positions—to mitigate the risks of market uncertainty.<sup>19</sup> *Second*, while it is true that PJM faces a supply shortfall, this is not a reason to *weaken* market signals to add supply. *Third*, Complainants' conjecture that there only can be a minimal response to price signals—from resources currently in the interconnection queue or otherwise—is incorrect. Mr. Ming testifies of the significant response that can reasonably be expected in response to a "strong build signal."<sup>20</sup> P3 also provides the declaration of Samuel

<sup>&</sup>lt;sup>15</sup> Complaint at 2.

<sup>&</sup>lt;sup>16</sup> *Id.* at 14.

<sup>&</sup>lt;sup>17</sup> See, e.g., *id.* at 17, 23, 27.

<sup>&</sup>lt;sup>18</sup> See Ming Testimony at 18 ("PJM's Fifth Quadrennial Review of the VRR curve evaluated many years with higherthan-expected load growth and lower than expected supply.").

<sup>&</sup>lt;sup>19</sup> Ironically, the most difficult risk to hedge against is the risk of *regulatory intervention in the markets*, primarily consisting of last-minute (or even retroactive) changes in the market rules. This risk is not driven by supply and demand fundamentals.

<sup>&</sup>lt;sup>20</sup> See id. at 32-33 (discussing quantities in MWs of potential resources and refuting Complainants' 770 MW projection).

Siegel, Vice President for Wholesale Market Strategy for Vistra Corp. ("Vistra"),<sup>21</sup> and incorporates by reference evidence already in the record in other proceedings,<sup>22</sup> regarding the strong investment response of developers since the July 2024 auction.<sup>23</sup> *Fourth*, several regions' capacity constructs already hold auctions much closer in time to the delivery year, so it is not a legitimate criticism to suggest PJM's markets are unworkable because of the current Commission-approved shorter planning horizons. The Commission would not have approved the shorter planning horizons in the last several auctions if it muted the effectiveness of the capacity construct as a long-term investment signal to ensure reliability.

*Finally*, another critical failing with Complainants' assumptions about future prices is the fact that PJM has two pending Federal Power Act section 205 filings proposing numerous fundamental changes to the capacity market construct.<sup>24</sup> Complainants agree that the pending PJM 205 Filings include "price suppressive proposals"<sup>25</sup> and other "changes [that] would affect the price cap"<sup>26</sup> that—according to Complainants—"will improve matters" (*i.e.*, by lowering prices).<sup>27</sup> Most significantly for the instant Complaint, this includes PJM's proposed change in the First PJM 205 Filing to replace the reference resource with a Combustion Turbine—which *P3 supports*.<sup>28</sup>

<sup>&</sup>lt;sup>21</sup> See Exhibit 2 hereto, Declaration of Samuel Siegel ("Siegel Declaration").

<sup>&</sup>lt;sup>22</sup> See Protest of Calpine Corporation and LS Power Development, LLC, Exh. 2, Testimony of Suriyun Sukduang, Exh. 3, Testimony of Nathan Hanson, *Sierra Club v. PJM Interconnection, L.L.C.*, Docket No. EL24-148-000 (filed Oct. 24, 2024).

<sup>&</sup>lt;sup>23</sup> See Siegel Declaration at ¶ 3 ("In response [to the July 2024 Auction], "[Vistra] immediately commenced a comprehensive effort to evaluate potential development opportunities across Vistra's PJM footprint to be in a position to respond to ongoing capacity market price signals.").

<sup>&</sup>lt;sup>24</sup> *PJM Interconnection, L.L.C.*, Docket No. ER25-682-000 (filed Dec. 9, 2024) ("First PJM 205 Filing"); *PJM Interconnection, L.L.C.*, Docket No. ER25-785-000 (filed Dec. 20, 2024) ("Second PJM 205 Filing") (and collectively, "PJM 205 filings"); *see* 16 U.S.C. § 824d (FPA section 205).

<sup>&</sup>lt;sup>25</sup> Complaint at 13.

<sup>&</sup>lt;sup>26</sup> Motion to Consolidate and Request for Expedited Action of Governor Josh Shapiro and the Commonwealth of Pennsylvania, Docket Nos. EL25-46-000, ER25-682-000, & ER25-785-000 (filed Jan. 6, 2025) ("Motion") at 4.

<sup>&</sup>lt;sup>27</sup> Complaint at 2.

<sup>&</sup>lt;sup>28</sup> See Comments and Request to Sever of the PJM Power Providers Group, Docket No. ER25-682-000 (filed Jan. 6, 2025) at 3-5 ("P3 fully supports the Combustion Turbine reference unit.").

This change alone would, according to PJM's calculations, automatically reduce the price cap from \$696 to \$499/MW-Day, which is nearly a *thirty percent reduction in the price cap*.<sup>29</sup> Acceptance of the PJM 205 Filings thus would largely resolve, or at least meaningfully mitigate and alter, Pennsylvania's underlying concerns over the price cap—a fact that the Pennsylvania itself acknowledges.<sup>30</sup>

For all these reasons, it is insufficient for Complainants to merely assume high prices in the upcoming auctions to meet its section 206 burden in this docket that the existing capacity construct is unjust and unreasonable.

Complainants thus fail their evidentiary burden of proof that the existing capacity market is unjust and unreasonable. Accordingly, the Complaint must be rejected and there is no justification to consider Complainants' proposed replacement rate, which is to further reduce the price cap beyond the thirty percent already anticipated in the First PJM 205 Filing. If the Commission agrees with Complainants that the current capacity market is unjust and unreasonable based on Complainants' showing in this docket, the Commission should still not accept Complainants' proposed replacement rate.

The price cap is the administrative mechanism that blocks capacity prices from rising above a pre-set level during a capacity auction even though supply is needed above that price. The price cap currently is the *higher of* Gross CONE or 1.75 times Net CONE. Complainants seek to reset

<sup>&</sup>lt;sup>29</sup> See First PJM 205 Filing, Att. C, Affidavit of Dr. Samuel A. Newell, at  $\P$  8 ("retaining a [Combustion Turbine] ... as reference technology will have the following effects" on the demand curve: "the price cap ... would be reduced from \$696 to \$499/MW-Day UCAP, mitigating the price risk faced by customers in the event that the market clears short, yet still providing strong incentives to activate available supply response and preserving RPM's long-term model for supporting investment, in part by paying new and existing capacity more during tighter conditions.").

<sup>&</sup>lt;sup>30</sup> Motion at 4 ("PJM has not proposed direct changes to the price cap formula maximum (*although its changes would affect the price cap*).") (emphasis added); *id.* at 6 (same).

the price cap to 1.5 times Net CONE, which Complainants calculate would reduce auction prices by \$20.4 billion in the two 2025 auctions.

Complainants have not demonstrated that their proposed replacement rate would achieve anything in the current capacity construct other than the potential for a near-term price reduction, which could come at the cost of significant long-term harm, including higher prices and greater overall costs for consumers. Instead, should the Commission grant the Complaint, it should limit any replacement rate to PJM's already proposed change to the reference unit and its concomitant reduction to the price cap.

The Commission must also remain (1) cognizant of its critical role in preserving the customer benefits of electricity markets and (2) vigilant in allowing markets to operate without undue regulatory interference and "command-and-control" intervention. Markets cannot work if every single time prices rise to reflect a shortage of supply—which is how the markets *are designed to function*—regulators allow well-meaning but near-term focused complaints to "reform" the market design to immediately suppress capacity market prices.<sup>31</sup> Capacity markets already are designed to reduce volatility and spread out the cost impact of supply shortfalls over time. If the mechanism created to "mitigate the impact" of these costs on consumers is itself always being mitigated, the reality is that costs will increase over time as investors flee from a market with unlimited downside exposure and severely constrained upside potential. Needed resources will not respond to constantly muted market signals.

<sup>&</sup>lt;sup>31</sup> Chairman Christie termed this "endless Rube Goldberg tinkering," as recited in the Complaint. Complaint at 31 (citing *See PJM Interconnection, L.L.C.*, 182 FERC ¶ 61,073 (Feb. 14, 2023), (Christie, Comm'r, concurring at ¶ 2) (describing tinkering "with the minute details of the capacity market construct ... has gone on for years and never reaches a point of stability, *yet stability of market design is essential to attract the necessary capital investment in capacity resources.*") (emphasis added)).

Yet this is the third complaint since the July 2024 auction<sup>32</sup> seeking to "drive outcomes"<sup>33</sup> to immediately lower auction prices, not to mention PJM's pending section 205 filings. And the developers and investors relying on the "strong build signal" the market was designed to elicit are castigated as the "interests that stand to benefit from imposing billions in gratuitous costs on customers."<sup>34</sup> The purpose of a capacity market is not to ensure artificially low prices year after year after year. It is to marshal competitive forces to ensure electric reliability at the lowest prices over time. The Commission must reject the Complaint.

#### PROTEST

# I. Complainants Fail Their Section 206 Burden to Show that the Existing Rate Is Unjust and Unreasonable

Under FPA section 206,<sup>35</sup> the Commission must follow "a two-step procedure that requires ... an explicit finding that the existing rate is unlawful before setting a new rate."<sup>36</sup> Thus, as a threshold matter, the Commission must first "determine whether an existing [rule] is 'unjust, unreasonable, unduly discriminatory or preferential...."<sup>37</sup> And "[o]nly *after* having made the determination that the utility's existing [rule] fails that test may [the Commission] exercise its section 206 authority to impose a new [rule]."<sup>38</sup> "In other words, a finding that an existing rate is

<sup>&</sup>lt;sup>32</sup> Sierra Club v. PJM Interconnection, L.L.C., Docket No. EL24-148-000 (filed Sep. 27, 2024); Joint Consumer Advocates v. PJM Interconnection, L.L.C., Docket No. EL25-18-000 (filed Nov. 18, 2024); Complaint.

<sup>&</sup>lt;sup>33</sup> Aksomitis Declaration at P 19.

<sup>&</sup>lt;sup>34</sup> Notice Denying Extension of Time, *Shapiro v. PJM Interconnection, L.L.C.*, Docket No. EL25-46-000 (Jan. 16, 2025) at 1 (summarizing opposition to motion for extension). As noted earlier, P3 and its members are strongly supporting a 30% reduction to the capacity market offer cap in ER25-682-000.

<sup>&</sup>lt;sup>35</sup> See 16 U.S.C. § 824e.

<sup>&</sup>lt;sup>36</sup> Emera Me. v. FERC, 854 F.3d 9, 24 (D.C. Cir. 2017); see also MISO Transmission Owners v. FERC, 45 F.4th 248, 253 (D.C. Cir. 2022) ("At step one, FERC decides if the old rate is unjust and unreasonable. ... If so, then FERC proceeds to step two and sets a new rate.") (citing 16 U.S.C. § 824e(a)).

<sup>&</sup>lt;sup>37</sup> Emera Me., 854 F.3d at 21 (quoting 16 U.S.C. § 824e(a)).

<sup>&</sup>lt;sup>38</sup> Id.

unjust and unreasonable is the 'condition precedent' to [the Commission's] exercise of its section 206 authority to change that rate."<sup>39</sup>

The complainant under section 206 bears the burden of demonstrating that the existing rule is unlawful.<sup>40</sup> A section 206 petitioner's claim "must be supported by 'substantial evidence."<sup>41</sup> "Regardless of whether [a section 206 petitioner] is charged with completing step two, proposing new just and reasonable rates, it still must complete step one, demonstrating that PJM's existing rates are unjust and unreasonable."<sup>42</sup> In determining whether the existing rate is unreasonable, the evidence must be "assessed in light of the FPA's goals of promoting reliable service at reasonable rates and developing plentiful energy supplies."<sup>43</sup>

If a section 206 petitioner successfully demonstrates that the existing rule is unjust and unreasonable, it must then present substantial evidence to show that its proposed replacement rate is just and reasonable. Complainants are transparent that they are "attempting to drive outcomes" in the capacity auction and spend most of the Complaint justifying the lower rates they seek.<sup>44</sup> But Complainants fail the step one burden to show that PJM's current capacity market is unjust and unreasonable and thus there is no need for the Commission to undertake the step two analysis of an appropriate replacement rate.

<sup>&</sup>lt;sup>39</sup> Id. at 25 (quoting FPC v. Sierra Pac. Power Co., 350 U.S. 348, 353 (1956)).

<sup>&</sup>lt;sup>40</sup> *Id.* at 24.

<sup>&</sup>lt;sup>41</sup> S.C. Pub. Serv. Auth. v. FERC, 762 F.3d 41, 65 (D.C. Cir. 2014) (per curiam) (quoting 5 U.S.C. § 706(2)(E)).

<sup>&</sup>lt;sup>42</sup> *FirstEnergy Serv. Co. v. FERC*, 758 F.3d 346, 353 (D.C. Cir. 2014) (affirming the Commission's finding that petitioner failed to meet its burden as to existing rates).

<sup>&</sup>lt;sup>43</sup> Constellation Mystic Power, LLC v. FERC, 45 F.4th 1028, 1035 (D.C. Cir. 2022) (per curiam) (citing Consol. Edison Co. v. FERC, 510 F.3d 333, 342 (D.C. Cir. 2007); NAACP v. FPC, 425 U.S. 662, 669–70 (1976)).

<sup>&</sup>lt;sup>44</sup> Aksomitis Declaration at P 19.

## A. Complainants Fail to Demonstrate "Arbitrarily High" Prices in Past and Future Auctions

Complainants try to prove that the current Reliability Pricing Model—the formal name for PJM's capacity market—is unjust and unreasonable with (1) allegations that prices were too high in the July 2024 auction and (2) assumptions that prices will be too high in the next two auctions, in July 2025 and December 2025. The prices were—and will be—too high, according to Complainants, because the market is not designed to accommodate current market conditions and there is insufficient time between auctions for new entry. Complainants fail to make their case that auction price outcomes have been or will be "arbitrarily high."<sup>45</sup>

# 1. Complainants Fail to Demonstrate that the July 2024 Auction Results Are Evidence of an Unjust and Unreasonable Capacity Market

Complainants' primary evidentiary allegation is that "[t]he 2025/2026 Base Residual Auction ... cleared at a price nearly ten times that of the immediately preceding auction"<sup>46</sup> and that this "revealed major issues with PJM's model."<sup>47</sup> To accept this conclusion as probative evidence that the Reliability Pricing Model is unjust and unreasonable, the Commission would have to agree with the Complainants that it is appropriate as a general matter to compare a single auction's clearing prices with the prior auction's clearing prices without any consideration for (1) market supply and demand fundamentals, (2) the design objectives of the market, (3) auction results on average and over time, or (4) whether the prior auction itself is an appropriate barometer

<sup>&</sup>lt;sup>45</sup> See New England Power Generators Ass'n, Inc. v. FERC, 879 F.3d 1192, 1200 (D.C. Cir. 2018) ("[Complainant] initiated its complaint pursuant to FPA § 206 and accordingly bore the burden of proof.").

<sup>&</sup>lt;sup>46</sup> Complaint at 1.

<sup>&</sup>lt;sup>47</sup> *Id.* at 11 ("The results of PJM's capacity auction for the 2025/2026 Delivery Year revealed major issues with PJM's model. That auction saw the clearing price increase almost tenfold from the previous auction: for most of the PJM region, the capacity price for the 2025/2026 delivery year increased from \$28.92/MW-day in the previous auction to \$269.92/MW-day, totaling \$14.7 billion in costs to consumers."). An equivalent analysis would be to argue that I cannot be insolvent because I saved ten times more money this year than last year; never mind that I only saved 10¢ last year and I have \$100K in debts coming due.

of just and reasonable prices. If the Commission cannot agree with the Complainants' underlying assumptions, it must reject the Complaint.

*First*, ignoring market supply and demand fundamentals in an auction price analysis would be akin to ignoring pulse in a life-or-death analysis. Pennsylvania in fact correctly summarizes current conditions in the marketplace and the July 2024 auction results, stating that "record load growth is making it plainly evident that new capacity is needed in the marketplace and *the capacity market is responding as designed with a strong build signal.*"<sup>48</sup> In a well-functioning market, this could "encourage investment in new generation and preserve reliability, both of which *Pennsylvania agrees are needed.*"<sup>49</sup>

After conceding this critical point, Pennsylvania never again mentions supply and demand fundamentals. But Pennsylvania is correct that it is "plainly evident" that the PJM region faces a supply shortfall. In February 2023, for example, PJM warned that "*[f]or the first time in recent history*, PJM could face decreasing reserve margins" because:

Our research highlights four trends below that we believe, in combination, present increasing reliability risks during the transition, due to a potential timing mismatch between resource retirements, load growth and the pace of new generation entry under a possible "low new entry" scenario:

• The growth rate of electricity demand is likely to continue to increase from electrification coupled with *the proliferation of high-demand data centers in the region*.

• Thermal generators are retiring at a rapid pace due to government and private sector policies as well as economics.

• Retirements are at risk of outpacing the construction of new resources, due to a combination of industry forces, including siting and supply chain, whose long-term impacts are not fully known.

• PJM's interconnection queue is composed primarily of intermittent and limited-duration resources. Given the operating characteristics of these

<sup>&</sup>lt;sup>48</sup> *Id.* at 23 (emphasis added).

<sup>&</sup>lt;sup>49</sup> *Id.* at 1 (emphasis added).

resources, we need multiple megawatts of these resources to replace 1 MW of thermal generation.  $^{50}$ 

In the Base Residual Auction for the 2024/2025 delivery year held in December 2022 (the auction that Complainants use as their price baseline), PJM reported "[s]upply offered into the RPM capacity market ... declined 2,192 MW.... This is the third [Base Residual Auction] in a row where the total Capacity offered ... has declined."<sup>51</sup>

The supply/demand balance has continued to erode in the two years since. In the July 2024 auction, PJM reported that "[s]upply offered into the RPM capacity market ... declined 13,252.1 MW.... This is the fourth [Base Residual Auction] in a row where the total Capacity offered ... has declined."<sup>52</sup> For comparison purposes, the ISO New England region's total nameplate capacity in 2023 was 38 GW—the same year that *PJM supply decreased by over 13 GW*.<sup>53</sup>

Any analysis whether clearing prices are "arbitrarily high" must explain why these conditions in the marketplace justify low prices. Complainants do not.

*Second*, "a legion of prior Commission orders hold[] that the purpose of capacity markets is to attract and retain sufficient capacity to maintain reliability requirements, and to do so, prices need to average out over time to the cost of new entry."<sup>54</sup> This means all prices, including energy and ancillary service market revenues. Accordingly, all capacity markets are designed to produce

<sup>&</sup>lt;sup>50</sup> PJM, *Energy Transition in PJM: Resource Retirements, Replacements & Risks*, (Feb. 24, 2023), at 2-3 (emphasis added), available at <u>https://www.pjm.com/-/media/DotCom/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx</u>. Also note the early warning regarding load growth due to "the proliferation of high-demand data centers in the region."

<sup>&</sup>lt;sup>51</sup> PJM, 2024/2025 RPM Base Residual Auction Results, at 2, available at: <u>https://www.pjm.com/-/media/DotCom/markets-ops/rpm/rpm-auction-info/2024-2025/2024-2025-base-residual-auction-report.ashx</u>.

<sup>&</sup>lt;sup>52</sup> PJM, 2025/2026 RPM Base Residual Auction Report," (July 30, 2024), at 3 (emphasis added), available at: <u>https://www.pjm.com/-/media/DotCom/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.ashx</u>.

<sup>&</sup>lt;sup>53</sup> 2023 State of the Markets, FERC Staff Report (March 21, 2024), at 38 (Figure 29), available at <u>https://www.ferc.gov/media/2023-state-markets-report</u>.

<sup>&</sup>lt;sup>54</sup> Calpine Corp. v. PJM Interconnection, L.L.C., 171 FERC ¶ 61,035, P 157 (2020) (citing, e.g., ISO New England Inc., 158 FERC ¶ 61,138, at P 52 (2017)).

revenues at the net Cost of New Entry ("Net CONE") (meaning capacity revenues less energy and ancillary service revenues) *on average and over time*.<sup>55</sup> Pennsylvania thus is right when it states that "True Net CONE itself is sufficient (and theoretically exactly correct)"<sup>56</sup> as the price in the capacity market. As Mr. Ming explains,

Both the Complainants and PJM acknowledge that achieving the reliability objective requires a market that is designed to produce capacity market prices at an *average of Net CONE over the long run*. For example, the Complainants state that "[n]et CONE is a barometer of the estimated support needed to bring a new unit [...] into the market." Similarly, the VRR Curve Review study commissioned by PJM states that "the capacity market outcome [...] long-run equilibrium assumption [is] that merchant generation will enter the market until average prices equal Net CONE."<sup>57</sup>

Third, Pennsylvania also conclusively demonstrates that capacity prices in the thirteen

years prior to the July 2024 auction cleared on average at about one-fourth of the net Cost of New

Entry.<sup>58</sup> At these levels, the market is sending very strong signals of surplus capacity. This is

precisely why PJM has had four successive auctions with declining supply, including over 13 GW

of reduced supply in the July 2024 auction alone.

Mr. Ming also analyzes past auction outcomes. He finds that:

Overlaying actual prices over the past fourteen years with expectations for what the market was designed to deliver in the long-run shows that contrary to the assertions of the Complainants, prices in the most recent auction (2025/2026) are well within expectations and in fact are much lower than expected prices in many simulated years.

<sup>&</sup>lt;sup>55</sup> *ISO New England Inc.*, 158 FERC ¶ 61,138, at P 52 ("[T]he purpose of the FCM is to enable [the RTO] to procure sufficient capacity to ensure reliability.... [T]o do so, the FCM will need to clear, on average, over time, at or near Net CONE.").

<sup>&</sup>lt;sup>56</sup> Complaint at 29.

<sup>&</sup>lt;sup>57</sup> Ming Testimony at 22 (citing Complaint at 6-7; Brattle, *Fifth Review of PJM's Variable Resource Requirement Curve*, at 42 (April 19, 2022), <u>https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf</u>).

<sup>&</sup>lt;sup>58</sup> See supra at 3 (discussing Aksomitis Declaration price analysis).

Figure 4: Expected Capacity Prices vs. Actual Historical Capacity Prices



In this vein, it is not the 2025/2026 auction results that are an outlier with respect to long-run market expectations, but rather the multitude of years immediately preceding.<sup>59</sup>

Yet notwithstanding all their acknowledgements of a current supply shortfall and the necessity of the market clearing at Net CONE on average and over time, and Complainants' own detailed analysis showing capacity prices at only a small fraction of Net CONE over the prior thirteen years, the Complainants' attempted showing that the capacity market is unjust and unreasonable focuses on prices arising out of the most recent auction in July 2024. In that auction, the market cleared at \$270/MW-Day and Net CONE was \$229/MW-Day.<sup>60</sup> This is a mere 17.9 percent above Net CONE, which the Complainants call "scarcity level pricing."<sup>61</sup> These prices certainly reflect the need for supply, but 18 percent above Net CONE in a single auction only

<sup>&</sup>lt;sup>59</sup> Ming Testimony at 25-26 & Figure 4.

<sup>&</sup>lt;sup>60</sup> Aksomitis Declaration, Exh. A, "PJM Capacity Auction Evaluation" (Dec. 23, 2024), at 21, Figure 3.

<sup>&</sup>lt;sup>61</sup> Complaint at 20.

bumps up the full fourteen-year average clearing price to 32.1 percent of Net CONE.<sup>62</sup> Prices at less than one-third of Net CONE over fourteen years are insufficient to ensure "[i]nvestment in new generation and preserving reliability"<sup>63</sup> unless the market is in a sustained period of significant oversupply which PJM has clearly said on multiple occasions, it is not.

*Fourth*, the final assumption the Complainants make in their critique of past prices in the capacity auction is that "the immediately preceding auction" in December 2022 is the correct barometer for auction outcomes.<sup>64</sup> In the December 2022 auction for the (current) 2024/2025 Delivery Year, the auction cleared at \$29/MW-Day and Net CONE was \$293/MW-Day.<sup>65</sup> Complainants argue that the July 2024 auction "saw the clearing price increase almost tenfold from the previous auction."<sup>66</sup>

This is true but lacks probative value. If anything, it reveals more about the flaws in the

December 2022 auction than anything about the July 2024 auction. The Commission also would

have to agree that one-tenth of the Net Cost of New Entry-the price outcome of the December

2022 auction—is the correct barometer for measuring auction results instead the net Cost of New

Entry itself, which is the auction's own barometer by design. As Mr. Ming testifies,

Comparing prices that are clearing slightly above Net CONE levels, which the Complainants themselves acknowledge is consistent with the "purpose" of the capacity market, to significantly depressed prices in prior auctions is akin to asserting that normal prices for goods are unjust and unreasonable the day after Black Friday because you could have bought the same items at a substantial discount yesterday. In other words, the relevant aspect of assessing the reasonableness of prices is not year-to-year percentage changes but rather the

<sup>&</sup>lt;sup>62</sup> Accordingly, PJM capacity clearing prices would need to average 67.9 percent *above* Net CONE or the next fourteen years to reach Net CONE on average and over time since the 2012/2013 auction. In the July 2024 auction, they were 18 percent above Net CONE.

<sup>&</sup>lt;sup>63</sup> Complaint at 1.

<sup>&</sup>lt;sup>64</sup> *Id.* ("[t]he 2025/2026 Base Residual Auction ... cleared at a price nearly ten times that of the immediately preceding auction.").

<sup>&</sup>lt;sup>65</sup> See Aksomitis Declaration, Exh. A, "PJM Capacity Auction Evaluation" (Dec. 23, 2024), at 21, Figure 3 (showing 2024/2025 auction clearing at \$29 with Net CONE at \$293 (or 9.9 percent of Net CONE)).

<sup>&</sup>lt;sup>66</sup> Complaint at 11.

absolute price level within the context of the outcomes a sustainable market should be designed to produce.<sup>67</sup>

One can observe the sequence of capacity market prices and changes in supply/demand balance over the last four auctions and understandably question why prices did not rise more gradually over that time as the supply increasingly tightened. But the answer to that question is not that the price in the July 2024 auction was too high. The answer to that question is that the previous prices were too low. If any of the last four auctions had prices that were unjust and unreasonable, it was the auction that produced a \$27/MW-Day price<sup>68</sup> and induced 13 GW less supply<sup>69</sup> and 6 GW of retirements.<sup>70</sup>

In sum, Complainants fail to demonstrate that the July 2024 auction prices that were 18 percent above Net CONE "revealed major issues with PJM's model"<sup>71</sup> or otherwise demonstrated that the Reliability Pricing Model is unjust and unreasonable. They instead reflect the fact that "[t]oday's capacity market is simultaneously confronting growing load *and diminishing supply* due to retirements, [Effective Load Carrying Capability] adjustments, and other changes. These are serious challenges...."<sup>72</sup>

# 2. Complainants' Assumptions About Future Prices Fail to Demonstrate that the Capacity Market Is Unjust and Unreasonable

Complainants' second broad evidentiary allegation is that "[t]he upcoming 2026/2027 [Base Residual Auction] is forecast to produce a result that could be the most expensive in capacity

<sup>&</sup>lt;sup>67</sup> Ming Testimony at 21.

<sup>&</sup>lt;sup>68</sup> PJM, 2024/2025 RPM Base Residual Auction Results, (June 18, 2024), at 5 (Table 1 - RPM Base Residual Auction Resource Clearing Price Results in the RTO), available at <u>https://www.pjm.com/markets-and-operations/rpm</u>.

<sup>&</sup>lt;sup>69</sup> 2023 State of the Markets, FERC Staff Report (March 21, 2024), at 38 (Figure 29), available at <u>https://www.ferc.gov/media/2023-state-markets-report</u>.

<sup>&</sup>lt;sup>70</sup> PJM, Generation Deactivations, <u>https://www.pjm.com/planning/service-requests/gen-deactivations</u> (last visited Jan. 25, 2025).

<sup>&</sup>lt;sup>71</sup> Complaint at 11.

<sup>&</sup>lt;sup>72</sup> *Id.* at 24 (emphasis added).

market history"<sup>73</sup> and "ordering PJM to redefine its capacity auction market cap" "could reduce costs by up to half."<sup>74</sup> Complainants project \$20.4 billion in consumer "savings" in the next two auctions "*[i]f the auction does clear near the current cap*."<sup>75</sup> These projections, however, are much less a showing that the existing Reliability Pricing Model is unjust and unreasonable than they are unsupported advocacy for a replacement rate.

Complainants' assumptions are rooted in the fact that there still is additional need for supply after the July 2024 auction and therefore prices signaling the need for more supply are likely to recur in the July 2025 and December 2025 auctions. This seems reasonable but also not the time to *weaken* capacity market signals. While there still may be a need for new supply, this does not mean prices will clear at the cap or even above Net CONE, which has only happened once in the history of the capacity market.

Assumptions are speculative. Assumptions can be wrong. Complainants, for example, tell us load growth was "unexpected" and requires a lower price cap at the same time it tells us there could be "unexpected incremental capacity entering the auction" that would clear the auction below its proposed lower cap.<sup>76</sup> Complainants in fact acknowledge that "[a]ny estimate of the clearing price for the next auction is subject to a reasonable range of uncertainty."<sup>77</sup>

While projections can have some probative value, more is required than simply asserting prices may be at the cap.<sup>78</sup> *First*, the market is designed to occasionally clear at the cap.<sup>79</sup> *Second*,

<sup>&</sup>lt;sup>73</sup> *Id*. at 1.

<sup>&</sup>lt;sup>74</sup> *Id*. at 5.

<sup>&</sup>lt;sup>75</sup> *Id.* at 27 (emphasis added); *see also id.* at 19 ("*If the upcoming auction clears at or near the current cap*, there is a meaningful risk that that extraordinary cost comes with very little reliability benefit.") (emphasis added).

<sup>&</sup>lt;sup>76</sup> Compare id. at 1 with Aksomitis Declaration at P 36.

<sup>&</sup>lt;sup>77</sup> Complaint at 5, n.9.

<sup>&</sup>lt;sup>78</sup> See Am. Pub. Gas Ass'n v. Fed. Power Comm'n, 567 F.2d 1016, 1037 (D.C. Cir. 1977) (Economic models can inform the Commission's decision-making "provided there is a conscientious effort to take into account what is known as to past experience and what is reasonably predictable about the future.").

<sup>&</sup>lt;sup>79</sup> See infra at 20 (discussing this issue).

Complainants assume almost no response to past or future auction prices from new or existing resources, including those currently deciding whether to remain in the interconnection queue. They also assume that PJM's two pending FPA section 205 filings and all other pending actions seeking scores of market rule changes are not approved by the Commission in whole or part, or if they are, they have minimal or no effect on auction prices. We discuss these factors in turn in the sections below. But the point here is that the Commission cannot rely on assumptions that prices will be at the cap in the next two auctions to find the current Reliability Pricing Model unjust and unreasonable because in these circumstances with so many pending changes, *no one knows what prices may be in the next two auctions*.

As a general matter, all sophisticated market participants hedge price risk. Parties concerned by potential prices above Net CONE in the next two auctions already are hedging. This includes hedging the risk that prices could clear at the cap. But it is anyone's guess whether that will happen. The *possibility* that prices could clear at the cap does not support a finding that the existing capacity market is unjust and unreasonable.

### 3. Complainants Fail to Demonstrate that Load Growth Renders the Capacity Market Unjust and Unreasonable

Complainants claim that "PJM's capacity market is a complex construct that was not built for this environment."<sup>80</sup> Specifically, Complainants argue that the demand curve assumptions "have been undercut by changing market conditions" that were "unforeseen even two years ago"<sup>81</sup> and cannot handle the "unexpected development[]" of "significant load growth"<sup>82</sup> and "[d]ramatic increases in load growth forecasts."<sup>83</sup> These arguments reflect a fundamental misunderstanding

<sup>&</sup>lt;sup>80</sup> Complaint at 2.

<sup>&</sup>lt;sup>81</sup> *Id.* at 13-14; *see id.* at 17 ("unexpected changes to PJM's marketplace have undone the assumptions" in the demand curve).

<sup>&</sup>lt;sup>82</sup> *Id.* at 1.

<sup>&</sup>lt;sup>83</sup> Id. at 14.

of the Reliability Pricing Model and its demand curve, the Variable Resource Requirement ("VRR"), which are expressly designed for "changing market conditions," including the "serious challenges" the region currently faces because of "growing load and diminishing supply due to retirements,"<sup>84</sup> among other things.

Mr. Ming explains that

[e]ach VRR curve is probabilistically evaluated using a multitude of load (demand) and generation (supply) levels. Additionally, the VRR curve is specifically designed to be scaled and modified to adapt to a changing or growing load forecast over time because requirements are based on percentages of a mutable reliability requirement. Therefore, the VRR curve design is robust to load forecast uncertainty and is well-positioned to adapt as conditions change.<sup>85</sup>

In setting the VRR curve currently in effect, PJM studied multiple scenarios, including high load

growth scenarios like those existing today.<sup>86</sup>

According to Complainants, demand curve modifications adopted in 2022 have had

inadvertent consequences—namely higher prices.<sup>87</sup> The "steep curve [of the VRR] *unintentionally* 

serves to raise prices beyond rational levels."<sup>88</sup> To the contrary, there is nothing "unintentional"

or "irrational" about the VRR design. As Mr. Ming testifies,

PJM periodically evaluates the VRR curve to ensure it is achieving overarching design objectives in a process called the "Quadrennial Review." PJM commissioned Brattle to perform the most recent (fifth) review, where analysis demonstrated that while the average price is Net CONE, the cleared capacity price should be expected to form above Net CONE in approximately 46% of years and above 1.5 times Net CONE in 9% of years.<sup>89</sup>

<sup>&</sup>lt;sup>84</sup> *Id.* at 14, 24.

<sup>&</sup>lt;sup>85</sup> Ming Testimony at 17.

<sup>&</sup>lt;sup>86</sup> See *id.* at 19 (section discussing scenario studies and 2025/2026 conditions in particular); *see also id.* at 18 (section discussing VRR curve development process).

<sup>&</sup>lt;sup>87</sup> Complaint at 13.

<sup>&</sup>lt;sup>88</sup> *Id.* at 16-17 (emphasis added).

<sup>&</sup>lt;sup>89</sup> Ming Testimony at 23 (citing Brattle, *Fifth Review of PJM's Variable Resource Requirement Curve*, at 19 (April 19, 2022), <u>https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf</u>).

The choice to adopt a steeper demand curve in 2022 was a choice for lower near-term prices in exchange for sharper price increases whenever supply was needed.<sup>90</sup> As Complainants acknowledge, "[t]he steeper, or more vertical, the demand curve, the more price volatility can be expected."<sup>91</sup> This was a design choice, not an accident of "unforeseen conditions."<sup>92</sup>

Now, supply is needed. Is it needed earlier than anyone predicted in 2022? This is an irrelevant question unless the plan all along was to tamp down the prices whenever supply was needed. That cannot be the case as it would create a "heads I win, tails you lose" policy choice against suppliers and investors in the marketplace. Muted market signals only postpone volatility, inevitably increasing it—as well as costs—over time. Exacerbating the volatility is regular regulatory intervention to "save" consumers from prices designed to signal the need for supply.

It likewise is not "unforeseen" or "unintentional" that the market may occasionally clear at

the cap. As Mr. Ming further testifies,

The price cap within the PJM capacity market serves two primary functions. First, it sets an upper limit on cost impacts when supply is significantly short of what is required to meet the reliability target. Second, it serves a role with the broader context of expected year-to-year price variations that the average long-run price will equal Net CONE. Within such a framework, it is not only allowable but expected that there will be some years in which the price cap is reached and the quantity of capacity that clears the market is not sufficient to meet the reliability requirement. Such an outcome being deemed unacceptable or intolerable would undermine the fundamental design basis of the capacity market construct, which allows that prices should clear at lower levels during periods of surplus and higher levels during periods of relative scarcity, on average achieving a balance at Net CONE.<sup>93</sup>

<sup>&</sup>lt;sup>90</sup> *PJM Interconnection, L.L.C.*, 182 FERC ¶ 61,073, at P 145 (Feb. 14, 2023) ("PJM states that Brattle evaluated several alternative curve shapes, finding each offered a different balance of trade-offs. PJM explains that flatter curves offer improved price stability, but at the cost of greater quantity uncertainty, while steeper curves offer improved certainty in quantity, but at the cost of higher price volatility.").

<sup>&</sup>lt;sup>91</sup> Aksomitis Declaration at P 28.

<sup>&</sup>lt;sup>92</sup> Complainants now assert that "[g]enerators and consumers would both benefit from a more stable curve that can provide consistent pricing." Complaint at 17.

<sup>&</sup>lt;sup>93</sup> Ming Testimony at 35-36.

Load growth also is the most obvious possible change in market dynamics. It is incredible to suggest accommodating variations in load growth would not always be a key component of capacity market design, including in the current VRR curve.

# 4. Complainants Fail to Demonstrate that the Auction Timeline Prevents a Market Response to Auction Prices

In support of its clearing price assumptions "at or near the cap," Complainants assume that "capacity sellers [are] unable to respond to the [Base Residual Auction] clearing price no matter how high it climbs"<sup>94</sup> because the interconnection queue is backlogged and there is insufficient time between auctions.<sup>95</sup> They assert that there can only be a minimal investment response to the July 2024 and July 2025 auction results. They focus almost exclusively on new entry,<sup>96</sup> and claim it must occur *immediately*—before a subsequent auction can run—or there is no need for a strong build signal.<sup>97</sup>

Complainants also assert that "there is no empirical basis to suggest markedly increased participation will occur at extremely high multiples of Net CONE or at Gross CONE versus at the historically high prices that the market is already delivering."<sup>98</sup> While this claim is tied more to its proposed replacement rate (to eliminate Gross CONE as an alternative cap), Complainants also

<sup>&</sup>lt;sup>94</sup> Complaint at 16.

<sup>&</sup>lt;sup>95</sup> See, e.g., Aksomitis Declaration at P 30 ("PJM held the 2022/2023 delivery year BRA thirteen months in advance, the 2023/2024 BRA twelve months in advance, the 2024/2025 BRA eighteen months in advance, the 2025/2026 BRA eleven months in advance, and recently delayed the 2026/2027 BRA to June 2025, twelve months in advance of the delivery date."). The next auction currently is scheduled for July 2025.

<sup>&</sup>lt;sup>96</sup> Aksomitis Declaration at P 8 ("My primary finding is that *the market signal for new capacity is not creating an investment response* due to delays in the interconnection queue exacerbated by the currently compressed auction timelines.") (emphasis added).

<sup>&</sup>lt;sup>97</sup> See Complaint at 18 (queue "obstacles mean most new projects are unable to even get in line to join the PJM grid for the foreseeable future, and none can realistically expect to be delivering power within eleven months" [in time for the next auction]); see also id. at 25 ("the literal inability to construct any new resources in response to a price signal of any amount within the next two years ... allays any concerns about rising prices impacting the feasibility of building said new resources.") (emphasis added). Complainants also fail to demonstrate "the literal inability" of "any new resource" to respond to price signals "within the next two years."

<sup>&</sup>lt;sup>98</sup> *Id.* at 20-21.

assert that "a price increase from 1.0 times Net CONE at \$224/MW-Day to Gross CONE at \$695/MW-Day would have elicited only about 770 MW of additional total capacity, at most," and thus the response to price increases above Net CONE allegedly is not worth the cost.<sup>99</sup>

Mr. Ming testifies that Complainants' analysis is based on the erroneous assumption that "the ability of the market to respond in the upcoming 2026/2027 BRA and beyond is at most equal to the quantity of uncleared capacity in the previous 2025/2026 BRA" and ignores that "expectations of higher prices in future years *creates additional offers* that would not have been made if price expectations were lower."<sup>100</sup> As to sources of supply, Mr. Ming explains,

Market participants and investors can respond to capacity price market signals in a multitude of ways, broadly through investments in "new" resources and retention of "existing" resources. Investments in new resources include not only utility-scale power plants but also distributed energy resources (including demand response) that often have shorter lead times. It is important to note that new power plants are assets that last many years and decisions to invest in these plants are *not driven by a single year of pricing* but rather on long-term expectations that market prices will support the investment over its lifetime. In other words, even a single year price (that occurs three years forward) at greater than 1.0 Net CONE is not necessarily sufficient to incentivize investment if market participants do not expect prices over the lifetime of the asset will allow them to recover their costs and a return on their investment.

Retention of existing resources can include the intentional decision to continue to incur operating and maintenance costs for a power plant that would have otherwise retired, investing in repowering a power plant that lacks modern capabilities, or bringing a mothballed plant back online.<sup>101</sup>

Complainants also cannot treat the interconnection queue as a lost cause for additional

supply. As Mr. Ming testifies,

The Complaint notes that "an all-time record 3,300 projects [are] awaiting interconnection" and "[a]s it works to address this serious backlog, PJM has

 <sup>&</sup>lt;sup>99</sup> Id. at 21 (citing Aksomitis Declaration, Exh. A, "PJM Capacity Auction Evaluation" at Section 5.2.3).
<sup>100</sup> Ming Testimony at 27-28.

<sup>&</sup>lt;sup>101</sup> Ming Testimony at 8 (emphasis added). Complainants do posit that mothballed units, projects that have exited the queue, and demand response do not "require scarcity level pricing to enter the marketplace." Complaint at 20. First, prices were 18 percent above Net CONE for a single year during a supply shortfall. Second, Complainants offer no proof whatsoever that mothballed units, projects that have exited the queue, and demand response did not respond to that market signal, nor why Net CONE suddenly is an incorrect measure for an appropriate long-term signal.

declined to allow new projects to join the queue." It then asserts a linkage between this queue backlog and it being "physically impossible for new resources to respond to high BRA [price] signals and enter PJM's marketplace." What this linkage misses however, is that there are more than sufficient resources in the queue to respond to high prices. Just because a resource is in the queue does not mean it will reach completion; for instance, PJM's interconnection queue had a 79% attrition rate (by capacity) between the year 2000 and 2018. Because queue dropouts are so common, it is very plausible that higher prices may incentivize resources already in the queue to completion and at a faster pace. The Complaint ignores this dynamic.<sup>102</sup>

Mr. Ming's analysis is affirmed by other evidence. Mr. Siegel of Vistra states that "the economic case for [all capacity] projects rests centrally on capacity market clearing prices that signal the need for more rather than less generation."<sup>103</sup> Mr. Siegel, thus, disagrees with assertion that the "interconnection queue challenges mean that the only pools of resources that are capable of responding to capacity market price signal are: (1) mothballed units that could return to service; (2) projects that have exited the interconnection queue but not yet entered service; and (3) demand response resources."<sup>104</sup> Moreover, PJM is already starting to streamline the interconnection queue. PJM has already processed "nearly 40,000 MW of generation projects" as of early 2024 and expects to process about 72,000 MW in projects by mid-2025, with 230,000 MW anticipated to clear over the next three years.<sup>105</sup>

After analyzing these sources of supply, Mr. Ming concludes that the Complainants' assertion that only 770 MW of incremental capacity could respond to high capacity prices is unreasonable:

<sup>&</sup>lt;sup>102</sup> Ming Testimony at 31 (emphasis added) (citing PJM, 2025/2026 Base Residual Auction Report (July 30, 2024), at 9, <u>https://www.pjm.com/-/media/DotCom/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.pdf</u>).

<sup>&</sup>lt;sup>103</sup> Siegel Declaration at  $\P$  5.

<sup>&</sup>lt;sup>104</sup> *Id*.

<sup>&</sup>lt;sup>105</sup> See Paul McGlynn, Interconnection Reform Is Working, but Will New Generation Actually Get Built? PJM Inside Lines (April 23, 2024), https://insidelines.pjm.com/interconnection-reform-is-working-but-will-new-generation-actually-get-built/.

[t]he incremental quantity of supply that is available is not just equal to uncleared capacity in the prior auction but is tied to actions that market participants can take based on expectations of future pricing to unlock additional supplies. Market participants rarely make long-term investments based on whether single high-priced capacity offer clears. Rather, they are constantly assessing future pricing and making decisions based on a forecast of how they expect market prices to clear in future years. Additionally, market participants may not go through the effort of putting together an offer that they do not expect will clear. To summarize, expectations of higher prices in future years creates additional offers that would not have been made if price expectations were lower.<sup>106</sup>

Complainants thus are incorrect that there will be minimal response to clearing prices in

the near term. But it also is wrong that the near term is the right timeline to analyze. Mr. Ming

explains,

investment is often predicated on future expectation that prices will rise to reflect market fundamentals even if there is not time for additional investment to respond in real-time. For example, investors do not react to surges in airfare prices during the holidays by manufacturing additional airplanes in real time; rather, the quantity of airplanes available during the holiday season is determined far in advance by investors' anticipations of the demand and associated high prices.<sup>107</sup>

As set forth below, several regions do not have a *forward* capacity market for this very reason.<sup>108</sup>

For the reasons explained above, the Reliability Pricing Model is a long-term market designed to elicit revenues at Net CONE on average and over time. A single clearing price at Net CONE does not provide all the revenues a capacity resource will ever need. Rejecting prices at levels above Net CONE because there may not be an *instantaneous* response by new entrants ignores basic design fundamentals.<sup>109</sup>

<sup>&</sup>lt;sup>106</sup> Ming Testimony at 27. There also are numerous interconnection queue reforms in the works.

<sup>&</sup>lt;sup>107</sup> *Id.* at 34-35.

<sup>&</sup>lt;sup>108</sup> See infra at 27; see also Ming Testimony at 34-35 (discussing same).

<sup>&</sup>lt;sup>109</sup> See Siegel Declaration at ¶ 2 ("Vistra bases its development activities on the net present value of projected energy and capacity revenue over the economic life of a potential investment."); see *id.* at ¶ 5 (Vistra "must assess whether these projects are technically feasible, and whether any permitting or regulatory issues will prevent them from moving forward.").

5. The Market Response to July 2024 Auction Prices Refutes Complainants' Case Record evidence also confirms that market participants responded to the July 2024 auction results. Mr. Siegel of Vistra states that his company "viewed the most recent capacity auction clearing auction clearing price as a strong signal that additional capacity was needed in the PJM region."<sup>110</sup> "After years of low clearing prices, well below Net CONE, which had sent a signal for generation to exit the market, [Vistra] concluded that the recent clearing price, slightly above Net CONE, demonstrated a potential need for additional investment."<sup>111</sup> In response, "[Vistra] immediately commenced a comprehensive effort to evaluate potential development opportunities across Vistra's PJM footprint to be in a position to respond to ongoing capacity market price signals."<sup>112</sup>

Suriyun Sukduang, Calpine Corporation's Vice President of Origination and East/Texas Development, also testified in one of the other pending FPA section 206 proceedings that Calpine responds to market signals exactly as economists would expect.<sup>113</sup> He further testified that before the summer of 2024, clearing prices in PJM's capacity market did not indicate a need for new generation.<sup>114</sup> Calpine's development team, however, identified growing demand through projected load growth and resource retirements.<sup>115</sup> Then, the July 2024 auction clearing prices for the 2025/2026 delivery year sent them a clear signal that new supply was needed,

[I]n July 2024, auction clearing prices for the 2025/2026 delivery year sent a strong signal to investors and developers that new supply is needed in the region. In this way, the price signal from the capacity market aligned with other market signals that Calpine's development team had observed, and indicated a higher demand for

<sup>&</sup>lt;sup>110</sup> *Id.* at  $\P$  3.

<sup>&</sup>lt;sup>111</sup> *Id*.

<sup>&</sup>lt;sup>112</sup> *Id*.

<sup>&</sup>lt;sup>113</sup> Protest of Calpine Corporation and LS Power Development, LLC, Exh. 2, Testimony of Suriyun Sukduang, *Sierra Club v. PJM Interconnection, L.L.C.*, Docket No. EL24-148-000 (filed Oct. 24, 2024).

<sup>&</sup>lt;sup>114</sup> *Id*. at 6.

<sup>&</sup>lt;sup>115</sup> *Id.* ("[I]n the PJM region, Calpine's development team over the course of the past 18 months has observed an emerging need for new supply additions due to the trajectory of anticipated load growth and resource retirements.").

the type of reliable power Calpine has deep experience in bringing to market. As a result of these aligned market signals, Calpine's generation development program in PJM has ramped up.<sup>116</sup>

Nathan Hanson, LS Power's President, Generation, testified that LS Power relies on capacity market price signals in making capital investment decisions and that regulatory intervention and late-stage market rule changes significantly dampen investor confidence needed to sustain capital investment in PJM.<sup>117</sup> Mr. Hanson also noted that prior local capacity market clearing prices signaled an oversupplied market, which delayed investment assessments.<sup>118</sup> But "based on the outcome of the July 2024 auction, LS Power resumed the process for the on-hold projects."<sup>119</sup> Mr. Ming further testifies that there is

reason to believe that the markets are already responding to the higher capacity prices from the July 2024 BRA for the 25/26 delivery year.<sup>120</sup> Since the 25/26 auction results were announced, Constellation announced that it had entered into an agreement to restart the former Three Mile Island nuclear facility,<sup>121</sup> Middle River Power announced it was withdrawing the deactivation notice for its Elgin

<sup>&</sup>lt;sup>116</sup> Id.

<sup>&</sup>lt;sup>117</sup> See Protest of Calpine Corporation and LS Power Development, LLC, Exh. 3, Testimony of Nathan Hanson, *Sierra Club v. PJM Interconnection, L.L.C.*, Docket No. EL24-148-000 (filed Oct. 24, 2024). LS Power is not the only generator concerned about possible regulatory intervention. Although Vistra acknowledges that "there are real opportunities" to add capacity, "efforts to intervene in the capacity market, including efforts to limit capacity prices in the near-term, make it more likely that Vistra will need to take a "wait-and-see" approach to some investments in order to ensure prudent investment of shareholder capital." Siegel Declaration at  $\P$  6 (adding that Vistra is "particularly concerned that the proposal at issue in this docket could artificially yield very low capacity prices in delivery year 2027/28.").

<sup>&</sup>lt;sup>118</sup> Protest of Calpine Corporation and LS Power Development, LLC, *Sierra Club v. PJM Interconnection, L.L.C.*, Docket No. EL24-148-000 (filed Oct. 24, 2024) at 16 ("Mr. Hanson of LS Power also testified that 'during the years with low capacity market clearing prices ... the investment assessment process put various projects on hold to wait for price signals to indicate the need for incremental investment.' 'Until the 2025/2026 capacity market auction results in 2024 auction, PJM's capacity market indicated a significantly oversupplied condition.'").

<sup>&</sup>lt;sup>119</sup> *Id.* ("But 'based on the outcome of the July 2024 auction, LS Power resumed the process for the on-hold projects based on the changes made to the capacity market design following PJM's fast track stakeholder process."").

<sup>&</sup>lt;sup>120</sup> Ming Testimony at 45. PJM's capacity markets were designed to clear around Net CONE over time. Although prices were above Net CONE for the 25/26 delivery year, historically prices have trended significantly below Net CONE.

<sup>&</sup>lt;sup>121</sup> *Id.* (citing Constellation Energy Corporation, *Constellation to Launch Crane Clean Energy Center, Restoring Jobs and Carbon-Free Power to The Grid* (Sept. 20, 2024), https://www.constellationenergy.com/newsroom/2024/Constellation-to-Launch-Crane-Clean-Energy-Center-Restoring-Jobs-and-Carbon-Free-Power-to-The-Grid.html).

Energy Center in Illinois,<sup>122</sup> and Homer City Redevelopment LLC announced that it was converting and restarting the retired coal facility with natural gas....<sup>123</sup> Moreover, as part of its Reliability Resource Initiative (RRI) filing, PJM stated it has, "reasonable confidence that the RRI process will attract applications from multiple projects, representing at least 10 GW of reliable resources for the PJM Region."<sup>124</sup>

The market response to the July 2024 auction results is as expected under the capacity

market design. This includes the response from existing resources relying on the "missing money"

and "stable capacity revenues" to remain in service. As Complainants correctly state it, the

second purpose [of the capacity market] is to provide 'missing money' to capacity resources in order to support resource adequacy and ensure sufficient capacity. This "missing money" enables facilities to remain online to provide capacity even if they could not economically do so if reliant on energy revenues alone. In this way, the RPM is designed to serve the interests of ratepayers and generators by replacing the need for highly variable energy market scarcity pricing with *stable capacity revenues*."<sup>125</sup>

Complainants, however, claim the July 2024 auction outcome "serves only th[is] second purpose"

and minimize it as being of "very little reliability benefit."<sup>126</sup> The evidence indicates otherwise

<sup>&</sup>lt;sup>122</sup> *Id.* (citing Utility Dive, *Middle River Power Reverses Plan to Shut 540-MW Plant Amid Record PJM Capacity Prices* (Sept. 12, 2024), https://www.utilitydive.com/news/middle-river-power-retire-elgin-power-plant-pjm-interconnection/726824/).

<sup>&</sup>lt;sup>123</sup> *Id.* (citing D. Proctor, *Largest Pennsylvania Coal-Fired Plant Will Convert to Natural Gas*, POWER (Dec. 6, 2024), https://www.powermag.com/largest-pennsylvania-coal-fired-plant-will-convert-to-natural-gas/).

<sup>&</sup>lt;sup>124</sup> See Ming Testimony at 37-38 (citing Post-Technical Conference Comments, Written Comments of Glen R. Thomas, Pennsylvania Public Utility Commission, Technical Conference on Resource Adequacy in Pennsylvania, Post-Technical Conference Comments, Docket Number M-2024-3051998id., Attachment B (illustrating that although prices were above Net CONE for the 25/26 delivery year, historically prices have trended significantly below), available at <a href="https://www.pjm.com/pjmfiles/directory/etariff/FercDockets/8547/20241213-er25-712-000.pdf">https://www.pjm.com/pjmfiles/directory/etariff/FercDockets/8547/20241213-er25-712-000.pdf</a>.

<sup>&</sup>lt;sup>125</sup> Complaint at 7 (emphasis added) (citing Complaint, Attachment 1, Exhibit A at Section 4.1. *See also* Murty P. Bhavaraju et al., *PJM Reliability Pricing Model - A Summary and Dynamic Analysis*, IEEE XPLORE (June 2007), *available at* https://ieeexplore.ieee.org/document/4275491 ("[S]ince the peaking generation needed to meet the adequacy criterion will not receive enough revenue from the energy market to justify investments, other revenue streams are needed to ensure that they cover their fixed costs.... [this] is referred to as 'Missing Money.''')) (emphasis added); Ming Testimony at 7 ("Due to well-established characteristics of the energy market, generation resources require additional revenues to recover their full costs (known as "missing money") and enter or stay in the market. Capacity markets are designed to provide this missing money on average in the long run in order to incent investment. While capacity market prices can vary year-over-year in a manner that reflects system fundamentals, the variability of total system costs is significantly lower than in an energy-only market design with energy scarcity pricing.").

<sup>&</sup>lt;sup>126</sup> Complaint at 19 (emphasis added); *see also id.* at 29 ("True Net CONE itself is sufficient (and theoretically exactly correct) to supply the 'missing money' when that is the sole effective outcome of the RPM.").

and disproves the claim that the existing Reliability Pricing Model is unjust and unreasonable because it cannot elicit an investment response.

6. The Commission Has Approved Capacity Constructs with Short Duration Forward Periods, Including Every Auction in PJM since 2019

Complainants argue that delays in PJM's capacity auctions and the resulting truncated auction schedules since 2019 have undermined the market's ability to function as an effective signal for new power generation.<sup>127</sup> According to Complainants, this compressed auction schedule "trend has curtailed the market's ability to respond to auction signals irrespective of price."<sup>128</sup> However, numerous other capacity markets do not operate as a three-year forward market.<sup>129</sup> MISO's capacity market utilizes a prompt auction that is run only two months before the capacity commitment period, allowing minimal time for new entry to respond.<sup>130</sup> Yet its price cap is set at Gross CONE, permitting prices to reflect new-supply costs even when there is no time to build new resources.<sup>131</sup> ISO New England currently is considering shortening its capacity market from

<sup>&</sup>lt;sup>127</sup> *Id.* at 18-19:

But compounding delays since 2019 have resulted in increasingly condensed timelines between when capacity auctions are being held and the auction's covered delivery year. PJM held the 2022/2023 delivery year BRA thirteen months in advance, the 2023/2024 BRA twelve months in advance, the 2024/2025 BRA eighteen months in advance, the 2025/2026 BRA eleven months in advance, and recently delayed the 2026/2027 BRA to July 2025, eleven months in advance of the delivery date.

See PJM Interconnection, L.L.C., 183 FERC ¶ 61,172 (2023) (delaying auctions for 2025/2026 through 2028/2029 delivery years); PJM Interconnection, L.L.C., 178 FERC ¶ 61,122 (2022) (revising schedule for auctions through 2026/2027 delivery years); PJM Interconnection, L.L.C., 177 FERC ¶ 61,209 (2021) (delaying 2023/2024 BRA), clarified by PJM Interconnection, L.L.C., 178 FERC ¶ 61,085 (2022); Indep. Mkt. Monitor for PJM v. PJM Interconnection, L.L.C., 176 FERC ¶ 61,050 (2021) (granting waivers to deadlines for 2023/2024 BRA); PJM Interconnection, L.L.C., 177 FERC ¶ 61,050 (2021) (granting waivers to 2023/2024 auctions); Calpine Corp. v. PJM Interconnection, L.L.C., 173 FERC ¶ 61,061 (2020) (revising 2022/2023 and 2023/2024 delivery-year schedules); Calpine Corp. v. PJM Interconnection, L.L.C., 164 FERC ¶ 61,051 (2019) (revising 2022/2023 BRA).

<sup>&</sup>lt;sup>128</sup> Complaint at 19.

<sup>&</sup>lt;sup>129</sup> Ming at 34-35 ("MISO's capacity market is structured with a prompt auction, meaning the auction is run right before the start of the delivery year.").

<sup>&</sup>lt;sup>130</sup> *Id.* at 34.

<sup>&</sup>lt;sup>131</sup> *Id*.

a three-year forward market to a prompt/seasonal market.<sup>132</sup> While prompt auctions are a different kind of market design, it is not mandatory to have a long forward period to send long-term investment signals.

The Commission's also has approved PJM's compressed auction schedule.<sup>133</sup> This reflects its confidence in the Reliability Pricing Model's ability to provide reliable long-term investment signals, ensuring continued reliability despite the adjustments.

In sum, the duration of the planning period is not the critical point to ensure just and reasonable rates. The steady investment signal reflective of market supply and demand fundamentals is the critical point. The primary problem with truncating auction schedules is that the compressed timelines lead to exactly this sort of argument—that the results are less important because the planning period is shorter. But the Reliability Pricing Model is structured as an annual capacity payment for services to be rendered. Treating these auctions as less important is wrong. We cannot skip a year's compensation just because rule changes were pending, and the exact compensation was under discussion.

<sup>&</sup>lt;sup>132</sup> ISO New England, *Capacity Auction Reforms Key Project*, https://www.iso-ne.com/committees/keyprojects/capacity-auction-reforms-key-project (last visited Jan. 24, 2025) ("To better ensure power system reliability and cost-efficiency as New England's resource mix evolves, ISO New England is proposing Capacity Auction Reforms (CAR) that would transition the capacity market from a forward/annual market to a prompt/seasonal market with accreditation reforms.").

<sup>&</sup>lt;sup>133</sup> See, e.g., PJM Interconnection, L.L.C., 189 FERC ¶ 61,105, at P 29 (2024):

<sup>[</sup>W]e find that, based on the record here, the benefits of delaying the capacity market auctions outweigh any potential harm. Although the auction delay will have an effect on other BRAs through the 2029/2030 delivery year and will require cancelling several Incremental Auctions, on balance we find that granting the waiver request provides the opportunity to address potential consequential changes in the market rules and provides the opportunity for market participants to respond to any changed rules by having additional time to prepare and submit requests and elections in advance of the next auction.

#### 7. Complainants' Price Assumptions Are Unduly Speculative Because Pending Filings Would Increase Available Supply and Lower the Offer Cap.

The final reason Complainants' assumptions of prices at the caps are of very limited probative value is the fact that there are *numerous pending rule changes* in two FPA section 205 filings by PJM to change core features of the capacity market. The First PJM 205 Filing seeks a change to the reference resource which is used to set the net Cost of New Entry back to a combustion turbine, which will have the effect of reducing the price cap *by 30 percent*.<sup>134</sup> Complainants downplay the 30 percent price reduction by stating it "will tend to flatten the curve"<sup>135</sup> and as "*indirectly modestly lowering the price cap*."<sup>136</sup> This assessment is inconsistent with Complainants own claim that prices 18 percent above Net CONE are "through the roof."<sup>137</sup> The First PJM 205 Filing also sets the penalty factor on a regionwide basis at RTO Net CONE. *P3 supports these changes*, which should lower the price cap and increase penalty exposure—two things you would not typically expect generators and suppliers to support.

The First PJM Filing also would require up to 2 GW of reliability must-run units to participate in the capacity auction, which would increase supply participating in the auction by requiring non-capacity RMR resources to bid in as price takers—an effect that Complainants fail to incorporate and analyze. The Second PJM 205 Filing would eliminate the must offer exemption for all capacity resources except Demand Response, which would add intermittent and storage resources as capacity resources and could have a meaningful effect on auction prices by

<sup>&</sup>lt;sup>134</sup> See First PJM 205 Filing, Att. C, Affidavit of Dr. Samuel A. Newell, at  $\P$  8 ("retaining a [Combustion Turbine] ... as reference technology will have the following effects" on the demand curve: "the price cap ... would be reduced from \$696 to \$499/MW-Day UCAP, mitigating the price risk faced by customers in the event that the market clears short, yet still providing strong incentives to activate available supply response and preserving RPM's long-term model for supporting investment, in part by paying new and existing capacity more during tighter conditions.").

<sup>&</sup>lt;sup>135</sup> Complaint at 27.

<sup>&</sup>lt;sup>136</sup> *Id.* at 30 (emphasis added).

<sup>&</sup>lt;sup>137</sup> *Id.* at 17.

significantly adding supply. Complainants state that these "price suppressive proposals"<sup>138</sup> "will improve matters"<sup>139</sup> by reducing auction clearing prices by \$53.6 billion in the next two auctions (according to its calculations).<sup>140</sup> The statutory deadlines for these 205 filings both are in February—*in time for the July 2025 auction*.

There also are two pending FPA section 206 complaints. One complaint seeks a similar treatment of RMR resources to that now proposed by PJM.<sup>141</sup> The other requests a full smorgasbord of price-reducing measures.<sup>142</sup> There also are other pending PJM FPA section 205 filings that will also affect supply and demand, capacity clearing rules, and auction prices.<sup>143</sup>

With this universe of pending and imminent rule changes—particularly PJM's 205 Filings—assumptions about prices arising out of the July 2025 and December 2025 are too speculative to serve as the basis for finding the existing Reliability Pricing Model unjust and unreasonable.<sup>144</sup>

<sup>&</sup>lt;sup>138</sup> *Id.* at 13.

<sup>&</sup>lt;sup>139</sup> *Id.* at 2.

<sup>&</sup>lt;sup>140</sup> See id. at 2, n.4 ("\$20.4 billion is the difference between the projected outcome of an auction conducted with the price cap changes requested by the Commonwealth and one conducted under the BRA parameters PJM has proposed in its Section 205 filings but without further changes to the price cap. If neither PJM's nor the Commonwealth's proposals are enacted, the next two auctions could cost ratepayers as much as \$74 billion....") (\$74 billion less \$20.4 billion is \$53.6 billion.).

<sup>&</sup>lt;sup>141</sup> Sierra Club v. PJM Interconnection, L.L.C., Docket No. EL24-148-000 (filed Sep. 27, 2024).

<sup>&</sup>lt;sup>142</sup> Joint Consumer Advocates v. PJM Interconnection, L.L.C., Docket No. EL25-18-000 (filed Nov. 18, 2024).

<sup>&</sup>lt;sup>143</sup> *PJM Interconnection, L.L.C.*, Proposed Tariff Amendments for Surplus Interconnection Service, Docket No. ER25-778-000 (Dec. 20, 2024) (proposing revisions to expand the availability for generating facilities to use Surplus Interconnection Service); *PJM Interconnection, L.L.C.*, Tariff Revisions for Reliability Resource Initiative, Docket No. ER25-712-000 (filed Dec. 13, 2024) (proposing to accelerate specific interconnection projects that can improve reliability).

<sup>&</sup>lt;sup>144</sup> We note here that it would be procedurally improper for the Commission to accept a party's use of an FPA section 206 complaint to force its preferred rate design into an ongoing FPA section 205 case. *See* Answer of the PJM Power Providers Group Opposing Motion to Consolidate and Request for Expedited Action of Governor Josh Shapiro and the Commonwealth of Pennsylvania, Docket Nos. EL25-46-000, ER25-682-000, & ER25-785-000 (filed Jan. 10, 2025), at 5 ("No party can use section 206 to shoehorn its preferred rate into a utility's pending 205 proposal to change its own rate.").

### B. Complainants' Other Arguments Fail to Demonstrate that the Existing Reliability Pricing Model Is Unjust and Unreasonable

While almost exclusively focused on the prices in the last auction and in the next two auctions to attempt its required showing that the existing rate is unjust and unreasonable, Complainants do lodge a few arguments about the cap itself, which Complainants acknowledge is set to be used "for the first time ever."<sup>145</sup> The current cap is the higher of 1.75 times Net CONE or Gross CONE. Complainants' primary critique of 1.75 times Net CONE, it that "the reference technology changes that PJM is now proposing to reverse [from a combined cycle to a combustion turbine] were correlated with the move to 1.75 times Net CONE in the last quadrennial review."<sup>146</sup> But PJM itself opposed reverting to a lower cap upon proposing to re-adopt the combustion turbine as the reference resource because—as Complainants acknowledge—"interventions that suppress the price would increase investor perceptions of regulatory risk…."<sup>147</sup> Complainants also aver, however, that "Gross CONE is expected to set the maximum price regardless of the Net CONE multiplier used if Gross CONE is permitted to operate in the forthcoming auction" and thus Complainants focus less on why 1.75 times Net CONE allegedly is unjust and unreasonable.<sup>148</sup>

As for Gross CONE, "[w]itness Aksomitis found that setting the price cap at Gross CONE would likely increase capacity prices for the 2026/2027 BRA by as much as 50% relative to prices under a Net CONE-based price cap, with no reasonable expectation of an incremental market response sufficient to justify this cost."<sup>149</sup> Their focus, then, remains on prices more than gross CONE itself.

<sup>&</sup>lt;sup>145</sup> Motion at 4.

<sup>&</sup>lt;sup>146</sup> Complaint at 13.

<sup>&</sup>lt;sup>147</sup> *Id.* (quoting Newell Affidavit at P 20).

<sup>&</sup>lt;sup>148</sup> *Id.* at 3, n.6.

<sup>&</sup>lt;sup>149</sup> *Id.* at 22-23.

In describing why Gross CONE was adopted as the higher-of cap in the first place, Complainants fully explain why it remains just and reasonable.<sup>150</sup> "In 2011, the Brattle Group, in its Second Quadrennial Review, recommended introducing an alternate reference point to define the top of the curve due to inaccuracies that had been repeatedly observed in the estimation of Energy and Ancillary Services ... revenues. Gross CONE was proposed to serve this function....<sup>3151</sup> "In essence, high energy market revenues could depress Net CONE, potentially masking the need for a high price signaling the market to build new capacity.<sup>3152</sup> Gross CONE is necessary to "avoid a scenario where the Installed Reserve Margin [is] not met but capacity prices nonetheless remain[] artificially low due to reliance solely on a multiple of Net CONE.<sup>3153</sup>

PJM's use of Gross CONE in the VRR curve price cap reflects a deliberate and necessary design to ensure system reliability and long-term market sustainability. Gross CONE provides a critical safeguard against the collapse of the VRR curve, particularly in conditions where Net CONE is zero due to high energy and ancillary service ("E&AS") margins. "Under the current parameters (which are currently under review by FERC) for the upcoming 2026/2027 BRA, Net CONE for the reference resource (a CC unit) is \$0/MW-day for the RTO."<sup>154</sup> This ensures that capacity prices reflect the true need for resources, even when high E&AS revenues mask the need for new capacity. Without a Gross CONE linkage, the VRR curve would effectively guarantee zero capacity prices in such scenarios, removing any financial incentive for resources to remain in operation. This approach is not unique to PJM, as both ISO New England and the New York

<sup>&</sup>lt;sup>150</sup> See id. at 8-9.

<sup>&</sup>lt;sup>151</sup> *Id*. at 8.

<sup>&</sup>lt;sup>152</sup> *Id*. at 9.

<sup>&</sup>lt;sup>153</sup> *Id*. at 9.

<sup>&</sup>lt;sup>154</sup> Ming Testimony at 46.

Independent System Operator have relied on Gross CONE establishing capacity auction price caps.<sup>155</sup>

Additionally, linking the price cap to Gross CONE ensures that capacity prices fluctuate over time, allowing resources to recover costs across their lifespans.<sup>156</sup> Net CONE, as a forward-looking estimate, is inherently variable and subject to numerous assumptions, making it an insufficient standalone basis for setting the price cap.<sup>157</sup> A price cap linked solely to Net CONE would suppress prices during periods of high energy revenues or capacity deficits, risking resource retirements and compromising reliability.<sup>158</sup> The inclusion of Gross CONE addresses these risks by providing a "back-up" to ensure the capacity market functions as intended, even in extreme conditions where "high E&AS revenue masked the need for entry of new capacity."<sup>159</sup> This framework prevents market distortions, maintaining a balance between supply and demand while ensuring sufficient compensation to incentivize necessary resources.<sup>160</sup>

Complainants provide no evidence refuting the concern that the demand curve could collapse without Gross CONE in the price cap formula. Indeed, Complainants could not make such a showing because there is meaningful potential that Net CONE could be very low in 2027/2028. Thus, aside from allegedly high past and future prices, Complainants fail to

<sup>&</sup>lt;sup>155</sup> See ISO New England Inc., 161 FERC ¶ 61,035, at P 16 (2017); In re N.Y. Indep. Sys. Operator, Inc., 184 FERC ¶ 61,038, at P 6 (2023).

<sup>&</sup>lt;sup>156</sup> Ming Testimony at 48 ("[T]he only way to ensure that resources can expect to recover Net CONE on average across their entire lives is to clear prices in some years at levels higher than Net CONE. Designing the VRR curve with a price cap that is linked to Gross CONE is one way to accomplish this.").

<sup>&</sup>lt;sup>157</sup> Id. at 47 ("Net CONE that is used in the VRR curve is a forward-looking estimate that is not guaranteed.").

<sup>&</sup>lt;sup>158</sup> *Id.* ("Delinking the VRR price cap from Gross CONE without making any other changes would necessarily result in price suppression and would therefore not yield a system that achieves the reliability standard.").

<sup>&</sup>lt;sup>159</sup> Complaint at 9.

<sup>&</sup>lt;sup>160</sup> Ming Testimony at 45-46 ("The Gross CONE linkage to the VRR price cap is driven by a longstanding concern that a price cap linked only to Net CONE 'risks the collapse of the entire VRR curve' whenever energy and ancillary service margins rise. This is particularly true in the circumstance of a capacity deficit which is likely to correlate with high forecasted energy and ancillary service margins and thus low forecasted Net CONE values. This would create the unintended consequence of *decreasing* capacity prices at a time of increasing capacity need. For this reason, PJM has historically proposed, and FERC has approved, a linkage between Gross CONE and the VRR price cap.").

demonstrate that the existing price cap—that has never been used—of the higher of 1.75 times Net CONE or Gross CONE is unjust and unreasonable.

Complainants witness Aksomitis makes two other abbreviated arguments for why the existing capacity market is unjust and unreasonable: (1) the reliability requirement allegedly is overstated because of "fleet performance improvements,"<sup>161</sup> and (2) Net CONE is overstated on UCAP basis "particularly with respect to new capacity" by "using class average performance and ignoring the impact of increased winter capacity"<sup>162</sup> The Complaint itself, however, barely references these allegations.<sup>163</sup> This is an insufficient showing to demonstrate the existing Reliability Pricing Model is unjust and unreasonable. It is more akin to the Joint Consumer Advocates' complaint, which lodged a broad array of proposals—every single one designed to suppress capacity prices. The Complaint in fact attempts largely the same showing as the Joint Consumer Advocates' complaint—that past and prospective prices in the capacity auction make it unjust and unreasonable. The two complaints simply propose different replacement rates. But neither complaint makes the required step one showing, and both should be rejected, as should Complainants generic critiques of other market rules it disfavors.

*II.* With No Showing that the Existing Rate Is Unjust and Unreasonable, the Commission Should Not Fix a Replacement Rate

Because Complainants do not meet their section 206 burden to show that PJM's capacity auction market cap of the higher of 1.75 times Net CONE or Gross CONE is unjust and unreasonable, there are no grounds for the Commission to fix a replacement rate. The Commission cannot "skip[] to Section 206's second step and reason[] backward from there," as doing so would

<sup>&</sup>lt;sup>161</sup> Aksomitis Declaration at PP 49-53.

<sup>&</sup>lt;sup>162</sup> *Id.* at PP 54-59.

<sup>&</sup>lt;sup>163</sup> See Complaint at 11 (listing bullets).
contravene the framework of the Federal Power Act.<sup>164</sup> The first step must be satisfied before reaching the second step.<sup>165</sup> We discuss in the prior section Complainants' attacks on the current cap at the higher of 1.75 times Net CONE or Gross CONE. The attacks boil down to the current cap allows potentially higher prices than Complainants' preferred rate. But this fails to explain how the existing cap is unjust and unreasonable and says nothing at all about Complainants' preferred replacement rate.

# A. If the Commission Fixes a Replacement Rate, It Should Not Be Complainants' Proposal of 1.5 Times Net CONE

If the Commission were to find PJM's capacity auction unjust and unreasonable, it still could not adopt Complainants' proposed replacement rate. Complainants transparently admit that their proposal to reduce the price cap to 1.5 times Net CONE "represent[s] an estimate of attempting to drive outcomes"<sup>166</sup> to "reduce costs by up to half."<sup>167</sup> This is a confession, not a justification. Sufficient evidentiary support does not exist for purely price suppressive reduction in the price cap.<sup>168</sup> And in the face of the already-pending thirty percent reduction in Net CONE caused by PJM's proposal to return to a Combustion Turbine as the reference resource, it has not been shown to be just and reasonable. Complainants thus fail to carry their burden under FPA section 206.<sup>169</sup>

<sup>&</sup>lt;sup>164</sup> Int'l Transmission Co. v. FERC, 988 F.3d 471, 485 (D.C. Cir. 2021).

<sup>&</sup>lt;sup>165</sup> *Id.* (explaining that the Commission cannot conclude an existing rate is unjust and unreasonable if the existing rate "remain[s] within a broader zone of reasonableness.").

<sup>&</sup>lt;sup>166</sup> Aksomitis Declaration at P 19.

<sup>&</sup>lt;sup>167</sup> Complaint at 5.

<sup>&</sup>lt;sup>168</sup> Ming Testimony at 42-43 ("Given that the current VRR curve is designed such that it delivers an average long-run capacity price of Net CONE, a change to the curve that is purely price suppressive, even if for only two auctions, would necessarily result in the market delivering less than Net CONE on average for a system that achieves the reliability standard.... Because a system that delivers less than Net CONE on average is not in equilibrium (as defined by Brattle in the VRR curve review), this would result in a reduction in capacity and degradation of system reliability below the target.").

<sup>&</sup>lt;sup>169</sup> See, e.g., Blumenthal v. FERC, 552 F.3d 875, 881 (D.C. Cir. 2009); Atl. City Elec. Co. v. FERC, 295 F.3d 1, 10 (D.C. Cir. 2002); La. Pub. Serv. Comm'n v. Entergy Corp., 123 FERC ¶ 61,188, at P 31 (2008).

Aside from reducing prices, Complainants state that "1.5 times Net CONE is a conservative, reliability-centric price cap" that PJM should return to, noting it "has existed in every previous BRA auction," making it "familiar and predictable for market participants."<sup>170</sup> There is nothing "reliability-centric" about Complainants' assumed \$20.4 billion reduction in market signals that new supply is needed to ensure reliability. And the "predictability" factor is lost when the price cap is being changed—as Complainants propose—*after market participants have been hedging positions based on the current cap*. The fact that it was the old cap does not mean market participants could predict that it suddenly would be the new cap. And for a Complaint that spends so much time focused on prior auction outcomes, there is a surprising lack of support for the likely practical implications—including reasonable projections of Net CONE (which could promptly fall to zero)—of the replacement rate.

Complainants proposed lower cap also is unjust and unreasonable because it will have negative, unintended consequences for reliability, future investment, and affordability.<sup>171</sup>

*First*, the lower price cap is not just a cap. It also shifts the demand curve downward and thus reduces prices at levels below the cap itself. Inserting a reduced-price cap of 1.5 times Net CONE into the VRR curve results in the suppression of prices at all quantities of cleared supply up to 101.5% of the reliability requirement.<sup>172</sup> Although the impact of the price suppression "would be greatest at the price cap segment of the curve, even a system exactly at target reliability

<sup>&</sup>lt;sup>170</sup> Complaint at 29.

<sup>&</sup>lt;sup>171</sup> Ming Testimony at 40 ("A reduction in the price cap to 1.5 times Net CONE and elimination of Gross CONE from the cap formula would harm the market by reducing the average long-run price below Net CONE, a key objective of the capacity market.").

<sup>&</sup>lt;sup>172</sup> *Id.* at 42 ("Reducing the price cap to 1.5 times Net CONE and eliminating Gross CONE from the price cap formula" (as proposed by the Complainants) "would have the impact of suppressing prices at all quantities of cleared supply up to 101.5% of the reliability requirement.").

would see a reduction in the capacity price."<sup>173</sup> The resulting scenario is illustrated in the following figure:



A more accurate name for the price cap thus would be "price suppression mechanism."

*Second*, the 1.5 times Net CONE mechanism fails to meet the objectives of the Reliability Pricing Model and thus jeopardizes reliability. Without any other changes to current structure of PJM's system, the lower "cap" would cause the market to deliver less than Net CONE on average and over time.<sup>174</sup> A system delivering less than Net Cone on average cannot sustain reliability.<sup>175</sup> Brattle confirmed this in the most recent VRR curve review when it stated, a "cap at 1.5x Net CONE is too low to support reliability under base assumptions (unless over-written by CONE-

<sup>&</sup>lt;sup>173</sup> *Id.* ("While the price suppressive effects would be greatest at the price cap segment of the curve, even a system exactly at target reliability would see a reduction in the capacity price.").

<sup>&</sup>lt;sup>174</sup> *Id.* at 42-43 ("Given that the current VRR curve is designed such that it delivers an average long-run capacity price of Net CONE, a change to the curve that is purely price suppressive, even if for only two auctions, would necessarily result in the market delivering *less* than Net CONE on average for a system that achieves the reliability standard.").

<sup>&</sup>lt;sup>175</sup> *Id.* at 43 ("Because a system that delivers less than Net CONE on average is not in equilibrium (as defined by Brattle in the VRR curve review), this would result in a reduction in capacity and degradation of system reliability below the target.").

based minimum).<sup>176</sup> Because the proposed rate would prohibit PJM's system from adhering to its reliability standard, Complainants' proposal is unjust and unreasonable.

The holistic design of PJM's capacity market ensures that it delivers an average of Net CONE in the long run, even as prices fluctuate annually due to natural oscillations between capacity surpluses and deficits.<sup>177</sup> This variability reflects the market's adaptive nature, maintaining equilibrium over time. To ensure these overarching design objectives are met, PJM periodically evaluates and adjusts the VRR curve through its quadrennial review process.<sup>178</sup> In the latest review, PJM commissioned Brattle whose analysis projects that "the cleared capacity price should be expected to form *above* Net CONE in approximately 46% of years and above 1.5 times Net CONE in 9% of years."<sup>179</sup>

With its proposed rate, Complainants assume that changes to capacity prices one year will *not* affect supply offered into PJM's capacity market in future years. This implies that an expected increase or decrease in the capacity price in one year does not affect the supply of capacity in future years. This assumption is fundamentally flawed because it fails to account for the holistic design of PJM's capacity market, which relies on a delicate balance of long-term price signals to maintain equilibrium.<sup>180</sup> PJM's capacity market is designed to ensure that supply remains

<sup>&</sup>lt;sup>176</sup> *Id.* at 43 ("Initial analysis by Brattle in the most recent VRR curve review support this assertion by stating that a 'cap at 1.5x Net CONE is too low to support reliability under base assumptions (unless over-written by CONE-based minimum).") (citing Brattle, *Sixth Review of the PJM's RPM VRR Curve Parameters*, at Slide 23 (Dec. 17, 2024), https://www.pjm.com/-/media/DotCom/committees-groups/committees/mic/2024/20241217-special/item-1-a-2024-12-17-updated-pjm-qr-vrr-curve-deck\_december-meeting.pdf).

<sup>&</sup>lt;sup>177</sup> *Id.* at 23 ("While the capacity market is designed to deliver an average of Net CONE across all years in the longrun, actual prices are expected to vary on a year-to-year basis given that the market will naturally oscillate between periods of capacity surplus and deficits.").

<sup>&</sup>lt;sup>178</sup> *Id.* ("PJM periodically evaluates the VRR curve to ensure it is achieving overarching design objectives in a process called 'Quadrennial Review.").

<sup>&</sup>lt;sup>179</sup> *Id*.

<sup>&</sup>lt;sup>180</sup> *Id.* at 14 ("Every four years, PJM undertakes a 'quadrennial review' in which it holistically reviews various parameters of the market to ensure it is well-equipped to meet the reliability requirement at the lowest possible cost. One key parameter that is reviewed in this process is the price cap of the VRR curve. The quadrennial review is completed by an independent vendor (currently and most recently Brattle) alongside significant opportunity for

adequate over time, with price variability serving as a necessary mechanism to incentivize investment during periods of scarcity while moderating prices during surpluses.<sup>181</sup>

Capacity supply is inherently a function of long-run prices and investor expectations a change in the capacity price in any given year does not operate in isolation; rather, it reverberates across future years by influencing investor confidences and the willingness of to commit capital to new capacity resources.<sup>182</sup> Each auction result provides price discovery to inform investment decisions. Despite the Complainants' assertions, the cumulative effects of the multitude of proposed and suggested market rule changes create meaningful uncertainty about future market outcomes. Investment decisions in these markets are predicated on the expectation that prices will be allowed to rise to the price cap when market fundamentals warrant, enabling investors to recover their costs plus a reasonable return over the life of the investment.<sup>183</sup> This balancing mechanism ensures that, even when some years yield low prices due to favorable market conditions, prices will rise during tighter conditions to signal the need for additional investment.<sup>184</sup> The use of Net CONE alone to establish the price cap and thus demand curve shape create meaningful risk that the demand curve will collapse.

stakeholder input and engagement. The independent vendor conducts simulations to understand how the market will respond to various combinations of design parameters.").

<sup>&</sup>lt;sup>181</sup> *Id.* at 36 ("Within such a framework, it is not only allowable but expected that there will be some years in which the price cap is reached and the quantity of capacity that clears the market is not sufficient to meet the reliability requirement."). *See id.* at 37 ("Generation developers have indicated that the price signals that have materialized in the recent auction and that they expect to continue over the near-term future are an indication that future pricing is sufficient to support new investment.").

<sup>&</sup>lt;sup>182</sup> See, e.g., *id.* at 23 ("While the capacity market is designed to deliver an average of Net CONE across all years in the long-run, actual prices are expected to vary on a year-to-year basis given that the market will naturally oscillate between periods of capacity surplus and deficits.").

<sup>&</sup>lt;sup>183</sup> *Id.* at 36 ("The lifetime of new powerplants is measured in decades, so investments in new resources must be predicated on expectations that investors will be able to recover their investment plus a return over the life of the investment.").

<sup>&</sup>lt;sup>184</sup> *Id.* ("[F]or the market to function effectively, investors must have confidence that prices will be able to rise to the price cap when market fundamentals warrant as an offset for years with low prices.").

By reducing capacity prices in the short term, Complainants' proposal undermines this delicate balance, diminishing the long-term price signal and eroding investor confidence. If investors doubt that prices will rise when market conditions justify it, they will be less likely to fund new projects in the market, resulting in reduced supply in the future.<sup>185</sup> This suppression of future capacity additions could, paradoxically, drive prices higher over time as the market struggles to correct for the resulting shortfalls.

If Pennsylvania's complaint is approved, the challenges facing PJM's market would be further compounded by the material risk of generation resources remaining exposed to very low prices. On the date that this answer is being filed, capacity resources are being paid \$28/MW-Day.<sup>186</sup> The prospect of future low prices, combined with the precedent of regulatory intervention to prevent prices from rising, creates significant uncertainty that would discourage investors from pursuing projects where they cannot reasonably expect to recover their original investments.

Nowhere do Complainants demonstrate how its proposed reduction in the cap and demand curve would ensure sufficient investment and generation to meet future capacity needs.<sup>187</sup> Complainants' failure to consider the holistic design of the PJM capacity market and its future capacity needs not only makes its 1.5 times Net CONE proposed rate unjust and unreasonable but also likely to produce outcomes contrary to the underlying rationale for the proposal—ultimately leading to higher electricity costs for Pennsylvania ratepayers.

<sup>&</sup>lt;sup>185</sup> *Id*.

<sup>&</sup>lt;sup>186</sup> Aksomitis Declaration, Exh. A, "PJM Capacity Auction Evaluation" (Dec. 23, 2024), at 21, Figure 3.

<sup>&</sup>lt;sup>187</sup> Ming Testimony at 34-35 ("[T]he position of the Complainants is not grounded in economic basis where in fact investment is often predicated on future expectation that prices will rise to reflect market fundamentals even if there is not time for additional investment to respond in real-time. For example, investors do not react to surges in airfare prices during the holidays by manufacturing additional airplanes in real time; rather, the quantity of airplanes during the holiday season is determined far in advance by investors' anticipations of the demand and associated.").

## B. The Commission Should Adopt a Combustion Turbine as the Reference Resource

Rather than Complainants' proposed change to the price cap itself, the Commission should adopt PJM's proposal to return to a combustion turbine as the reference resource, which PJM proposed in the First PJM 205 Filing, and which P3 supports. This will have the effect of reducing the capacity market price cap by thirty percent and reducing capacity market volatility, and thus addresses the concerns animating the Complaint.

We would not characterize adopting a combustion turbine as a replacement rate because Complainants have not met their burden of proof. But in the event the Commission finds that Complainants *have* met their burden to demonstrate that the existing Reliability Pricing Model is unjust and unreasonable, adopting a combustion turbine as the reference resource will ensure a price floor thirty percent lower than the one in effect today and is a superior replacement rate to Complainants' proposal.

### CONCLUSION

WHEREFORE, P3 respectfully requests that the Commission reject the Complaint. If the Commission adopts a replacement rate, it should be to return to a combustion turbine as the reference resource and leave the existing price cap mechanism in place.

Respectfully submitted,

/s/ Paul F. Wight

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Counsel for The PJM Power Providers Group

Dated: January 27, 2025

## **CERTIFICATE OF SERVICE**

I hereby certify that I have on this 27<sup>th</sup> day of January, 2025, caused to be served a copy of the foregoing upon all parties on the service list in these proceedings in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.2010 (2022).

<u>/s/ Mack Dowiak</u> Mack Dowiak Kirkland & Ellis LLP 1301 Pennsylvania Ave., N.W. Washington, D.C. 20004 Tel: (202) 389-3266 Mack.Dowiak@kirkland.com

# Exhibit 1

# **Testimony of Zachary Ming**

# Testimony of Zachary Ming Partner Energy and Environmental Economics, Inc. ("E3")

On behalf of The PJM Power Providers Group ("P3")

January 24, 2024



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3	PJM's Current VRR Curve is Just and Reasonable	13
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1		PJM Power Providers			
2 3 4 5	Res	ponse to the Complaint of Governor Josh Shapiro Regarding the PJM RPM Price Cap			
6 7 8		<u>Testimony of Zachary Ming, Partner, Energy and Environmental</u> <u>Economics, Inc. ("E3")</u>			
9	9 <b>1 Introduction</b>				
10	Q1.	PLEASE STATE YOUR NAME, OCCUPATION, BUSINESS ADDRESS.			
11	A1.	My name is Zachary Ming. My current position is Partner at Energy and			
12		Environmental Economics ("E3"). My business address is 44 Montgomery Street,			
13		Suite 1500, San Francisco, California 94104.			
14	Q2.	PLEASE STATE ON WHOSE BEHALF YOU ARE FILING TESTIMONY.			
15	A2.	I am filing this testimony as an independent expert, and it represents my own			
16		positions and perspectives. This testimony was funded by the PJM Power Providers			
17		("P3").			
18	Q3.	PLEASE DESCRIBE YOUR PROFESSIONAL BACKGROUND AND			
19		EXPERIENCE.			
20	A3.	I received a B.S. in Civil and Environmental Engineering (Atmosphere and Energy			
21		program) with a Minor in Economics, and an M.S. in Management Science and			
22		Engineering (Energy track), both from Stanford University. For more than 11 years,			
23		I have held various roles at E3, an energy consulting firm specializing in the			
24		economics of the electricity system where I am currently a Partner. In addition to			

full-time consulting work at E3, I teach a graduate-level course at Stanford
 University titled *Electricity Economics*.

### **3 Q4. PLEASE DESCRIBE YOUR RESPONSIBILITIES AS PARTNER AT E3.**

4 A4. In my role as Partner, I oversee E3 projects across a number of areas including 5 reliability and resource adequacy, rate design, system planning, and market design. I have authored several reports related to resource adequacy including Long-Run 6 7 Resource Adequacy under Deep Decarbonization Pathways for California,<sup>1</sup> Resource Adequacy in the Pacific Northwest,<sup>2</sup> and Assessment of Market Reform 8 Options to Enhance Reliability of the ERCOT System.<sup>3</sup> I have worked on resource 9 10 adequacy and market design topics in PJM, MISO, ERCOT, CAISO, SPP, NYISO, 11 and ISONE. Most broadly, I work with E3 staff and clients to understand the current 12 challenges facing the electricity system and to implement solutions that are 13 economic, environmentally sustainable, and reliable.

## 14 Q5. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE FEDERAL

## 15 ENERGY REGULATORY COMMISSION ("FERC")?

A5. Yes, I have previously testified multiple times before FERC on topics related to the
 participation of reliability must run ("RMR") units in the PJM capacity market<sup>4</sup>,
 PJM's filing to use marginal effective load carrying capability ("ELCC") as the

<sup>&</sup>lt;sup>1</sup> <u>https://www.ethree.com/wp-content/uploads/2019/06/E3 Long Run Resource Adequacy CA Deep-Decarbonization\_Final.pdf</u>.

<sup>&</sup>lt;sup>2</sup> <u>https://www.ethree.com/wp-content/uploads/2019/03/E3 Resource Adequacy in the Pacific-Northwest March 2019.pdf</u>.

<sup>&</sup>lt;sup>3</sup> <u>https://www.ethree.com/wp-content/uploads/2023/05/E3-PUCT\_Assessment-of-Market-Reform-Options-to-Enhance-Reliability-of-the-ERCOT-System 11.10.22-Sent.pdf</u>.

<sup>&</sup>lt;sup>4</sup> Docket EL24-148-000.

basis for accreditation in the capacity market<sup>5</sup>, and on behalf of MISO regarding
their filing to use the direct loss of load ("DLOL") methodology for resource
accreditation<sup>6</sup>. Additionally, I have testified before state and provincial public
utility commissions in Oregon, Texas, South Carolina, and New Brunswick on
topics relating to reliability, resource adequacy, market design, and rate design.

6 (

15

#### Q6. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

7 A6. The purpose of my testimony is to explain why the current variable resource 8 requirement ("VRR") curve, including the current price cap, used in the PJM 9 reliability pricing model ("RPM") is just and reasonable. I further demonstrate the 10 harm to the market by modifying the price cap outside of the holistic VRR curve 11 review process that is currently underway and why such a change is unjust and 12 unreasonable.

### 13 Q7. PLEASE PROVIDE AN OUTLINE OF YOUR TESTIMONY.

- 14 A7. My testimony is organized as follows.
  - In Section 2, I provide a general background on RPM and its long-term goals;
- In Section 3, I demonstrate why PJM's current VRR curve is just and
   reasonable;
- In Section 4, I demonstrate how the Complainants' proposed changes to the
   VRR curve price cap<sup>7</sup> would harm the market and hinder its ability to deliver
   its long-term goals;

<sup>&</sup>lt;sup>5</sup> Docket ER24-99-000.

<sup>&</sup>lt;sup>6</sup> Docket ER24-1638-000.

<sup>&</sup>lt;sup>7</sup> Docket EL25-46-000, Complaint.

• In Section 5, I summarize the key takeaways of my testimony.

## 1 2 Background

### 2 Q8. PLEASE PROVIDE AN OVERVIEW OF CAPACITY MARKETS.

A8. Capacity markets play an important role in restructured competitive electricity
 markets by ensuring resource adequacy through price signals that encourage
 efficient entry into and exit from the market.<sup>8</sup>

# 6 Q9. HOW DO PRICE SIGNALS ENCOURAGE EFFICIENT ENTRY AND 7 EXIT?

8 A9. The prices resulting from capacity market auctions play a crucial role in 9 incentivizing new investment and maintaining existing capacity. Due to well-10 established characteristics of the energy market, generation resources require 11 additional revenues to recover their full costs (known as "missing money") and enter or stay in the market. Capacity markets are designed to provide this missing 12 13 money on average in the long run to incent investment. While capacity market 14 prices can vary year-over-year in a manner that reflects system fundamentals, the 15 variability of total system costs is significantly lower than in an energy-only market 16 design with energy scarcity pricing.

<sup>&</sup>lt;sup>8</sup> In PJM, the specified resource adequacy target is 0.1 days/year loss of load expectation ("LOLE"). This target aims to ensure that loss-of-load events should occur no more frequently than one day in every ten years.

# Q10. HOW DO MARKET PARTICIPANTS AND INVESTORS RESPOND TO CAPACITY PRICE MARKET SIGNALS?

3 A10. Market participants and investors can respond to capacity price market signals in a 4 multitude of ways, broadly through investments in "new" resources and retention 5 of "existing" resources. Investments in new resources include not only utility-scale 6 power plants but also distributed energy resources (including demand response) 7 that often have shorter lead times. It is important to note that new power plants are 8 assets that last many years and decisions to invest in these plants are *not driven by* 9 a single year of pricing but rather on long-term expectations that market prices will 10 support the investment over its lifetime. In other words, even a single year price 11 (that occurs three years forward) at greater than 1.0 Net CONE is not necessarily 12 sufficient to incentivize investment if market participants do not expect prices over 13 the lifetime of the asset will allow them to recover their costs and a return on their 14 investment.

15 Retention of existing resources can include the intentional decision to 16 continue to incur operating and maintenance costs for a power plant that would 17 have otherwise retired, investing in repowering a power plant that lacks modern 18 capabilities, or bringing a mothballed plant back online.

### 19 Q11. PLEASE PROVIDE AN OVERVIEW OF PJM'S CAPACITY MARKET.

A11. PJM's capacity market, called the Reliability Pricing Model ("RPM"), seeks to
procure sufficient capacity to meet the reliability target across both the entire
Regional Transmission Organization ("RTO") and PJM's Local Deliverability
Areas ("LDAs") in a least-cost manner. RPM is run centrally by PJM by

aggregating generator capacity bids to create a capacity supply curve, both RTO wide and for each LDA. The Base Residual Auction ("BRA") clears these supply
 curves against administratively-determined demand curves, which in PJM are
 called variable resource requirement ("VRR") curves for both the RTO and for each
 LDA to find market clearing prices and quantities that minimize costs.

6 PJM's capacity market is generally a three-year forward market. This means 7 that the BRA for a specific delivery year is run three years in advance to facilitate 8 the participation of new resources that often require multiple years to develop. 9 However, recent changes in PJM's capacity market design have caused delays in 10 the latest RPM auctions, so that auctions are currently occurring closer to the 11 delivery year. For instance, the BRA for the 2025/2026 delivery year took place in 12 July 2024, less than 10 months before the delivery year. The 2026/2027 BRA is 13 currently planned to take place in July 2025, less than 12 months before the delivery year, after FERC approved PJM's petition to delay the auction in November 2024.<sup>9</sup> 14

# Q12. WHAT ARE THE CURRENT VRR CURVE PARAMETERS FOR THE 2026/2027 BRA?

A12. The current VRR curve design was defined in Brattle's "Fifth Review of PJM's Resource Requirement Curve" report and is illustrated as the "Candidate Curve"
(orange) in the figure below.<sup>10</sup> A natural gas combined cycle ("CC") unit was selected as the reference technology used to define the CONE and Net CONE values in the VRR curve.

<sup>&</sup>lt;sup>9</sup> Docket ER25-118-000.

<sup>&</sup>lt;sup>10</sup> Page 15, <u>https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf</u>.



For context, the "Current Curve" (gray) represents the VRR curve utilized
through the 2025/2026 BRA.

#### 5 Q13. PLEASE PROVIDE A SUMMARY OF CRITICAL ELEMENTS OF THE

### 6 **2026/27 BRA THAT ARE BEING EVALUATED AT FERC.**

- A13. There are a number of parameters that are currently being evaluated and could
  change before the BRA for the 2026/2027 delivery year, including:
- 9 1. Whether reliability must run ("RMR")<sup>11</sup> units procured through cost-of-service
- 10 contracts will participate in the BRA, as contested by the Sierra Club through a
- 11 Federal Power Act 206 Complaint. PJM also filed proposal tariff revisions
- 12 under Section 205 of the Federal Power Act that, if approved, would require

<sup>&</sup>lt;sup>11</sup> Reliability must run ("RMR") units refer to resources that have applied for deactivation but, following analysis by PJM, are deemed necessary for reliability and are retained on a short-term cost-of-service basis.

1		RMR unit to participate capacity auction as price takers if certain criteria are
2		met; <sup>12</sup>
3	2.	Whether the reference technology used to calculate Gross and Net CONE will
4		be changed from a combined cycle ("CC") unit to a combustion turbine ("CT")
5		unit, as proposed by PJM through Federal Power Act 205 Filing;
6	3.	Whether intermittent resources will be required to offer into the BRA and be
7		able to reflect their costs and risks in their offers, as PJM has proposed; and
8	4.	Whether the price cap used in the VRR curve should be kept at the greater of
9		1.0 times Gross CONE or 1.75 times Net CONE, or whether it should be
10		reduced to 1.5 times Net CONE, as contested by Pennsylvania Governor Josh
11		Shapiro through a Federal Power Act 206 Complaint.

# Q14. PLEASE PROVIDE A BRIEF SUMMARY OF THE COMPLAINT FILED TO FERC PURSUANT TO SECTION 206 OF THE FEDERAL POWER ACT BY GOVERNOR JOSH SHAPIRO AND THE COMMONWEALTH OF PENNSYLVANIA.

A14. Governor Josh Shapiro and The Commonwealth of Pennsylvania ("Complainants") filed a Complaint to FERC pursuant to Section 206 of the Federal Power Act that posits that the current VRR curve price cap is unjust and unreasonable due to "unexpected developments" in the market including 1) load growth 2) delays in PJM interconnection queue times and 3) a compressed auction schedule that together render "high prices that are ineffective at delivering new power

<sup>&</sup>lt;sup>12</sup> Docket ER25-682-000.

- 1 generation."<sup>13</sup> The Complaint proposes a replacement rate of a VRR curve price
- 2 cap of no more than 1.5 times Net CONE.

<sup>&</sup>lt;sup>13</sup> Page 1, Complaint.

## **3 PJM's Current VRR Curve is Just and Reasonable**

# Q15. PLEASE SUMMARIZE THE ARGUMENTS PUT FORTH BY THE COMPLAINANTS TO SUPPORT THEIR ASSERTION THAT PJM'S VRR CURVE PRICE CAP IS UNJUST AND UNREASONABLE.

The Complainants assert that the increase in capacity market prices in recent years<sup>14</sup> 5 A15. 6 is unjust and unreasonable because the VRR curve that yields these prices are the 7 result of circumstances that were unforeseen at the time of the VRR curve 8 development. The Complaint also asserts that several factors, including delays in 9 PJM's interconnection queue and a compressed capacity auction schedule, leave 10 the market with limited ability to respond. In other words, they assert that the high 11 prices are unjust and unreasonable because they will do "extraordinarily little to ensure grid reliability."<sup>15</sup> 12

# Q16. DO YOU AGREE WITH THE ARGUMENTS PUT FORTH BY THE COMPLAINANTS TO SUPPORT THEIR ASSERTION THAT THE

## 14 15

# CURRENT VRR CURVE IS UNJUST AND UNREASONABLE?

# A16. No, I do not. I believe the arguments put forward by the Complainants either misunderstand or misrepresent the dynamics of the capacity markets. In the following sections, I more fully describe my arguments.

<sup>&</sup>lt;sup>14</sup> <u>https://www.utilitydive.com/news/pjm-interconnection-capacity-auction-vistra-constellation/722872/</u>.

<sup>&</sup>lt;sup>15</sup> Page 2, Complaint.

# 3.1 The VRR curve design, including its price cap, was developed through a quantitative, structured, and deliberative process—the PJM Quadrennial Review—which examines potential market outcomes across a wide array of conditions

### 5 Q17. HOW IS PJM'S VRR CURVE DEVELOPED?

Every four years, PJM undertakes a "quadrennial review" in which it holistically 6 A17. 7 reviews various parameters of the market to ensure it is well-equipped to meet the 8 reliability requirement at the lowest possible cost. One key parameter that is 9 reviewed in this process is the price cap of the VRR curve. The quadrennial review 10 is completed by an independent vendor (currently and most recently Brattle) 11 alongside significant opportunity for stakeholder input and engagement. The independent vendor conducts simulations to understand how the market will 12 13 respond to various combinations of design parameters.

## 14 Q18. WHAT ARE PJM'S VRR CURVE DESIGN OBJECTIVES?

A18. The VRR curve has multiple objectives that can broadly be categorized into 1)
ensuring the market will clear sufficient but not excess capacity and 2) that price
formation will occur in a manner that supports this prior objective. A full set of
VRR curve design objectives is provided in the table below.

Demand Curve Design Objectives			
Reliability	<ul> <li>Maintain 1-in-10 LOLE system-wide target on a long-term average basis; maintain 1-in to 25 conditional LOLE in each locational deliverability area. Reliability as measured immediately prior to the Planning Year</li> </ul>		
	<ul> <li>Avoid market clearing outcomes that result in insufficient capacity and out-of-market intervention</li> </ul>		
	<ul> <li>Maintain reliability across a range of potential market conditions, while mitigating the potential for over-procurement</li> </ul>		
Prices	<ul> <li>Prices high enough to attract entry when needed for reliability; prices low enough to enable efficient exit and retirements during surplus</li> </ul>		
	<ul> <li>Manage price volatility due to small changes in supply and demand</li> </ul>		
	<ul> <li>Mitigate susceptibility to exercise of market power</li> </ul>		
	<ul> <li>Allow prices to move sufficiently to reflect changes in market conditions</li> </ul>		
	<ul> <li>Few outcomes at the administrative price cap</li> </ul>		
Other	Strike a balance among competing objectives		
	<ul> <li>Aim for simplicity, stability, transparency, and consensus</li> </ul>		
Source/Notes: PJM, Man	ual 20, Section 1.4 PJM Installed reserve Margin (IRM), 2021; Section 4.1 Overview; Newell		

TABLE 1: SUMMARY OF DESIGN OBJECTIVES OF VRR CURVE

2

Source/Notes: PJM, <u>Manual 20</u>, Section 1.4 PJM Installed reserve Margin (IRM), 2021; Section 4.1 Overview; Newell et. al., <u>Fourth Review of PJM's Variable Resource Requirement Curve</u>, April 19, 2018.

## 3 Q19. WHAT ARE EXPECTATIONS FOR HOW THE VRR CURVE WILL

#### 4 **PERFORM**?

A19. One key expectation is that the VRR curve should provide an average price of Net
CONE across all years in the long run because this is what is required to induce
new investment into the market. Specifically, the review states that different
candidate VRR curves are evaluated "under the long-run equilibrium assumption
that merchant generation will enter the market until *average prices equal Net CONE*" (emphasis added).<sup>16</sup> This key expectation that average prices in the long

<sup>&</sup>lt;sup>16</sup> Page 10, https://www.brattle.com/wp-content/uploads/2021/05/13894\_20180420-pjm-2018-variable-resource-requirement-curve-study.pdf.

1

2

run will equal Net CONE is critical in order to evaluate *any* particular VRR curve's performance.

## 3 Q20. HOW DOES PJM SELECT A SPECIFIC VRR CURVE DESIGN?

4 A20. The independent vendor conducts probabilistic simulation analysis to evaluate the 5 performance of multiple VRR curve design options in equilibrium (i.e. average 6 prices in the long run will equal Net CONE). For each VRR curve, capacity is added 7 or subtracted until this equilibrium condition is achieved. Different levels of 8 capacity are represented through a probabilistic distribution, recognizing that the 9 level of the capacity in the market in any given year is unlikely to exactly equal the 10 target reliability requirement and there will be some expected surplus or deficit in 11 each year. Once an equilibrium quantity of capacity is determined for each curve, 12 specific metrics such as reliability, average price, and price volatility can be 13 calculated for each curve. The independent vendor ultimately recommends a 14 specific "candidate curve" that can achieve the reliability objective with both low 15 cost and low price volatility while recognizing that there is a "workable range" of 16 different curve options that "would offer sufficient system reliability but with a 17 differing balance of performance trade-offs."<sup>17</sup>

<sup>&</sup>lt;sup>17</sup> Page iv, <u>https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf</u>.

# Q21. FOR ANY GIVEN VRR CURVE, WHAT WOULD THE RESULT BE OF REDUCING THE PRICE CAP?

3 A21. Every viable VRR curve is developed such that it yields target reliability and an 4 average price of Net CONE in the long-run. Different curves can be developed with 5 different shapes, slopes, and price caps, but they all adhere to these same basic 6 objectives. Once a viable VRR curve has been developed that achieves target 7 reliability and an average price of Net CONE, reducing any segment of the curve 8 (such as the price cap) without increasing other segments would necessarily reduce 9 the average price below Net CONE in the long run. This would cause less capacity 10 to enter the market and ultimately lead to outcomes that will not achieve target 11 reliability. The only way to avoid this outcome would be to change two or more 12 parameters at the same time in opposing directions. In other words, no single 13 parameter should be evaluated or adjusted in isolation, which is why PJM utilizes 14 a holistic review process.

# 15 Q22. IS EACH VRR CURVE DEVELOPED FOR A SPECIFIC LOAD OR 16 RESOURCE PORTFOLIO FORECAST?

A22. No. Each VRR curve is probabilistically evaluated using a multitude of load
(demand) and generation (supply) levels. Additionally, the VRR curve is
specifically designed to be scaled and modified to adapt to a changing or growing
load forecast over time because requirements are based on percentages of a mutable
reliability requirement. Therefore, the VRR curve design is robust to load forecast
uncertainty and is well-positioned to adapt as conditions change.

# Q23. HOW MANY UNIQUE SYSTEM SCENARIOS WERE EVALUATED IN PJM'S LATEST (FIFTH) QUADRENNIAL REVIEW?

A23. PJM's VRR curve is evaluated using a Monte Carlo simulation with distributions
of price, quantity, and reliability outcomes determined over "1000 distinct
simulated draws." For each draw, the clearing price is determined from a unique
combination of supply and demand availability in each model run. The resulting
range of scenarios is illustrated in the figure below.<sup>18</sup>



Figure 2: Illustration of Range of Scenarios in VRR Review<sup>19</sup>



<sup>&</sup>lt;sup>18</sup> Page 53, <u>https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf</u>.

<sup>&</sup>lt;sup>19</sup> Page 54, <u>https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf.</u>

# Q24. WHAT RANGE OF LOAD AND RESOURCE CONDITIONS WERE EVALUATED IN THE LATEST (FIFTH) PJM QUADRENNIAL REVIEW STUDY?

A24. PJM's Fifth Quadrennial Review of the VRR curve evaluated many years with
higher-than-expected load growth and lower than expected supply. As seen in the
figure below, 11% of the system conditions years evaluated in the study did not
meet the reliability standard. The study even evaluated system conditions in which
the quantity of cleared capacity fell short of PJM's reliability requirement by as
much as 3,000 MW.

10 Figure 3: Expected Variability in PJM's Cleared Capacity from VRR Design Study<sup>20</sup>



<sup>&</sup>lt;sup>20</sup> Page 19, <u>https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf.</u>

# Q25. DID THE FIFTH QUADRENNIAL REVIEW STUDY INCLUDE SYSTEM CONDITIONS THAT ARE IN LINE WITH PJM'S 2025/2026 BRA RESULTS?

4 A25. Yes. The 2025/2026 BRA cleared 135,684 MW (UCAP), while the reliability requirement was only 134,813 MW (UCAP).<sup>21</sup> This means that the market cleared 5 6 871 MW (UCAP) above the reliability requirement, which is close to the middle of 7 the distribution in the figure above. In fact, more than 27% of the system conditions 8 evaluated in the study represent a tighter system than those seen in the 2025/2026 9 BRA. So while the Complainants characterize the recent load growth and supply 10 conditions as "unexpected", the very process through which the demand curve was 11 selected directly considers the possibility of tight market conditions like the ones 12 currently experienced in PJM.

# 3.2 Reasonableness of prices should be judged based on their absolute level, not on year-to-year changes, and total cost estimates should incorporate hedging

## 16 Q26. HOW DO THE COMPLAINANTS CHARACTERIZE RECENT PRICES,

## 17 INCLUDING THE MOST RECENT 2025/2026 BRA?

A26. The Complainants characterize recent "record-setting prices" primarily based upon
 their increase from prior years, noting that "[t]he 2025/2026 [BRA] cleared at a
 price nearly ten times that of the immediately preceding auction."<sup>22</sup> Through this

<sup>&</sup>lt;sup>21</sup> <u>https://www.pjm.com/-/media/DotCom/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.ashx</u>.

<sup>&</sup>lt;sup>22</sup> Page 1, Complaint.

- lens, they describe prices as "astronomical" or "runaway," often referring to
   "billions" of dollars in "unnecessary costs."

# 3 Q27. ARE YEAR-TO-YEAR CHANGES AN APPROPRIATE BASIS UPON 4 WHICH TO JUDGE WHETHER PRICES ARE JUST AND 5 REASONABLE?

A27. No. The relevant aspect upon which to assess prices is their absolute level, not on
year-to-year changes in prices. Prices in the 2025/2026 BRA cleared at 118% of
Net CONE, where 100% of Net CONE is the long-run objective of the capacity
market – a fact acknowledged by the Complainants themselves:

10...[t]he second purpose [of the capacity market] is to provide 'missing money' to11capacity resources in order to support resource adequacy and ensure sufficient12capacity... To perform [this] function[], PJM relies on Net CONE to establish13the RPM auction price.<sup>23</sup>

14 In contrast, prices in the immediately preceding auction (2024/2025) 15 cleared at just 10% of Net CONE. Comparing prices that are clearing slightly above 16 Net CONE levels, which the Complainants themselves acknowledge is consistent 17 with the "purpose" of the capacity market, to significantly depressed prices in prior 18 auctions is akin to asserting that normal prices for goods are unjust and 19 unreasonable the day after Black Friday because you could have bought the same 20 items at a substantial discount yesterday. In other words, the relevant aspect of 21 assessing the reasonableness of prices is not year-to-year percentage changes but 22 rather the absolute price level within the context of the outcomes a sustainable 23 market should be designed to produce.

<sup>&</sup>lt;sup>23</sup> Page 7, Complaint.

1Q28.REGARDING THE CONSUMER IMPACT OF PRICE INCREASES, IS2THE COMPLAINANTS' ASSERTION THAT "PENNSYLVANIA3CONSUMERS AND RATEPAYERS ACROSS THE REGION FACE UP TO4A \$20.4 BILLION INCREASE IN ELECTRICITY BILLS OVER THE NEXT5TWO YEARS" A REASONABLE ONE?

A28. No it is not. In later sections, I demonstrate how the Complainants ignore significant
quantities of incremental supply that could respond to price signals and reduce
prices below the assumption that underlies the \$20.4 billion number put forward by
the Complainants. Additionally, this \$20.4 billion figure assumes that customers
are *completely unhedged* and exposed to the market price of capacity. Given that
many consumers are hedged,<sup>24</sup> this \$20.4 billion number represents an unrealistic
upper bound for customer cost impacts.

3.3 Contrary to assertions that high prices are evidence of an unjust or
 unreasonable VRR curve design, the prices resulting from the
 2025/2026 RPM reflect a reasonable and expected outcome in the
 design of the competitive capacity market

17 Q29. GIVEN THE **AFOREMENTIONED OBJECTIVES** OF THE THE 18 **QUADRENNIAL REVIEW**, **PLEASE SUMMARIZE** 19 EXPECTATIONS FOR HOW THE CAPACITY MARKET SHOULD 20 **PERFORM?** 

- A29. Both the Complainants and PJM acknowledge that achieving the reliability
   objective requires a market that is designed to produce capacity market prices at an
  - <sup>24</sup> https://www.utilitydive.com/news/dominion-rate-payers-capacity-auction-pjm-generation/723535/.

*average of Net CONE over the long run.* For example, the Complainants state that
 "[n]et CONE is a barometer of the estimated support needed to bring a new unit
 [...] into the market."<sup>25</sup> Similarly, the VRR Curve Review study commissioned by
 PJM states that "the capacity market outcome [...] long-run equilibrium assumption
 [is] that merchant generation will enter the market until average prices equal Net
 CONE."<sup>26</sup>

# Q30. WHAT ARE THE EXPECTATIONS OF HOW PRICES WILL FORM IN THE CAPACITY MARKET ON A YEAR-TO-YEAR BASIS?

9 A30. While the capacity market is designed to deliver an average of Net CONE across 10 all years in the long-run, actual prices are expected to vary on a year-to-year basis 11 given that the market will naturally oscillate between periods of capacity surplus 12 and deficits. PJM periodically evaluates the VRR curve to ensure it is achieving 13 overarching design objectives in a process called the "Quadrennial Review." PJM 14 commissioned Brattle to perform the most recent (fifth) review, where analysis 15 demonstrated that while the average price is Net CONE, the cleared capacity price 16 should be expected to form *above* Net CONE in approximately 46% of years and above 1.5 times Net CONE in 9% of years.<sup>27</sup> This is illustrated graphically in the 17 18 figure below.

<sup>&</sup>lt;sup>25</sup> Pages 6-7, Complaint.

<sup>&</sup>lt;sup>26</sup> Page 42, <u>https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf</u>.

<sup>&</sup>lt;sup>27</sup> Page 19, <u>https://www.brattle.com/wp-content/uploads/2022/05/Fifth-Review-of-PJMs-Variable-Resource-Requirement-Curve.pdf</u>.



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# 3 Q31. HOW HAVE ACTUAL PRICES IN THE PJM CAPACITY MARKET 4 FORMED OVER THE PAST FOURTEEN YEARS?

A31. Over the past fourteen years, prices have formed significantly below expectations
for what the market is designed to deliver in the long run (Net CONE), as illustrated
in the figure below. As the Complaint's own supporting analysis demonstrates,
capacity prices in all but the most recent auction were significantly lower than Net
CONE, as illustrated in the figure from the Complainants' Exhibit copied below.

#### PJM Capacity Auction Evaluation





These recent historically low capacity prices were due to a number of factors, including an extended period of limited load growth, a significant investment in new renewables and storage incentivized by government policy and subsidies, and various FERC and PJM decisions.<sup>28</sup> This resulted in low prices that would not be expected to persist in an environment of significant load growth resulting in the need for new investment in generation.

<sup>&</sup>lt;sup>28</sup> Pages 2-4, https://www.p3powergroup.com/siteFiles/News/B2539CF44D0320D737ADBAE381066AB4.pdf.





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Figure 6: Expected Capacity Prices vs. Actual Historical Capacity Prices



[1] "Actual" prices were normalized to ensure consistency in the Clearing Price distribution between "Modeled" and "Actual" outcomes. Values were normalized by first dividing by the net CONE of that year's BRA and then multiplying by the net CONE in the "Modeled" study.

In this vein, it is not the 2025/2026 auction results that are an outlier with respect to long-run market expectations, but rather the multitude of years immediately preceding. This comparison directly rebuts the Complainants' assertion that recent higher than historical price levels render the auction outcomes unjust and unreasonable.
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**3.4** Contrary to the Complainants' assertion that price increases "will do extraordinarily little to ensure grid reliability," there are a multitude of ways in which market participants can respond

#### 4 **O33.** HOW DO THE COMPLAINANTS CHARACTERIZE THE ABILITY OF

- 5 THE MARKET TO RESPOND TO NEAR-TERM PRICES?
- 6 A33. The Exhibit supporting the Complaint asserts that "a price increase from 1.0 times 7 Net CONE at \$224/MW-Day to Gross CONE at \$695/MW-Day would have
- elicited only about 770 megawatts ("MW") of additional total capacity, at most."<sup>29</sup> 8
- 9 Within the context of the PJM market, this represents a relatively small value equal
- 10 to approximately half of one percent of total UCAP capacity demand.

#### WHAT ASSUMPTION UNDERLIES THE ASSERTION ABOVE? 11 **Q34**.

12 A34. The assertion above is based on the assumption that the ability of the market to 13 respond in the upcoming 2026/2027 BRA and beyond is at most equal to the 14 quantity of uncleared capacity in the previous 2025/2026 BRA.

#### 15 **IS THIS ASSUMPTION REASONABLE?** Q35.

16 A35. No, this assumption is not reasonable and misunderstands the nature of how supply 17 participates the capacity market. The incremental quantity of supply that is 18 available is not just equal to uncleared capacity in the prior auction but is tied to 19 actions that market participants can take based on expectations of future pricing to 20 unlock additional supplies. Market participants rarely make long-term investments 21 based on whether single high-priced capacity offer clears. Rather, they are

<sup>&</sup>lt;sup>29</sup> Page 21, Complaint.

constantly assessing future pricing and making decisions based on a forecast of how
 they expect market prices to clear in future years. Additionally, market participants
 may not go through the effort of putting together an offer that they do not expect
 will clear. To summarize, expectations of higher prices in future years *creates additional offers* that would not have been made if price expectations were lower.

### 6 Q36. WHAT TYPES OF ADDITIONAL SUPPLY MIGHT BE AVAILABLE 7 THAT ARE NOT CONSIDERED BY THE COMPLAINANTS?

### 8 A36. Additional sources of capacity supply in PJM that is not considered by the 9 Complainants includes:

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### **Existing resources that have not historically offered:** Some resource types, namely wind and solar, are categorically exempt from being required to offer

- into the PJM capacity market. Because production from these resources is based
  largely on weather factors outside of their control, they face salient financial
  penalty risks for not performing during system emergencies and often elect to
  avoid these penalties through non-participation in the capacity market.
  Increased capacity prices would encourage more capacity offers if resource
  owners anticipate they would be sufficient to compensate for penalty risk.
- Existing resources with planned retirements: Units that have submitted deactivation requests can withdraw these requests and delay retirements to provide additional capacity to PJM's market. Given that these units are old, they generally require investment to ensure they can continue to meet the performance requirements of the capacity market and will therefore only commit to entering the capacity market if they expect prices that allow recovery

of and on capital invested over the life of the investment. Retirement delays
 have, in fact, already occurred. As the Complainants mention, "Elgin Energy
 Center (483 MW ICAP) has canceled its prior deactivation plans as of
 September 2024" slightly after the 2025/2026 BRA results were published.<sup>30</sup>

- <u>Mothballed units that could come back online:</u> Recently retired units, many of which are mothballed, can be repowered by incurring an investment to bring them back into operation and to participate in the PJM capacity market provided they have interconnection rights. These units will only incur investment required to return to service and to offer into the capacity market if they have expectations that prices over their new extended lifetime will make their investment whole, rather than looking at the price in just a single year.
- Incremental upgrades to existing resources: Existing units can incur capital
   investments to increase their capacity through pathways that include
   configuration optimization, adding wet compression technology to increase
   turbine maximum power, or replacing or upgrading different parts of their
   system to increase their operational efficiency and potential output.
- Additional demand response ("DR"): DR represents the ability of customers
   to reduce electricity usage during periods of high system stress, which can
   provide additional capacity. DR capacity *offered* into PJM's BRA can increase
   significantly from one year to another, generally in response to increases in the
   auction prices from the previous auctions. In the 2015/2016 BRA, DR offered

<sup>&</sup>lt;sup>30</sup> Page 35, Complaint Attachment 1, Exhibit A

<sup>(</sup>https://elibrary.ferc.gov/eLibrary/filelist?accession\_number=20241230-5225).

19,956 MW (ICAP), more than 11,700 MW (ICAP) above the DR offered in
 the 2025/2026 BRA.<sup>31</sup>

- 3 **New utility-scale power plants:** The PJM interconnection queue contains 60 ٠ projects totaling more than 35,000 MW (ICAP) in capacity that are currently 4 5 under construction or in engineering and procurement phases. Of these, more than 11,000 MW (ICAP) utilize dispatchable technologies like battery storage 6 and natural gas.<sup>32</sup> It is expected that at least some of the projects will be able to 7 become operational by mid-2026 and participate in the 2026/2027 BRA. 8 9 Additionally, new utility-scale power plants could also bypass the interconnection queue by leveraging the Surplus Interconnection Service 10 11 ("SIS"). In 2018, FERC issues Order 845 for all regions to "allow new resources 12 that do not require transmission upgrades to interconnect at the site of an existing generator."<sup>33</sup> This Order enables new capacity to interconnect to PJM's 13 14 system directly if they are sited next to an existing facility that might not utilize its full interconnection rights during all hours. A prime potential example to use 15 16 this option would be for new battery storage co-located with existing solar and 17 wind.
- Reduced capacity exports and/or increased capacity imports: Some resources that are physically located in PJM make firm capacity sales to neighboring regions such as MISO. Additionally, PJM also facilitates a

<sup>&</sup>lt;sup>31</sup> Page 10, <u>https://www.pjm.com/-/media/DotCom/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.pdf</u>.

<sup>&</sup>lt;sup>32</sup> Include all projects with status "Under Construction" and "Engineering and Procurement", <u>https://www.pjm.com/planning/service-requests/serial-service-request-status</u>.

<sup>&</sup>lt;sup>33</sup> <u>https://acore.org/resources/resisting-a-resource-shortfall-fixing-pjms-surplus-interconnection-service-sis-</u> to-enable-battery-storage/#surplus-interconnection-service-sis.

mechanism for external resources (such as those in MISO) to participate in
PJM's capacity market as "External Generation Capacity Resources", as long
as they meet the requirements listed in Section 4.2.2 of "PJM Manual 18: PJM
Capacity Market."<sup>34</sup> In the 2025/2026 BRA, 1,485 MW (ICAP) of capacity
imports cleared PJM's capacity market, significantly below the historical
maximum of 8,412 MW (ICAP) in the 2016/17 BRA.<sup>35</sup> This could translate to
6,927 MW (ICAP) of potential additional capacity.

8 For resources with the option to participate in either PJM or a 9 neighboring region's capacity market, higher prices in PJM would incentivize 10 participation in PJM.

# Q37. PLEASE RESPOND TO THE COMPLAINANTS' ASSERTION THAT THE INTERCONNECTION QUEUE BACKLOG POSES CHALLENGES TO BRINGING NEW RESOURCES ONLINE.

14 A37. The Complaint notes that "an all-time record 3,300 projects [are] awaiting 15 interconnection" and "[a]s it works to address this serious backlog, PJM has 16 declined to allow new projects to join the queue." It then asserts a linkage between 17 this queue backlog and it being "physically impossible for new resources to respond 18 to high BRA [price] signals and enter PJM's marketplace." What this linkage 19 misses however, is that there are more than sufficient resources in the queue to 20 respond to high prices. Just because a resource is in the queue does not mean it will 21 reach completion; for instance, PJM's interconnection queue had a 79% attrition

<sup>&</sup>lt;sup>34</sup> Page 59, <u>https://www.pjm.com/-/media/DotCom/documents/manuals/m18.pdf</u>.

<sup>&</sup>lt;sup>35</sup> Page 9, <u>https://www.pjm.com/-/media/DotCom/markets-ops/rpm/rpm-auction-info/2025-2026/2025-</u>2026-base-residual-auction-report.pdf.

rate (by capacity) between the year 2000 and 2018.<sup>36</sup> Because queue dropouts are
 so common, it is very plausible that higher prices may incentivize resources already
 in the queue to completion and at a faster pace. The Complaint ignores this
 dynamic.

### 5 Q38. HOW MUCH INCREMENTAL SUPPLY MIGHT BE AVAILABLE FROM 6 THESE SOURCES?

A38. While it is difficult to predict how market participants will respond to the recent
surge in prices, the pool of resources that could possibly respond by offering
additional capacity into the market could be more than 30,000 MW (UCAP) across
various supply sources, as outlined in the table below. Note that this total does not
include the potential incremental capacity from existing resource upgrades and
reduced exports and/or higher imports.

<sup>&</sup>lt;sup>36</sup> Page 9, <u>https://www.pjm.com/-/media/DotCom/markets-ops/rpm/rpm-auction-info/2025-2026/2025-</u>2026-base-residual-auction-report.pdf.

**Potential Capacity (UCAP)** Source Existing solar and wind resources that did not 1,441 MW<sup>37</sup> offer into the 2025/2026 BRA 2,046 MW<sup>38</sup> Existing resources with planned retirements Recently retired units that could come back 5,857 MW<sup>39</sup> online Incremental upgrades to existing resources *Not quantified* 8.683 MW<sup>40</sup> Additional DR 7,286 MW<sup>41</sup> New utility-scale power plants 5.194 MW<sup>42</sup> Reduced exports and/or increased imports 30,507 MW **Total Potential Incremental Capacity** 

Table 2: Summary of Potential Incremental Capacity Overlooked by Complainants

#### 2 Q39. WHAT CONCLUSIONS DO YOU DRAW IN EVALUATING THE TYPES

#### AND QUANTITIES OF POTENTIAL INCREMENTAL CAPACITY THAT

1

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4 YOU LIST ABOVE?

A39. While the extent to which the 30,000+ MW (UCAP) of incremental potential
capacity that I list above will participate in the upcoming BRA is unknown, if even
a small fraction participates, the response of the market is likely to be significantly
larger than the 770 MW asserted by the Complainants. This additional supply
would have a material impact on system reliability, also contrary to the assertions
of the Complainant.

<sup>38</sup> Includes all capacity that has submitted deactivation notices to PJM to retire between 2025 and 2028; <u>https://www.pjm.com/planning/service-requests/gen-deactivations</u>. Multiply the ICAP MW of each project by class-specific ELCC for the 2026/2027 BRA to calculate total UCAP MW. 2026/2027 BRA ELCC values from PJM, <u>https://www.pjm.com/-/media/DotCom/planning/res-adeq/elcc/2026-27-bra-elcc-class-ratings.pdf</u>.

<sup>&</sup>lt;sup>37</sup> Page 13,

https://www.monitoringanalytics.com/reports/Reports/2024/IMM Analysis of the 20252026 RPM Base Residual\_Auction\_Part\_A\_20240920.pdf.

 <sup>&</sup>lt;sup>39</sup> Multiply 7,451 MW ICAP by class-specific ELCC for the 2026/2027 BRA to calculate total UCAP MW.
 <sup>40</sup> Multiply 11,734 MW ICAP by 74% ELCC of DR.

<sup>&</sup>lt;sup>41</sup> Multiply 35,000 MW ICAP—based on Maximum Facility Output ("MFO")—by class-specific ELCC for the 2026/2027 BRA to find facility effective capacity. Then find the minimum between the effective capacity and the capacity requested by the facility; this value is the final UCAP utilized in the calculations. <sup>42</sup> Multiply 6,927 MW ICAP by capacity-weighted ELCC of 75%. <u>https://www.pjm.com/planning/servicerequests/serial-service-request-status</u>.

3.5 Contrary to assertions that limitations on the ability of supply to
 respond in the short-run to high prices renders the capacity market
 unjust and unreasonable, the incentive for investors to respond to
 high prices should be evaluated over the long-run

# Q40. PLEASE CHARACTERIZE THIS POSITION OF THE COMPLAINANTS REGARDING THE ABILITY OF SUPPLY TO RESPOND IN THE SHORTRUN TO HIGH PRICES.

8 A40. A key argument of the Complainants as to why RPM is unjust and unreasonable 9 relates to purported limitations of supply to respond in the short run to prices. For 10 example, the Complainants state that "increasing prices in the forthcoming auction 11 cannot reasonably be expected to deliver sizable increases in capacity at any price, 12 and requiring customers to pay scarcity pricing for *de minimis* variations in supply 13 would serve neither the purpose of the RPM nor the public interest. In short, the 14 current RPM auction rules are not just and reasonable under these market 15 conditions."

#### 16 Q41. WHAT IS YOUR RESPONSE TO THIS POSITION?

A41. Notwithstanding my contention that the Complaint significantly underestimates the potential market response (see prior subsection), the position of the Complainants is not grounded in economic basis where in fact investment is often predicated on future expectation that prices will rise to reflect market fundamentals even if there is not time for additional investment to respond in real-time. For example, investors do not react to surges in airfare prices during the holidays by manufacturing additional airplanes in real time; rather, the quantity of airplanes available during the holiday season is determined far in advance by investors' anticipations of the
 demand and associated high prices.

### 3 Q42. IS THE ECONOMIC BASIS FOR YOUR POSITION ALSO APPLICABLE 4 TO THE ELECTRICITY SECTOR?

5 A42. Yes, the economic basis for my position is also applicable to the electricity sector. 6 For example, MISO's capacity market is structured with a *prompt* auction, meaning 7 the auction is run right before the start of the delivery year. This leaves market 8 participants with limited ability to react to market prices with new investments; 9 rather, market participants make decisions to invest in new resources on the basis 10 of their long-run expectations of market outcomes. Despite the auction's prompt 11 timing, the price cap in MISO's capacity market is set to Gross CONE, allowing 12 prices to rise to the market fundamental price of new supply even if new supply cannot be constructed.<sup>43</sup> In NYISO's capacity market, the maximum clearing price 13 14 is tied to 1.5 times seasonally adjusted Gross CONE, ensuring that total annualized 15 capacity prices can rise even above the gross cost of new supply in order to provide 16 a sufficient price signal.<sup>44</sup>

### 17 Q43. WHAT IS THE ROLE OF THE PRICE CAP IN PJM'S CAPACITY 18 MARKET?

A43. The price cap within the PJM capacity market serves two primary functions. First,
it sets an upper limit on cost impacts when supply is significantly short of what is

<sup>43</sup> https://cdn.misoenergy.org/2024-05-13%20Docket%20No.%20ER23-2977-002632873.pdf.

<sup>&</sup>lt;sup>44</sup> <u>https://www.nyiso.com/documents/20142/3036383/ICAP-Demand-Curves.pdf/a16634ed-20c8-0f50-5912-4dd92793cef8</u>.

1 required to meet the reliability target. Second, it serves a role with the broader 2 context of expected year-to-year price variations that the average long-run price 3 will equal Net CONE. Within such a framework, it is not only allowable but 4 expected that there will be some years in which the price cap is reached and the 5 quantity of capacity that clears the market is not sufficient to meet the reliability 6 requirement. Such an outcome being deemed unacceptable or intolerable would 7 undermine the fundamental design basis of the capacity market construct, which 8 allows that prices should clear at lower levels during periods of surplus and higher 9 levels during periods of relative scarcity, on average achieving a balance at Net 10 CONE.

### 11 Q44. WHY SHOULD THE INCENTIVE FOR INVESTORS TO RESPOND TO 12 HIGH PRICES SHOULD BE EVALUATED OVER THE LONG-RUN?

13 A44. The lifetime of new powerplants is measured in decades, so investments in new 14 resources must be predicated on expectations that investors will be able to recover 15 their investment plus a return over the life of the investment. Within this context, 16 for the market to function effectively, investors must have confidence that prices 17 will be able to rise to the price cap when market fundamentals warrant as an offset 18 for years with low prices. In fact, investors in Pennsylvania and Maryland have 19 spent billions of dollars to build more than 23 natural gas power plants in the past 20 10 years without public or regulated utility funding. These investments were made 21 on the premise that capacity prices would increase to offset the initial low-price 22 years once (or if) PJM's market became capacity constrained, as it currently is.

# Q45. EVEN IF INVESTORS' ABILITY TO RESPOND TO HIGH PRICES SHOULD BE EVALUATED OVER THE LONG-RUN, DO YOU SEE INDICATIONS THAT INVESTORS HAVE STARTED RESPONDING TO THE PRICE SIGNAL FROM THE 2025/2026 BRA?

5 A45. Yes. Generation developers have indicated that the price signals that have 6 materialized in the recent auction and that they expect to continue over the near-7 term future are an indication that future pricing is sufficient to support new 8 investment. For example, at the Technical Conference on Resource Adequacy in

9 Pennsylvania, Glen R. Thomas<sup>45</sup> states that:

10 With that in mind, there is reason to believe that the markets are already 11 responding to the higher capacity prices from the July 2024 BRA for the 25/26 12 delivery year.<sup>46</sup> Since the 25/26 auction results were announced, Constellation announced that it had entered into an agreement to restart the former Three Mile 13 Island nuclear facility,<sup>47</sup> Middle River Power announced it was withdrawing the 14 *deactivation notice for its Elgin Energy Center in Illinois*<sup>48</sup>, and Homer City 15 *Redevelopment LLC announced that it was converting and restarting the retired* 16 17 coal facility with natural gas<sup>49</sup>, and Calpine announced it was accelerating its 18 PJM development program<sup>50</sup>. Similarly, LS Power offered to FERC in EL 24-148 19 that, "As a response to the July 2024 auction results, which indicated that the 20 PJM capacity market is no longer in an excess capacity situation, LS Power 21 restarted development of a portfolio of investment opportunities in both existing and new capacity resources in the PJM footprint."<sup>51</sup> Moreover, as part of its 22 23 *Reliability Resource Initiative (RRI) filing, PJM stated it has, "reasonable* 

<sup>&</sup>lt;sup>45</sup> Page 4-5, Docket Number M-2024-3051998, Pennsylvania Public Utility Commission, Technical Conference on Resource Adequacy in Pennsylvania, Post-Technical Conference Comments, Written Comments of Glen R. Thomas.

<sup>&</sup>lt;sup>46</sup> PJM's capacity markets were designed to clear around Net CONE over time. Although prices were above Net CONE for the 25/26 delivery year, historically prices have trended significantly below Net CONE.See Attachment B.Also included in Attachment B are the capacity clearing prices for the Appalachian Power FRR as a point of reference.

<sup>&</sup>lt;sup>47</sup> <u>https://www.constellationenergy.com/newsroom/2024/Constellation-to-Launch-Crane-Clean-Energy-Center-Restoring-Jobs-and-Carbon-Free-Power-to-The-Grid.html</u>.

<sup>&</sup>lt;sup>48</sup> https://www.utilitydive.com/news/middle-river-power-retire-elgin-power-plant-pjminterconnection/726824/

 <sup>&</sup>lt;sup>49</sup> <u>https://www.powermag.com/largest-pennsylvania-coal-fired-plant-will-convert-to-natural-gas/</u>
 <sup>50</sup> <u>https://www.calpine.com/calpine-accelerates-pjm-development-program/</u>.

<sup>&</sup>lt;sup>51</sup> Page 6, Hanson Affidavit, Protest of Calpine Corporation and LS Power Development, LCC (EL24-148).

1confidence that the RRI process will attract applications from multiple projects,2representing at least 10 GW of reliable resources for the PJM Region."52

<sup>&</sup>lt;sup>52</sup> Page 12, <u>https://www.pjm.com/pjmfiles/directory/etariff/FercDockets/8547/20241213-er25-712-000.pdf</u>.

### 4 Complainants' Proposed VRR Curve is Unjust and 2 Unreasonable

### 3 Q46. PLEASE SUMMARIZE THE REQUESTED MODIFICATIONS TO THE 4 VRR CURVE PRICE CAP PUT FORTH BY THE COMPLAINANTS.

A46. The Complainants request that FERC leave all elements of the VRR curve intact *except* for the price cap, which they request to be reduced from the greater of 1.75
times Net CONE and 1.0 times Gross CONE to 1.5 times Net CONE.

#### 8 Q47. PLEASE SUMMARIZE THE ARGUMENTS PUT FORTH BY THE 9 COMPLAINANTS TO SUPPORT THEIR ASSERTION THAT PJM 10 SHOULD MODIFY ITS VRR CURVE WITH A PRICE CAP OF 1.5 TIMES 11 NET CONE.

12 The first argument that the Complainants put forward is that "PJM should be A47. 13 directed to remove the Gross CONE linkage" because "Gross CONE is an 14 arbitrarily high alternative price cap as by definition it provides far more than the 15 'missing money''. The second argument is that PJM should reduce the cap to 1.5 16 times Net CONE (from 1.75 times Net CONE) for multiple reasons including that 17 "1.5 times Net CONE is a conservative, reliability-centric price cap. True Net 18 CONE itself is sufficient (and theoretically exactly correct) to supply the 'missing 19 money' when that is the sole effective outcome of the RPM." With this logic and 20 statement, the Complainants imply that the only reason the price cap should ever 21 exceed 1.0 Net CONE is because "true" Net CONE is uncertain and an administratively determined 1.0 Net CONE value may inadvertently underestimate
 what the market requires for new entry.

# Q48. DO YOU AGREE WITH THE ARGUMENTS PUT FORTH BY THE COMPLAINANTS TO SUPPORT THEIR ASSERTION THAT PJM SHOULD MODIFY ITS VRR CURVE WITH A PRICE CAP OF 1.5 TIMES NET CONE?

A48. No, I do not agree with the recommendation put forward by the Complainants nor
the arguments they use to support their position. A reduction in the price cap to 1.5
times Net CONE and elimination of Gross CONE from the cap formula would harm
the market by reducing the average long-run price below Net CONE, a key
objective of the capacity market.

#### 12 Q49. PLEASE SUMMARIZE THE ARGUMENTS FOR YOUR POSITION.

#### 13 A49. The arguments for my position include: 14 The VRR curve is developed through a holistic process, and reducing the price ٠ 15 cap without any making other changes will reduce the average market below 16 Net CONE over the long-run and degrade system reliability 17 ٠ Linking the price cap to Gross CONE plays an important role in ensuring that 18 tightening capacity conditions do not inadvertently lead to reductions in price 19 • The Complainants' proposal is based on the uncertain assumption that the 20 proposed changes before FERC to the PJM capacity market are approved

4.1 The VRR curve is developed through a holistic process, and
 reducing the price cap without making any other changes will
 reduce the average market below Net CONE over the long-run and
 degrade system reliability

### 5 Q50. PLEASE SUMMARIZE THE DESIGN AND PERFORMANCE OF THE 6 CURRENT VRR CURVE.

7 A50. The current VRR curve is designed such that it delivers an average long-run 8 capacity price of Net CONE for a system that achieves the reliability standard. This 9 point cannot be understated as it is the primary relevant fact in evaluating why the 10 proposed change is unjust and unreasonable. An average capacity price of Net 11 CONE across all years in the long-run is achieved through a combination of prices 12 that are lower than Net CONE in years when there is a capacity surplus and prices 13 that are higher than Net CONE in years in which there is a capacity deficit. This 14 outcome is illustrated in the figure below.

15 Figure 7: Expected Long-Run Price Outcome from Current VRR Curve



### Q51. WHAT WOULD THE BE THE IMPACT OF IMPLEMENTING THE COMPLAINANTS' PROPOSAL?

3 A51. Reducing the price cap to 1.5 times Net CONE and eliminating Gross CONE from 4 the price cap formula (as proposed by the Complainants) would have the impact of 5 suppressing prices at all quantities of cleared supply up to 101.5% of the reliability 6 requirement. While the price suppressive effects would be greatest at the price cap 7 segment of the curve, even a system exactly at target reliability would see a 8 reduction in the capacity price. The price impact of the Complainants' proposal can 9 be visualized by comparing the current and proposed VRR curves in the figure below. 10

#### 11 Figure 8: Comparison of Current and Complainants' Proposed VRR Curves



12

#### 13 Q52. WHAT WOULD BE THE OUTCOME OF THIS PRICE SUPPRESSION?

A52. Given that the current VRR curve is designed such that it delivers an average long run capacity price of Net CONE, a change to the curve that is purely price
 suppressive, even if for only two auctions, would necessarily result in the market

- 1 delivering *less* than Net CONE on average for a system that achieves the reliability
- 2 standard. This dynamic is illustrated in the figure below.
- 3

4

Figure 9: Expected Long-Run Price Outcome from Complainants' Proposed VRR Curve



5 Because a system that delivers less than Net CONE on average is not in 6 equilibrium (as defined by Brattle in the VRR curve review), this would result in a 7 reduction in capacity and degradation of system reliability below the target. Initial 8 analysis by Brattle in the most recent VRR curve review support this assertion by 9 stating that a "cap at 1.5x Net CONE is too low to support reliability under base assumptions (unless over-written by CONE-based minimum)." 53 Because a 10 11 reduction in the price cap without making any other changes would not yield a 12 system that achieves the reliability standard, the Complainants' proposal is unjust 13 and unreasonable.

<sup>&</sup>lt;sup>53</sup> Slide 23, <u>https://www.pjm.com/-/media/DotCom/committees-groups/committees/mic/2024/20241217-</u> special/item-1-a-2024-12-17-updated-pjm-qr-vrr-curve-deck\_december-meeting.pdf

# Q53. ARE THE DYNAMICS YOU DESCRIBE ABOVE APPLICABLE EVEN IF THE PRICE CAP IS LOWERED FOR AN INTERIM PERIOD OF ONLY TWO YEARS?

A53. Yes. This finding is true even if this change is only implemented for an interim twoyear period for two reasons. First, a reduction in price for even one year will
decrease the average long-run price. Second, reducing the price cap now will create
investor expectations that FERC could take similar actions in the future when prices
rise, reducing their expectations of future pricing. This would ultimately reduce
market entry and degrade system reliability below the target.

### Q54. IS IT POSSIBLE TO REDUCE THE PRICE CAP AND STILL MEET THE RELIABILITY TARGET IN THE LONG-RUN?

12 A54. The only way to reduce the price cap of the current VRR curve and still meet the 13 reliability target in the long run would be to *increase* other segments of the curve. 14 A reduction in one segment of the curve and an increase in another segment would 15 not be purely price suppressive and could theoretically still deliver an average 16 capacity price of Net CONE in the long run.

### 17 Q55. HOW SHOULD PROPOSED CHANGES TO THE VRR CURVE BE 18 EVALUATED?

A55. It is critical to evaluate the performance of any VRR curve in its entirety (i.e.
 holistically) and not evaluate individual parameters on an isolated basis. This is
 precisely what the VRR curve Quadrennial Review process is designed to do and

why any changes to the VRR curve should be evaluated and occur through that
 process.

## 4.2 Linking the price cap to Gross CONE plays an important role in ensuring that tightening capacity conditions do not inadvertently lead to reductions in price

#### 6 Q56. WHAT IS PJM'S CURRENT VRR CURVE PRICE CAP?

A56. The current VRR curve price cap is the greater of 1.75 times Net CONE and 1.0
times Gross CONE for the reference resource which is currently a combined cycle
(CC) unit. Gross CONE is calculated as the total annual levelized cost of a new CC
unit, while Net CONE is calculated as Gross CONE minus forecasted energy +
ancillary service revenues for a new CC unit.

### 12 Q57. WHY DID PJM PROPOSE AND FERC APPROVE THE GROSS CONE 13 LINKAGE TO THE VRR CURVE PRICE CAP?

14 A57. The Gross CONE linkage to the VRR price cap is driven by a longstanding concern 15 that a price cap linked only to Net CONE "risks the collapse of the entire VRR 16 curve" whenever energy and ancillary service margins rise.<sup>54</sup> This is particularly 17 true in the circumstance of a capacity deficit which is likely to correlate with high 18 forecasted energy and ancillary service margins and thus low forecasted Net CONE 19 values. This would create the unintended consequence of *decreasing* capacity 20 prices at a time of increasing capacity need. For this reason, PJM has historically

<sup>&</sup>lt;sup>54</sup> Pg viii, <u>https://www.brattle.com/wp-</u> <u>content/uploads/2017/10/6232 second performance assessment of pjms reliability pricing model pfeif</u> <u>enberger\_et\_al\_aug\_26\_2011-3.pdf</u>

proposed, and FERC has approved, a linkage between Gross CONE and the VRR
 price cap.

### 3 Q58. IS SUCH A CONCERN ABOUT THE COLLAPSE OF THE ENTIRE VRR 4 CURVE PLAUSIBLE IN TODAY'S PJM SYSTEM?

A58. Under the current parameters (which are currently under review by FERC) for the
upcoming 2026/2027 BRA, Net CONE for the reference resource (a CC unit) is
\$0/MW-day for the RTO. In other words, if the VRR curve price cap were only
linked to Net CONE, the price of capacity would be guaranteed to be zero. Thus,
this concern is not only plausible but a reality.

10 In response to this zero Net CONE result (which has several impacts beyond 11 just the price cap), PJM has proposed through a Section 205 filing to modify the 12 reference unit from a CC to a CT for the upcoming 2026/2027 BRA. While such a 13 change would yield a positive CT Net CONE in the 2026/2027 BRA, there is no 14 guarantee that the same result would hold in the following 2027/2028 BRA. It is 15 more than plausible that tightening system conditions could lead a very low or even 16 zero CT Net CONE in the 2027/2028 BRA. Such a result would yield precisely the 17 low price conditions that the inclusion of Gross CONE was designed to avoid.

#### 18 19

#### Q59. WHAT ARE THE PRIMARY CONCERNS WITH A COLLAPSED (OR EVEN ENTIRELY ZERO) VRR CURVE?

A59. There are multiple concerns with a collapsed (or even entirely zero) VRR curve.
First, Net CONE that is used in the VRR curve is an administrative estimate that is
a function of a multitude of assumptions. "True" Net CONE is not known and

1 therefore could plausibly be higher than the administratively-determined Net 2 CONE. Second, Net CONE that is used in the VRR curve is a forward-looking 3 estimate that is not guaranteed. Thus, an estimate of zero Net CONE would 4 essentially force units to stay online and meet their capacity obligations for zero 5 guaranteed compensation. Finally, units that clear the capacity market—even when 6 prices are zero—are subject to performance requirements that can lead to penalties. 7 Therefore, a capacity price of zero force units to accept penalty risk without any 8 compensation in the capacity market.

### 9 Q60. IS IT POSSIBLE TO DESIGN THE VRR CURVE BY DELINKING THE 10 PRICE CAP FROM GROSS CONE?

11 A60. Delinking the VRR price cap from Gross CONE without making any other changes 12 would necessarily result in price suppression and would therefore not yield a system 13 that achieves the reliability standard. For this reason, delinking the VRR curve price 14 cap from Gross CONE without making any other changes is unjust and 15 unreasonable. Delinking the VRR price cap from Gross CONE while making other 16 changes such as increasing other curve segments could potentially yield a long-run 17 average price of Net CONE. Such changes can only be evaluated holistically 18 through a process such as through the quadrennial review.

### 19Q61. HOW DO YOU RESPOND TO THE STATEMENT FROM THE20COMPLAINANTS THAT THAT GROSS CONE "WILL

#### 1 DEFINITIONALLY ALWAYS BE MORE THAN THE NECESSARY 2 CAPACITY PAYMENT"?

3 A61. The use of Gross CONE in the VRR curve can only be understood within the long-4 run context of prices clearing over many different years. As I have previously 5 demonstrated, prices can and do clear below Net CONE in some years. Therefore, 6 the only way to ensure that resources can expect to recover Net CONE on average 7 across their entire lives is to clear prices in some years at levels higher than Net 8 CONE. Designing the VRR curve with a price cap that is linked to Gross CONE is 9 one way to accomplish this. While there is no single correct answer for what the 10 price cap should be, it should definitionally be designed to rise above Net CONE.

# Q62. HOW DO YOU RESPOND TO THE STATEMENT FROM THE COMPLAINANTS THAT "TRUE NET CONE ITSELF IS SUFFICIENT (AND THEORETICALLY EXACTLY CORRECT) TO SUPPLY THE 'MISSING MONEY' WHEN THAT IS THE SOLE EFFECTIVE OUTCOME OF THE RPM"?<sup>55</sup>

A62. This statement by the Complainants implies that the only reason the VRR curve is structured with a price cap of greater than 1.0 times Net CONE (i.e. 1.5 times Net CONE in the Complainants' proposal) is to account for the fact that "true" Net CONE is unknown and 1.5 times Net CONE provides a "conservative" buffer around its estimation. While I acknowledge and agree that true Net CONE uncertainty is one good reason to set the price cap above an administrative estimate,

<sup>&</sup>lt;sup>55</sup> Page 29. Complaint.

1 setting a price cap of true Net CONE almost certainly ensures that the long-run 2 average price will be lower than true Net CONE because all it takes is one year in 3 a resource's life of a price at less than the cap for it to not recover Net CONE. In 4 making this assertion, the Complainants conflate the objective of the capacity 5 market to provide price signals that achieve an outcome of net CONE over the long 6 run (which is, in fact, the theoretically correct outcome) with idea that the maximum 7 price paid in any single year should be set at net CONE. The only way in which a 8 market design could achieve the theoretically correct outcome with a cap at Net 9 CONE would be for prices to be set at Net CONE every year, regardless of market conditions. 10

### 4.3 The Complainants' arguments are based on assumptions of the final outcomes on the proposed changes to PJM's capacity market that are currently before FERC.

#### 14 Q63. PLEASE PROVIDE A SUMMARY OF CRITICAL ELEMENTS OF THE 15 2026/27 BRA THAT ARE BEING EVALUATED AT FERC.

- A63. There are a number of parameters that are currently being evaluated and could
  change before the BRA for the 2026/2027 delivery year, including:
- Whether reliability must run ("RMR")<sup>56</sup> units procured through cost-of-service
   contracts participate in the BRA, as contested by the Sierra Club through a
   Federal Power Act 206 Complaint. PJM also filed proposal tariff revisions
   under Section 205 of the Federal Power Act that, if approved, would require

<sup>&</sup>lt;sup>56</sup> Reliability must run ("RMR") units refer to resources that have applied for deactivation but, following analysis by PJM, are deemed necessary for reliability and are retained on a short-term cost-of-service basis.

1 RMR unit to participate capacity auction as price takers if certain criteria are 2 met; 2. Whether the reference technology used to calculate gross and Net CONE will 3 4 be changed from a combined cycle ("CC") unit to a combustion turbine ("CT") 5 unit, as proposed by PJM through Federal Power Act 205 Filing; 6 3. Whether intermittent resources will be required to offer into the BRA and be 7 able to reflect their costs and risks in their offers, as PJM has proposed; and 8 4. Whether the price cap used in the VRR curve should be kept at the greater of 9 1.0 times Gross CONE or 1.75 times Net CONE, or whether it should be 10 reduced to 1.5 times Net CONE, as contested by Pennsylvania Governor Josh 11 Shapiro through a Federal Power Act 206 Complaint.

### 12 Q64. WHAT REFERENCE TECHNOLOGY DO THE COMPLAINANTS' 13 ARGUMENTS ASSUME FOR THE 2026/2027 AUCTION?

A64. The Complaint assumes that FERC will accept "PJM's proposed reliance on a
[combustion turbine] CT reference resource" as filed by PJM in December 2024
pursuant to the Federal Power Act Section 205.

### 17 Q65. IS THE COMPLAINANTS' ASSUMED REFERENCE TECHNOLOGY 18 ACCURATE AS OF TODAY?

A65. No. FERC has not yet ruled on this issue. Today, the reference technology is a
combined cycle (CC) unit for the 26/27 BRA.

### Q66. HOW DOES THE ASSUMPTION IN REFERENCE TECHNOLOGY IMPACT THE COMPLAINANTS' ARGUMENTS?

A66. The Complainants assert that a zero or near-zero Net CONE result that would cause
the collapse of the VRR curve is not a realistic probability and that "Net CONEbased capacity prices are expected to remain elevated, or even at record highs, for
the foreseeable future." They assert that "[t]his removes the feasibility of the
'extreme scenario' that the Commission feared" of a collapsed VRR curve.

# 8 Q67. WHAT WOULD THE IMPACT BE IF THE COMPLAINANTS' 9 PROPOSAL WAS IMPLEMENTED WITHOUT FERC ACCEPTING 10 CHANGE IN REFERENCE UNIT TO A CT?

A67. If FERC accepted the Complainants' proposal to reduce the VRR curve price cap
to 1.5 times Net CONE and eliminate Gross CONE from the price cap formula, and
did not accept PJM's proposal to change the reference unit from a CC to a CT, the
VRR curve would collapse to zero at all quantities. This would ensure a zero
capacity price for all resources during a year with a capacity deficit.

# 16Q68. DOTHECOMPLAINANTSINCLUDEANYPOTENTIAL17IMPLICATIONS OF THE PROPOSEDCHANGE TO INCLUDE RMR18RESOURCES IN THE MARKET?

A68. No. If FERC approves PJM's proposal to require RMR units to participate in the
 market as price takers with a zero dollar offer, there could be up to 2 GW of
 additional supply that would reduce prices beyond what the Complainants assert
 and assume.

#### 1 5 Recommendations & Summary

### 2 Q69. IN LIGHT OF THE ARGUMENTS YOU MAKE, DO YOU HAVE A 3 RECOMMENDATION?

4 A69. Yes. Based on the arguments I make above, I recommend that FERC retain the 5 current PJM VRR curve design for the 2026/2027 and 2027/2028 BRAs which is 6 just and reasonable. In the interim, PJM's can holistically evaluate alternative 7 demand curve designs through the Sixth Quadrennial Review, including VRR 8 curves with a lower price cap that are correspondingly higher in other segments. 9 Reducing the current VRR curve price cap without making any other changes 10 would result in a long-run average capacity price of less than Net CONE, would 11 degrade system reliability and is unjust and unreasonable.

#### 12 Q70. PLEASE SUMMARIZE YOUR TESTIMONY.

13 A70. Yes. The key takeaways of my testimony are:

- The current VRR curve is just and reasonable because it is designed to deliver
   a long-run average capacity price of Net CONE
- The Complainants' proposed VRR curve price cap of 1.5 times Net CONE
   would harm the market and hinder its ability to deliver long-term reliability,
   making the proposal unjust and unreasonable.

#### 19 Q71. DOES THIS CONCLUDE YOUR TESTIMONY?

20 A71. Yes

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

Governor Josh Shapiro and The	)
Commonwealth of Pennsylvania	)
	)
V.	)
	)
PJM Interconnection, L.L.C.	)

Docket No. EL25-46-000

#### **VERIFICATION**

I, Zachary Ming, pursuant to 28 U.S.C. § 1746, state, under penalty of perjury, that I am the same Zachary Ming referred to in the foregoing document entitled "Testimony of Zachary Ming, Partner, Energy and Environmental Economics, Inc. ("E3")," that I have read the same and am familiar with the contents thereof, and that the facts set forth therein are true and correct to the best of my knowledge, information, and belief.

Zachary Ming Zachary Ming

Dated: January 27, 2025

### Exhibit 2

### **Declaration of Samuel Siegel**

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

Governor Josh Shapiro and The	)
Commonwealth of Pennsylvania	)
	)
V.	)
	)
PJM Interconnection, L.L.C.	)

Docket No. EL25-46-000

#### **DECLARATION OF SAMUEL SIEGEL**

- My name is Samuel Siegel. I am the Vice President for Wholesale Market Strategy for Vistra Corp. ("Vistra"). My responsibilities include evaluating and pursuing potential development opportunities across the FERC jurisdictional markets and ERCOT. In particular, my business development efforts include evaluating opportunities for the development of new gas resources and decarbonization of existing coal assets. Specifically, my recent efforts include exploring the extension of the lives of certain resources in Vistra's fleet in PJM, including consideration of fuel conversations and augmentations.
- 2. Vistra bases its development activities on the net present value of projected energy and capacity revenue over the economic life of a potential investment. In that evaluation, expected near- and medium-term energy and capacity revenues play an important role in determining whether an investment makes economic sense. Given the historic volatility in capacity prices, current capacity prices provide important information about near- and medium-term projections.
- 3. My colleagues and I viewed the most recent capacity auction clearing price as a strong signal that additional capacity was needed in the PJM region. After years of low clearing prices, well below Net CONE, which had sent a signal for generation to exit the market,

we concluded that the recent clearing price, slightly above Net CONE, demonstrated a potential need for additional investment. In response, my colleagues and I immediately commenced a comprehensive effort to evaluate potential development opportunities across Vistra's PJM footprint to be in a position to respond to ongoing capacity market price signals. The focus for such efforts were identifying short term solutions that could bring incremental MWs online quickly. We identified a wide array of potential opportunities that may make economic sense given the recent capacity clearing price.

4. In particular, we are actively looking at opportunities to extend the lives of certain coal plants in PJM that are retiring due to environmental regulations. These plants could potentially be repowered through fuel conversions. In addition to these projects, Vistra is investigating the potential for augmentation of a number of existing natural gas fired generation resources. Vistra is also looking at opportunities for nuclear uprates in the region. In evaluating potential uprates, Vistra recognizes that utilizing headroom at existing interconnects is the fastest way to bring uprate MWs to market, and we expect other market participants are performing a similar analysis to identify headroom and potential uprates that will react to capacity price signals quickly. Importantly, such opportunities would be adding capacity into PJM that PJM does not currently include in its near-term modeling for available capacity in the region. Vistra has extensive experience in augmenting or uprating existing generation across its natural gas fleet. We are also actively discussing the potential for new resource development with large load customers. The most recent capacity clearing price is important to our ongoing evaluation of whether these investments might be economic.

- 5. In conjunction with the economic analysis, my colleagues and I must assess whether these projects are technically feasible, and whether any permitting or regulatory issues will prevent them from moving forward. In particular, incremental natural gas generation typically requires incremental natural gas transportation and supply. Securing such supply includes economic, permitting, regulatory and contractual analysis that will need to be resolved. Of course, such considerations are part of any development effort. However, the economic case for such projects rests centrally on capacity market clearing prices that signal the need for more rather than less generation. Therefore, I disagree with the assertion that the interconnection queue challenges mean that the only pools of resources that are capable of responding to capacity market price signal are: (1) mothballed units that could return to service; (2) projects that have exited the interconnection queue but not yet entered service; and (3) demand response resources. The recent lack of new investment was a reasonable reaction to low clears, and reflects market fundamentals at work. A new higher capacity clear, in turn, has begun to flip that analysis with a renewed focus on growth.
- 6. As noted above, Vistra believes that there are real opportunities to add critically-needed capacity into the PJM region, notwithstanding the known challenges with the interconnection queue. Further, efforts to intervene in the capacity market, including efforts to limit capacity prices in the near-term, make it more likely that Vistra will need to take a "wait-and-see" approach to some investments in order to ensure prudent investment of shareholder capital. We are particularly concerned that the proposal at issue in this docket could artificially yield very low capacity prices in delivery year 2027/28. For investments like resource uprates that could be ready by June 2027, the potential for

artificial very low capacity prices could result in Vistra and other investors waiting until delivery year 2028/29 or later or cancel the projects altogether.

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

Governor Josh Shapiro and The	)
Commonwealth of Pennsylvania	)
	)
<b>v</b> .	)
	)
PJM Interconnection, L.L.C.	)

Docket No. EL25-46-000

VERIFICATION

I, Samuel Siegel, pursuant to 28 U.S.C. § 1746, state, under penalty of perjury, that I am the same Samuel Siegel referred to in the foregoing document entitled "Declaration of Samuel Siegel, Vice President for Wholesale Market Strategy, Vistra Corp.," that I have read the same and am familiar with the contents thereof, and that the facts set forth therein are true and correct to the best of my knowledge, information, and belief.

Samuel Siegel

Dated: January 27, 2025