UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Aurora Generation, LLC	)	
Elwood Energy, LLC	)	
Jackson Generation, LLC	)	
Lee County Generating Station, LLC	)	
LSP University Park, LLC	)	**Docket No. EL23-54-000**
Rockford Power, LLC	)	
Rockford Power II, LLC	)	
University Park Energy, LLC	)	
Complainants	)	
	)	
v.	)	
	)	
PJM Interconnection, L.L.C.	)	
Respondent	)	

ANSWER, MOTION TO DISMISS OR SUMMARILY DISPOSE COMPLAINT, AND REQUEST FOR CONFIDENTIAL TREATMENT OF PJM INTERCONNECTION, L.L.C.

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In accordance with Rules 212, 213 and 217 of the Commission's Rules of Practice and Procedure,[1] and the Notice of Extension of Time issued on April 21, 2023, PJM Interconnection, L.L.C. (PJM) submits this Answer to the Complaint filed by an ad hoc group of Complainants called the "ComEd Zone Generators,"[2] own or operate natural gas-fired generation facilities located in the portion of northern Illinois, including the Chicago metropolitan area, served by the Commonwealth Edison Company (ComEd Zone).[3]

Complainants, unlike other generators in the ComEd Zone and across PJM, failed to meet their obligations as Capacity Resources to respond to Emergency Actions declared by PJM during Winter Storm Elliott.[4] As required by the PJM Tariff and Operating Agreement (OA),

[1] 18 C.F.R. §§ 385.212, 213 & 217 (2023).

[2] *See* Aurora Generation, LLC, *et al.*, Complaint Requesting Fast Track Processing and Shortened Answer Period and Request for Interim Order Suspending Billing and Payment Provisions, Docket No. EL23-54-000 (Apr. 4, 2023) (Complaint). Complainants are Aurora Generation, LLC, Elwood Energy, LLC, Jackson Generation, LLC, Lee County Generating Station LLC, Lincoln Generating Facility, LSP University Park, Rockford Power, LLC, Rockford Power II, LLC, and University Park Energy, LLC.

[3] *See* PJM Open Access Transmission Tariff (Tariff), Attach. J (depicting PJM' Transmission Zones).

[4] Winter Storm Elliott was an unusually severe winter storm that struck the PJM Region between December 23 and 24, 2022. Winter Storm Elliott presented extraordinary reliability challenges by causing an extremely rapid drop in temperatures at a time of record-breaking high

Complainants were assessed Non-Performance Charges for each Performance Assessment Interval (PAI) in which they failed to perform during the two-day storm.[5] Complainants now seek to "eliminate the penalties assessed" against them because, in their view, "the penalties are the result of PAIs that never should have been triggered."[6]

The Complaint has no merit. It is essentially a *post hoc* challenge to the prudence of PJM's Emergency Actions during Winter Storm Elliott that fundamentally conflicts with the core purpose of the Capacity Performance reforms the Commission adopted in response to the 2014 Polar Vortex.[7] Complainants misread cherry-picked language in Manual 13[8] to impose irrational constraints on PJM's use of Emergency Actions that both defy Good Utility Practice and also squarely violate PJM's Tariff and North American Electric Reliability Corporation (NERC) Reliability Standards. Moreover, Complainants' after-the-fact economic arguments are wholly detached from the operational realities that PJM faced during Winter Storm Elliott.

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holiday loads and widespread performance failure by Capacity Resources. *See* PJM, *Winter Storm Elliott Info*, https://www.pjm.com/markets-and-operations/winter-storm-elliott (collecting PJM's public statements addressing Winter Storm Elliott's impact on PJM's operations and markets).

[5] Capitalized terms not defined herein have the meaning set forth in the Tariff and OA.

[6] Complaint at 18; *accord id.* at 6.

[7] *See PJM Interconnection, L.L.C.*, 151 FERC ¶ 61,208 (Capacity Performance Order), *order denying clarification, granting reh'g in part, granting complaint in part & directing compliance filing*, 152 FERC ¶ 61,064 (2015) (July 22 Order), *order on reh'g &compliance*, 155 FERC ¶ 61,157 (2016) (Capacity Performance Rehearing and Compliance Order), *order on reh'g & compliance*, 155 FERC ¶ 61,260 (2016), *pet'n for rev. denied sub nom. Advanced Energy Mgmt. Alliance v. FERC*, 860 F.3d 656 (D.C. Cir. 2017), *order on compliance*, Docket No. ER15-623-009 (delegated letter order issued Oct. 11, 2017), *order denying reh'g*, 162 FERC ¶ 61,047 (2018) (collectively, the Capacity Performance Orders).

[8] PJM Manual 13: Emergency Operations (Nov. 3, 2022), https://www.pjm.com/~/media/documents/manuals/m13.ashx. References to all PJM Manuals herein are to the versions in effect during Winter Storm Elliott.

Winter Storm Elliott presented PJM with a series of unexpected and extraordinary reliability challenges. In the end, PJM avoided any mandatory curtailments of firm load and even managed to provide limited assistance to neighboring systems that were shedding load. PJM accomplished this despite equally unexpected and extraordinary performance failures by Complainants and other Capacity Resources. These failures could have had life and death consequences had events played out differently. As it was, PJM operators preserved reliability while contending with unprecedented difficulties and uncertainties that were exacerbated by Complainants' non-performance. In short, the lights stayed on despite extremely stressed conditions brought about by Capacity Resources failing to meet their obligations.

Capacity Resources knowingly accept the risk of Non-Performance Charges when they accept substantial payments to perform as Capacity Resources. The Tariff was explicitly designed to give generators powerful incentives not to repeat the severe performance failures that occurred during the 2014 Polar Vortex.[9]

Section 10A of Tariff Attachment DD establishes straightforward expectations and consequences for the conduct of Capacity Resources during emergencies.[10] PAIs are automatically triggered when a PJM-declared "Emergency Action is in effect."[11] The Tariff defines "Emergency Action" as "any action for locational or system-wide capacity shortages,"[12] such as the capacity

[9] *See, e.g.*, Capacity Performance Order at P 158 (finding that PJM's proposed Non-Performance charges would "provide incentive to capacity sellers to invest in and maintain their resources"); Capacity Performance Rehearing and Compliance Order at P 26 ("[W]e affirm our finding that PJM showed that these revisions are needed to provide adequate incentives for resources to perform during the most critical periods of the delivery year.").

[10] *See* Tariff, Attach. DD, § 10A (Charges for Non-Performance and Credits for Performance).

[11] *Id.* § 10A(a).

[12] Tariff § 1 (Definitions).

shortages during Winter Storm Elliott. A Capacity Performance Resource is "obligated to deliver energy . . . as scheduled and/or dispatched by the Office of Interconnection during [PAIs]."[13] If it "falls short of the expected performance" for "all or any part of a clock-hour during the emergency," it is subject to a Non-Performance Charge that is used to fund bonus payments to Market Participants that fulfill or exceed their obligations.[14] In certain narrowly-defined circumstances, "Capacity Performance Resources that fail to meet this obligation" may be "excused pursuant to Tariff, Attachment DD, section 10A(d)."[15]

Complainants' failure to perform throughout a two-day extreme weather emergency cannot be excused by claiming that PJM's Emergency Actions during Winter Storm Elliott were invalid, or by asserting that there was no emergency, or that their performance was not actually needed to address that emergency.

First, those decisions do not and cannot belong to Complainants. It is PJM's core duty under the Operating Agreement to "[d]irect the operation" of the facilities in the PJM Region to "maintain" and "secure reliability and continuity of service and other advantages of pooling on a regional basis," and that duty carries with it the discretion "necessary to manage, alleviate or end an Emergency."[16] Nothing in the Tariff contemplates second-guessing PJM's operational decisions. The Commission cannot grant the Complaint without undermining the fundamental bargain that was struck in the adoption of the Capacity Performance rules. Moreover, the

[13] Tariff, Attach. DD, § 5A(a).

[14] *Id.* § 10A(a).

[15] *Id.* § 5A(a).

[16] Operating Agreement, §§ 10.4(vi), (vii), (xvi), and (xx); *Regional Transmission Organizations*, Order No. 2000, FERC Stats. & Regs. ¶ 31,089 (1999) (cross-referenced at 89 FERC ¶ 61,285), *order on reh'g*, Order No. 2000-A, FERC Stats. & Regs. ¶ 31,092 (2000) (cross-referenced at 90 FERC ¶ 61,201), *aff'd sub nom. Pub. Util. Dist. No. 1 of Snohomish Cnty. v. FERC*, 272 F.3d 607 (D.C. Cir. 2001).

Complainants urge the Commission to become the Monday morning quarterback and super-operator of the grid, which are both roles the Commission has been careful to avoid in the past. The regulatory process will rapidly unwind with perpetual litigation, and reliability will be undermined, should the Commission choose to disregard the real-time flexibility Regional Transmission Organizations (RTOs) must have to manage emergencies and to substitute its judgment with the luxury of perfect hindsight. Moreover, given the complaint's criticism of PJM's assistance to its neighbors who were facing even more dire circumstances, granting the Complaint would also chill cooperation between neighboring systems in future emergencies.

Second, the Complaint misreads the Tariff as well as Manual 13. Complainants argue that the Emergency Actions taken by PJM during Winter Storm Elliott were invalid because Section 2.3.2 of "Manual 13 requires PJM to curtail all non-firm exports before taking these Emergency Actions" and PJM violated its Tariff because it "failed to take this predicate step."[17] This claim is unsustainable because the action sequence described in Section 2.3.2 of Manual 13, including the specific language Complainants cite, is explicitly non-binding on PJM's operators. That section plainly states that "PJM dispatchers may find it necessary to vary the order of application to achieve the best overall system reliability" and further explains that "it is unlikely that some Steps would be implemented" depending on various circumstances.[18] The Complainants simply ignore these caveats and try to transform Manual 13 into a rigid rule book that cannot be adapted to particular emergency circumstances. This position defies both the plain language of Manual 13 and its practical application. The curtailment language in Manual 13 cannot mean what Complainants claim because their construction not only defies Good Utility Practice, but also

[17] Complaint at 4.

[18] Manual 13, § 2.3.2 at 30.

ignores mutual assistance policies established by this Commission and NERC and directly conflicts with numerous unambiguous directives in the Tariff, NERC Reliability Standards, and Manual 37.[19] Those conflicts also destroy Complainants' spurious claim that their misreading of Manual 13 has been incorporated by reference into the Tariff and OA.[20]

Third, Complainants move well beyond the facts when they claim "there was no emergency in the ComEd region and therefore no need for Complainants' generation facilities."[21] As a threshold matter, Complainants do not determine whether emergencies exist. That is PJM's responsibility, and the Department of Energy declared an emergency in PJM as a matter of law.[22] Moreover, Complainants' claim their capacity was 'unneeded' is simply wrong. Complainants collectively control 6,110 MW of generation capacity that they failed to provide; that is 21.5 percent of the generation reserves PJM anticipated to be available during Winter Storm Elliot.[23] As detailed in the Affidavit of Mr. Paul McGlynn, had the Complainants performed consistent with the obligations they had been paid to meet during system emergencies, the level and extent

[19] *See infra* Sections IV.**Error! Reference source not found.**-IV.**Error! Reference source not found.** (citing, *inter alia*, NERC Standard EOP-011-1, § 2.3, Attach. 1; NERC Standard IRO-014-3 R7; OA Sch. 1, §§ 1.6.2(vi) & 1.7.11; Manual 37 § 1.1); Bryson Aff., Ex. PJM-006, at P 14 n.29. Tariff Attachment K-Appendix incorporates the provisions of Schedule 1 of the Operating Agreement into the Tariff for ease of reference. *See* Tariff, Attach. K-App'x Preface, https://agreements.pjm.com/oatt/4454. Thus, for convenience, all references in this Answer to Schedule 1 of the OA should be understood to also refer to the corresponding identical provision in Attachment K-Appendix, and vice versa.

[20] *See* Complaint at 4.

[21] *Id.*

[22] U.S. Dep't Energy, *Federal Power Act Section 202(c): PJM December 2022*, DOE Order No. 202-22-4, at 1 (Dec. 24, 2022) ("[A]n emergency exists in the electricity grid operated by PJM Interconnection, LLC (PJM) due to a shortage of electric energy, a shortage of facilities for the generation of electric energy, and other causes, and . . . issuance of this Order will meet the emergency and serve the public interest."), https://www.energy.gov/ceser/federal-power-act-section-202c-pjm-december-2022.

[23] *See* Pilong Aff., Ex. PJM-004, at P 46.

of PJM's emergency procedures would have been greatly reduced.[24] Instead, Complainants' inability or unwillingness to provide capacity during Winter Storm Elliott contributed to the uncertainty facing PJM, materially diminished PJM's flexibility in responding to a major multi-regional emergency.[25]

PJM recognizes that there remain valid issues associated with the lack of synchronization between the natural gas nomination cycles and the real time nature of electric system dispatch. This lack of synchronization is not new and existed at the time these unit owners submitted their bids into the capacity base residual auction. PJM has raised the issue of improving gas/electric coordination in numerous dockets before the Commission.[26] However, this case is not the forum to resolve those issues nor should the system operators be required to serve as fuel managers for approximately 800 gas, diesel, and coal-fired generators in the PJM region. The Commission has most recently, as part of its recommendations from the NERC/FERC investigation of Winter Storm Uri, assigned gas/electric coordination to NAESB. PJM has been actively participating in that process. The issues associated with nomination of gas supplies and its relationship to system dispatch are valid, but are also nationwide in scope. The Complaint should not be used as a vehicle to litigate those generic nationwide issues, which are beyond the scope of this proceeding.

[24] *See* McGlynn Aff., Ex. PJM-005.

[25] *See infra* Part II.D.

[26] *See, e.g.*, PJM Interconnection, L.L.C., Comments and Responses of PJM Interconnection, L.L.C., Docket No. AD18-7-000 at 6-7 (Mar. 9, 2018) (listing proposed steps to enhance grid resilience including establishing "improved coordination and communication requirements between RTOs and Commission-jurisdictional natural gas pipelines"); PJM Interconnection, L.L.C., Initial Comments of PJM Interconnection, L.L.C. on the United States Department of Energy Proposed Rule, Docket No. RM18-1-000 at 29 (Oct. 23, 2017).

For each of the foregoing reasons, and others detailed below, the Commission should dismiss or summarily dispose of the Complaint as a matter of law.[27] To the extent that any portion of the Complaint survives dismissal or summary disposition, the Commission should deny the Complaint on the merits because it fails to meet the burden of proof under the Federal Power Act (FPA) and Commission precedent.[28] There is no need for the Commission to commence hearing procedures, grant discovery rights, or take any other action beyond granting PJM's pending request for the initiation of global settlement judge procedures.

I. DOCUMENTS SUBMITTED

PJM is submitting the following exhibits to support this Answer.

1. Timeline of PJM's Actions Related to Winter Storm Elliott (Exhibit 1).

2. Affidavit of Donald Bielak (Exhibit 2): Mr. Bielak, Senior Manager – Dispatch at PJM, explains that PJM had learned the lessons of recent winter reliability events and was well prepared for Winter Storm Elliott. He discusses PJM's comprehensive winter preparedness procedures, the specific measures PJM undertook in advance of winter 2022/23 (including communications with neighboring systems and natural gas pipelines), and PJM's actions leading up to its declaration of emergency procedures on December 23, 2022. Mr. Bielak notes that, although the overwhelming majority of generators indicated compliance with PJM's winter preparedness guidelines, many failed to operate to their stated minimum operating temperatures. Mr. Bielak further discusses the lack of accurate data provided by generators concerning their fuel supply.

3. Affidavit of Joseph Mulhern (Exhibit 3): Mr. Mulhern, Lead Engineer, Market Coordination for PJM, discusses PJM's preparation of load forecasts for December 23 and December 24, 2023. Mr. Mulhern explains that PJM's load forecasts were reasonable given the information available to PJM at the time that they were made. PJM's load forecasts for December 23 and 24 were impacted by the unprecedented combination of rapidly plunging temperatures and record-shattering holiday loads during Winter Storm Elliott. Mr. Mulhern also notes that PJM's load forecasts are disconnected from any generator's ability to perform and do not dictate whether generators will be needed, should procure fuel, or will experience forced outages.

4. Affidavit of Christopher Pilong (Exhibit 4): Mr. Pilong, Senior Director, Operations Planning for PJM, discusses generators' poor performance during Winter Storm Elliott.

[27] *See infra* Part III.

[28] *See infra* Part **Error! Reference source not found.**.

Mr. Pilong explains that this poor performance was a major factor contributing to PJM's need to institute Pre-Emergency Load Management Reduction Actions and Emergency Actions. Mr. Pilong also discusses generators' additional failure to follow rules designed to keep PJM operators informed regarding their availability. As Mr. Pilong explains, these failures made dispatch and interchange especially difficult and contributed to the uncertainty faced by PJM operators during Winter Storm Elliott.

5. Affidavit of Paul McGlynn (Exhibit 5): Mr. McGlynn, Executive Director, System Operations for PJM, discusses PJM's compliance with the PJM Tariff, OA, Manual 13, NERC Reliability Standards, and Good Utility Practice throughout Winter Storm Elliott. Mr. McGlynn notes that despite PJM's best efforts, many generators unexpectedly failed to perform when they were most needed. Mr. McGlynn further explains that PJM exercised reasonable judgment given the available facts and that PJM successfully avoided load shedding in PJM while providing as much help as practicable to neighboring systems that were shedding firm load.

6. Affidavit of Michael E. Bryson (Exhibit 6): Mr. Bryson, Senior Vice President, Operations for PJM addresses claims that PJM acted improperly during Winter Storm Elliott by exporting power to other Balancing Areas during periods in which PJM had declared Pre-Emergency Load Management Reduction Actions and Emergency Actions, including Maximum Generation Emergency and Emergency Load Management Reduction Actions. Mr. Bryson explains that PJM acted properly and complied with its obligations to support neighboring Balancing Authorities in crisis. Mr. Bryson further notes that curtailing all non-firm exports would not have enabled PJM to avoid taking pre-emergency and emergency actions. He warns that the Complaint's misreading of the Tariff, Operating Agreement, and Manual 13 would "impose irrational and counter-productive constraints on emergency operations."

7. Affidavit of Steven T. Naumann (Exhibit 7): Mr. Naumann, former Vice President, Transmission and NERC Policy for Exelon Business Services Company, discusses PJM's ability to navigate Winter Storm Elliott without shedding load despite the extremely high rates of generator outages and derates PJM operators faced. Mr. Naumann also notes that PJM's decision to maintain non-firm exports when it had the additional resources to do so complied with Good Utility Practice, especially given the rapidly-changing weather, high generator failure rate, inaccurate and untimely information provided by generators, the fact that neighboring regions did not have excess capacity to supply to PJM if additional PJM generation tripped, and the uncertain load level.

8. PJM Protective Order

II. REGULATORY AND FACTUAL BACKGROUND

A. The Capacity Performance Reforms Shifted Performance Risk to Generators from Load and Required Generators to Perform When Needed, With Very Limited Excuses, or Pay Stringent Non-Performance Charges

PJM's capacity market is designed to ensure reliability at just and reasonable rates. Following the Polar Vortex in January 2014, during which generating resources in the PJM Region performed very poorly, PJM proposed, and the Commission accepted, capacity market reforms to incentivize committed Capacity Resources to deliver the promised energy and reserves when PJM calls upon them in emergencies.[29] Central to these reforms was a new capacity product, the Capacity Performance Resource,[30] which must be "capable of sustained, predictable operation such that the resource will be reliably available to provide energy and reserves in an emergency condition."[31]

To incent Capacity Performance Resources to deliver the capacity and reliability they are paid to provide, the Tariff provides that in emergency conditions underperforming Capacity Resources face stringent Non-Performance Charges and over-performing resources earn Bonus Payments.[32] The Commission found that Non-Performance Charges would "act as a strong incentive for performance,"[33] explaining that "if and to the extent [a Capacity Resource] fails to

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[29] *See supra* note 7 (listing Capacity Performance orders). Other regions impacted by the 2014 Polar Vortex contemporaneously enacted similar reforms, most notably the ISO New England "Pay for Performance" reforms. *See ISO New Eng., Inc.*, 147 FERC ¶ 61,172 (2014), *reh'g denied*, 153 FERC ¶ 61,223 (2015).

[30] This defined term has become superfluous because all Capacity Resources are subject to the Capacity Performance penalty and bonus payment structure.

[31] Capacity Performance Order, 151 FERC ¶ 61,208 at P 28.

[32] The details for applying and determining Non-Performance Charges and bonus payments are set forth in Tariff Attachment DD, section 10A. Bonus payments are also available to energy-only resources.

[33] Capacity Performance Rehearing and Compliance Order, 155 FERC ¶ 61,157 at P 72.

perform during an emergency, when it is most needed, it is appropriate that the compensation for that resource be reduced and possibly entirely forfeited."[34]

There are only two excuses from Non-Performance Charges, and they are "strictly circumscribed."[35] Specifically, a resource's performance shortfall may be excused only if the resource (1) "was unavailable during such Performance Assessment Interval solely because the resource on which such Capacity Resource . . . is based was on a Generator Planned Outage or Generator Maintenance Outage approved by [PJM]" or (2) "was not scheduled to operate by [PJM], or was online but was scheduled down, by [PJM], based on a determination by [PJM] that such scheduling action was appropriate to the security-constrained economic dispatch of the PJM Region."[36]

There is also a crucial caveat to the second exception. Attachment DD further provides that "a resource shall be assessed Non-Performance Charges to the extent it "otherwise was needed and would have been scheduled by [PJM] to perform, but was not scheduled to operate, or was scheduled down, solely due to: (i) any operating parameter limitations submitted in the resource's offer, or (ii) the seller's submission of a market-based offer higher than its cost-based offer."[37] The Capacity Market Seller has thus placed limitations on the availability of the resource, thereby reducing PJM's ability to deploy the resource to help alleviate an emergency. Any shortfall in Actual Performance below Expected Performance that would have been provided *but for* the seller's economic choice is assessed Non-Performance Charges, regardless of whether that choice

[34] Capacity Performance Order, 151 FERC ¶ 61,208 at P 29.

[35] *Id.* P 167.

[36] Tariff, Attach. DD, § 10A(d).

[37] *Id.*

is reflected in a seller-specified parameter limitation[38] or in a market-based offer. As the U.S. Court of Appeals for the D.C. Circuit observed, "the Commission concluded that it is reasonable to penalize a resource for failing to operate outside of its parameter limitations. It explained that 'parameter limits should not be viewed as a permanent entitlement to under-perform. Instead, those limits should be exposed to financial and market consequences.'"[39]

In other words, the Capacity Performance Tariff provision holds "resources with restrictive operating limits to the same standards as resources with fewer limitations."[40] This equivalent treatment makes sense, as "a resource that is unable to produce energy or provide operating reserves during Performance Assessment [Intervals] because of parameter limitations provides less capacity value to customers than a resource that is able to perform during these [intervals]."[41] As a result, "a resource that fails to perform because of parameter limitations [may] receive less net capacity revenue than a performing resource."[42]

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[38] *See, e.g.*, Answer of PJM Interconnection, L.L.C., Docket No. ER15-623, at 70 (Feb. 13, 2015) ("[P]hysical resource limitations are a design and economic choice by the resource provider. Other resource providers may have made a choice to install a more flexible or robust design. Resource providers should be exposed to the consequences of those economic design choices. When they are, the result over time will be more flexible and better performing resources—because project developers will see that better performing resources end up with more capacity revenues.").

[39] *AEMA*, 860 F.3d at 674; *see* Capacity Performance Order, 151 FERC ¶ 61,208 at P 45 ("Without more stringent penalties, PJM has shown there is little incentive for a seller to make capital improvements, or increase its operating maintenance for the purpose of enhancing the availability of its unit during emergency conditions").

[40] *AEMA*, 860 F.3d at 674.

[41] Capacity Performance Order, 151 FERC ¶ 61,208 at P 441; *see* Capacity Performance Rehearing and Compliance Order, 155 FERC ¶ 61,157 at P 106 ("[I]n the capacity market, if PJM does not schedule that resource due to its parameter limits, then PJM applies a Non-Performance Charge since the resource was not available pursuant to its capacity obligation. Resources therefore run a risk in including parameter limitations in their energy market offers, and are encouraged to maximize their flexibility to perform consistent with the new capacity obligation.").

[42] Capacity Performance Order, 151 FERC ¶ 61,208 at P 441.

Due to the very limited excuses from Non-Performance Charges, Capacity Market Sellers are responsible for ensuring resource performance, and thus "bear the burden of delivering on their capacity obligation."[43] As a result, when it comes to the issue of fuel procurement, "[a] natural gas generator is held responsible for arranging sufficient natural gas deliveries despite pipeline outages and this same principle should apply to all such outages."[44] In this way, the Non-Performance Charge "holds capacity resources accountable for delivering on their capacity commitments"[45] and "provide[s] incentive to capacity sellers to invest in and maintain their resources by tying capacity revenues more closely with real-time delivery of energy and reserves during emergency system conditions."[46]

Capacity Resources are not paid to simply exist; they are paid to be available to perform and serve PJM's loads. Thus, Capacity Market Sellers should assume that their resources will be needed, at a minimum, any time the PJM Region is under a declared emergency for capacity shortages. If Capacity Market Sellers need to purchase natural gas and self-schedule to ensure that their Capacity Resources can be available when needed, then sellers of gas-fueled Capacity Resources should engage in such forward-looking behavior.[47]

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[43] Capacity Performance Rehearing and Compliance Order, 155 FERC ¶ 61,157 at P 110.

[44] *Id.* P 110.

[45] *Id.* P 18.

[46] Capacity Performance Order, 151 FERC ¶ 61,208 at P 158; *see also* Capacity Performance Rehearing and Compliance Order, 155 FERC ¶ 61,157 at P 88 ("Capacity sellers need to make the investment and maintenance decisions ahead of time to reduce the probability that they will consistently, and for prolonged periods, be unable to deliver energy during Performance Assessment Hours.").

[47] Generators have recognized that the Capacity Performance rules require that "the generator must manage its fuel supply risks and ensure it is able to perform when called to do so by PJM." *See* Answer of Direct Energy to PJM Interconnection, L.L.C.'s Motion for Leave to Answer, Docket No. ER19-664-000, at 3 (Feb. 14, 2019); *see also* Pilong Aff. at P 15 ("Resources also have the ability to avoid potential Non-Performance Changes by self-scheduling their resources in advance of potential pre-emergency or Emergency Actions resulting in PAIs, or

Capacity Performance also offers a carrot to perform, in addition to the Non-Performance Charge stick. Resources that over-perform receive "bonus" payments,[48] "provid[ing] the appropriate incentives for all resources to perform when they are needed most."[49] Bonus payments are derived from the collected Non-Performance Charges.[50] The Commission found this "redistribution of capacity revenues from under-performing resources to over-performing resources provides the appropriate incentives for all resources to perform when they are most needed."[51]

The Non-Performance Charges and bonus payments are "a tariff-defined mechanism that establishes a transparent, operative framework to provide an incentive for resource reliability."[52] They work in tandem toward the overarching goal of Capacity Performance: ensuring all Capacity Resources are available and providing energy or reserves when needed, while reallocating non-performance risk from consumers to capacity suppliers.[53] Stated differently, PJM's Tariff rules

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during PAIs. In such cases, the self-scheduling unit may propose an operating schedule and the PJM operators will attempt to accommodate the request. This is not necessarily the behavior that Capacity Performance was intended to elicit, but it is an available strategy for minimizing the risk that units will not meet their Capacity Performance commitments.").

[48] *See* Tariff, Attach. DD, § 10A(g) ("Revenues collected from assessment of Non-Performance Charges for a Performance Assessment Interval shall be distributed to each Market Participant, whether or not such Market Participant committed a Capacity Resource or Locational UCAP for a Performance Assessment Interval, that provided energy or load reductions above the levels expected for such resource during such interval.").

[49] Capacity Performance Order, 151 FERC ¶ 61,208 at P 182.

[50] *See* Tariff, Attach. DD, § 10A(g); *see also* Capacity Performance Order, 151 FERC ¶ 61,208 at P 182 ("Regarding PJM's proposal to allocate Non-Performance Charge revenues to over-performing resources, we find PJM's proposal to distribute these penalties to generators to be just and reasonable.").

[51] Capacity Performance Order, 151 FERC ¶ 61,208 at P 182.

[52] *Id.* P 15.

[53] *See, e.g.*, *id.* P 5 ("[A] resource adequacy construct that fails to provide adequate incentives for resource performance can threaten the reliable operation of PJM's system and force consumers to pay for capacity without receiving commensurate reliability benefits"); Capacity

penalizing under-performance and rewarding over-performance are designed so that customers get the reliability they pay for and generators' capacity revenues are tied "more closely with real-time delivery of energy and reserves during emergency system conditions."[54]

B. PJM Maintains A Comprehensive Winter Preparedness Regime That Is Continually Refined In Response to Guidance from Reliability Regulators and Lessons Learned from Extreme Weather Events in PJM and Other Regions

The January 2014 Polar Vortex not only prompted the Capacity Performance market reforms described above, but also prompted PJM to develop and maintain a comprehensive program for addressing winter preparedness to reliably meet the needs for power and reserves on the PJM system.[55]

Through enhancements to its Tariff and Manuals, PJM has strengthened its winter preparedness program by defining clear generator preparedness expectations and requiring greater transparency from generators concerning their cold weather preparations. These enhancements are an on-going process. PJM updates its winter preparedness process in response to lessons learned from other serious winter events over the last decade, including Winter Storm Uri, which caused over two hundred deaths and as much as $130 billion in economic losses in Texas alone.[56]

Performance Rehearing and Compliance Order, 155 FERC ¶ 61,157 at P 27 ("PJM's proposed revisions to the capacity market penalty structure reallocate a significant portion of this performance risk to capacity resource owners and operators."); *id.* P 109 (citing *ISO New Eng. Inc.*, 147 FERC ¶ 61,172, at P 71 (2014) (recognizing that each non-performance excuse "represent[s] a reallocation of nonperformance risk from capacity suppliers to consumers).

[54] Capacity Performance Order, 151 FERC ¶ 61,208 at P 158.

[55] *See* Bielak Aff., Ex. PJM-002, at P 5.

[56] *See, e.g.*, FERC - NERC - Regional Entity Staff Report: The February 2021 Cold Weather Outages in Texas and the South Central United States at 9-10 (Nov. 2021), https://www.ferc.gov/media/february-2021-cold-weather-outages-texas-and-south-central-united-states-ferc-nerc-and.

1. PJM's Winter Assessments

PJM prepares load forecasts—including the annual Winter Assessment—and shares the results with its stakeholders. As discussed in the Bielak Affidavit, the 2022/2023 Winter Assessment identified no reliability issues.[57] PJM also prepared a "high load" sensitivity study that similarly identified no "unexpected or uncontrollable issues."[58] PJM thus appeared to be well-positioned to meet demand in extreme winter conditions.

2. Winter Preparation of Generating Units

PJM maintains robust procedures to ensure generators are aware of its winter preparedness expectations. A key requirement for generators is the "Cold Weather Preparation Guideline and Checklist" (Checklist) found in Attachment N to PJM Manual 14D.[59] Generators must verify each year that their represented resources have completed enumerated Checklist items (or substantially equivalent alternatives).[60] As noted in the Bielak Affidavit, almost every generator responded to PJM's corresponding data requests, and only a small number indicated noncompliance.[61]

PJM also issues all generation resources an annual data request to collect fuel switching capability, fuel supply and inventory, and emissions/environmental baseline information.[62] Generating Unit minimum operating temperatures are also validated annually as part of the PJM Cold Weather checklist.[63] During the winter season, PJM issues periodic data requests to all

[57] Bielak Aff. P 7.

[58] *Id.*

[59] *Id.* P 12.

[60] *Id.* P 13.

[61] *Id.*

[62] *Id.* P 11.

[63] *Id.*

thermal generation resources regarding fuel and non-fuel consumables used in power production.[64] An additional data request is issued annually to all generation resources to collect plant-specific data relative to cold weather operations.[65] The Bielak Affidavit describes the additional measures PJM undertakes to ensure generators and other PJM members are aware of PJM's winter preparedness expectations.[66]

3. Gas Industry Collaboration

PJM's winter preparedness also entails active engagement with the gas industry.[67] During the winter months, the PJM Gas Electric Coordination Team conducts weekly operational calls with every major interstate natural gas pipeline within the PJM service territory to assess mutual system conditions.[68] PJM also submits Annual Fuel Data Requests to collect information on

[64] *Id.* P 14.

[65] *Id.* P 15.

[66] *See id.* PP 10-20.

[67] *See id.* PP 21-25. PJM acknowledges that gas/electric coordination and scheduling practices could be better synchronized. In fact, PJM has called on FERC in many proceedings to prioritize gas/electric coordination issues. *See* PJM Interconnection, L.L.C., Comments and Responses of PJM Interconnection, L.L.C., Docket No. AD18-7-000 at 6-7 (Mar. 9, 2018) (listing proposed steps to enhance grid resilience including establishing "improved coordination and communication requirements between RTOs and Commission-jurisdictional natural gas pipelines"); PJM Interconnection, L.L.C., Initial Comments of PJM Interconnection, L.L.C. on the United States Department of Energy Proposed Rule, Docket No. RM18-1-000 at 29 (Oct. 23, 2017). However, the need for better coordination of scheduling practices cannot be solved by PJM alone—this is a national issue as the Commission has recognized. *See Coordination of the Scheduling Processes of Interstate Nat. Gas Pipelines & Pub. Utils.*, Order No. 809, 151 FERC ¶ 61,049 at P 9 (2015) ("Several events over the last few years, such as the Southwest Cold Weather Event and the extreme and sustained cold weather events in the eastern U.S. in January 2014, show the crucial interrelationship between natural gas pipelines and electric transmission operators and underscore the need for improvements in the coordination of wholesale natural gas and electric markets."(footnotes omitted)). It does not justify the Complainant's attempt to require PJM operators to also serve as fuel managers overseeing fuel procurement for approximately 800 of gas, diesel, and coal-fired generators in the PJM footprint. Consistent with the Capacity Performance construct, this responsibility lies in the first instance with the unit owners themselves.

[68] *Id.* P 22.

generator fuel availability and gas supply and transportation contracts.[69] Between November and March, the PJM Gas Electric Coordination Team conducts daily reviews of the interstate pipeline bulletin boards to assess pipeline operating conditions and identify supply risks.[70]

4. Existing Arrangements With Other Reliability Coordinators

PJM engages with neighboring Reliability Coordinators regarding operations during emergency conditions, and has joint operating and or joint coordination agreements with Midcontinent Independent System Operator, Inc. (MISO), Tennessee Valley Authority (TVA), New York Independent System Operator, Inc. (NYISO), Duke Energy Progress, LLC (Duke), and VACAR South RC (VACAR).[71] PJM discusses a variety of metrics, including peak load estimates, reserve requirements, and estimated loads during daily conference calls with the neighboring Reliability Coordinators.[72] These calls took place in the period leading up to and during Winter Storm Elliott.[73]

5. Weather and Load Forecasting

PJM employs state of the art forecasting tools and processes. Three widely-used vendors send PJM hourly weather forecast data covering temperature, effective temperature, temperature humidity index, heat index, wind speed, wind direction, humidity, and cloud cover.[74] PJM systems use a weighted average of the three vendor forecasts based on recent observed performance.[75] Vendors also provide additional periodic weather reports on, among other things, wind turbine

[69] *Id.* P 24.

[70] *Id.*

[71] *Id.* P 26.

[72] *Id.* P 27.

[73] *See id.*

[74] Mulhern Aff., Ex. PJM-003, at P 13.

[75] *Id.* P 14.

icing and high wind cut-out risks. All reports are sent to control room staff, operations support staff, and Dispatch leadership, on either a daily or as needed basis determined by the vendor.

PJM uses multiple tools to visualize this weather data. A custom in-house weather dashboard presents temperature, effective temperature, wind speed, cloud cover, and other parameters for weather stations and forecast zones for the current and next six days.[76] The dashboard features charts that compare vendor forecasts and show the 24-hour temperature change, along with daily written reports on forecasted weather conditions in each major PJM zone.[77]

PJM forecasts load using a suite of neural network and pattern matching models.[78] Weather parameters such as temperature and effective temperature (which is based on temperature and wind speed) serve as direct inputs into the load models.[79] A custom in-house load forecast dashboard presents weather forecast data and load forecasts from multiple models and shows how weather and load behaved on similar days.[80] A dashboard with maps of the United States and parts of Canada shows real-time temperature, radar, dew point, and infrared and forecasted temperature deviations from normal for the current day and next 14 days.[81] A custom Dispatch interactive mapping tool shows weather radar and satellite; temperature, wind speed, dew point, and relative humidity observations; local storm reports; National Weather Service bulletins; and a variety of severe conditions.[82]

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[76] *Id.*

[77] *Id.*

[78] *Id.* P 15.

[79] *Id.*

[80] *Id.* P 18.

[81] *Id.*

[82] *Id.*

6. Cold Weather Advisories and Cold Weather Alerts

When winter emergency conditions appear imminent, PJM issues either a Cold Weather Advisory or a Cold Weather Alert. The Bielak Affidavit outlines the actions that generators and PJM are expected to take upon declaration of a Cold Weather Advisory.[83] An important component in PJM operators' decision-making process is the data supplied by generators in Markets Gateway and Dispatcher Application and Reporting Tool (eDART), which generators are obligated to update upon issuance of the Cold Weather Advisory. PJM will compare the data to the forecasted temperatures, determine if there will be any limiting factors for the generation fleet, and prepare accordingly.

PJM issues Cold Weather Alerts when emergency conditions are more immediately expected.[84] Though PJM Manual 13 contains guidelines regarding when a Cold Weather Alert will be declared, PJM operators are ultimately vested with the authority to exercise judgment in light of the surrounding factors.[85] The Bielak Affidavit outlines the requirements for generators and PJM after PJM declares a Cold Weather alert.[86] Perhaps the most critical of these obligations is for generators to provide various information to PJM operators, who rely on it to make dispatch and scheduling decisions. If generators fail to provide accurate information, operators' ability to manage an emergency may be compromised, as occurred during Winter Storm Elliott.

[83] *See* Bielak Aff. PP 28-29.

[84] *Id.* P 30.

[85] *See id.* PP 30-31.

[86] *See id.*

7. PJM Staffing and Training

A crucial element of PJM's winter preparedness is the training of its staff. PJM staff participates in the drills and other training events held for generators.[87] In addition, PJM conducts annual training, monthly load shed drills, and pre-winter and summer Emergency Procedures drills to train operators on proper load shedding procedures and to maintain their load shedding skills.[88]

PJM took steps to assure that adequate staff was available during Winter Storm Elliott, notwithstanding the impending Christmas holiday. Beginning on December 23, PJM brought in additional control room, support, and management staff that remained on duty or available around the clock throughout the entirety of the cold weather event.[89] PJM also activated the Operations Event Response Team (OERT), a cross-divisional group of internal PJM employees (including participants from Dispatch Leadership and other PJM departments) formed to prepare for and respond to operational events.[90]

8. PJM's Status in the Period Leading Up to the Emergency Declarations on December 23 and December 24, 2022

Based on PJM's modeling and the data it received from generators, PJM entered the period before Winter Storm Elliott in the reasonable belief that it had more than enough capacity to serve customers during what was expected to be a severe storm. As became apparent as conditions worsened, however, the information PJM's operators received from generators regarding winter preparedness and unit operating parameters was often substantially inaccurate.[91] PJM issued a Cold Weather Advisory for Western PJM starting at 7:00 AM on December 20, and a Cold

[87] *Id.* P 32.

[88] *Id.*

[89] *Id.* P 33.

[90] *Id.* P 34.

[91] *Id.* P 36.

Weather Alert for Western PJM on December 21. PJM also issued an RTO-wide Cold Weather Advisory on December 22, 2022, and an RTO-wide Cold Weather Alert on December 23, 2022.[92] As discussed below in Part IV.B and in the Pilong Affidavit, Capacity Resources should have been taking steps to update their unit operating parameters in response, but they often did not.

PJM operators lacked vital information needed to make dispatch decisions during Winter Storm Elliott because of the widespread failure of generators to provide accurate information regarding the operating parameters of their units.[93] In particular, many owners of gas-fired generators did not provide updates regarding the availability of natural gas needed for fuel.[94] The lack of accurate and timely information from many generators continued to be a problem throughout the entire cold weather period.

C. Widespread Generator Performance Failure Exacerbated Extraordinary System Conditions During Winter Storm Elliott

On December 23, 2022, the PJM region experienced the most rapid temperature drop it had seen in a decade, an abrupt 29°F decrease over 12 hours.[95] Although PJM correctly forecasted Winter Storm Elliott would bring freezing temperatures, the sudden temperature drop was more rapid than any other in the last decade. The rate at which temperatures fell, together with the fact that the drop occurred during what is normally the milder part of winter, distinguishes Winter Storm Elliott from other large storms.[96]

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[92] *Id.* P 35.

[93] *Id.* P 36.

[94] *Id.*

[95] Mulhern Aff., Ex. PJM-003, at P 27.

[96] *Id.*

PJM's algorithm-based load forecast model had never seen the conditions that occurred on December 23 with the confluence of unprecedented cold temperature drops, the holiday, and the weekend.[97] In some parts of PJM, the difference between the high and low temperature on December 23 was one of the greatest in recorded history.

Operators knew there was a great deal of uncertainty in the load forecast and, as a result, operated conservatively, making a conscious decision to carry a large amount of additional capacity.[98] Mindful of the potential for unpredictable impacts, PJM conducted a detailed review of its load forecast beforehand. Actual Winter Storm Elliott conditions were extreme, but within the outer bounds of what PJM prepared for.[99] The under-forecasts for December 23 and 24 were attributable to a once-in-a-decade unfavorable combination of severe cold and blizzard conditions unusually early in the winter season and outlier holiday impacts.[100]

PJM's forecasted load for December 23 was 126,968 MW. PJM was confident in its operating plans given the approximately 158,000 MW showing available for PJM dispatch. This was based on the data provided by the generators themselves. PJM was confident it was guarding against potential uncertainty by having substantially more capacity available than normally necessary. Based on submitted Generator Availability Data, PJM believed it had almost 29 GW of reserve capacity available to absorb load and generating contingencies and to support neighboring systems.[101]

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[97] *Id.* PP 26-27.

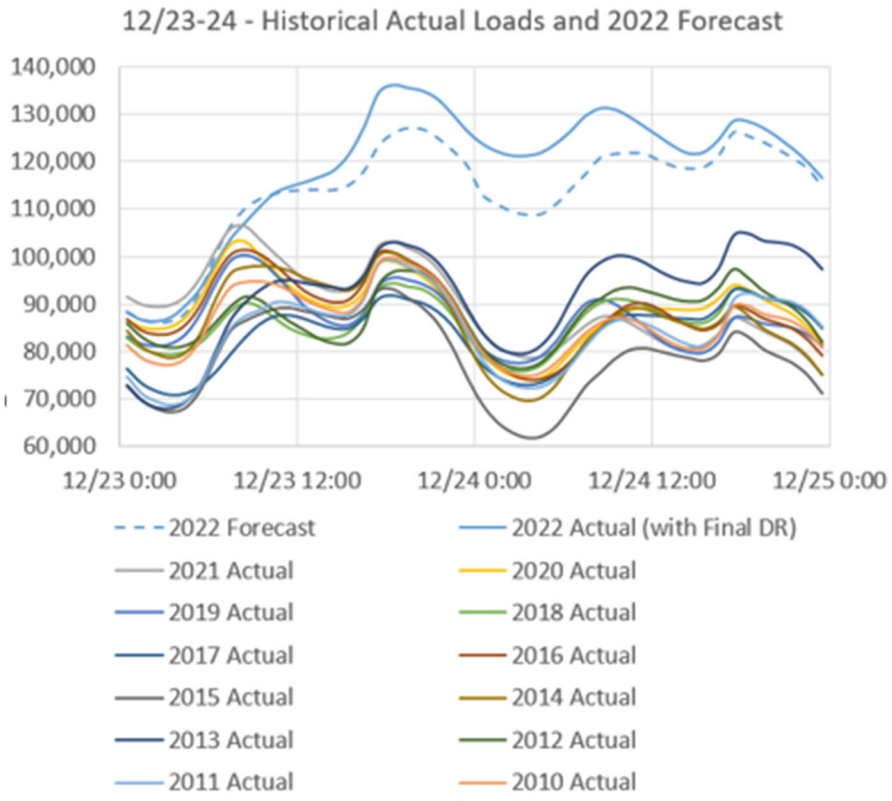
[98] *Id.* P 29; *see also* Winter Storm Elliott Frequently Asked Questions (Apr. 12, 2023), at 5, https://www.pjm.com/-/media/markets-ops/winter-storm-elliott/faq-winter-storm-elliott.ashx (WSE FAQs).

[99] *See* WSE FAQs, *supra* note 98, at 5.

[100] Mulhern Aff. at PP 25-27.

[101] Bielak Aff. at P 30.

At the same time, 2022 holiday weekend load proved to be an extreme outlier in both magnitude and timing.[102] The actual hourly load was 136,010 MW on December 23 and 131,113 MW on December 24.[103]



Load also stayed unusually high overnight and in the early morning of December 24.[104] The "Christmas Eve Valley" was 40,000 MW higher than the second highest over the last decade.[105] In fact, the Christmas Eve load "valley" was higher than any peak load on that date in a decade.[106]

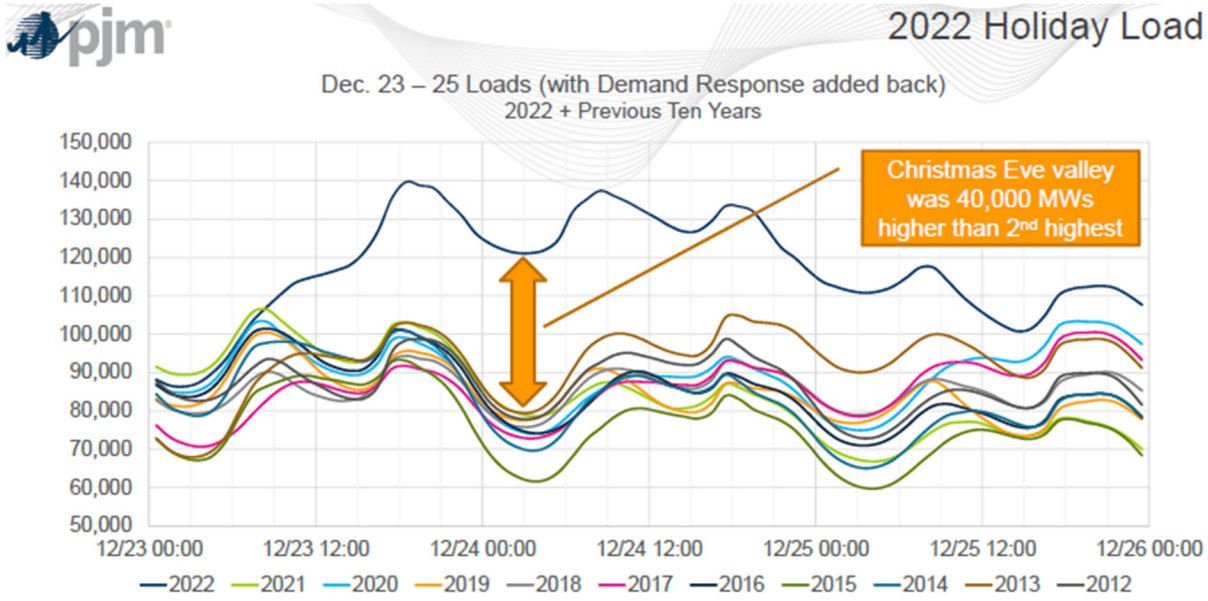
[102] Mulhern Aff. at P 32.

[103] *Id.*

[104] *Id.*

[105] *Id.*

[106] *See* WSE FAQs, *supra* note 98, at 3; Mulhern Aff. at P 32.



It is also noteworthy that PJM load forecasts were back to their "normal" levels of accuracy immediately before and after Winter Storm Elliott.[107] This indicates that the Winter Storm Elliott forecast was an outlier attributable to the anomalous combination of record-breaking temperature drops and demand levels never before seen over the Christmas holiday.

Winter Storm Elliott also created serious reliability issues across the Eastern Interconnection. It is estimated that Winter Storm Elliott impacted two-thirds of the United States and "contributed to" millions of customer outages. Like PJM, neighboring systems experienced the rapid onset of freezing temperatures coupled with unprecedented high holiday loads that were not predicted by forecasting models. As NERC has stated, "utilities in parts of the southeast were forced to engage in rolling blackouts and the bulk power system in other regions was significantly stressed."[108] Furthermore, "[i]n addition to the load shedding in Tennessee and the Carolinas,

[107] Mulhern Aff. at P 42.

[108] *See* NERC, *FERC, NERC to Open Joint Inquiry into Winter Storm Elliott* (Dec. 28, 2022), https://www.nerc.com/news/Pages/FERC,-NERC-to-Open-Joint-Inquiry-into-Winter-Storm-Elliott.aspx.

multiple energy emergencies were declared and new demand records were set across the continent. And this was in the early weeks of a projected 'mild' winter."[109]

For example, the TVA and VACAR portion of the SERC Reliability Corporation (SERC) region experienced cold weather and heavy loads and faced various stages of energy emergencies.[110] TVA was forced to engage in load shedding on December 23 and 24 for the first time in its ninety-year history. TVA set an all-time winter peak power demand record of 33,425 MW. A normal winter peak for TVA is around 24,000 MW. Duke had a load under-forecast that was in some respects larger than PJM. At times the forecast was off by approximately 10% for Duke Energy Carolinas LLC and about 5%-6% for Duke Energy Progress LLC.[111] Duke was also forced to resort to load shedding on December 24 that impacted 500,000 customers.[112]

Southwest Power Pool, Inc. (SPP) likewise had a 9% error rate in its Winter Storm Elliott forecast. SPP also set a winter peak demand record of 47,157 MW and, in SPP's own words, "[t]he presence of extreme wind chill without adequate historical data impacted [SPP's] ability to determine its impact on load."[113] In MISO, "[a]bnormally high load forecasting errors occurred

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[109] *Id*.

[110] *See id.*

[111] *See* S&P Global Market Intelligence, *Holiday 2022 Winter Storm Raises Reliability, Generation Diversity Questions* (Mar. 27, 2023), https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/holiday-2022-winter-storm-raises-reliability-generation-diversity-questions-74685081.

[112] *See* Robert Walton, *Duke Energy Apologizes for Winter Storm Outages as FERC, NERC Open Investigation Into Grid Failures*, UtilityDive (Jan. 4, 2023), https://www.utilitydive.com/news/duke-energy-apologizes-for-winter-storm-outages-as-ferc-nerc-open-investig/639583/.

[113] *See* S&P Global Market Intelligence, *How the Holiday 2022 Winter Storm Confounded Grid Operators' Forecast Models* (Apr. 6, 2023), https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/holiday-2022-winter-storm-raises-reliability-generation-diversity-questions-74685081.

due to a lack of historical data for similar extreme conditions in December."[114] Peak load on December 23 was 105,916 MW compared to forecast peak of 100,033 MW, a 5.5% error.[115]

The Electric Reliability Council of Texas (ERCOT) has stated that its load forecasts were "too low going into [Winter Storm Elliott], cold weather intrusion was deeper and quicker than the national weather models were forecasting, load forecasting models overplayed the reduction in demand due to the holiday, and that there was a "[l]ack of comparable historic load data without loadshed . . . for the load forecast models to reference."[116] Actual demand was 8% higher than ERCOT's forecasted peak demand for December 22. ERCOT has estimated that 11 GW of thermal generation, 4 GW of wind, and 1.7 GW of other resources were out of service on December 23. Just as PJM would later do, ERCOT obtained an FPA section 202(c) emergency order from the Department of Energy to allow needed resources to exceed otherwise applicable environmental limits on December 23.[117] Lastly, Louisville Gas & Electric Co. and Kentucky Utilities were forced to shed load to 53,000 customers on December 23 after underestimating peak load for that day by as much as 16%.[118]

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[114] *See* MISO, *Overview of Winter Storm Elliott December 23, Maximum Generation Event* (Jan. 17, 2023), https://cdn.misoenergy.org/20230117%20RSC%20Item%2005%20Winter%20Storm%20Elliott%20Preliminary%20Report627535.pdf.

[115] *See* S&P Global Market Intelligence, *supra* note 113.

[116] *See* ERCOT, *Item 7: Review of Winter Storm Elliott* (Feb. 28, 2023), https://www.ercot.com/files/docs/2023/02/21/7-Review-of-Winter-Storm-Elliott.pdf.

[117] *See* U.S. Dep't Energy, *Federal Power Act Section 202(c): ERCOT December 2022*, https://www.energy.gov/ceser/federal-power-act-section-202c-ercot-december-2022.

[118] *See* Ryan Van Velzer, *LG&E/KU Underestimated Energy Demand Ahead of Winter Storm Elliott*, Louisville Public Media (Jan. 26, 2023), https://www.lpm.org/news/2023-01-26/lg-e-ku-underestimated-energy-demand-ahead-of-winter-storm-elliott.

D. Many Capacity Resources, Including Complainants, Failed to Fulfill Their Performance Obligations When PJM Most Needed Them

1. Capacity Performance Failures Were Widespread and Unexpected

PJM reasonably expected generators to operate at a much higher standard than they achieved even taking account of the difficult weather conditions. Under Capacity Performance, generators must be available to PJM for dispatch when called during emergencies. As explained above, generators are excused from performing only in very narrow circumstances. The onus is not on PJM to arrange dispatch to accommodate gas nomination practices or to agree to keep generators whole that acquire gas if they are not called; rather, generation owners decide what measures are needed to avoid Non-Performance Charges and to place themselves in a position to receive bonus payments.[119] This includes the option of self-scheduling resources if generation owners are unsure if PJM will call them but wish to be certain of being online if an emergency occurs. Further, based on the information provided to PJM by generators during the previous fall, most generators were ready for winter conditions. Notably, as discussed previously, the vast majority of generators indicated in the Checklist response required by Attachment N to Manual 14D concerning their winter preparedness that they were compliant. Managing the gas nomination cycles remains the responsibility of Capacity Resource unit owners. Challenges with the synchronization of the gas nomination cycles and dispatch directives are not new. They existed at the time the unit owners submitted their bids to serve as Capacity Resources and should have been taken into account through arrangements with local distribution companies (LDCs) and others for

[119] *See* Pilong Aff. at P 13 ("To be clear, under Capacity Performance, a unit is *not* excused from being assessed Non-Performance Charges because: (i) it lacks fuel; (ii) the cost of available fuel is very expensive; (iii) it cannot obtain natural gas in a timely manner because of pipeline nomination cycles; or (iv) the unit faces operational challenges due to cold weather conditions. These are not acceptable excuses under the Capacity Performance regime.").

gas storage, no notice service, installation of dual fuel facilities, and other measures to limit their performance risk.

Notwithstanding their Capacity Performance commitments and representations made to PJM, many generators failed to respond when called upon by PJM to operate or submitted parameter limitations in their offers to PJM that were inconsistent with PJM's needs.[120] In many cases, units failed to update their parameters even after direction from PJM. Nor did these generators avail themselves of the option to self-schedule in advance of the emergency even though PJM had issued Cold Weather Advisories and declared Cold Weather Alerts. Capacity resource outages reached approximately 35,000 MW on December 23, and 46,000 MW on December 24.[121] This even exceeded the level of outages experienced by PJM during the 2014 Polar Vortex. And Complainants were among the culprits. Complainants' collectively control approximately 6,110 MW of capacity shown as available in Markets Gateway going into the December 23 operating day, before midnight on December 23, and *all* were being reported as being on a forced outage due to fuel related issues or freezing.[122]

In addition, many generators failed to provide timely updates regarding operating parameters and potential fuel restrictions as required by Manual 13,[123] which contributed significantly to the difficulties of the operators in committing resources in an orderly fashion. It

[120] *See id.* P 6.

[121] *Id.* P 25.

[122] *Id.* P 46.

[123] *See* Manual 13, § 3.3.1 (Cold Weather Advisory). (When a Cold Weather Advisory is issued, a generator must "[u]pdate Markets Gateway and eDART by entering unit specific operation limitations associated with cold weather preparedness . . . includ[ing] . . . [f]uel supply and inventory concerns."); *Id.* § 3.3.2 (Cold Weather Alert) (noting that when a Cold Weather Alert is declared, generation dispatchers must "contact PJM Dispatch if it is anticipated that spot market gas is unavailable, resulting in unavailability of bid-in generation.").

was not uncommon for PJM operators to learn that a gas-fired Capacity Resource that, on paper, was available could not run when dispatched due to a lack of fuel until dispatch instructions were actually issued.[124] In fact, over 92% of outages were reported to PJM with either less than an hour's notice or no notice.[125] And again, Complainants were among the units that fell into this category. For example, the University Park units owned by one of the Complainants, offered all of its 18 combustion turbine units—about 840 MW—into the PJM Day Ahead and Real Time markets for December 23 as available and with no changes to their typical notification time parameters. The PJM dispatcher directed that these units be brought on in the late morning and early afternoon of December 23. Although the generation dispatcher initially indicated the units would ramp up, a short time later he advised they were unavailable due to a "fuel limitation" and a "gas restriction."[126]

Poor generation performance was also evident in other ways and had a negative cascading impact. In addition to the forced outages expected by operations, approximately 6,000 MW of steam generation was called but was not online as expected for the morning peak on December 24.[127] Overall, over 16,000 MW of generation that was committed in the Day-ahead Market failed to perform.[128] The high generator outage rates also limited PJM's ability to replenish pond levels for pumped storage hydro prior to the morning peak on December 24.[129] Taken together, PJM

[124] Pilong Aff. at P 40.

[125] *Id.*

[126] *Id.* P 37. One unit that was already operating went off line. *Id.*

[127] *Id.* P 41.

[128] *Id.* P 28.

[129] *Id.* P 27.

faced approximately 57 GW of generator unavailability for the morning peak on December 24. PJM operators could not have reasonably anticipated this level of failure by Capacity Resources.[130]

2. Capacity Resources' Poor Performance Was a Major Factor in PJM's Decision to Extend Emergency Actions Through the Evening Peak on December 24, 2022

The performance failures of the generator sector generally and the failures of Complainants individually had a profound impact on PJM's decision-making during the period following the December 24 morning peak. This was especially so because PJM was facing many other uncertainties including that: (i) the load forecast had significantly understated the last two peaks and the reasons why the usually reliable forecast process was not working were unclear; (ii) production area freeze-offs and gas pipeline curtailments had occurred and it was uncertain when natural gas operations would return to normal; and (iii) PJM reasonably believed that the morning peak it had just experienced would have been about 7,000 MW higher without Load Management. As explained in detail below and in the affidavit of Mr. Bryson, considering the totality of the circumstances, extending the Pre-Emergency/Emergency Load Management Actions and Maximum Generation Emergency Action was prudent and consistent with the Good Utility Practice Standard.

PJM will not speculate as to whether its operators might have ended the Emergency Actions sooner if generator performance had been better over the previous 24 to 36 hours. It is clear, however, that the generator sector's, including Complainants', poor performance was a major driving factor behind the decision to extend those procedures and was a factor that PJM would have been reckless to ignore. Some generators performed well during Winter Storm Elliott. But the performance of generators such as Complainants that appear not to have taken their

[130] *Id.* P 27.

Capacity Performance obligations seriously and failed even to keep PJM informed as to their status added tremendously to the operators' concerns regarding the December 24 evening peak. In this area, as with many other aspects of the Complaint, the Commission should review the facts in light of the information operators had available at the time rather than second guessing their actions through perfect 20/20 hindsight.

III. MOTION TO DISMISS OR SUMMARILY DISPOSE OF COMPLAINT

The Complaint is fatally flawed for reasons that demand dismissal or summary disposition under Rule 217. A motion for summary disposition should be granted when there is "no genuine issue" of material fact left in dispute.[131] The Commission's rules do not address motions to dismiss, but the Commission will dismiss complaints that fail to state a claim upon which relief can be granted as described in Federal Rules of Civil Procedure 12(b)(6).[132] The Complaint fails under either standard, and PJM is indifferent as to which rule the Commission chooses to reject the Complaint.

Complainants seek to avoid paying approximately $275 million in Tariff-required Non-Performance Charges that are the direct consequence of Complainants' failure to provide generation capacity in response to PJM's Emergency Actions during Winter Storm Elliott. Complainants collectively own or control 6,110 MW of Capacity Performance Resources, which represents 21.5 percent of the generation reserves PJM anticipated to be available going into Winter Storm Elliott.[133] Complainants now argue that "the Commission should eliminate the

[131] 18 C.F.R. § 385.217(b).

[132] *BP Am. Inc.*, 47 FERC P 61 at P 21 n.46 (2014); *see High Prairie Pipeline, LLC v. Enbridge Energy*, 149 FERC P 61,004 at PP 9-10 (2014) ("The Commission did not grant summary disposition; the commission dismissed the complaint. . . .").

[133] Pilong Aff. at P 46.

penalties assessed to the ComEd Zone Generators because the penalties are the result of PAIs that never should have been triggered."[134] Complainants' theory is that they should be relieved from Non-Performance Charges because PJM "violated" Manual 13 by taking Emergency Actions without satisfying certain allegedly binding "pre-requisites," and that these alleged violations of Manual 13 are tantamount to violations of the Tariff. Complainants' alternative theory is that it would be unreasonable for them to be penalized on various policy or economic grounds.[135]

The Complaint fails to state a cognizable claim because Complainants' request for relief is foreclosed by the filed rate doctrine and the corollary rule against retroactive ratemaking.[136] It presents a direct collateral attack on the longstanding Capacity Performance regime that the Commission has no authority to grant. Moreover, the Complaint is also improperly pled.

A. The Tariff Provisions Governing Nonperformance Penalties Operate Automatically and Do Not Contemplate Complainants' Unprecedented Collateral Attacks on Operators' Decisions to Declare Emergency Actions

Nothing in the Tariff, Operating Agreement, or Manuals permits Complainants to collaterally attack PJM's real-time decision to take Emergency Actions in a Complaint to the Commission. The Tariff is clear: when PJM declares an Emergency Action, PAIs are automatically triggered and Non-Performance Charges are calculated according to the Tariff's

[134] Complaint at 18; *accord id.* at 6.

[135] *See id.* at 28-29 (asserting that "the continuation of PAIs into December 24 . . . had the effect of penalizing generation where it would not have made sense for PJM to dispatch such generation, particularly to provide below cost supply to TVA and other SERC utilities.").

[136] *See, e.g.*, *San Diego Gas & Elec. Co.*, 99 FERC ¶ 61,364, at P 8 (2002) ("The filed rate doctrine bars the Commission from imposing an after-the-fact surcharge above the rate on file for the services already performed. Its corollary, the rule against retroactive ratemaking bars the Commission from adjusting current rates to make up for over-or-under collection of costs in prior periods."); *OXY USA, Inc. v. FERC*, 64 F.3d 679, 699 (D.C. Cir. 1995) ("The [filed rate] doctrine's corollary . . . is the rule that agencies may not alter rates retroactively.").

strictures.[137] And while certain narrowly-defined exceptions to the Tariff's Non-Performance Charges rules exist, Complainants make no attempt at pleading these exceptions.

Complainants acknowledge they are currently responsible for $275 million in Non-Performance Charges.[138] That is a very large figure, but Complainants were paid substantial sums of money by PJM's customers to provide capacity and nevertheless failed to perform at the very time it was most important to meet their obligations as Capacity Resources. Significant penalties for non-performance are entirely consistent with the intent of the Capacity Performance reforms.[139] To the extent the Complainants seek to diminish their Non-Performance Charges as a form of equitable relief grounded in policy arguments or financial hardship, the Complaint must be dismissed. The Commission is bound to enforce the strict terms of the Tariff even when it leads to "harsh consequences," lest it violate the filed rate doctrine and undermine enforcement of the FPA.[140] "The filed rate doctrine and the rule against retroactive ratemaking leave the Commission *no discretion* to waive the operation of a filed rate or to retroactively change or adjust a rate for good cause or for any other equitable considerations."[141]

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[137] Tariff, Attach. DD (Reliability Pricing Model), §10A(a).

[138] *See, e.g.*, Complaint at 3 ("Complainants in aggregate face over $275 million in penalty assessments.").

[139] *See supra* Section II.A.

[140] *Maislin Indus., U.S., Inc. v. Primary Steel, Inc.*, 497 U.S. 116, 132 (1990) ("[S]trict adherence to the filed rate has never been justified on the ground that the carrier is equitably entitled to that rate, but rather that such adherence, despite its harsh consequences in some cases, is necessary to enforcement of the Act."); *accord, e.g.*, *AT&T v. Cent. Office Tel., Inc.*, 524 U.S. 214, 223 (1998) (explaining that the filed rate doctrine applies regardless of any benefit or harm to a particular customer); *see, e.g.*, *Ark. La. Gas Co. v. Hall*, 453 U.S. 571, 577 (1981) (finding that the "Commission itself has no power to alter a rate retroactively") (footnote omitted)).

[141] *Old Dominion Elec. Coop., Inc. v. FERC*, 892 F.3d 1223, 1230 (D.C. Cir. 2018) (citing *Columbia Gas Transmission Corp. v. FERC*, 895 F.2d 791, 794-97 (D.C. Cir. 1990)).

Moreover, the procedure the Complainants demand is unprecedented. In past cases when PAIs were called, there was no *ex post* review of operator actions, and the amount of the Performance Shortfalls were based on operator actions and decisions that occurred during the PAIs. No *post hoc* review was ever performed when PAIs were triggered in October 2019 ($8.2 million), June 2022 ($1.1 million), and October 2022 (none).[142] Thus, even if the Commission were to conclude that the Tariff is ambiguous regarding the permissibility of *post hoc* review, the fact that this has never occurred before is evidence that such reviews are not permitted in the normal course.[143] And, as we next explain, the Tariff is not ambiguous on this point: on the contrary, it expressly bars Complainants' request for Commission review.

B. The Complaint Is Foreclosed by Operating Agreement, Schedule 1, Section 1.8.2 and Commission Precedent

PJM's Answer and supporting Exhibits demonstrate that PJM's actions in connection with Winter Storm Elliott did not violate Manual 13. On the contrary, PJM's Emergency Actions

[142] *See* PJM, *PAI Settlements*, (Mar. 2022), https://www.pjm.com/-/media/committees-groups/committees/mic/2020/20200415/20200415-item-08bperformance-assessment-event-settlement-paper-october-2019.ashx; Monitoring Analytics, LLC, *State of the Market Report for PJM (Q3 2022)*, at 404 (Nov. 10, 2022), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2022/2022q3-som-pjm.pdf.

[143] The Commission interprets clear tariff language based exclusively on a tariff's express terms. It only looks to extrinsic evidence, including course of performance, if the express terms of a tariff are ambiguous. *See Cities of Bethany v. FERC*, 727 F.2d 1131, 1144 (D.C. Cir. 1984) (parties' course of performance under a contract may give meaning to otherwise unclear contract terms); *MME Energy, Inc.*, 123 FERC ¶ 61,251, at P 80 (2008) ("[E]vidence [such as course of performance] is only considered to ascertain the intent of the parties when the intent has been imperfectly expressed in ambiguous language and is not admissible to contradict or alter express terms."); *Nicole Gas Prod., Ltd.*, 105 FERC ¶ 61,371, at P 10 (2003) ("Extrinsic evidence (which may include the parties' course of performance) is admissible to ascertain the intent of the parties when the intent has been imperfectly expressed in ambiguous contract language, but is not admissible either to contradict or alter express terms."), *rev'd on other grounds*, *Columbia Gas Transmission Corp. v. FERC*, 404 F.3d 459 (D.C. Cir. 2005). In past cases when PAIs were called, there was no *ex post* review of operator actions, and the amount of the Performance Shortfalls were based on the operator actions and decisions that occurred during the PAIs.

complied with, and were required by, the Tariff, Operating Agreement, NERC's mandatory reliability standards, and Manuals—including Manual 13.[144] But the Commission need not reach or decide any of those arguments because the Complaint is foreclosed by Operating Agreement, Schedule 1, section 1.8.2 and foreclosed by the Commission's decision in *PPL EnergyPlus, LLC v. PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,338 (2006).

Operating Agreement, Schedule 1, Section 1.8.2, provides that disputes concerning PJM's dispatch decisions should be made directly to PJM, not to the Commission. Section 1.8.2(a) states that "[c]omplaints arising from or relating to [the selection, scheduling or dispatch of resources] shall be brought to the attention of [PJM]."[145] Section 1.8.2(d) provides that PJM's market participants shall not be entitled to any "form of reimbursement from [PJM] or any other Market Participant for any loss, liability or claim, including any claim for lost profits, incurred as a result of a mistake, error or other fault by [PJM] in the selection, scheduling or dispatch of resources."[146] The Complainants' request for relief falls squarely within the scope of this provision because they seek both to avoid "loss" by evading or diminishing their Non-Performance Charges and a form of "reimbursement" from other Capacity Performance Resources who are entitled to bonus payments. As such, claims that PJM "should not have scheduled the ComEd Zone generation . . . or should have scheduled down self-scheduled units" must be dismissed summarily because the Operating Agreement provides they should not be litigated before the Commission.

The Commission's decision in *PPL EnergyPlus* confirms this reading of the Operating Agreement. There, the Commission rejected a generator's complaint that its unit should have been

[144] *See infra* Section IV.**Error! Reference source not found.**.

[145] OA, Sch. 1, § 1.8.2(a).

[146] *Id.* § 1.8.2(d).

called sooner by PJM's operators during a reliability emergency related to the overload of a single transmission line.[147] The generator argued that its unit should have been dispatched before PJM called a Maximum Emergency Generation Event and started to purchase emergency power and not afterwards, in violation of the Operating Agreement.[148] The Commission dismissed the generator's claim stating: "PJM and the signatories to the Operating Agreement, including PPL, have agreed that disputes concerning these matters *not* lead to the retroactive unraveling of PJM's market dispatch decisions leading to re-creation of hypothetical prices based on potentially different dispatch decisions."[149] This finding applies equally to Complainants' claims here.

Further, PJM's longstanding rationale for including this provision in the Operating Agreement, as explained by the Commission, underscores why it should be applicable in this case:

> As PJM correctly notes . . . the parties' claim limitation agreement recognizes the day-to-day stress of system operations and the need, on PJM's part, to exercise judgment in making dispatch decisions, particularly in emergencies. Because such dispatch decisions are made in real-time, such decisions cannot be reversed and trying to recreate monetary damages for potential errors would be difficult and inappropriate.[150]

The "stress" faced by the PJM operators and the "need for judgement" during Winter Storm Elliott dwarfs the issues faced by the operators in *PPL EnergyPlus*, where the emergency conditions affected only a small part of the PJM system. This rationale thus applies with even greater force to the facts in this proceeding given the severity of the situation that PJM faced.

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[147] *PPL EnergyPlus*, 117 FERC ¶ 61,338 at PP 2, 33.

[148] *Id.* PP 3-4.

[149] *Id*. P 33.

[150] *Id.*

Complainants' desire to insert themselves into PJM's reliability decisions as an RTO also cannot be reconciled with Order No. 2000.[151] A FERC-prescribed "minimum characteristic" of any RTO is that it must "have exclusive authority for maintaining the short-term reliability of the grid that it operates" including "the right to order the redispatch of any generator connected to the transmission facilities it operates if necessary for the reliable operation of the transmission system."[152] This redispatch authority for reliability was clearly intended to encompass—in fact was focused on—emergency situations:

> We clarify that we intend the authority for generator redispatch to be used by the RTO to prevent or manage emergency situations, such as abnormal system conditions that require automatic or immediate manual action to prevent or limit equipment damage or the loss of facilities or supply that could adversely affect the reliability of the electric system, or to restore the system to a normal operating state.[153]

Further, the Commission found that PJM satisfies the redispatch authority requirement, stating "PJM has the right to order the redispatch of any generator connected to the transmission facilities it operates if necessary for the reliable operation of the transmission system."[154]

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[151] *Regional Transmission Organizations*, Order No. 2000, FERC Stats. & Regs. ¶ 31,089, (1999) (cross-referenced at 89 FERC ¶ 61,285), *order on reh'g*, Order No. 2000-A, FERC Stats. & Regs. ¶ 31,092 (2000) (cross-referenced at 90 FERC ¶ 61,201), *aff'd sub nom. Pub. Util. Dist. No. 1 of Snohomish Cnty. v. FERC*, 272 F.3d 607 (D.C. Cir. 2001).

[152] 18 C.F.R. §§ 35.34(j)(4), 35.34(j)(4)(ii). Similarly, Order No. 888's "ISO Principles" required that PJM have the "primary responsibility in ensuring short-term reliability." *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, Order No. 888, FERC Stats. & Regs. ¶ 31,036, 31,731 (1996) ("An ISO should have the primary responsibility in ensuring short-term reliability of grid operations"), *order on reh'g*, Order No. 888-A, FERC Stats. & Regs. ¶ 31,048 (1997), *order on reh'g*, Order No. 888-B, 81 FERC ¶ 61,248 (1997), *order on reh'g*, Order No. 888-C, 82 FERC ¶ 61,046 (1998), a*ff'd in relevant part sub nom. Transmission Access Pol'y Study Grp. v. FERC*, 225 F.3d 667 (D.C. Cir. 2000).

[153] *Id.* at 875.

[154] *PJM Interconnection, L.L.C.*, 96 FERC ¶ 61,061, at 61,233 (2001).

C. The Tariff and Operating Agreement Do Not "Explicitly Incorporate" Complainants' False Construction of Manual 13, and Their Claim is Irrelevant Because the Operating Agreement Specifically Permits PJM to Override Manuals During Emergencies

The language in Manual 13 the Complainants rely upon is, of course, not found in the Tariff, which is why Complainants' resort to claiming it is incorporated by reference. The Complaint asserts, at most, an alleged violation of two cherry-picked provisions in Manual 13 concerning exports to adjacent regions and load management.[155] PJM demonstrates in its answer below that Complainants grossly misread Manual 13 to constrain PJM's ability to respond to emergencies in ways that squarely conflict with the Tariff, NERC reliability standards, and other Manuals.[156] PJM fully expects the Commission to concur with those arguments. However, for purposes of summary disposition, it is not necessary for the Commission to reach the merits of those arguments because the Tariff and Operating Agreement do not, as the Complainants claim, "explicitly incorporate by reference" the Complainants' false construction of Manual 13.[157]

Manuals are an extremely important source of guidance to Market Participants, and all entities, including PJM itself, are expected to follow that guidance. However, legal authorities are hierarchical, and the Commission and reviewing courts apply the "rule of reason" to enforce that hierarchy.[158] Thus, "a company's tariff, not its manuals or handbooks, must define the rates, terms and conditions of jurisdictional services," but the unfiled provisions in a manual are always

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[155] *See* Complaint at 21 (alleging export constraints); *id.* at 27-28 (alleging load management constraints).

[156] *See infra* Section IV.**Error! Reference source not found.**.**Error! Reference source not found.**.

[157] *See* Complaint at 4.

[158] *Keyspan-Ravenswood, LLC v. FERC*, 474 F.3d 804, 810-11 (D.C. Cir. 2007) (quoting *City of Cleveland v. FERC*, 773 F.2d 1368, 1376 (D.C. Cir. 1985)).

subordinate to the filed Tariff.[159] Here, the Commission need not consider Complainants' spurious "incorporation" argument because Operating Agreement section 1.7.15 specifically provides that PJM "shall be authorized to direct or coordinate corrective action, *whether or not specified in the PJM Manuals,* as necessary to alleviate unusual conditions that threaten the integrity or reliability of the PJM Region, or the regional power system."[160]

D. The Complaint Is Improperly Pleaded Because It Relies Exclusively on FPA Section 206 Without Reference to FPA Section 306

Finally, the Complaint was improperly pleaded because it relies exclusively on FPA section 206,[161] which cannot provide the relief Complainants seek. FPA section 206 permits complainants to seek prospective modifications of filed tariffs, or relief from the prospective application of tariffs as-applied to a complainant, starting no earlier than the day a complaint is filed.[162] Retroactive

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[159] *Quest Energy, L.L.C. v. Detroit Edison Co.*, 106 FERC ¶ 61,227 at P 20 (2004); *see, e.g.*, *Hecate Energy Greene Cty. 3 LLC v. Cent. Hudson Gas & Elec. Corp. N.Y. Indep. Sys. Operator, Inc.*, 177 FERC ¶ 61,121 at P 30 (2021); *Cal. Indep. Sys. Operator Corp.*, 175 FERC ¶ 61,245 at P 166 (2021); *Energy Storage Assoc. v. PJM Interconnection, L.L.C.*, 162 FERC ¶ 61,296 at P 108 (2018); *Cal. Indep. Sys. Operator Corp.*, 126 FERC ¶ 61,147 at P 58 (2009); *Atl. City Elec. Co. v. PJM Interconnection, L.L.C.*, 91 FERC ¶ 61,063, at 61,219-20 (2000); *PJM Interconnection, L.L.C.*, 81 FERC ¶ 61,257 at 62,242-43 (1997), *vacated in part not relevant sub nom. Atl. City Elec. Co. v. FERC*, 295 F.3d 1 (2002).

[160] OA, Attach. K-App'x, § 1.7.15 (emphasis added). This authority is consistent with the hierarchy recognized in section 1.7.11, which provides that PJM's actions during Emergencies "shall be carried out in accordance with this Agreement, the NERC Operating Policies, Applicable Regional Entity reliability principles and standards, Good Utility Practice, and the PJM Manuals." *Id.* § 1.7.11. This hierarchy is instructive, because Complainants cite this section for the proposition that their mistaken interpretation of Manual 13 has been incorporated by reference into the Tariff and Operating Agreement.

[161] 16 U.S.C. § 824e.

[162] *See City of Anaheim, Cal. v. FERC*, 558 F.3d 521, 524 (D.C. Cir. 2009) (quoting *Towns of Concord, Norwood & Wellesley, Mass. v. FERC*, 955 F,2d 67, 72 (D.C. Cir. 1992) (explaining that section 206a "allows the Commission to fix rates and charges, but only prospectively"); *FirstEnergy Serv. Co. v. FERC*, 758 F.3d 346, 353 (D.C. Cir. 2014) ("FirstEnergy bears the burden of demonstrating that, as applied … Schedule 12 of PJM's tariff is unjust and unreasonable.").

modifications of the Tariff are, of course, prohibited.[163] Here, the Complaint does not request prospective revisions to the Tariff provisions or prospective exemption from the Tariff as applied to Complainants; rather, the Complainants claim that they are seeking to enforce the existing terms of the Tariff.[164] Therefore, the proper statute to invoke is FPA section 306,[165] as the Commission has expressly held in prior cases.[166]

IV. ANSWER TO THE COMPLAINT

Chairman Phillips recently emphasized in testimony before the United States Senate that reliability "is—and always must be—job number one" for the Commission.[167] That is also PJM's primary purpose. PJM's foremost obligation as a FERC-jurisdictional Transmission Provider and RTO, registered NERC Balancing Authority Transmission Operator, and Reliability Coordinator, is to maintain reliability.[168] The Tariff, Operating Agreement, PJM Manuals and other authorities all recognize that PJM must have the flexibility to do what is needed in reliability emergencies.[169]

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[163] *See supra* notes 4, 7, 8.

[164] *See, e.g.*, Complaint at 20, 38, 41.

[165] 16 U.S.C. § 825e.

[166] *See, e.g.*, *Richard Blumenthal, Att'y Gen. for the State of Conn. v. ISO New Eng. Inc.*, 128 FERC ¶ 61,182 at P 55 (2009) ("Complainants improperly filed their complaint under section 206 of the FPA, which applies to rate changes for public utility tariffs. The complaint here does not seek changes in the rates, terms, and conditions of ISO-NE's tariff, other than with respect to the market monitoring unit provisions of the tariff; Complainants should have filed their market manipulation complaint under section 306 of the FPA, which permits the filing of complaints regarding any violation of the FPA.").

[167] *Testimony of Chairman Willie Phillips, Federal Energy Regulatory Commission, Senate Energy and Natural Resources Committee* (May 4, 2023), https://www.ferc.gov/media/testimony-chairman-willie-phillips-federal-energy-regulatory-commission-senate-energy-and.

[168] *Who We Are*, PJM, https://pjm.com/about-pjm; *accord, e.g.*, OA § 7.7 (making "the safe and reliable operation of the PJM Region" the first of the PJM Board's "primary responsibilities").

[169] *See infra* Part IV.A.2.

Complainants failed to meet their obligations as Capacity Resources during Winter Storm Elliott, a major interregional emergency that stressed PJM and its surrounding Balancing Authorities. Complainants now face substantial nonperformance charges as a result. In an effort to escape those charges, Complainants seek to second-guess PJM's reliability decisions to avoid the consequences of their own role in exacerbating the emergency. Complainants even go so far to claim there was no emergency at all. To be perfectly clear, Complainants' complete failure to meet their obligations as Capacity Resources during Winter Storm Elliott was unacceptable, dangerous, and neither attributable to PJM nor excusable because of any action PJM did or did not take.

Witnesses testifying on behalf of PJM discuss in detail the applicable Tariff, Operating Agreement, and Manual provisions and other rules governing PJM's actions during emergencies.[170] These rules confer on PJM considerable discretion and flexibility in responding to emergencies.[171] Moreover, PJM's emergency decisions are "binding on all Market Participants until [PJM] announces that the actual or threatened Emergency no longer exists."[172]

PJM's supporting witnesses explain how each of PJM's major actions during Winter Storm Elliott complied with all applicable requirements and was reasonable on the merits. In the face of "incredibly challenging" and rapidly-deteriorating conditions, PJM used this authority wisely and "did not shed a single megawatt of load on December 23 and December 24."[173] As PJM's

[170] *See* McGlynn Aff. at PP 14-28.

[171] *Id.* at PP 17-19, 23; *see also infra* Section IV.A.3.

[172] Tariff, Attach. K-App'x, § 1.7.11; OA, Sch. 1, § 1.7.11.

[173] *Id.* PP 8, 13.

witnesses explain, PJM operators "fully satisfied their compliance obligations in advance of, and for the entire duration of, Winter Storm Elliott."[174]

A. PJM Has Broad Discretion to Declare Emergencies and the Prudence of PJM's Real-Time Decisions During Emergencies Is Subject to Great Deference Under the Good Utility Practice Standard

Complainants have a heavy burden of proof in this proceeding and they fail to carry it. Complainants do not identify or demonstrate compliance with any standard of review. Good Utility Practice is the correct standard for evaluating the reasonableness of utility decisionmaking. That standard is explicitly set forth in the Tariff and Operating Agreement, but it is mentioned nowhere in the Complaint. Nor does the Complaint acknowledge or confront the Commission's specific application of the Good Utility Practice standard in the context of prudence challenges. The Complaint fails under both lines of precedent for several reasons.

- First, the Good Utility Practice standard is highly deferential on its face, and that deference is exceptionally broad in the context of emergency management.
- Second, where, as here, Complainants retroactively challenge the prudence of PJM's past decisions, they must do so "in light of the facts known at the time the decision was made."[175] That constraint is fatal because it renders the *post hoc* analysis offered by the Complainants' witnesses irrelevant as a matter of law.
- Third, PJM's flexibility to respond to emergencies under Good Utility Practice is powerfully reinforced in the Tariff, Operating Agreement, and Manuals.
- And fourth, Complainants' misapply FPA section 206 in their failed attempt to bypass the deference afforded PJM under the applicable standard of review.

Finally, in addition to the manifest legal flaws in the Complaint, it also undermines public policy. Complainants' request for retroactive invalidation of PJM's actions during emergencies is not only unprecedented, but also foreclosed by the Operating Agreement and Commission

[174] *Id.* ("I also feel certain that if [Complainants'] restrictive and unrealistic interpretation of Manual 13 was adopted it would seriously inhibit PJM operators' ability to keep the lights on.").

[175] *E.g.*, Tariff § 1 (defining Good utility Practice); OA § 1 (same).

precedent for good reasons.[176] If operators are not accorded a high degree of flexibility to implement their best technical judgment in emergencies, they may avoid using available and effective tools that seem more vulnerable to *post hoc* legal challenges to the ultimate detriment of reliability.

1. The Good Utility Practice Standard Affords Great Deference to Public Utilities, and Commission Precedent Broadens that Deference in Emergency Conditions

The Good Utility Practice standard was adopted by the Commission's *pro forma* Open Access Transmission Tariff in Order No. 888, and that definition is incorporated verbatim into the Tariff and Operating Agreement. It reads:

> "Good Utility Practice" shall mean any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather is intended to include acceptable practices, methods, or acts generally accepted in the region; including those practices required by Federal Power Act, section 215(a)(4).[177]

This standard is highly deferential on its face: it does not require utilities to choose the best or most agreeable options;[178] and it does not overturn mistaken decisions based on erroneous

[176] *See supra* Part III.A.

[177] Tariff § 1; OA § 1.

[178] *See Tenaska Clear Creek Wind, LLC*, 182 FERC ¶ 61,084, at P 41 (2023) ("[E]ven if Tenaska is correct that a less expensive alternative existed, Good Utility Practice affords SPP discretion in selecting among alternatives, and SPP was not obligated to adopt it under the terms of its Tariff."); *Sierra Pac. Power Co.*, 106 FERC ¶ 61,155, at P 23 (2004) ("[W]hile it is certainly preferable for utilities to reach agreement, the absence of agreement by itself does not constitute a violation of good utility practice."); *Metzenbaum v. Columbia Gas Transmission Corp*., 4 FERC ¶ 61,277 (1978) (agreeing "that courts in passing upon discretionary action should endeavor to put themselves in the position of the actors in the transaction, and not be ready to find that the course actually pursued was blameworthy because the results were unfortunate").

information.[179] Commission precedent also confirms that system operators are accorded especially broad flexibility under the Good Utility Practice standard when making decisions in emergency conditions.[180]

2. The Good Utility Practice Standard's and the Commission's Prudence Doctrine Require Past Decisions to be Reviewed "in light of the facts known at the time the decision was made"

A core feature of the Good Utility Practice standard is the requirement that past decisions are evaluated only "in light of the facts known at the time the decision was made."[181] The

[179] *See Midwest Indep. Transmission Sys. Operator, Inc.*, 143 FERC ¶ 61,050, at P 44 (2013) (finding that "an error [in certain calculations required by the tariff] does not, by itself, demonstrate a violation of Good Utility Practice").

[180] *See, e.g.*, *Midcontinent Indep. Sys. Operator, Inc*., 164 FERC ¶ 61,129, at P 37 (2018) ("We find that it is appropriate for MISO to have discretion to respond to operational circumstances related to reliability concerns."); *Big Sandy Peaker Plant, LLC*, 154 FERC ¶ 61,216, at P 50 (2016) ("The Commission has recognized that it may be appropriate to provide operational and reliability-related discretion to independent system operators, and to not second-guess their decisions [to deselect a generator]."); *Cal. Indep. Sys. Operator Corp.*, 139 FERC ¶ 61,207, at PP 48-50 (2012) (finding good cause for *post hoc* waiver of CAISO tariff restrictions inconsistent with actions taken during an emergency where (1) "[t]he Commission believes that CAISO, in this emergency situation, took the actions it believed were necessary in order to ensure the reliability of the grid" and that (2) "CAISO set prices it thought necessary to encourage generation to be available to prevent the blackout from spreading further and to restore power in the SDG&E area as quickly as possible."); *N. Nat. Gas Co*., 103 FERC ¶ 61,083, at P 14 (2003) ("The Commission gives pipelines much discretion regarding when and how they respond to system emergencies."); *Equitrans, Inc*., 65 FERC ¶ 61,132, at P 4 (1993) ("[W]e have traditionally allowed pipelines considerable discretion in managing operational emergencies that threaten the integrity of the system."); *Re Consol. Gas Supply Corp*., 2 P.U.R.4th 202 (1973) ("We find that there was an emergency, and that what management did under the circumstances was reasonable."); *Mun. Light Bds. v. Bos. Edison Co.,* 53 F.P.C. 1545, 1565 (1975) ("Since emergencies usually allow no time for consultation or debate the judgment must be made by the electric utility involved. The judgment, however, must be one which a reasonable man acting in good faith might have made under the circumstances then known and within the time which appeared to be available for action."), *aff'd sub nom. Towns of Norwood v. F.P.C*., 546 F.2d 1036 (D.C. Cir. 1976).

[181] Tariff § 1 (defining Good utility Practice); OA § 1 (same); s*ee, e.g.*, *Salt Creek Solar, LLC*, 180 FERC ¶ 61,116, at P 68 (2022) ("The Tariff's definition of Good Utility Practice affords SPP discretion to exercise reasonable judgment in light of the facts known at the time it makes a business decision.").

Commission's application of this principle is particularly strong in the context of prudence review, which is essentially what the Complaint demands. The Commission's prudence decisions underscore that it is inappropriate to second guess past decisions with the advantage of perfect hindsight.[182] Complainants ignore this constraint by attempting to demonstrate, after the fact, that PJM could have navigated the Winter Storm Elliott emergency in a different way that might have allowed them to avoid Non-Performance charges. However, the potential for alternate outcomes is simply irrelevant under the Good Utility Practice standard.

PJM took timely and necessary actions to address volatile and extreme conditions during Winter Storm Elliott. The reasonableness of PJM's actions must be evaluated in light of what was known at the time the decisions were made and not based upon a *post hoc* determination of what PJM might have decided had its operators possessed perfect knowledge and an extended period to deliberate. As Mr. Naumann explains:

> The ComEd Zone Generators argue that PJM did not operate in a reasonable manner based on their own *post hoc* economic analysis months after Winter Storm Elliott has passed. The essence of their argument is that, because not enough bad things actually happened, the actions of PJM's operators to be prepared for

[182] *See, e.g.*, *Pac. Gas & Elec. Co.,* 173 FERC ¶ 61,045, at P 179 (2020) (citation omitted) ("Even if a decision turns out to be incorrect in hindsight, the Commission's task is to review the prudence of a utility's actions and the costs resulting from the particular circumstances existing either at the time the costs were incurred or when the utility became committed to incur those expenses."); *J. William Foley Inc. v. United Illuminating Co.*, 142 FERC ¶ 61,125, at P 19 (2013) (quoting *New Eng. Power Co.*, 31 FERC ¶ 61,047, at 61,084 (1985)), *aff'd sub nom. Violet v. FERC*, 800 F.2d 280 (1st Cir. 1986)) ("Foley fails to provide any evidence bearing upon the prudence (or imprudence) of any specific costs . . ., such as whether they were 'costs which a reasonable utility management . . . would have made, in good faith, under the same circumstances, and at the relevant point in time.' . . . Foley must do more than, in hindsight, second-guess utility management decisions based on the resulting costs."); *Ind. Mun. Power Agency v. FERC*, 56 F.3d 247, 289 (D.C. Cir. 1995) (citing *Ohio Power Co.*, 39 FERC ¶ 61,098 (1987)) ("The Commission has long used its prudence and market rate tests to enforce the just and reasonable provision of section 205 . . . ."); *New Eng. Power Co.*, 31 FERC ¶ 61,047, at 61,086 (granting full cost recovery for terminated nuclear generation project because utility prudently considered, among other things, the best interests of its customers at that time to reduce dependence on imported oil during an oil shortage).

> foreseeable contingencies were not only wrong, but also a violation of PJM's tariffs and manuals. This type of *post hoc* economic analyses and other varieties of "Monday morning quarterbacking" are irrelevant to the question of whether operators acted reasonably and in accordance with Good Utility practice with the knowledge they had at the time they had to make decisions. While post event analyses are useful to better understand the event, and can be used to improve rules and processes going forward, they cannot upset real-time decisions.[183]

In short, Complainants fail to meet the standard of review because it is not enough for them to point to information that operators might have weighed differently, or to devise an alternative set of actions or dispatch decisions that might have addressed an emergency situation more efficiently. Even if those arguments had merit—and they do not—they are simply not relevant under Good Utility Practice or prudence review.

3. The Tariff, Operating Agreement, and Manuals Expressly Provide PJM With Enhanced Flexibility to Respond to Emergencies

The Operating Agreement affords PJM an extraordinary degree of operational flexibility to manage Emergencies.[184] Section 1.7.11 grants PJM the exclusive responsibility "for declaring the existence of an Emergency, and for directing the operations of Market Participants as necessary to manage, alleviate or end an Emergency," and it further instructs that PJM's directives "shall be binding on all Market Participants until [PJM] announces that the actual or threatened Emergency no longer exists." [185] Section 1.7.15 similarly provides that "[c]onsistent with Good Utility

[183] Naumann Aff., Ex. PMG-007 at P 29 (citations omitted).

[184] The Operating Agreement defines an "Emergency" as "(i) an abnormal system condition requiring manual or automatic action to maintain system frequency, or to prevent loss of firm load, equipment damage, or tripping of system elements that could adversely affect the reliability of an electric system or the safety of persons or property; or (ii) a fuel shortage requiring departure from normal operating procedures in order to minimize the use of such scarce fuel; or (iii) a condition that requires implementation of emergency procedures as defined in the PJM Manuals." OA § 1.

[185] OA, Sch. 1, § 1.7.11; *see id.* (stating that PJM's actions during Emergencies "shall be carried out in accordance with this [Operating] Agreement, the NERC Operating Policies,

Practice, [PJM] shall be authorized to direct or coordinate corrective action, whether or not specified in the PJM Manuals, as necessary to alleviate unusual conditions that threaten the integrity or reliability of the PJM Region, or the regional power system."[186] Moreover, the Commission has specifically held that "PJM, as the independent transmission operator, needs to have discretion to dispatch resources as necessary to meet load and ensure reliability depending on the circumstances affecting the grid at a particular point in time."[187]

Moreover, Manual 13, the principal source for PJM's emergency procedures, advises that "[t]he policy of PJM is to maintain, at all times, the integrity of the PJM RTO transmission systems *and the Eastern Interconnection* and to *give maximum reasonable assistance to adjacent systems when a disturbance that is external to the PJM RTO occurs*."[188] Manual 13 section 2.3.2 thus provides that PJM must be able "tak[e] actions it determines are consistent with Good Utility Practice and are necessary to maintain the operational integrity of the PJM RTO *and the Eastern Interconnection*."[189] Manual 13 vests with PJM the responsibility for "[d]eclaring an emergency exists or ceases to exist,"[190] and it expressly preserves PJM's broad operational flexibility during emergencies, including the ability to modify or skip the sequence of emergency procedures as necessary to address emergency situations.[191]

Applicable Regional Entity reliability principles and standards, *Good Utility Practice*, and the PJM Manuals") (emphasis added).

[186] OA, Attach. K-App'x, § 1.7.15.

[187] *PPL EnergyPlus*, 117 FERC ¶ 61,338, at P 33; *see supra* Part II.B (detailing this precedent).

[188] Manual 13, § 1.1 (Policy Statements) (emphasis added).

[189] *Id.* § 2.3.2 (emphasis added).

[190] *Id.*

[191] *See id.* § 2.3.2 (Real-Time Emergency Procedures (Warnings and Actions)) (noting that "[d]ue to system conditions and the time required to obtain results, PJM dispatchers may find it necessary to vary the order of application" of measures outlined in Manual 13 "to achieve the best

The Complaint concedes, as it must, that the "PJM Tariff, OA, and Manual 13 permit PJM to take *operational* Emergency Actions in cases of emergency."[192] However, while conceding that "PJM has operational discretion," the Complaint argues that PJM "does not have discretion to simply violate the terms of its Tariff in administering the penalty provisions."[193] PJM agrees, of course, that the Tariff does not authorize violations of itself. But the Complaint alleges violations of specific language in Manual 13 and, as PJM has already explained, Operating Agreement section 1.7.15 clearly states that PJM "shall be authorized to direct or coordinate corrective action, *whether or not specified in the PJM Manuals*, as necessary" to manage emergencies.[194]

4. Complainants' Misplaced Reliance on FPA Section 206 Does Not Evade the Constraints of the Good Utility Practice Standard or PJM's Authority Under the Tariff and Operating Agreement

Complainants admit that the Commission could find that "PJM has discretion to administer certain Tariff provisions," but they insist that FPA section 206 requires consideration of the economic consequences of reliability decisions. Specifically, they claim that "[t]o the extent the Commission finds that PJM has discretion to administer certain Tariff provisions, it has to exercise such discretion in a manner that is reasonable and leads to just and reasonable results."[195] That

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overall system reliability"); *id.* ("The Real-Time Emergency Procedures section combines Warnings and Actions in their most probable sequence based on notification requirements during extreme peak conditions. Depending on the severity of the capacity deficiency, it is unlikely that some Steps would be implemented.").

[192] Complaint at 19.

[193] *Id.* at 20.

[194] OA, Attach. K-App'x, § 1.7.15 (emphasis added).

[195] *See* Complaint at 20. The *Astoria* case Complainants cite is inapposite. *See* Complaint at 6 n.10 (citing *Astoria Generating Co., L.P. v. N.Y. Indep. Sys. Operator, Inc.*, 151 FERC ¶ 61,044, at P 30 (*Astoria*), *reh'g denied*, 153 FERC ¶ 61,274 (2015)). *Astoria* held that NYISO had not properly followed certain provisions of NYISO's version of capacity market Minimum Offer Price Rules. Those provisions prescribed how NYISO was to conduct analyses of whether potential new entrants into the NYISO-administered capacity market would have the ability to prospectively exercise buyer-side market power. The dispute had nothing to do with real-time

theory is a straightforward invitation to violate the filed rate doctrine and the rule against retroactive ratemaking.[196]

PJM is not infallible and is not suggesting that emergency operating decisions may never be challenged. But, consistent with the broad discretion PJM has to manage emergencies under the Good Utility Practice standard, the Operating Agreement and Attachment DD also grant PJM broad discretion to declare and manage Emergencies with binding effect on Market Participants. The Complaint does not even attempt to make the kind of evidentiary showing required to challenge PJM's actions during Winter Storm Elliott on Good Utility Practice or prudence grounds.

Complainants warn of the supposed dangers of deferring to PJM's operational decisions.[197] Dr. Harvey says that "[i]f [the Commission] finds that PJM has the discretion to declare a performance event in order to maintain a higher level of reserves, then there will be almost no limits on PJM's discretion and large unmanageable risks for market participants."[198] The Commission should disregard Complainants' false alarm because PJM's operational discretion is subject to review under the Good Utility Practice standard as informed by prudence principles. Showing reasonable deference to PJM does not mean that it is subject to "almost no limits."

Dr. Harvey also frames the issue inaccurately. PJM does not seek new authority to "declare a performance event in order to maintain a higher level of reserves." PJM is simply defending the discretion that it, and other utility operators, traditionally have had to make real-time operational

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operations or with reliability. *Astoria* therefore provides no support for Complainants' attempt to second guess valid operational decisions made in the midst of a major emergency.

[196] *See supra* Part III.B.

[197] Complaint at 21.

[198] Harvey Aff., Ex. CZG-0001, at P 85.

decisions without worrying about contrived *post hoc* challenges. If those reliability decisions trigger PAIs, that is a function of a Capacity Performance regime that Complainants knew beforehand was in place and a part of the filed rate.

5. Declining to Afford System Operators Appropriate Deference Under the Good Utility Practice Standard Would Undermine Public Policy

It would undermine public policy to enable Capacity Performance Resources to concoct *post hoc* objections to PJM's real-time emergency management decisions without regard for the Good Utility Practice standard or PJM's explicit authority under the Tariff and Operating Agreement. Capacity Resources would be encouraged to under-perform if they thought that future litigation presented a too-easy avenue to evade Non-Performance Charges. Making the prospect of bonus payments for over-performance less probable would likewise discourage over-performance. Creating these kinds of incentives would be particularly problematic when operators are seeking to optimize available resources to harmonize potentially competing goals such as serving internal load while providing assistance to neighboring areas experiencing difficulties – a situation faced by PJM's operators during Winter Storm Elliott. The Commission should avoid these outcomes by following its precedent and denying the Complaint.

B. PJM's Emergency Actions—Including Its Load Management Decisions and Support to Neighboring Systems in Distress—Complied with the Tariff, Operating Agreement, NERC Requirements, Manuals, and Good Utility Practice

PJM is required under the Tariff, Operating Agreement, Manual 37, Manual 13, NERC reliability standards, and agreements with other Balancing Authorities to provide emergency assistance to neighboring regions when possible.[199] PJM met these obligations and satisfied Good Utility Practice by "help[ing] adjacent Balancing Areas to the extent feasible without shedding

[199] *See* Bryson Aff. at PP 7-19.

load in PJM."[200] If PJM had done otherwise it would have been acting contrary to such requirements and contrary to how PJM operators are trained to act in emergency situations. In the face of an uncertain load forecast and "shockingly poor" generator performance, PJM operators appropriately took pre-emergency and emergency actions and avoided "risking that PJM could avoid load-shedding by curtailing non-firm exports."[201] As Mr. Bryson explains, "PJM prioritized meeting its own load when by cutting exports—both firm and non-firm—when necessary."[202] But "once PJM had sufficient capacity to provide assistance to other Balancing Areas, it was obligated to do so."[203] For example, after the morning peak on December 24, 2022, "PJM took pre-emergency and emergency actions to meet its own needs, which created more capacity than it needed on a minute-by-minute basis, and it supplied some of that capacity to other areas that needed it through non-firm exports (as well as firm exports and emergency sales)."[204] On both December 23 and 24, 2022, even if PJM had curtailed all non-firm exports, pre-emergency and emergency actions would still have been necessary.[205]

The Complaint nonetheless alleges PJM did not follow all required "prerequisites" before taking the Emergency Actions that triggered PAIs.[206] Specifically, Complainants reference section 2.3.2 of Manual 13, which indicates that PJM's normal procedure will be to "curtail all non-firm exports" prior to entering into capacity related Emergency Procedure.[207] They also invoke section

[200] *Id.* P 19.

[201] *Id.* P 20.

[202] *Id.* P 23.

[203] *Id.* P 30.

[204] *Id.* P 29.

[205] *Id.* PP 21, 22.

[206] Complaint at 1.

[207] *See id.* at 21; *see also id.* at 3, 4, 5, 16, 23.

2.3.2 for the proposition that "PJM RTO Load Management Reductions are not to be used to provide assistance to adjacent Control Areas" and contend that PJM was inappropriately "calling Pre-Emergency and Emergency Load Management Reduction Actions during Winter Storm Elliott during periods when PJM was a net exporter, especially to TVA/SERC."[208] In the same vein, Complainants suggest that section 2.5 "reiterates" section 2.3.2 by specifying that "PJM load management programs are not to be used to provide assistance to adjacent Balancing Areas."[209] Dr. Harvey and Dr. Sotkiewicz devote substantial attention to confirming the existence of certain exports, deducing whether other exports were allowed to flow during Winter Storm Elliott, and suggesting that PJM improperly initiated Load Reductions to support such exports.

As discussed below, and in the McGlynn, Bryson, and Naumann Affidavits, PJM had ample authority to allow non-firm exports during Winter Storm Elliott when PJM believed it could assist neighboring systems without jeopardizing PJM. In addition, PJM "did not initiate Load Management procedures for the purpose of assisting other regions and thus was not constrained from providing exports regions experiencing or attempting to avoid capacity deficient conditions."[210] PJM committed no Manual 13, Tariff, or Operating Agreement violations.

1. PJM's Decisions to Support Neighboring Systems in Distress When Feasible Complied With the Tariff, Operating Agreement, NERC Requirements, Manual 13, and Good Utility Practice

a. Manual 13 Does Not and Cannot Prohibit Exports to Neighboring Systems During Emergencies

Complainants assert that Manual 13 section 2.3.2 prohibits PJM from declaring emergency actions without first terminating all exports from PJM to neighboring Balancing Authorities. That

[208] *See id.* at 27-28.

[209] *Id.* at 15.

[210] Bryson Aff. at P 6.

claim has no merit. Manual 13 does not and cannot prohibit exports to neighboring systems during emergencies. As discussed *supra* at Part IV.**Error! Reference source not found.** and in multiple PJM Exhibits,[211] Manual 13 is replete with statements confirming that operators have broad discretion to deviate from the Manual 13 procedure when necessary to preserve reliability. Complainants overlook that language and focus solely on isolated excerpts to offer an interpretation of Manual 13 that imposes binding prerequisites on PJM's operational flexibility. The Commission must reject this attempt to handcuff PJM's operational flexibility during emergencies.

Manual 13 unambiguously recognizes that reliability is PJM's paramount obligation. Section 1.1 of Manual 13 begins by declaring that "the policy of PJM is to maintain, at all times, the integrity of the PJM RTO transmission systems and the Eastern Interconnection and to give maximum reasonable assistance to adjacent systems when a disturbance that is external to the PJM RTO occurs."[212] PJM must take actions "it determines are consistent with Good Utility Practice and are necessary to maintain the operational integrity of the PJM RTO and the Eastern Interconnection."[213]

Manual 13 states that "[t]he PJM Manuals are the instructions, rules, procedures, and guidelines established by PJM for the operation, planning, and accounting requirements of PJM and the PJM Energy Market."[214] Manual 13 refers to "expected" behaviors, not compulsory conduct, and it affirms that "PJM dispatchers have the flexibility of implementing the emergency procedures in whatever order is required to ensure overall system reliability. PJM dispatchers have

[211] *See id.* P 17; Naumann Aff. PP 14-15.

[212] Manual 13, § 1.1.

[213] *Id.*

[214] *Id.* at 9.

the flexibility to exit the emergency procedures in a different order than they are implemented when conditions necessitate."[215]

Similarly, section 2.3.2, which addresses "Real-Time Emergency Procedures (Warnings and Actions)," preserves PJM's operational flexibility during emergencies. Section 2.3.2 provides that "[d]ue to system conditions and the time required to obtain results, PJM dispatchers may find it necessary to vary the order of application [of Warnings and Actions in real time] to achieve the best overall system reliability."[216] PJM can therefore "deviate from or change the order of the above actions [pertaining to Maximum Generation Emergency Action] as/if necessary."[217] A specially highlighted "Note" in section 2.3.2 emphasizes that "[t]he Real-Time Emergency Procedures section combines Warnings and Actions in their most probable sequence based on notification requirements during extreme peak conditions. Depending on the severity of the capacity deficiency, it is unlikely that some Steps would be implemented."[218]

In addition, Manual 13 repeatedly states that, "[a] NERC EEA2 is issued when the following has occurred: Public appeals to reduce demand, voltage reduction, interruption of non-firm load in accordance with applicable contracts, demand side management/active load management, *or* utility load conservation measures."[219] PJM Michael Bryson attests that this

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[215] *Id.* § 2.3.

[216] *Id.* § 2.3.2.

[217] *Id.*

[218] *Id*.

[219] Manual 13, § 2.3.2 (Step 2 - Emergency Load Management Reduction Action) at 30 (emphasis added); *id*. (Step 7 - Deploy All Resources) at 37; *id*. (Step 9 - Voltage Reduction Action) at 40; *id*. § 2.5 (Transmission Security Emergency Procedures) (Step 2 - Emergency Load Management Reduction Action) at 90; *id*. (Step 7 - Deploy All Resources) at 98; *id*. (Step 9 - Voltage Reduction Action) at 100 (emphasis added); *see also id.* § 2.3.2 (Step 2 - Emergency Load Management Reduction Action) (Note 4, EEA Levels) at 30 (stating that a NEARC EEA2 "may

language in particular must mean that Manual 13 "does not mandate that Maximum Generation Emergency Action or a Pre-Emergency/Emergency Load Management Reduction Action may be taken only when all non-firm exports are curtailed."[220] He adds that section 2.3.2 has a specific procedure for determining whether to cut transactions to other Balancing Authorities if PJM has declared a Maximum Emergency Action. This provision gives such transactions a priority almost as high as native load which, contrary to Complainants' reading, must mean that "there cannot be a mandatory requirement that PJM must cut all non-firm exports before taking an Emergency Action."[221]

As for cold weather events, Manual 13 advises that "PJM confers with generator owners [during Cold Weather Alerts] and if appropriate, directs them to call in or schedule personnel in sufficient time to ensure that all combustion turbines and diesel generators that are expected to operate are started and available for loading when needed for the morning pick up."[222] Other PJM Manuals likewise reflect the broad range of PJM's discretion to take appropriate actions during emergencies. PJM Manual 37 states that "PJM Members are responsible for . . . [t]aking any action, as requested or directed by PJM, to manage, alleviate, or end an Emergency or other reliability issue."[223]

Complainant witnesses Dr. Harvey and Dr. Sotkiewiecz also assert that NERC reliability standard EOP-011-1 provides an independent basis for denying PJM needed operational flexibility

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be issued," rather than "is issued"); *id*. § 2.5 (Transmission Security Emergency Procedures) (Note 4, EEA Levels) at 91 (same).

[220] Bryson Aff. at P 14.

[221] Bryson Aff. at P 15.

[222] Manual 13, § 3.3.2 (Cold Weather Alert).

[223] PJM Manual 37: Reliability Coordination (Mar. 23, 2022), https://www.pjm.com/-/media/documents/manuals/archive/m37/m37v19-reliability-coordination-03-23-2022.ashx

during emergencies.[224] Mr. Bryson explains why this argument is misplaced.[225] It is true that EOP-011-1 provides that curtailing "[n]on-firm wholesale energy sales (other than those that are recallable to meet reserve requirements)" may be a typical step before declaring an EEA-1 alert. However, EOP-011-1 also specifies that "[t]he Reliability Coordinator may declare whatever alert level is necessary, and need not proceed through the alerts sequentially." Therefore, declaring an EEA-1 alert is not a prerequisite for declaring an EEA-2 event such the Maximum Generation Emergency Actions or the Pre-Emergency Load Management Reduction Actions that triggered PAIs during Winter Storm Elliott.

Mr. Bryson identifies another flaw in Dr. Sotkiewicz's attempt to treat the guidance provided by EOP-011-1 as a "mindless mandate."[226] Dr. Sotkiewicz interprets "the reference to curtailing non-firm load prior to declaring an EEA-1 alert in Attachment 1-EOP-011-1, to mean that non-firm load should be curtailed when the operators have a reasonable expectation that doing so will address the emergency or potential emergency."[227]

Given the foregoing, there is no plausible way to read Manual 13 or EOP-011-1 as making the recall of all non-firm exports a binding "prerequisite" of calling a Maximum Generation

[224] *See* Sotkiewicz Aff. at P 4. Dr. Sotkiewicz's expertise concerns economics, not utility operations. He likewise is not, and does not claim to be, a legal expert. Consequently, his professed "expert opinion" concerning the interpretation of the Operating Agreement at P 101 of his affidavit should not be treated as expert testimony. *See, e.g.*, *Entergy Servs., Inc.*, 128 FERC ¶ 63,015 at P 12 (2009) (Silverstein, ALJ) (noting that "a witness's testimony is limited to factual statements and expert opinion based on those facts" and that "legal arguments . . . are not considered to be evidence").

[225] Bryson Aff. at PP 16-17.

[226] Bryson Aff. at P 17. As Mr. Bryson explains, "Complainants insistence that it is a strict rule regardless of its impact is unreasonable." *Id.*

[227] *Id*.

Emergency Action or a Pre-Emergency or Emergency Load Management Reduction Action. As Mr. Bryson states,

> Complainants' assertions misstate the terms of the controlling documents, misrepresent or misunderstand the relevant facts, and ignore mutual assistance policies established by this Commission and [NERC]. Specifically, Complainants misread the Tariff, OA, and Manual 13 to impose irrational and counter-productive constraints on emergency operations that are entirely alien to my understanding of those documents and contrary to the manner our operators are trained to respond in emergency conditions.[228]

Or, as the Affidavit of Paul McGlynn states, "I also feel certain that if [Complainants'] restrictive and unrealistic interpretation of Manual 13 was adopted it would seriously inhibit PJM operators' ability to keep the lights on."[229]

There are good and obvious reasons for the Tariff, Operating Agreement, and Manual 13 to give PJM broad flexibility during emergencies. As Mr. Naumann explains, preserving reliability can be extremely challenging "when system operators face severe conditions, especially where decisions need to be made within a short period of time and circumstances are rapidly changing."[230] It therefore, "should be no surprise that operators may take actions in real-time to address difficult problems that others may question after the fact as being overly conservative or uneconomic."[231] That is exactly what Complainants seek to do here. But it is critical to remember that during emergencies, "delaying actions can result in unnecessary loss of load" and it is vitally "important for operators to be proactive—i.e., stay ahead of potential problems, not reactive after problems occur—to ensure reliability, especially during periods of severe stress."[232] Simply

[228] *Id.* P 6.

[229] McGlynn Aff. at P 28.

[230] Naumann Aff. at P 6.

[231] *Id*.

[232] *Id*.

stated, "operators have to make decisions based on current conditions, expected conditions, and the uncertainty of various elements of the system with an eye to preventing loss of load. They must have flexibility."[233] Manual 13 expressly provides PJM with this flexibility. The Commission should reject Complainants' attempt to radically re-interpret Manual 13 to take PJM's flexibility away.

Finally, Complainants anticipate PJM will rely on Manual 13 language stating that if the "net result of cutting off-system capacity sales would put the Sink Balancing Authority into load shed then PJM will not curtail the transactions unless it would prevent load shedding in PJM."[234] Complainants argue this provision is inapplicable because it somehow conflicts with section 1.10.6(c) of Schedule 1 of the Operating Agreement, which provides that PJM "shall curtail deliveries to an External Market Buyer if necessary to maintain appropriate reserve levels for a Control Zone as defined in the PJM Manuals, or to avoid shedding load in such Control Zone."[235]

Complainants again ignore that the Tariff, the Operating Agreement, and Manual 13 establish a framework of guidelines to inform operators confronting emergencies. That framework does not impose absolute prescriptions that deprive operators of the flexibility to address emergencies by, for example, prohibiting PJM from assisting a neighbor on the brink of shedding load solely because of concerns about reserve levels in PJM.

This flexibility is reflected in the fact that section 1.10.1(d) describes the content of section 1.10 as a set of "scheduling procedures and principles." Flexibility is further embedded in section 1.10.6(c), which empowers PJM to determine what constitutes "appropriate reserve levels" during

[233] *Id.* P 15.

[234] Complaint at 30 (citing Manual 13, § 2.3.2).

[235] *Id.*; *see also* Sotkiewicz Aff., Ex. CZG-0004, at P 100.

an emergency with reference to the PJM Manuals. Reserve levels are addressed in Manual 13 which, as described above, does not contain absolute requirements. Consequently, Dr. Sotkiewicz misses the mark in arguing PJM violated section 1.10.6(c) because it "allowed reserves levels fall [sic] below their requirements RTO-wide and within the Mid-Atlantic-Dominion ('MAD') reserve sub-zone frequently while supporting exports."[236]

In fact, PJM exercised its discretion to let reserve levels fall below normal requirements for a series of relatively brief periods in order to help struggling neighbors. PJM maintained what it believed were appropriate reserve levels at all times and did not support exports to neighbors when its operators judged that doing so would threaten PJM's ability "to avoid shedding load" within PJM.

b. NERC Reliability Standards Require PJM to Assist Neighboring Systems in Emergencies When it Can Do So

It is not mere charity for neighboring systems to help each other during emergencies. Assistance by neighboring grid operators provides mutual benefits to consumers within interconnected control areas. This is a primary benefit of pooled and interconnected utility operations. As Mr. Bryson states, "[i]t would waste the Eastern Interconnection's capabilities to accept the Complainants' artificial, needlessly formalistic, and counter-productive constraints on providing mutual assistance."[237]

Moreover, assisting neighbors is not simply good policy or an honored industry tradition. In many instances, including this case, assistance *must* be provided to a neighbor facing load shedding whenever possible without causing load shedding in the assisting region.[238] Specifically,

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[236] *Id.* P 100; *see also id.* at PP 101-115.

[237] Bryson Aff. at P 6.

[238] *See* Naumann Aff. at P 25.

as a NERC-registered Reliability Coordinator, PJM is legally required by Reliability Standard IRO-014-3 to assist neighboring Reliability Coordinators that request help after implementing their emergency procedures. Reliability Standard IRO-014-3, R7 mandates that "[e]ach Reliability Coordinator *shall* assist Reliability Coordinators, if requested and able, provided that the requesting Reliability Coordinator has implemented its emergency procedures, unless such actions cannot be physically implemented or would violate safety, equipment, regulatory, or statutory requirements."[239] By its own terms, IRO-014-3 explicitly designates a failure to comply with R7 as a "High" Violation Risk Factor, and a "Severe" Violation Severity Level, indicating the extraordinary importance of strict compliance and the extraordinary risk of non-compliance.[240]

Furthermore, when reviewing compliance with IRO-014-3, R7, the applicable Reliability Standard Audit Worksheet (RSAW) specifies that the Compliance Enforcement Authority must "verify the entity provided such assistance," and "[i]f assistance was available and not provided, review evidence to verify that such actions could not be physically implemented or would violate safety, equipment, regulatory, or statutory requirements."[241] Separate and apart from its requirements as a Reliability Coordinator, PJM is also a NERC-registered Transmission Operator, and independently bound by an identical requirement to assist fellow TOPs within its Reliability Coordinator Area under TOP-001-5, R7. PJM's Tariff and Operating Agreement also incorporate mutual assistance principles. The Tariff establishes that PJM "shall . . . [a]dminister . . . agreements for the transfer of energy in conditions constituting an Emergency in the PJM Region or in an

[239] NERC Standard IRO-014-3 – Coordination Among Reliability Coordinators, https://www.nerc.com/pa/Stand/Technical%20Rationale%20fro%20Reliability%20Standards/IRO-014-3.pdf (emphasis added).

[240] *Id.*

[241] *Id*.

interconnected Control Area, and the mutual provision of other support in such Emergency conditions with other interconnected Control Areas . . . ."[242] Further, the Operating Agreement specifies that PJM "shall . . . [c]oordinate the curtailment or shedding of load, or other measures appropriate to alleviate an Emergency, in order to preserve reliability in accordance with NERC, or Applicable Regional Entity principles, guidelines and standards, and to ensure the operation of the PJM Region in accordance with Good Utility Practice and this Agreement."[243] Additional mutual assistance provisions are set forth in PJM's coordination agreements with its neighbors and in Manual 13 itself.[244]

In short, Complainants' interpretation of Manual 13 section 2.3.2 is not just contrary to multiple provisions of Manual 13, the Tariff, and the Operating Agreement. Their interpretation is also inconsistent with mandatory and enforceable NERC reliability standards and with Tariff and Operating Agreement requirements. As Mr. Naumann says, "the standard is clear – help your neighbors if you can without endangering your system."[245] That is yet another reason for the Commission not to accept Complainants' interpretation.

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[242] Tariff § 1.6.2.

[243] OA, Sch. 1, § 1.6.2.

[244] *See* Bryson Aff. at PP 10-12.

[245] Naumann Aff. at P 25; *see also id.* P 18 ("Dr. Sotkiewicz's analogy to the airline safety instruction concerning putting on your mask before helping others is incorrect. PJM operators did in-fact keep the PJM system reliable and helped keep their neighbors reliable. Furthermore, to the extent reserve levels in PJM were below what Dr. Sotkiewicz believes were required, PJM temporarily shared the oxygen in their masks with their neighbors when it was safe to do so, rather than allowing them to pass out.") (citing Sotkiewicz Aff., Ex. CZG-0004, at PP 123-24)).

c. Complainants Wrongly Assert the Balancing Ratio Formula Shows that Non-Performance Charges were Not Contemplated for Periods in Which PJM is a Net Exporter

Complainants wrongly claim that the formula in the Tariff for the Balancing Ratio shows that Non-Performance Charges were not contemplated when PJM is a net exporter of power to other regions. Complainants base this misguided assertion on the fact that the Balancing Ratio includes Net Energy Imports and that the "Net Energy Imports" definition states that the value used in the calculation shall be "not less than zero,"[246] *i.e.*, net *exports* are not included.

The language Complainants rely on merely reflects the self-evident fact that it would not make sense for PJM generators to be assessed Non-Performance Charges related to incidental support provided to other regions during an emergency given that the goal of the Capacity Performance mechanism is to provide sufficient capacity for PJM. Understood properly in this light, the referenced Tariff language simply serves an accounting function. The exclusion of net exports from the Balancing Ratio reflects that the nominator of the Balancing Ratio should be based on production supporting PJM. As PJM explained in the transmittal letter submitted in the Capacity Performance docket:

> For the hourly load and reserves part of this calculation, PJM will simply look at the energy output of all generation and storage resources that are satisfying that need for energy and reserves in that hour, plus all imports (which also help meet that need), and plus any net over-performance by Demand Resources (which reduces the energy and reserve *PJM requires from generators and storage resources*.").[247]

Net energy exports do not support what "PJM requires from generators and storage resources." Therefore, as an accounting matter, they should not be included in the Balancing Ratio.

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[246] Complaint at 29 (quoting Tariff, Attach. DD, § 10A(c)).

[247] *See PJM Interconnection, L.L.C*, Docket No. ER15-623-000, Transmittal Letter at 50, n.140 (Dec.12, 2014) (emphasis added).

Moreover, the Tariff provision Complainants rely on itself supports this interpretation. It provides: "Net Energy Imports = the sum of interchange transactions importing energy into PJM (not including those associated with external Generation Capacity Resources and therefore included in All Actual Generation Performance) minus the sum of *interchange transactions exporting energy out of PJM*, but not less than zero."[248] This undermines Complainants' claim that "PJM assumed that during PAIs in which PJM assesses penalties for non-performance, PJM would be a net exporter because Net Energy Imports would not be negative."[249] The provision shows that "interchange transactions exporting energy out of PJM" were contemplated during emergencies. Accepting Complainants' cribbed reading would mean that PJM could call an emergency when PJM was a net importer but, if during the emergency, ongoing exports (which are expressly contemplated) increased so that PJM became a *net* exporter the emergency would automatically dissolve. That is an absurd reading of the Tariff.

Ultimately, Complainants read too much into five words in the Tariff. If the Tariff intended that there could not be an emergency whenever PJM was a net exporter—or slipped into becoming one after an emergency was called—it would have said so expressly. The only reasonable reading of the provision is that it performs an accounting function.

d. Granting Complainant's Arguments Would Have a Chilling Effect on the Provision of Mutual Support

The Commission should also be wary of the policy implications of Complainant's request. Mutual support has been a bedrock of electric utility operations since the industry started. Good faith efforts to provide support to neighbors in distress will inevitably be chilled if system operators face the spectre of depositions and cross-examination whenever they provide such mutual support.

[248] Tariff, Attach. DD, § 10A(c).

[249] Complaint at 29-30.

2. PJM's Decisions regarding Load Management Reductions Complied with the Tariff, Manuals, NERC Requirements, and Good Utility Practice

Mr. Bryson thoroughly disposes of Complainants' assertion that PJM violated section 2.5 by allowing non-firm exports after it had implemented Load Management Actions.[250] Section 2.5 prevents PJM from calling Load Management Actions for the purpose of providing assistance to another region. PJM's actions during Winter Storm Elliot were never inconsistent with section 2.5 because PJM called Load Management Actions *because PJM itself* needed them to address its own needs. Even if the Load Management Actions had the incidental effect of facilitating some non-firm exports when PJM was experiencing emergency conditions, the Manual 13 guidance not to initiate Load Management Actions for the purpose of assisting other regions simply was not implicated during Winter Storm Elliott.[251] Mr. Bryson also explains that Complainants ignore that PJM has "added flexibility to dispatch . . . resources [that qualify for the Pre-Emergency Load Reduction Program] in response to system conditions, *without* the added step of declaring a system emergency."[252]

In fact, if Complainants' interpretation was adopted, PJM could effectively never provide any form of emergency assistance to neighboring systems if PJM previously called for Load Management Actions. Nothing in Section 2.5 of Manual 13 would limit the (claimed) prohibition of providing assistance to other regions after initiating Load Management Actions to non-firm exports. As Mr. Bryson warns, "[g]iven that PJM would be expected to call for Load Management Action during any capacity shortage (including during pre-emergency conditions) PJM would be

[250] Bryson Aff. at PP 33-36.

[251] *See id.* P 35.

[252] *Id.* P 37; *see also PJM Interconnection, L.L.C.*, 147 FERC ¶ 61,103, at P 38 (2014).

side-lined in virtually any wide-area capacity event that included its territory. Such an interpretation of this manual provision would be irrational."[253]

PJM's decisions with respect to non-firm exports and Load Management were also entirely reasonable on their merits. Indeed, Mr. Naumann testifies:

> For example, given the quickly changing weather and the large amount of gas-fired generation unavailable, the fact that neighboring regions did not have excess capacity to supply to PJM if additional PJM generation tripped, and uncertainty of the level of load, maintaining non-firm exports when PJM had additional resources to do so must be considered Good Utility Practice. If some generators that were delivering energy had tripped or were forced to derate, or load unexpectedly increased, PJM could then interrupt non-firm exports and utilize the energy from the remaining generators that are on-line to maintain service to PJM load. Similarly, PJM operators had to consider the probability that generators would not start when called upon, or start-up would be delayed. . . . Having generation running and synchronized, as well as additional generation available for such contingencies is by definition Good Utility Practice.[254]

Mr. Bryson shows that PJM's decisions to initiate various actions were validated by the supply and demand conditions that existed in real-time. On both December 23 and 24 PJM could not have met system demand only by cutting non-firm exports.[255] Pre-emergency and Emergency Actions would have been necessary on both days even if all non-firm exports had been cut.[256]

Mr. Bryson also emphasizes what is ultimately the most important point. "PJM operators were successful in their efforts as PJM avoided load shedding and the assistance that PJM provided to other regions enabled them either to avoid or mitigate shedding their customers' load."[257] It will never be known to what extent PJM's assistance saved lives and avoided economic harm in

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[253] *See* Bryson Aff. at P 36.

[254] Naumann Aff. at P 16.

[255] *See* Bryson Aff. at PP 20-23.

[256] *See id.* P 23.

[257] *Id.* P 19.

neighboring regions. But the Commission should keep in mind that PJM was acting at all times to the best of its ability given the information available to avert such consequences. Mr. Bryson's analysis shows that PJM did so while prioritizing its own load and by cutting both firm and non-firm exports when necessary.[258]

The Commission should recognize the adverse consequences if it were to agree with the Complainants on this issue. Just as PJM's responsibility is to reliability in its region, the Commission has responsibility to oversee the reliability of the grid in the entire nation. Yet Complainants argument would significantly diminish the role of mutual support that has been a bedrock principle of reliability throughout the Interconnection. The Commission's adoption of those arguments would be sending a signal for each region to de-value the need to assist its neighbors by curtailing certain transactions even if such action would have significant reliability impacts to neighboring regions. In effect, the Commission would be encouraging a balkanization of operations and discounting the obligations each region has to its neighbors at the very time that the entire Interconnection is evolving and facing potential future reliability challenges. As a result, the Complainant's argument is not just an incorrect reading of the Manual provisions but represents a poor public policy solution going forward.

3. Contrary to Complainants' Position, PJM is Not Required to Ensure LMPs are Reflective of System Conditions Before Addressing Emergencies

The Complaint cites section 2.3.2 of Manual 13 for the proposition that PJM must "[e]nsure LMPs are reflective of system conditions" before entering into "capacity-related Emergency Procedures."[259] The Complaint avers that PJM should not have scheduled ComEd Zone generation

[258] *Id.* P 23.

[259] Complaint at 15, 37.

consistent with security-constrained economic dispatch (SCED), or should have scheduled down self-scheduled units, and thus that ComEd Zone generators should not be penalized.[260] According to Complainants, units were scheduled that were "hopelessly uneconomic based on intraday gas prices"[261] and "that the Day-Ahead price signal [on December 24, 2022] did not signal a need for more ComEd zone generation."[262]

This argument is another fundamentally flawed attempt to transform precatory Manual 13 language into a mandate that would tie PJM operators' hands during emergencies. Just like Complainants' argument that all non-firm exports must be recalled before PJM could take Emergency Actions, the language about PJM ensuring that LMPs are reflective of system conditions is not a required step. The quoted language appears in a list of four bullet items immediately after the previously mentioned "Note" in section 2.3.2 clarifying that "[t]he Real-Time Emergency Procedures section combines Warnings and Actions in their most probable sequence based on notification requirements during extreme peak conditions. Depending on the severity of the capacity deficiency, it is unlikely that some Steps would be implemented."[263] Thus, PJM did not "violate" Manual 13, let alone the Tariff, by failing to ensure that LMPs were reflective of system conditions before acting. This is consistent with Good Utility Practice.[264]

Moreover, Complainants' arguments that PJM's dispatch decisions were faulty because they were supposedly "uneconomic" and inconstant with the "security-constrained economic dispatch" ignores that a Maximum Generation Emergency Action was in effect during this period.

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[260] *Id.* at 36-38.

[261] *Id.* at 36 (quoting Harvey Aff. P 78).

[262] *Id.* at 37.

[263] Manual 13, § 2.3.2, at 28.

[264] *See supra* Section III.C.

If a Maximum Generation Emergency Action has been declared, PJM will not solely be dispatching resources under the typical "security constrained economic dispatch" algorithm. As stated in Manual 13, "[t]he purpose of the Maximum Generation Emergency Action is to increase the PJM RTO generation *above the maximum economic level*. It is implemented whenever generation is needed that is greater than the highest incremental cost level."[265] The two dispatch mechanisms thus are very different. For this additional reason, Complainants' claim also falls flat.

Finally, PJM's dispatch decisions were reasonable given the circumstances PJM faced on December 24, 2022. Consistent with Good Utility Practice, PJM sought to bring additional generation on line and to retain generation that was operating because of the operators' legitimate concern regarding PJM's ability to meet the evening peak on December 24, 2022. Uncertain weather conditions, poor generator performance that fell far below PJM's expectations, and growing concerns about production area problems and pipeline disruptions all contributed to the need for actions taken by the PJM operators.

C. Complainants Bizarrely Contend No Emergency Existed in the ComEd Zone Zone and That Bringing Their Resources Online Would Have Exacerbated Emergency Conditions in Elsewhere in PJM

The Complaint contends PJM took Emergency Actions or failed to cancel them when there was allegedly no emergency in the ComEd Zone and when the ComEd Zone was not short of supply but was actually exporting energy to the rest of PJM.[266] According to Complainants:

> [B]eginning at 06:00 on December 24, there was no emergency in the ComEd Zone that permitted PJM to take Emergency Actions. After this time there was persistent transmission congestion that did not allow resources in ComEd to increase output to serve the rest of PJM. In fact there was <u>excess</u> generation in ComEd, and generation could not be dispatched up to meet PJM load in other regions because the transmission lines from ComEd to the rest of PJM were constrained. As Dr. Harvey states, "incremental supply in ComEd (including MISO imports) could not

[265] Manual 13, § 5.2 (emphasis added).

[266] *See* Complaint at 31-32 (alteration in original).

> be used to meet load in eastern PJM without further overloading the PJM transmission system.[267]

Dr. Harvey elaborately extrapolates his way from ComEd Zone constraint, shadow price, and LMP data to his conclusion that "there was no emergency in ComEd beginning at least as of 06:00 on December 24 and thereafter."[268] Dr. Harvey even insinuates that PJM *knew* "that there was no emergency" and was acting solely out of a desire "to go short on PJM reserves relative to the reliability requirement in order to export more power to adjacent balancing areas."[269] Dr. Sotkiewicz "fully support[s] and endorse[s]" Dr. Harvey's conclusions and what Dr. Sotkiewicz describes as Dr. Harvey's "technical *tour de force* showing why additional ComEd generation would only exacerbate transmission reliability issues."[270]

At the outset, Complainant's notion that there was no emergency in the ComEd Zone after 06:00 on December 24 is belied by DOE Order No. 202-22-4, which expressly held as a matter of law on that same day that "an emergency exists in the electricity grid operated by PJM Interconnection, LLC (PJM) due to a shortage of electric energy, a shortage of facilities for the generation of electric energy, and other causes, and that issuance of this Order will meet the emergency and serve the public interest."[271] That finding was based, in part, on concern that PJM had experienced approximately 45,000 MW of outages and derates as of early December 24, that

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[267] *Id.* at 32-33.

[268] *Id.* at 34 (citing Harvey Aff. at P 70). As explained below, the notion that the ComEd Zone can be carved out in this way is fundamentally inaccurate. The ComEd Zone is not an electrical island.

[269] Harvey Aff. at P 69 n.70.

[270] Sotkiewicz Aff. at PP 2, 41.

[271] U.S. Dep't Energy, *Federal Power Act Section 202(c): PJM December 2022* at 1, https://www.energy.gov/ceser/federal-power-act-section-202c-pjm-december-2022 (DOE Order No. 202-22-4).

PJM feared the relevant resources would not soon return to service, and that "in the event PJM experiences additional generating unit outages, PJM states that it may need to curtail some amount of firm load on December 24, December 25, or December 26, 2022 in order to maintain the security and reliability of the PJM system."[272] DOE Order No. 202-22-4 was in effect from 17:30 on December 24 through December 26. DOE did not exclude the ComEd Zone from the PJM-wide emergency.

Dr. Harvey's claim that PJM made a deliberate choice to support exports in order to short reserves is patently absurd, and Complainants offer no explanation why PJM might do so.

More generally, Dr. Harvey's and Dr. Sotkiewicz's claims represent after-the-fact *economic* arguments that are wholly detached from the *operational* realities that PJM faced during Winter Storm Elliot. Their arguments are rooted in 20/20 hindsight that was obviously not available to PJM's operators confronting real world problems. For example, Dr. Harvey asserts that "[t]ermination of the PAI event for the ComEd region beginning at 06:00 in the morning of December 24 would have helped transmission system reliability by reducing flows on transmission elements that were overloaded either in the base case or in contingency cases."[273] Even if Dr. Harvey's assumptions were correct—which they are not—they are not based on how events actually transpired. If PJM had done what Dr. Harvey says it should have then subsequent events could have gone differently and outcomes may have changed.

Mr. Naumann points out the fundamental flaws in the approach taken by Dr. Harvey and Dr. Sotkiewicz approach. As detailed above in Part IV.A, "[t]his type of *post hoc* economic analyses and other varieties of "Monday morning quarterbacking" are irrelevant to the question of

[272] *Id*.

[273] Harvey Aff. at P 72.

whether operators acted reasonably and in accordance with Good Utility practice."[274] Complainants effectively claim that "PJM should have rolled the dice, wagering that generation from their units would not be needed for the duration of the emergency because the Complainants' *post hoc* analysis suggests those units were not arguably needed to supply load to the ComEd Zone."[275] The critical flaw in Complainants' *post hoc* reasoning is that, it treats the successful performance by other generators as a given" while "PJM operators had no such luxury when they were managing the emergency in real-time."[276] Complainants overlook the fact that outcomes could have been much different if one or more additional resources had tripped. The argument that transmission constraints east of the ComEd Zone meant that bringing the ComEd Zone Generators on line could not have helped to increase the supply of energy available to other PJM zones suffers from the same flaw.[277] It is yet another *post hoc* claim that presents an incomplete and misleading view of the operating situation.

As Mr. Naumann explains, "even if transmission was constrained east of ComEd at particular times, PJM operators had to be prepared to have sufficient generation available in other time periods and also in the event of foreseeable contingencies that would have required increases in generation in the ComEd Zone."[278]

Furthermore, although Dr. Harvey is literally correct to suggest that "from the standpoint of transmission flows from ComEd to eastern PJM, a load reduction in [the] ComEd [zone] has the same effect on net exports from the zone as an increase in ComEd [zone] generation

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[274] Naumann Aff. at P 29 (citations omitted).

[275] *Id.*

[276] *Id*.

[277] *See* Harvey Aff. at P 65.

[278] Naumann Aff. at P 34.

output.'"[279] In reality, PJM operators had to be concerned about the opposite situation, i.e., "an unexpected increase in load in the ComEd Zone, which, to use Dr. Harvey's language, would have the same effect on net exports from the ComEd Zone as a decrease in generation in the ComEd Zone, which would relieve the constraints."[280] Similarly, "PJM system operators had to be concerned that more generation, possibly even large nuclear units, would trip, causing the same impact. The fact that those contingencies were avoided does not mean that PJM operators should not have had more generation available to deal with severe and changing conditions."[281]

Complainants' economists also completely ignore the context that the ComEd Zone is not an electrical island, but is an integrated part of the PJM region. Manual 13 sections 2.2 and 2.3.2 both provide PJM with broad flexibility. Section 2.2 incorporates a presumption that "PJM issues capacity emergencies across the entire PJM RTO."[282] It also creates express exceptions "for PJM Load Dump Warnings/Actions, which are solely issued on a Control Zone basis" and notes that "transmission constraints may force Emergency Procedure warnings/actions to be issued on a Control Zone or a subset of a Control Zone."[283] Most important, section 2.2 reflects a prevailing understanding that capacity shortages are to be addressed regionally, not locally.

As Mr. Bryson explains, "the general criteria for generation interconnection in PJM and for transmission planning are that all generation resources in aggregate should be deliverable to all loads in aggregate during peak conditions."[284] PJM Manual 14B establishes that, "within an area

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[279] Harvey Aff. at P 64.

[280] *Id*.

[281] *Id*.

[282] Manual 13, Section 2.2.

[283] Manual 13, Section 2.2.

[284] Bryson Aff. at P 37.

experiencing a localized capacity emergency, or deficiency, energy must be deliverable from the aggregate of the available Capacity Resources to load."[285] Also, "Capacity Resources within a given electrical area must, in aggregate, be able to be exported to other areas of PJM." Taken together, "[t]hese deliverability tests ensure that the PJM Transmission System is adequate for delivery of energy from the aggregate of Capacity Resources to the aggregate of PJM load."[286] Thus, "a capacity shortage will almost always be a PJM system-wide event because generation in any PJM zone can be used to support loads in any zone."[287]

Mr. Bryson recognizes that Complainants argue the ComEd Zone during Winter Storm Elliott was an exceptional case "at various times because the lines connecting ComEd to the rest of PJM could not carry more power."[288] But even to the extent that Complainants' claims are true, they do not make PJM's real-time operational decisions unreasonable, especially under the Good Utility Practice standard. "PJM's operators were not concerned just with the minute-by-minute situation on the system. They were also considering longer time frames.[289]

After 06:00 on December 24 PJM operators continued to be very concerned about the state of the PJM system. They reasonably feared based on events on December 23 and the morning of December 24 that PJM might not be able to meet the RTO-wide evening peak Contrary to Complainants' claims, retaining the pre-emergency and Emergency Actions in ComEd during December 24 served an important purpose. It increased the probability that sufficient ComEd

[285] Manual 14B: PJM Regional Transmission Planning Process (Dec. 15, 2021), Attach. C § C.1.2 (Types of Deliverability Requirements), https://www.pjm.com/-/media/documents/manuals/archive/m14b/m14bv51-pjm-regional-transmission-planning-process-12-15-2021.ashx.

[286] Bryson Aff. at P 37.

[287] *Id.*

[288] *Id.* P 38.

[289] *See id.* P 25.

Zone generation would be available for the evening peak. At that point in time, ComEd Zone generators might have been needed to serve load in the ComEd Zone or, with changing system conditions, additional ComEd Zone generation may have deliverable to the rest of PJM consistent with the planning criteria.[290]

PJM operators were also concerned that if the Maximum Generation Emergency Action and the Pre-Emergency/Emergency Load Management Reduction Action were rescinded and PJM then tried to reinstate them to meet a potentially high evening peak on December 24, there could be a significantly lower response rate. If allowed to go offline, some generators might not restart due to the cold weather conditions or units running on gas might resell their gas supply. In addition, if Demand Resources were released and allowed to resume normal power consumption, PJM operators were concerned that those resources might not be willing or able to redeploy if called again prior to the evening peak. These concerns were well grounded in PJM's practical experience with demand response.[291]

Thus, the fact that the evening peak came in at a relatively lower level does not undermine the validity of the operators' decisions under the Good Utility Practice standard based on the information they had when those decisions were made.[292]

PJM is under no obligation to avoid declaring regional emergencies solely because emergency conditions might not exist at that moment in a particular zone. Nor must it end regional emergencies as soon as it appears that an emergency might have ceased in a particular zone. Instead, PJM's operators have discretion to exercise their judgment in the face of uncertainty.

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[290] *See id.* P 26.

[291] *See id.* P 27.

[292] *See* Bryson Aff. at P 28.

They must have the ability to exercise that discretion without being distracted by economic arguments such as those in the Complaint.

Dr. Harvey implicitly acknowledges the breadth of PJM's discretion when he refers to an example of PJM's operational flexibility found in the Maximum Generation Alert discussion in section 2.3 of Manual 13.[293] That provision states that, "[a]n Action can be issued for the entire PJM RTO, specific Control Zone(s) or a subset of a Control Zone if transmission limitations exist." Dr. Harvey tries to use this language to support his *post hoc* theory that PJM should have acted as if the Winter Storm Elliott emergency did not encompass the ComEd Zone. Dr. Harvey notes that "for all previous performance events PJM declared an event for a subset or previous zones," and that this was "generally" PJM's practice before the Capacity Performance reforms.[294]

Dr. Harvey effectively claims that PJM should not have exercised its discretion to treat Winter Storm Elliott as a regional threat because it was not necessary to do so in the past. As Mr. Naumann explains, this is an attempt to use history to handcuff PJM operators confronting extreme system conditions that did not have historic antecedents. During Winter Storm Elliott, PJM faced "unprecedented operating conditions in the form of rapidly failing generators, fuel supply problems, increasing load, and continuing uncertainty. It is absurd to suggest that because PJM had not issued an RTO-wide PAI in the past, it was unreasonable to do so under the conditions presented in Winter Storm Elliott."[295] Just because "PJM *may* limit Emergency Actions to specific zones does not mean that under every and all conditions PJM *must* tie its hands and take risks to the reliability of the rest of PJM."[296] In addition, Dr. Harvey's observation that PJM had not

[293] *Id.* P 74 n.75.

[294] *See id.* P 92.

[295] Naumann Aff. at P 31.

[296] *Id*.

declared a regional performance event in a decade overlooks the fact that the 2014 Polar Vortex, the most recent analogue for Winter Storm Elliot, prompted PJM to declare a region-wide Emergency Generation Action.[297]

The reality is that PJM faced a dire reliability emergency during Winter Storm Elliott that extended well beyond PJM's own boundaries. Large portions of the Eastern Interconnection and ERCOT were impacted by record-breaking temperature drops and unprecedented holiday loads. Neighboring systems were shedding load or declaring emergencies. PJM itself was struggling to maintain reliability in the face of widespread non-performance by generators, including Complainants and others in the ComEd Zone. At times PJM was relying on emergency imports from the Northeast Power Coordinating Council to avoid load shedding in PJM. Heading into December 24, PJM had valid reasons to fear that non-performance issues would become even worse, including in the ComEd Zone. The Department of Energy endorsed PJM's view that there was a region-wide emergency by issuing an FPA section 202(c) emergency order, just as it had a day before in ERCOT.

D. Dr. Harvey is Wrong to Suggest PJM Improperly Set Up the December 23 Operating Day

Dr. Harvey disputes PJM's statements that PJM took a cautious approach to the December 23 operating day with approximately 158,000 MW of generation available.[298] He suggests there are two main flaws in PJM's statements. First, Dr. Harvey asserts that calling so many MWs into the operating capacity for the December 23, 2022 operating day was excessive because PJM "did

[297] PJM declared an Emergency Generation Action during the 2014 Polar Vortex. *See* Ex. CZG-0003 at 6-7; *see also* Harvey Aff. at P 92 ("[B]efore the establishment of PJM's capacity performance rules [emergency declarations] were also *generally* limited to a subset of PJM zones.") (emphasis added).

[298] *See* Harvey Aff. at PP 15-21.

not expect [20,000 MW of that amount] to be needed.[299] Second, Dr. Harvey contends that because PJM included the allegedly excessive 20,000 MWs in the set-up for the December 23, 2022 operating day, PJM should have "t[old] long start units that did not have day-ahead market schedules or RAC schedules to be prepared to come online at [a] particular time."[300] Neither contention is valid.

For the reasons discussed above, PJM operators faced many uncertainties when the December 23, 2022 set-up was developed. Weather was uncertain both in terms of temperature and wind, the load was not responding consistently with historical norms to weather conditions, many generators had already exhibited poor performance and/or had not properly updated unit parameters, and gas supply concerns in the production area and on the gas pipelines were emerging. Including more than 158,000 MW of generation in the operating day set-up for December 23 was admittedly conservative but appropriately so. Given all the uncertainties, PJM operators can hardly be faulted for acting in a manner that mitigated risk by providing a cushion of additional generation under circumstances in which the level of risk was already known to be substantial and seemed to be increasing moment-by-moment. The operators' actions were fully consistent with Good Utility Practice.

Dr. Harvey's second assertion is also incorrect. Essentially, Dr. Harvey seeks to relitigate the operation of the Capacity Performance mechanism. In fact, PJM was under no obligation to provide commitments to "long start units" notwithstanding the possibility that they might be needed. Under the Capacity Performance mechanism, the onus is on the generators to be available

[299] *Id.* P 20.

[300] *Id.* P 21.

when called during emergency conditions. In other words, Dr. Harvey attempts to turn the Capacity Performance construct on its head.

This claim also fails because it challenges PJM's dispatch decision not to schedule "long start units" in the December 23, 2022 operating day set-up. Identical language in section 1.8.2(a) of the Operating Agreement states that "[c]omplaints arising from or relating to [the selection, scheduling or dispatch of resources] shall be brought to the attention of the Office of the Interconnection." Section 1.8.2(d) of both documents provides that PJM's market participants shall not be entitled to any "form of reimbursement from [PJM] or any other Market Participant for any loss, liability or claim, including any claim for lost profits, incurred as a result of a mistake, error or other fault by [PJM] in the selection, scheduling or dispatch of resources." Based on these provisions, Complainants' claims that PJM should have dispatched "long start units" in the December 23, 2022 operating day set-up should be dismissed summarily because the Operating Agreement provides that they should not be litigated before the Commission.

Finally, Dr. Harvey's argument also fails insofar as it suggests that Complainants were somehow treated unfairly because PJM should have given them advance notice to operate. In fact, the inability of these generators to be available when called by PJM was their own decision. Many other generators whose primary fuel is natural gas did operate without the kind of advance notice that Complainants assert they should have received. For example, many units whose primary fuel is natural gas have dual fuel capability to run on fuel oil. Many of these units that operated during the Winter Storm Elliott event will receive bonus payments. Complainants chose not to make the necessary investments to be available when called during an emergency like Winter Storm Elliott and are now complaining about the consequences of their decisions.

E. Potential or Desired Reforms of the Capacity Performance Construct Are Beyond the Scope of this Proceeding

Fortunately, as also discussed in detail above and in PJM's supporting Exhibits, refusing to grant relief is also the right policy answer in this case. By denying the Complaint, the Commission will preserve the operational flexibility that PJM expressly has, and must have, to address emergencies under the Tariff, Operating Agreement, and Manual 13. Denying the Complaint will also reaffirm that all market participants must comply with their capacity performance obligations and avoid undermining performance incentives that are essential to the functioning of the capacity market.

There may be reasons to believe, as the Independent Market Monitor has suggested, that the Capacity Performance construct should be revised prospectively. Potential rule changes that might narrow when PAIs are triggered or cap the maximum level of Non-Performance Charges in the future are currently under consideration in the PJM stakeholder process. But these matters are beyond the scope of this proceeding. In part this is because the Complainants have not raised them. It is also because the rule against retroactive ratemaking prohibits the Commission from altering the rules that were in force during Winter Storm Elliott. Whether or not prospective rule changes that would apply to the 2024/25 Delivery Year are accepted by the Commission has no bearing on the fact the charges for performance failures during Winter Storm Elliott cannot be altered under the filed rate doctrine absent tariff violations.

V. THE COMMISSION SHOULD ALSO DENY COMPLAINANTS' OTHER REQUESTS

There is no need for the Commission to commence hearing procedures, grant discovery rights, or take any other action beyond granting PJM's request for the initiation of settlement judge procedures.

A. Complainants' Request for an Investigation of PAIs Before 06:00 on December 24 and its Request for Discovery Should Be Denied

The Complaint and its supporting affidavits focus principally on arguing that Complainants should be excused from all Non-Performance Charges arising from PAIs triggered after 06:00 on December 24 because of PJM's alleged "tariff" violations and other purported operational errors. However, the Complaint also asserts that the evidence it presents indicates that earlier PAIs may have also been "improperly imposed" and that the Commission should investigate them as well.[301]

As demonstrated in detail above and in the Exhibits to this Answer,[302] Complainants have failed to meet their burden of proof with respect to PAIs for periods after 06:00 on December 24. Therefore, the Complaint's evidence and arguments for that timeframe are not a reasonable predicate for further investigation of PAIs for earlier times.

The Complaint also proposes that "[d]iscovery should be allowed to better develop the facts and allow for transparency in the imposition of $1 to $2 billion in penalties."[303] Dr. Harvey identifies multiple topics that he suggests could be clarified or resolved through discovery.[304]

There is no need for any form of discovery in this proceeding. The Commission can and should resolve all disputed factual issues based on the Complaint, this Answer, its supporting Exhibits, and any other paper filings. If the Commission needs additional information from PJM on any point it could direct PJM to provide it. For example, there is no reason to allow

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[301] Complaint at 44-46.

[302] *See* McGlynn Aff.

[303] *Id.* at 46; *see id.* at 2 ("If the Commission declines to grant the requested relief, it should at a minimum establish hearing procedures, including discovery.").

[304] *See* Harvey Aff. at PP 18, 60, 66 n.63, 81, 96 n.97, 104, 105. Dr. Harvey also suggests that the allegedly unauthorized uneconomic exports could be evaluated through "the audit." *Id.* P 105. It is unclear what Dr. Harvey means, but to the extent this is meant as a synonym for the investigation that Complainants seek, it should be denied for the same reasons set forth *supra*.

Complainants' discovery rights to enable them to confirm PJM allowed non-firm exports to support neighboring systems when PJM freely concedes it was doing so to support neighbors in need. There would likewise be no benefit to helping Dr. Harvey and Dr. Sotkiewicz invent new *post hoc* economic challenges to real-time operational decisions that were necessarily made without the benefit of hindsight.[305]

In addition, there is already an ongoing joint FERC/NERC inquiry that is investigating all aspects of Winter Storm Elliott, including PJM's actions. It would be redundant to allow Complainants to conduct their own version of that larger fact-finding effort. Moreover, it would serve no purpose. The facts as determined by FERC and NERC will be made public after an exhaustive review by both FERC and NERC Staff. Allowing discovery in this case will be redundant to that effort and essentially would create an opportunity for the Complainants to challenge the final results of that analysis through a discovery process in this proceeding. This is clearly not what the Commission intended when it set the events surrounding Winter Storm Elliott for investigation by its staff and NERC staff. For this reason alone, discovery would be redundant if not harmful to that larger Commission effort.

B. Complainants' Request for Interim Relief Should Be Denied

Complainants' request for interim relief also lacks merit and should be denied. The Complaint does not articulate whether it requests a stay or a waiver and, unsurprisingly, does not articulate the standard for either form of relief. Instead, the Complaint generically asks the

[305] Complainants are also wrong to suggest that the Commission should treat each decision by PJM operators as if were a "input" under a transmission formula rate. Complaint at 5-6. The Commission's formula rate protocol model, which provide for customer review of utility cost inputs and for challenges to disputed costs, does not, and should not, apply here. If it did, it would undermine and nullify the Good Utility Practice standard and the prudence precedents that do apply to this kind of proceeding.

Commission to "act expeditiously to issue and order in this docket suspending the billing and collections processes associated with the penalty payments."[306]

Neither form of relief is warranted here. Any waiver request here should fail because it (1) would not be "of limited scope" and (2) would have "undesirable consequences, such as harming third parties."[307] Indeed, granting a waiver would harm a myriad of third parties, including those generators who performed during Winter Storm Elliott and are accordingly owed substantial bonus payments for performing when called upon.[308]

For similar reasons, a stay request should also be rejected. In assessing a stay request, the Commission "consider[s] several factors, which typically include: (1) whether the party requesting the stay will suffer irreparable injury without a stay; (2) whether issuing the stay may substantially harm other parties; and (3) whether a stay is in the public interest."[309] But as discussed above, a stay in this matter would "substantially harm" generators owed bonus payments and, as a result, cannot be described as being "in the public interest."

C. There is No Need for Trial-Type Hearing Procedures

Finally, the Complaint proposes that "[i]f the Commission declines to grant the requested relief, it should at a minimum establish hearing procedures, including discovery . . . regarding

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[306] Complaint at 46.

[307] *Front Range-Midway Solar Proj., LLC*, 183 FERC ¶ 61,060, at P 31 (2023) ("The Commission has granted waiver of tariff provisions where: (1) the applicant acted in good faith; (2) the waiver is of limited scope; (3) the waiver addresses a concrete problem; and (4) the waiver does not have undesirable consequences, such as harming third parties.

[308] *See, e.g.*, Constellation Energy Generation, LLC, Motion to Dismiss Capacity Performance Complaints, Docket Nos. EL23-53-000, *et al*., at 20 (May 1, 2023) ("[O]ver-performing units—which include resources that received no capacity payments at all—generated power in good faith, responding to the same allegedly defective Emergency Actions. Many did so at substantial cost. They should be rewarded with the bonus payments to which they are entitled under the Tariff.").

[309] *ISO New Eng.*, 178 FERC 61,063, at P 13 (2022).

PJM's actions during Winter Storm Elliott."[310] For each reason set forth above, there is no need for a formal hearing in this proceeding or any of the other Winter Storm Elliott complaint cases.

VI. PJM SUPPORTS SETTLEMENT OF THIS COMPLAINT AND THE OTHER PENDING WINTER STORM ELLIOTT PROCEEDINGS

For the reasons set forth above in Part III, the Commission should either dismiss the Complaint for failure to make cognizable legal claims or deny the Complaint on the merits. However, as set forth in PJM's motion to establish global settlement judge procedures, PJM recognizes the benefits of a prompt resolution to the pending claims in this and the other pending Winter Storm Elliott complaints brought against PJM, given the level of Commission resources that will be needed to resolve all of the filed Complaints.[311] PJM thus continues to support a Commission-directed global settlement process encompassing all such complaints.

VII. STATEMENTS PURSUANT TO 18 C.F.R. § 385.213(C)(2)

A. Admissions and Denials Pursuant

Pursuant to 18 C.F.R. § 385.213(C)(2)(i), PJM affirms that any allegation in the Complaint that is not specifically and expressly admitted above is denied.[312]

B. Affirmative Defenses

Pursuant to 18 C.F.R. § 385.213(C)(2)(ii), PJM's affirmative defenses are set above in this Answer and in the Motion to Dismiss.

VIII. REQUEST FOR CONFIDENTIAL TREATMENT

PJM respectfully requests, pursuant to 18 C.F.R. § 388.112, non-public treatment of identified portions of this answer and its attachments that are exempt from the mandatory public

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[310] *Id.* at 2.

[311] *See* Motion of PJM Interconnection, L.L.C., For Establishment of Settlement Judge Procedures, Docket Nos. EL23-53-000, *et al.*, at 3 (Apr. 14, 2023).

[312] 18 C.F.R. § 385.213(c)(2)(1).

disclosure requirements of the Freedom of Information Act, 5 U.S.C. § 552 ("FOIA"), and that should be withheld from public disclosure. Specifically, non-public treatment is requested for certain market sensitive information provided to PJM by Market Participants as confidential under Operating Agreement, section 18.17, which fall within the FOIA public disclosure exemption for "trade secrets and commercial or financial information obtained from a person and privileged or confidential." *See* 5 U.S.C. § 552(b)(4).

In accordance with 18 C.F.R. § 388.112(b)(2)(i), PJM includes with this filing, as Attachment A, a proposed form of protective agreement by which parties to this proceeding can obtain access to the non-public version of this answer and its attachments. The proposed Protective Agreement is identical in all substantive terms to the Protective Order PJM moved the Commission on May 24, 2023 to issue in this proceeding and eleven other related proceedings.[313] The proposed Protective Order, by its terms, will supersede and replace the proposed Protective Agreement five days after Commission issuance of the Protective Order.

PJM is submitting a non-public version of this answer and its attachments that is marked "CUI//PRIV-HC" in accordance with Paragraph 11 of the proposed Protective Agreement. PJM asks that the marked version of this answer and its attachments be placed in the Commission's non-public files. PJM is also submitting a public version of this answer and its attachments with the relevant confidential material redacted pursuant to section 388.112 of the Commission's regulations.

[313] *Essential Power OPP, LLC, et al. v. PJM Interconnection, L.L.C., et al*., Motion for Adoption of Protective Order, Docket Nos. EL23-54-000, *et al.* (May 24, 2023) ("Motion").

IX. COMMUNICATIONS

PJM requests that the Commission place the individuals listed on the signature block below on the official service list for this proceeding.[314]

X. CONCLUSION

For the reasons set forth above, the Commission should deny the Complaint and provide no relief, interim or otherwise.

Respectfully Submitted,

/s/ Ted. J. Murphy

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[314] To the extent necessary, PJM requests a waiver of Commission Rule 203(b)(3), 18 C.F.R. § 385.203(b)(3) to permit more than two persons to be listed in the official service list for this proceeding.

CERTIFICATE OF SERVICE

I hereby certify that I have this day caused to be served the foregoing document upon each person designated on the official service lists compiled by the Secretary in these proceedings.

Dated at Washington, DC this 26th day of May 2023.

Respectfully Submitted,

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Exhibit 1

Timeline of PJM's Actions Related to Winter Storm Elliott

EXHIBIT 1: Timeline of PJM's Actions in Response to Winter Storm Elliott

This exhibit describes the steps that PJM took before, during, and after Winter Storm Elliott to preserve reliability in the face of unprecedented weather and load conditions, extraordinary failures and uncertainties caused by the poor performance of PJM Capacity Resources and the enormous operational complexities confronting the PJM operators in their management of the PJM system while attempting to provide mutual assistance to other regions.

- **12/20/2022 09:00**: PJM issued a Cold Weather Advisory for the Western Region Zones from 07:00 on 12/23/2022 through 23:00 on 12/25/2022.
    - Because PJM issued a Cold Weather Advisory, generators in the Western Region Zones were required to update unit specific operation limitations associated with cold weather preparedness including fuel supply and inventory concerns.
- **12/21/2022 10:00**: PJM extended the Cold Weather Advisory for the Western Region Zones from 07:00 on 12/23/2022 through 23:00 on 12/26/2022.
    - Because PJM issued a Cold Weather Alert, generation plants in the affected region were required to: review fuel supply/delivery schedules in anticipation of greater-than-normal operation of units, monitor and report projected fuel limitations to the PJM dispatcher and update the unit Max Run field in Markets Gateway if less than 24 hours of run-time is remaining and contact PJM Dispatch if it is anticipated that spot market gas is unavailable, resulting in unavailability of bid-in generation.
- **12/22/2022 17:30:** PJM expanded its Cold Weather Advisory from 07:00 on 12/23/2022 through 23:00 on 12/26/2022 to the entire RTO (originally for Western Region Zones).
    - Because PJM issued an RTO-wide Cold Weather Advisory, all PJM generators were required to update unit specific operation limitations associated with cold weather preparedness including fuel supply and inventory concerns.
    - Given the expected weather, PJM was very conservative in developing its operating plans for 12/23/2022.
    - PJM's forecast load entering 12/23/2022 was 126,968 MW.
    - PJM had over 155,750 MW of operating capacity in the Day-Ahead set-up for 12/23/2022. PJM believed that it was guarding against potential uncertainty by having substantially more capacity available than would normally be needed to meet the load forecast.

    - Based on submitted Generator Availability Data, PJM believed that it had almost 29 GW of reserve capacity available to absorb load and generating contingencies and to support neighboring systems.

- **12/23/2022 circa 3:00**: PJM load and generation forced outages/derates began increasing substantially.

- **12/23/2022 between 3:30 and 08:00**: Consistent with normal practices, PJM participated in regularly held conference calls with Tennessee Valley Association (TVA), VACAR South Reliability Coordinator, Mid-Continent Independ System Operator (MISO), New York Independent System Operator (NYISO) and the Florida Reliability Coordinating Council (FRCC) to discuss inter-regional coordination including peak load estimates, reserve requirements, estimated loads and anticipated daily challenges. Further, on an as-needed basis, additional calls between PJM and other regions occurred throughout the entirely of Winter Storm Elliott.

- **12/23/2022 06:30**: PJM sent 500 MWs of Emergency Energy to TVA due to TVA being in an EEA3.

- **12/23/2022 circa 07:30**: PJM began contacting generators to remain online or to come on line to meet morning and evening peaks and discovered that many units shown as available in Markets Gateway and eDART could not actually perform, in particular because gas-fired units lacked fuel. In addition, in a pattern that continued throughout the entire winter storm event, many generators did not provide timely updates of their parameters in Markets Gateway and/or failed to provide timely updates of their status in eDART.

- **12/23/2022 10:14**: 100% RTO Synchronized Reserve Event – PJM deployed Synchronized Reserves to recover low Area Control Error (ACE) due to PJM reserves falling to approximately 1500 MW. PJM canceled the Synchronized Reserves at 10:25.

    - PJM experienced low ACE due to load increasing as generators tripped or failed to start. ACE is a measure of how well the Balancing Authority is matching generation to the load. If load and generation are perfectly balanced, the ACE is zero. When a generator within a Balancing Authority trips off-line the ACE goes negative.

    - "Synchronized Reserves" are "the reserve capability of generation resources that can be converted fully into energy or Demand Resources whose demand can be reduced within ten minutes from the request of the [PJM] dispatcher, and is provided by equipment that is electrically synchronized to the Transmission System." Synchronized Reserves are supplied from both 10-minute synchronized generating resources and 10-minute demand-side response resources.

- **12/23/2022 11:00**: PJM issued a Cold Weather Alert for the entire RTO from 00:00 on 12/24/2022 through 23:59 on 12/25/2022.

- Because PJM issued an RTO-wide Cold Weather Alert, all PJM generation plants were required to: review fuel supply/delivery schedules in anticipation of greater-than-normal operation of units, monitor and report projected fuel limitations to the PJM dispatcher and update the unit Max Run field in Markets Gateway if less than 24 hours of run-time was remaining and contact PJM Dispatch if it anticipated that spot market gas was unavailable, resulting in unavailability of bid-in generation.

- **12/23/2022 16:00**: PJM began curtailing exports.

- **12/23/22 16:11:** The first of a series of calls occurred with TVA involving potential recall of almost 2500 MW in exports. TVA indicates that implementation would push that region into EEA3 load shed. PJM works with TVA to preserve TVA exports.

- **12/23/2022 16:17**: 100% RTO Synchronized Reserve Event – PJM deployed Synchronized Reserves to recover from low ACE. PJM canceled the Synchronized Reserves at 18:09.

- **12/23/2022 17:05**: PJM requested 500 MW of shared reserves from NPCC.

- **12/23/2022 17:30**: PJM issued an EEA2 with Pre-Emergency Load Management Reduction Action covering 30 minute and 60 minute Demand Response and a Maximum Generation Action. PAI triggered.

- **12/23/2022 17:36**: PJM requested an additional 1,000 MW of shared reserves from NPCC.

- **12/23/2022 18:10**: PJM began lifting export transaction curtailments.

- **12/23/2022 22:00**: Pre-Emergency Load Management Reduction Action, Emergency Load Management Reduction Action, and EEA2 ended; all exports were reloaded.

- **12/23/2022 23:00**: PJM declared a Maximum Generation Alert/Load Management Alert, and an EEA1, starting Saturday, 12/24/2022 at 00:00. The Maximum Generation Action for 12/23/2022 ended, terminating the PAI.

    - Entire overnight period – PJM was unable to pump at any of the pumped storage facilities (approximately 6 GW).

    - Entire overnight period – The "Christmas Eve Valley" experienced in the early morning hours on 12/24/2022 was 40,000 MW higher than the next highest "valley" over the last decade and 15,000 MW higher than any peak load on that date in a decade.

- **12/24/2022 00:05**: PJM deployed Synchronized Reserves for the loss due to low ACE. PJM ends the Synchronized Reserves at 00:30.

- **12/24/2022 02:23**: PJM deployed Synchronized Reserves again as a result of a generator unit tripping off-line. PJM ends the Synchronized Reserves at 02:54.

- **12/24/2022 02:25**: PJM received 605 MW of NPCC shared reserves from 02:25 through 04:26.

- **12-24-2022 between 3:30 and 08:00**: Consistent with normal practices, PJM participates in regularly held conference calls with Tennessee Valley Association (TVA), VACAR South Reliability Coordinator, Mid-Continent Independ System Operator (MISO), New York Independent System Operator (NYISO) and the Florida Reliability Coordinating Council (FRCC) to discuss inter-regional coordination including peak load estimates, reserve requirements, estimated loads and anticipated daily challenges. Further, on an as-needed basis, additional calls between PJM and other regions occurred throughout the entirety of Winter Storm Elliott.

- **12/24/2022 04:00**: PJM issued a call for conservation of electricity use at 04:00 though 10:00 on 12/25/2022 and curtailed exports.

- **12/24/2022 04:20**: PJM issued an EEA2 – Pre-Emergency Load Management Reduction Action and Emergency Load Management Reduction Action covering 120 minute Demand Response.

- **12/24/2022 04:26**: PJM receives 1000 MW of NPCC shared reserves from 04:26 to 04:47.

- **12/24/2022 04:28**: PJM issued an EEA2 – Maximum Generation Emergency Action. PAI triggered.

    - The purpose of the Maximum Generation Emergency Action is to increase the PJM generation above the maximum economic level. It is implemented whenever generation is needed that is greater than the highest incremental cost level.

- **12/24/2022 04:50:** Load Management starts to come into effect creating an additional PAI trigger.

- **12/24/2022 04:52**: PJM issued a Voltage Reduction Alert.

- **12/24/2022 05:23**: PJM deployed Synchronized Reserves due to low ACE. PJM ends the Synchronized Reserves at 05:51.

- **12/24/2022 06:00**: Load Management came into effect; PJM curtails Non-Firm energy exports.

- **12/24/2022 06:17**: PJM encouraged Market Participants to submit bids to sell emergency energy into PJM and issued a public appeal to conserve energy.

- **12/24/2022 06:30**: PJM received first notification that generators were having to limit their output due to federal government environmental restrictions.

- **12/24/2022 07:15**: PJM issued Voltage Reduction Warning and Reduction of Non-Critical Plant Load.

- **12/24/2022 07:30**: PJM conducted an SOS conference call with the PJM transmission owners to update their leadership on the situation and to indicate the potential that PJM may need to shed load.

- **12/24/2022 08:00**: Over 24% of the PJM fleet experienced forced outages at around this time. These outages decreased after 08:00, but approximately 32,000 MW of generation was still experiencing forced outages by 22:00 on 12/24/2022.

- **12/24/2022 08:30**: PJM reached morning peak of approximately 130,000 MW; at the peak there were 46,000 MW of forced outages, with PJM experiencing 200 unit trips throughout the event. Approximately 6,000 MW of steam generation was called but was not online as expected for the morning peak. Factoring in start failures, units that operated at reduced output, and lack of pumped storage, PJM was missing approximately 57,000 MW of capacity that it expected to be available at this time.

- **12/24/2022 10:00**: Non-Firm energy exports resumed.

- **12/24/2022 15:00**: All exports were reloaded.

- **12/24/2022 17:30**: DOE 202(c) Order received and implemented effective immediately through 12:00 on 12/26/2022.

- **12/24/2022 18:15**: PJM ended Voltage Reduction Warning and Reduction of Non-Critical Plant Load.

- **12/24/2022 18:34**: PJM ended the Voltage Reduction Alert.

- **12/24/2022 22:00**: All pre-emergency and emergency procedures cancelled. PJM returned to EEA0. PAIs end.

- **12/24/2022 22:38**: PJM issued a Maximum Generation Emergency/Load Management Alert for 12/25/2022.

    - The purpose of the Maximum Generation Emergency Action is to increase the PJM generation above the maximum economic level. It is implemented whenever generation is needed that is greater than the highest incremental cost level.

    - PJM issued this Maximum Generation Emergency/Load Management Alert due to uncertainties regarding whether 12/25/2022 would match the unprecedentedly high load conditions of 12/23 and 12/24/2022.

- **12/25/2022 11:10**: PJM issued a Cold Weather Alert from 07:00 through 23:00 on 12/26/2022 for the Western Region Zones only.

    - Because PJM issued a Cold Weather Alert, generation plants in the affected region were required to: review fuel supply/delivery schedules in anticipation of greater-than-normal operation of units, monitor and report projected fuel limitations to the

PJM dispatcher and update the unit Max Run field in Markets Gateway if less than 24 hours of run-time is remaining and contact PJM Dispatch if it is anticipated that spot market gas is unavailable, resulting in unavailability of bid-in generation.

- **12/25/2022 22:00**: The Maximum Generation Emergency and Load Management Alert declared at 22:38 on 12/24/2022 ended, and PJM returned to EEA0. PJM's calls for conservation also end at this time.

    - The purpose of the Maximum Generation Emergency Action is to increase the PJM generation above the maximum economic level. It is implemented whenever generation is needed that is greater than the highest incremental cost level.

- **12/26/2022 23:00**: Cold Weather Alert for Western Regions Zones ended.

Exhibit 2

Affidavit of Donald Bielak

PUBLIC VERSION

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Power OPP, LLC, *et al.*	)	
Complainants	)	
v.	)	**Docket No. EL23-53-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Aurora Generation, LLC, *et al.*	)	
v.	)	**Docket No. EL23-54-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Coalition of PJM Capacity Resources	)	
Complainant	)	
v.	)	**Docket No. EL23-55-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	

AFFIDAVIT OF DONALD BIELAK
ON BEHALF OF PJM INTERCONNECTION, L.L.C.

A. Introduction

1. My name is Donald Bielak. My business address is 2750 Monroe Blvd., Audubon, Pennsylvania, 19403. My current title is Senior Manager – Dispatch at PJM Interconnection, L.L.C. (PJM). I am preparing this Affidavit to discuss PJM's general procedures in preparing for winter conditions, the particular steps taken to prepare for the winter of 2022/2023 and the status of the anticipatory steps taken by PJM for addressing cold weather conditions up to when PJM first declared emergency procedures on December 23, 2022.

2. I joined PJM in September of 2004 and have been continuously employed full-time by PJM since January of 2007. As Senior Manager – Dispatch, I am responsible for the oversight and operation of the Valley Forge and Milford Control Centers. This function includes ensuring the reliable operation of the power grid, in accordance with all PJM and NERC reliability standards pertaining to the functions of Reliability Coordinator, Balancing Authority, and Transmission Operator. In addition, I am responsible for ensuring the efficient economic dispatch of the system under the existing PJM market rules and neighboring Joint Operating Agreements. In this capacity, I was working remotely during the daytime hours of December 23 and then in the PJM Control Room for the period from 18:00 on December 23, through 08:00 on December 24 and then from 14:00 through 23:00 on December 24, managing PJM operators' successful efforts to keep the lights on in PJM. PJM operators repeatedly had to make difficult reliability decisions in real time while in the midst of unprecedented system conditions and significant uncertainties that were

exacerbated by generator failures. Because of PJM employees' actions, PJM was able to keep the lights on even in the challenging system conditions. PJM did not shed a single megawatt ("MW") of load on December 23 and December 24. Prior to serving as Senior Manager – Dispatch, I served as an Engineer in the Engineering Support Department, as a Sr. Engineer in the Markets Coordination Department, as a Reliability Engineer, and then as Manager – Reliability Engineering.

3. As the Manager for the Reliability Engineering Group, I managed the group responsible for coordinating day-ahead and real-time operating plans between PJM, its members Transmission Owners and Generation Owners, and our neighboring entities. As a Reliability Engineer prior to this, I performed these functions directly. In my previous engineering positions, I supported the Energy Management System (EMS) and the Security Constrained Economic Dispatch (SCED) application. I hold a Bachelor of Science degree in Electrical Engineering, a Master of Science degree in Electrical Engineering, and a Master of Science degree in Engineering Management, all from Drexel University.

4. Safely maintaining system reliability is the most fundamental goal of electric system operations. The availability of reliable electricity is an absolute necessity in the modern world. In fact, the impacts of having to direct firm load shed in winter conditions can be devastating. For example, during Winter Storm Uri in February 2021, it was reported that more than 4.5 million people in Texas lost power.[1] In some cases, outages were experienced for as long as four days during a period of below-freezing temperatures. It was determined that at least 210 people died during this event and that most of these deaths were connected to the power outages. Hypothermia, carbon monoxide poisoning, and medical conditions exacerbated by freezing conditions were leading causes. In addition, it was estimated that the outages caused direct and indirect losses to the Texas economy of between $80 to $130 billion.[2] As I discuss below, PJM has developed comprehensive procedures for winter preparedness in addition to standard procedures to reliably operate through emergency conditions.

5. PJM undertakes extensive preparation for winter conditions.[3] This includes obtaining information from generators regarding the expected capabilities of their units during cold weather conditions and the extent to which units have been weatherized to withstand low temperatures and windy conditions. PJM works to make generators aware of what is expected of them and provides training for generators, other stakeholders, and PJM

[1] *See* FERC - NERC - Regional Entity Staff Report: The February 2021 Cold Weather Outages in Texas and the South Central United States at 9 (Nov. 2021), https://www.ferc.gov/media/february-2021-cold-weather-outages-texas-and-south-central-united-states-ferc-nerc-and.

[2] *Id*. at 10.

[3] *See, e.g.*, Generation Resource Cold Weather Preparation (Oct. 7, 2022), https://www.pjm.com/-/media/committees-groups/committees/oc/2022/20221007/item-16---generation-resource-cold-weather-preparation.ashx (summarizing the verification and preparation requirements in the PJM Tariff and Manual 14).

personnel.[4] In addition, PJM Operations performs an annual winter assessment, which is communicated via the PJM Stakeholder process.[5] Further, PJM performs an annual fuel security study that examines extreme winter conditions.[6] Study results are reviewed via the stakeholder process and posted as part of the meeting materials. This fuel security study examines load levels as high as the ninety-ninth percentile, recognizes common mode generator outages, and simulates fuel disruptions beyond those PJM has previously experienced. PJM also coordinates with natural gas suppliers and neighboring Balancing Areas (BAs).[7] PJM also conducts winter drills (discussed *infra*), and recommends generator owners engage in certain testing at the beginning of winter during December (as discussed in greater detail in the Pilong Affidavit).

B. PJM Winter Assessment

6. As it has for previous winters, PJM conducted a winter assessment prior to winter 2022/23. The base case for the winter assessment is a 50/50 load forecast, designed to be as close to the actual load as possible with equal probabilities of over-forecasting and under-forecasting, rather than a worst-case forecast. No reliability issues were identified in this study which used an expected peak value of 136,867 MW. In addition, PJM examined a separate scenario in which load is at the 90/10 extreme level.[8] Under this study, the case data for the 2022/2023 Winter Load Forecast (not including losses) was 143,782 MW and discrete generation outages were 16,510 MW which is based on historical forced outage

[4] PJM Manual 14D: Generator Operational Requirements (Dec. 21, 2022), § 7.5 (Cold Weather Generation Resource Preparation), https://pjm.com/-/media/documents/manuals/m14d.ashx; *id.*, Attach. N (Cold Weather Preparation Guideline and Checklist).

[5] *See, e.g.*, Operations Assessment Task Force 2022-23 Winter Study (Nov. 3, 2022), https://www.pjm.com/-/media/committees-groups/committees/oc/2022/20221103/item-15---winter-oatf-review.ashx.

[6] *See, e.g.*, PJM, Fuel & Energy Security Update (Nov. 3, 2022), https://www.pjm.com/-/media/committees-groups/committees/oc/2022/20221103/item-14---fuel-security-and-energy-update.ashx.

[7] *See* PJM Manual 13: Emergency Operations (Nov. 3, 2022), § 3.6 (Inter RTO Natural Gas Coordination Procedure), https://pjm.com/-/media/documents/manuals/archive/m13/m13v86-emergency-operations-11-03-2022.ashx (describing PJM coordination procedures with other Regional Transmission Organizations and with interstate pipeline suppliers.).

[8] *See* PJM Manual 38: Operations Planning (Jan. 26, 2022), Attach. A (OATF Scope), https://pjm.com/-/media/documents/manuals/archive/m38/m38v15-operations-planning-01-26-2022.ashx ("Discrete unit outages for the study period will be determined based on an average obtained from unavailable generator MW (maintenance and unplanned) on ten days from the previous comparable season that are at or near the load level to be studied.").

rates. The study concluded that there were no reliability concerns at those elevated load levels.[9]

7. PJM also performed sensitivity studies assuming (1) almost all wind and solar generation would be unavailable and (2) there would be disruptions on gas pipelines. No reliability issues were identified.[10]

8. PJM considered the cumulative impacts of the 90/10 load case sensitivity study, low wind and solar sensitivity study and the pipeline disruption study. The cumulative impact of all three sensitivity studies was presented to the PJM System Operations Subcommittee on October 28, 2022. That presentation indicated that, taking account of all three sensitivity studies, the PJM 30-minute reserve requirement of 3.0 GW would be met plus there would be an additional reserve margin of 14.0 GW available.[11] This analysis did not rely on firm imports to serve load, but rather took a more realistic approach by modeling the net exports that PJM provides to the Eastern Interconnection because PJM is typically a net exporter of non-firm energy. PJM thus used an average of interchange values from the 10 peak days of the previous season to arrive at a net RTO interchange of 3,574 MW (exporting) in the Winter 2022/23 study. PJM also projected 7.6 GW of Winter pre/emergency load management (demand response) which was accounted for in reduced load projections. However, even when the projected impact of demand response was ignored, PJM's studies showed PJM could meet the 30-minute reserve requirement and still have an additional 6.4 GW reserve margin.

C. Generation Winter Preparation Requirements and Notices

9. PJM's winter preparation process considers NERC Guidelines, previous Bulk Electric System (BES) cold weather reports,[12] technical conferences, and Regional Entity workshops. PJM reviews the reports and guidelines before evaluating the PJM system, processes, and documentation to ensure applicable recommendations and potential improvements are addressed. PJM also reviews best practices and lessons learned from previous winters and shares its findings with PJM Members to ensure winterization

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[9] *See* Operations Assessment Task Force 2022-23 Winter Study (Nov. 3, 2022), *supra* n. 5.

[10] *See id*.

[11] *Id*.

[12] *E.g.*, FERC and NERC Staff Report on Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 2011 (Aug. 2011), https://www.ferc.gov/sites/default/files/2020-04/08-16-11-report.pdf; NERC, Polar Vortex Review (Sept. 2014), https://www.nerc.com/pa/rrm/January%202014%20Polar%20Vortex%20Review/Polar_Vortex_Review_29_Sept_2014_Final.pdf; FERC and NERC Staff Report on the South Central United States Cold Weather Bulk Electric System Event of January 17, 2018 (July 2019), https://www.nerc.com/pa/rrm/ea/Documents/South_Central_Cold_Weather_Event_FERC-NERC-Report_20190718.pdf; FERC - NERC - Regional Entity Staff Report: The February 2021 Cold Weather Outages in Texas and the South Central United States (Nov. 2021), *supra* n.1.

supplies and equipment are in place prior to the winter season. PJM Manuals are continuously updated to ensure PJM Members provide the critical data needed to assess the PJM system.

10. As described in PJM Manual 14D, Section 7.3.5,[13] PJM issues a data request to all generation resources to collect fuel switching capability, fuel supply and inventory, and emissions/environmental baseline information. This requirement is reviewed at the PJM Operating Committee in the fall.[14] In addition, Generating Unit minimums are validated annually as part of the PJM Cold Weather checklist eDART data request which in 2022 was open from November 7 to December 15. This requirement is also reviewed at the PJM Operating Committee in the fall.

11. Section 7.5.2 of Manual 14D[15] discusses Attachment N to Manual 14D, which is a "Cold Weather Preparation Guideline and Checklist" (Checklist). Attachment N was developed in response to the generator forced outages and start failures that occurred within the PJM footprint during the January 2014 Polar Vortex. The purpose of the Checklist is to identify and prioritize components, systems, and other areas of vulnerability that may experience freezing problems or other cold weather operational issues. It is intended to help generators mitigate such problems during cold weather events. The Checklist addresses areas such as training, personnel preparation, staffing, equipment preparation, fuel and environmental preparation, actions to be taken when cold weather is forecasted, actions during cold weather events, lessons learned after cold weather events as well as link to numerous documents that provide industry guidance.

12. More specifically, generator representatives are directed, between November 1 and December 15 of each year to verify via eDART that their represented resources have completed the items on the checklist or a substantially equivalent checklist the generator has developed. PJM enforces compliance with the Checklist submittal requirement by sending each generator data requests. The obligation to confirm or update eDART submissions regarding the Checklist remains in effect at least through February 28, for periods in which PJM issues a Cold Weather Advisory. 99% of all generators responded.

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[13] Manual 14D, § 7.3.5 (Fuel, Emissions, and Operational Data Reporting).

[14] *See* Generation Resource Cold Weather Preparation (Oct. 7, 2022), https://www.pjm.com/-/media/committees-groups/committees/oc/2022/20221007/item-16---generation-resource-cold-weather-preparation.ashx.

[15] Manual 14D, § 7.5.2 (Generation Resource Cold Weather Checklist) ("Attachment N of this Manual M14D contains the PJM generation resource Cold Weather Preparation Guideline and Checklist. This Checklist, or a similar one developed and maintained by the Generation Owner, should be used annually prior to the local National Oceanic and Atmospheric Administration (NOAA) first frost date to prepare its generation resources for extreme cold weather event operation. Between November 1st and December 15th of each year, the Generation Owner's representative shall verify via eDART that the represented generation resources have completed the items on the checklist, or a substantially equivalent one developed by the Generation Owner.").

Generators overwhelmingly indicated that they complied with the criteria for winter preparedness described in the PJM Guideline and Checklist.

13. In addition to the annual fuel and emissions data request described above, PJM also issues periodic data requests to all thermal generation resources during the winter season to collect additional information regarding fuel and non-fuel consumables used in power production.[16] Between October 3, 2022, and February 26, 2023, PJM issued weekly fuel and non-fuel consumable data requests to all thermal generators. This data was aggregated and reviewed internally by a cross-functional team to maintain situational awareness. The aggregated data was also posted publicly on the PJM Operating Committee website to raise awareness of fuel inventory trends.[17]

14. PJM issues an additional, annual data request to all generation resources to collect plant-specific data relative to cold weather operations. PJM commenced this practice in 2019 in response to recommendations in the 2019 FERC and NERC Staff Report on the MISO cold weather event in January 2018.[18] An updated data request asking for additional information from renewable resources was issued in 2021 to account for lessons learned and recommendations from the Electric Reliability Council of Texas (ERCOT) associated with Winter Storm Uri. For winter 2022/23, two additional questions were added to the data request to verify a generating facility's cold weather operating temperature limit and minimum start-up temperature.[19]

15. Section 7.5.1 of Manual 14D recommends that generators that have not operated in the eight weeks leading up to December 1 complete a resource operational exercise in December to evaluate their ability to operate in cold weather conditions.[20] Attachment N to Manual 14D also includes hyperlinks to various webpages with NERC "lessons learned" reports and training presentations, a NERC Reliability Guideline, and other winter reliability materials.

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[16] *See* Manual 14D, § 7.3.5.

[17] *See, e.g.*, PJM Fuel Supply Update (Feb. 9, 2023), https://pjm.com/-/media/committees-groups/committees/oc/2023/20230209/20230209-item-13---fuel-supply-overview.ashx; PJM Fuel Supply Update (Nov. 3, 2022), https://pjm.com/-/media/committees-groups/committees/oc/2022/20221103/item-16---fuel-supply-overview.ashx.

[18] 2019 FERC and NERC Staff Report: The South Central United States Cold Weather Bulk Electric System Event of January 17, 2018, https://www.nerc.com/pa/rrm/ea/Documents/South_Central_Cold_Weather_Event_FERC-NERC-Report_20190718.pdf.

[19] *See* Manual 13, § 3.3.1 at 54; Manual 14D, §7.3.5 at 75.

[20] Manual 14D, § 7.5.1 (Generation Resource Optional Exercise) ("In preparation for winter operations, PJM recommends that Generation Owners self-schedule any of their generation resources that have not operated in the 8 weeks leading up to December 1st to determine whether they are capable of reliably operating on both primary and alternate fuel and responding to PJM's dispatch instructions.").

16. In addition to sending data requests to generators and monitoring their responses, PJM took a number of actions prior to the winter of 2022/2023 to ensure generators were aware of performance expectations prior to and during cold weather conditions. Measures included:

    - September 29, 2022 Systems Operations Subcommittee, "Generation Resource Cold Weather Preparation" presentation, including, *inter alia*, Manual 14D, Attachment N checklist requirement and Manual 14D Cold Weather Exercise.

    - October 28, 2022 System Operations Subcommittee, "DTS Update," presentation reminding stakeholders, *inter alia*, of November 3, 2022 Winter Emergency Procedures Drill.

    - November 3, 2022 Winter Emergency Procedures Drill.

    - December 8, 2022 Operating Committee, Presentation regarding "Cold Weather Advisory Process," explaining expected generator actions in response to declaration of Cold Weather Advisory by PJM.

    - December 16-18, 2022 Cold Weather Advisory Drill.

17. PJM conducted its annual Winter Emergency Procedures Drill on November 3, 2022, for the winter 2022/2023. Information about the drill scenario is contained in the Emergency Procedures External Drill Packet and the Emergency Procedures Internal Drill Script. PJM offers an eLearning module each year in support of the drill. This online training course, available via the PJM Learning Management System (LMS), provides an overview of the emergency procedures that participants may encounter during the drill exercise. Information about this online training, including links to the course materials, is contained in the Emergency Procedures Refresh Training with Content Links document.

18. The Cold Weather Advisory Drill was held for the first time from December 16 through December 18, 2022. The Cold Weather Advisory Drill was designed to familiarize generators with the Cold Weather Advisory procedures added to the PJM Manuals in Fall 2022 in direct response to the recommendations set forth in the Winter Storm Uri Report and to allow generators time to prepare before PJM issues a Cold Weather Alert. In particular, this drill emphasized the procedures for updating cold weather operating limits for generators during a Cold Weather Advisory.

19. NERC also held a Winter Preparations Webinar on September 1, 2022.

D. Gas Industry Collaboration

20. PJM engages extensively with the natural gas industry. Prior to each winter season, PJM, along with fellow members of the ISO/RTO Council (IRC) Electric Gas Coordination Task Force, meets with all of the major interstate pipelines, the Interstate Natural Gas Association of America (the national pipeline trade organization), as well as the Natural Gas Supply Association, to review the upcoming winter and discuss mutual preparedness activities.

21. The PJM Gas Electric Coordination Team also conducts weekly operational calls during the winter months (November through March) with all of the major interstate natural gas pipelines in the PJM service territory. These interstate pipelines serve generation resources directly and also serve local gas distribution companies (LDCs), which in turn serve a smaller subset of PJM generators behind the LDC citygates. The purpose of these calls is to assess mutual system conditions. This includes reviewing load forecasts for both the electric and gas systems, any system outages that might impact service to generators, active and pending pipeline capacity restrictions, and any gas generation or gas nomination anomalies.

22. PJM also actively participates in the NAESB Gas Electric Harmonization Forum, which focuses on continuing efforts to address key lessons learned from Winter Storm Uri. PJM also routinely participates in gas electric drills and tabletop exercises with various strategic regional entities including individual interstate gas pipelines, local gas distribution companies, and through collaboration with neighboring transmission providers through the IRC Electric Gas Coordination Task Force and Eastern Interconnect Planning Collaborative (EIPC).

23. To better understand generator natural gas contract risks, PJM collects information regarding fuel availability though annual fuel data requests (via eDART), which ask generators to provide PJM information on their gas supply and transportation contracts. Additionally, the PJM Gas Electric Coordination Team conducts daily reviews during the winter months (November through March) of the interstate pipeline bulletin boards to assess pipeline operating conditions and identify potential natural gas supply risks to the natural gas-fired generation fleet. Daily gas risk assessment reports are prepared and shared with PJM Dispatch personnel to provide operational awareness.

24. PJM surveyed the PJM Member Transmission Owners to conduct a critical load review of gas production, processing, and transmission facilities, and to determine the level of protection such facilities should be accorded in the event of system stress or load shed. PJM considers electric powered gas compressor stations as critical load and collected data on the PJM Member Transmission Owner load shed plans and how gas infrastructure is treated. Manual 13, Section 2.3.2, Step 10[21] provides guidance on this topic and notes that critical load should be considered in PJM Member Transmission Owner load shed plans.

[21] Manual 13, § 2.3.2, Step 10 (Manual Load Dump Action), at 43 ("Member Load shed plans must recognize priority and critical load including: Essential health and public safety facilities such as hospitals, police, fire facilities, 911 facilities, wastewater treatment facilities; Facilities providing electric service to facilities associated with the Bulk Electric System including off-site power to generating stations, substation light and power; Critical gas infrastructure used to supply gas pipeline pumping plants, processing and production facilities; and Telecommunication facilities. Plans should be reviewed and updated at least annually including Attachment F of M-13.").

E. Existing Arrangements With Other Reliability Coordinators

25. PJM maintains close arrangements with other Reliability Coordinators on emergency operations. Specifically, PJM has joint operating and or joint coordination agreements with Midcontinent Independent System Operator, Inc. (MISO), Tennessee Valley Authority (TVA), New York Independent System Operator, Inc. (NYISO), Duke Progress, and VACAR South RC (VACAR). As explained in Section 5.1 of PJM Manual 37, "the coordination agreements detail requirements to which both parties are committed to preserve reliability. The agreements address a wide range of topics, including . . . emergency operations, [and] provide for the ongoing cooperation between the signatories by the establishment of joint operating committees that meet periodically to discuss and resolve operational issues."[22] PJM Manual 37 further provides that if an emergency situation is in progress, or imminent, PJM will provide notification to neighboring Reliability Coordinators by phone or conference call and enter a message on the Reliability Coordinators Information System (RCIS).[23] If the situation is of a magnitude that coordinated action or assistance may be necessary, Manual 37 requires that there be a conference call on the NERC hotline, or on a commercial teleconferencing service.[24]

26. Moreover, peak load estimates, reserve requirements and estimated loads are discussed during a daily 03:30 AM conference call. Participants on this call include TVA, VACAR, MISO, PJM, and the Florida Reliability Coordinating Council (FRCC). PJM conducts a similar call with NYISO and MISO at 05:00 AM and 8:00 AM each morning, respectively. Load projections, reserves and anticipated daily challenges are discussed on these calls.

F. Cold Weather Advisories and Cold Weather Alerts

1. Cold Weather Advisories

27. As noted in section 3.3.1 of Manual 13, PJM issues Cold Weather Advisories when possible "to provide an early notice that forecasted temperatures may call for a Cold Weather Alert. The early notification of an Advisory is intended to provide PJM members ample time to gather information required by NERC standards EOP-011, Emergency Preparedness and Operations, IRO-010 RC Data Specification and Collection, and TOP-003 Operational Reliability Data."[25] Upon issuance of a Cold Weather Advisory, generators are expected to take the following actions:

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[22] PJM Manual 37: Reliability Coordination (Mar. 23, 2022), § 5.1 (Agreements with Neighboring Reliability Coordinators), https://pjm.com/-/media/documents/manuals/archive/m37/m37v19-reliability-coordination-03-23-2022.ashx.

[23] *Id.* § 5.2.2 (Required Notifications).

[24] *Id.*

[25] Manual 13, § 3.3.1 (Cold Weather Advisory).

- Prepare to take freeze protection actions such as erecting temporary windbreaks or shelters, positioning heaters, verifying heat trace systems, or draining equipment prone to freezing.

- Review weather forecasts to determine any forecasted operational changes, and notify PJM of any changes.

- Update Markets Gateway and eDART by entering unit specific operation limitations associated with cold weather preparedness. Such operation limitations include: generator capability and availability; fuel supply and inventory concerns; fuel switching capabilities; environmental constraints; and generating unit minimums (design temperature, historical operating temperature, or cold weather performance temperature).

28. After declaring a Cold Weather Advisory, PJM takes additional steps to ensure reliability, such as scheduling additional generation and accounting for a higher forced outage rate during cold weather operations. An important component in PJM's decision-making is the data supplied by generators. PJM will compare the data to the forecasted temperatures and determine if there will be any limiting factors for the generation fleet and prepare accordingly. Natural gas-fired units should reflect any fuel restrictions when updating their unit offer parameters within Markets Gateway, and eDART and should report unplanned outages if they are unable to run.

2. Cold Weather Alerts

29. The purpose of the Cold Weather Alert is to prepare personnel and facilities for expected extreme cold weather conditions. PJM will generally initiate a Cold Weather Alert for all or part of PJM when the forecasted weather conditions approach minimum or actual temperatures of 10°F or below, but this is not a hard and fast guideline.

30. PJM may issue Cold Weather Alerts when warmer temperatures are forecasted if PJM anticipates increased winds or if PJM projects that spot market gas may not be available to gas-fired generators during load pick-up periods. Coordination and communication with the applicable natural gas transmission pipelines, in conjunction with neighboring RTOs/ISOs, is implemented to help ensure that the availability of the natural gas needed for generation resources is assessed and that contingency plans are developed, if necessary. In deciding whether and when to issue a Cold Weather Alert, PJM relies upon historical experience, information supplied by the pipelines and information supplied from the generator owners. Pursuant to Manual 13 section 3.3.2, PJM takes the following steps when a Cold Weather Alert is called:

- Generation dispatchers update their unit parameters, including the Start-up and Notification, Min Run Time, Max Run Time, Eco Min, Eco Max, etc. in Markets Gateway. This includes updating performance limited schedule parameters as indicated in Manual 11 Section 2.3.4.

- Generation dispatchers report to PJM Dispatch any and all resource limited facilities as they occur via Markets Gateway, as described in Section 6.4, and update PJM Dispatch as appropriate.

- Generation dispatchers with dual fuel determine whether alternate fuel will be made available to PJM for dispatch. If made available, any known alternate fuel resource limitations will be communicated via Markets Gateway.

- Generation dispatchers, based on direction received from PJM, call in or schedule personnel in sufficient time to ensure that all combustion turbines and diesel generators that are expected to operate are started and available for loading when needed for the morning pick up. This includes operations, maintenance, and technical personnel that are necessary to gradually start all equipment during the midnight period. The units are brought on at engine idle, where possible, and loaded as necessary to maintain reliability. Once units are started, they remain on-line until the PJM dispatcher requests the units be shut down. Combustion Turbine units running to provide Synchronized Reserve are monitored closely for situations in which fuel and delivery may be hampered. Each generator owner attempts to start their most troublesome or unreliable units first.

- Generation dispatchers review their combustion turbine capacities, specifically units burning No. 2 fuel oil that do not have sufficient additive to protect them from the predicted low temperature.

- Generation dispatchers review fuel supply/delivery schedules in anticipation of greater than normal operation of units.

- Generation dispatchers monitor and report projected fuel limitations to PJM Dispatch and update the unit Max Run field in Markets Gateway if less than 24 hours of runtime are remaining.

- Generation dispatchers contact PJM Dispatch if it is anticipated that spot market gas is unavailable, resulting in unavailability of bid-in generation.

- Transmission/Generation dispatchers review plans to determine if any maintenance or testing, scheduled or being performed, on any monitoring, control, transmission, or generating equipment can be deferred or cancelled.

- Generation dispatchers will update the "early return time" for any Planned generator outages as indicated in Manual 10 section 2.2.2.[26]

[26] PJM Manual 10: Pre-Scheduling Operations (Dec. 21, 2022), § 2.2.2 (Planned Outage Rules), https://www.pjm.com/-/media/documents/manuals/m10.ashx.

G. PJM Staffing

31. PJM staff receives extensive training on system operations during cold weather conditions. PJM staff participates in the drills and other generator training events discussed above.[27] PJM conducts annual training, monthly load shed drills, and pre-winter and summer Emergency Procedures drills to train operators in the proper issuance of emergency procedures and coordination with members.

32. Beginning on December 23, 2023, PJM brought in additional control room, support, and management staff that remained on duty throughout the entirety of the cold weather event, including overnight hours. Personnel also supported remotely, and some were recalled from scheduled vacations. Additional control room staff assisted with excessive system operations and phone call volume. Support staff assisted with procedure adherence (including emergency procedures). Management helped with decision-making and handling additional coordination calls both internally at PJM and externally with PJM members.

33. In addition to control room staff and direct control room support staff, PJM also activated the Operations Event Response Team (OERT). The OERT is a cross-divisional group of internal PJM employees designed to help prepare for and respond to operational events and includes participants from Dispatch Leadership, Corporate Communications, State and Government Affairs, Member Relations, Generation Department, Demand Response, Market Operations, EMS Support, Legal, Transmission Services and Federal Government Policy. Subject matter experts (including those supporting load forecasts) provided guidance.

H. PJM's Status in the Period Leading Up to the December 23 and December 24 Emergency Declarations

34. Under Manual 13, PJM attempts to issue Cold Weather Advisories as far in advance as possible, typically within 3-5 days of the expected cold weather, but given fluctuating and changing weather forecasts advisories, Cold Weather Advisories could be issued up to 24 hours in advance.[28] The PJM Manuals do not specify a targeted timeline for issuing a Cold Weather Alert. The actual timeline for issuing Cold Weather Advisories and Cold Weather Alerts for Winter Storm Elliott (including on December 25) was as follows:

- 12/20/2022 09:00: PJM issued a Cold Weather Advisory for the Western Region zones from 07:00 on 12/23/2022 through 23:00 on 12/25/2022.

- 12/21/2022 10:00: PJM extended the Cold Weather Advisory for the Western Region zones from 07:00 on 12/23/2022 through 23:00 on 12/26/2022 (originally posted to end on 12/25/2022).

[27] *See supra* P 22.

[28] Manual 13, § 3.3.1.

- 12/22/2022: 17:30: PJM expanded its Cold Weather Advisory from 07:00 on 12/23 through 23:00 on 12/26/2022 to the entire RTO (originally for Western Region zones).

- 12/23/2022: 11:00: PJM issued a Cold Weather Alert for the entire RTO from 00:00 on 12/24/2022 through 23:59 on 12/25/2022.

- 12/25/2022: 11:10: PJM issued a Cold Weather Alert from 07:00 on 12/26/2022 through 23:00 on 12/26/2022 for the Western Region zones only.

- 12/26/2022: 23:00: Cold Weather Alert Ended.

35. PJM Dispatch relies on the data generators supply concerning their unit parameters. But many generators failed to update their parameters in a timely manner in accordance with the Manual 13 procedures. In particular, many owners of gas-fired generators did not provide updates regarding the availability of natural gas needed for fuel. Although many gas-fired generators were unable to obtain gas, PJM Dispatch learned about most of these fuel limitations only when PJM called the units to come online. Generators provided PJM little or no notice regarding their fuel limitations. Indeed, PJM received a significant amount of incomplete or inaccurate data from the generation fleet. PJM relied on this same data to make advance and real-time decisions.

36. However, the single largest driver of forced outages was mechanical failures. Many units simply were unable to operate to their stated minimum operating temperatures which were requested and supplied by the generation owners during the declared Cold Weather Advisory.

37. PJM did not forecast any potential capacity issues in the seven days prior to the operating day of December 23. PJM tracks and maintains generator outage margins by transmission owner zone and the RTO as a whole to ensure that enough generation is held in reserve and not unavailable on planned or maintenance outages at any given time. Long term (*i.e.*, greater than seven days out), the generator outage margin is calculated based on the long-term load forecast. Near term (today plus six days), the generator outage margin is calculated using the short-term load forecast. In the seven days leading up to December 23, the outage reserve margins exceeded 30 GW in PJM.

38. Nor did PJM forecast any potential capacity issues on a day-ahead basis leading into the December 23 operating day. On a day ahead basis, PJM calculated 29 GW of *additional operating capacity* in excess of what was already scheduled to meet the demand for the operating day. Based on this, no generation maintenance outages were recalled.

39. PJM participated in Northeast Power Coordinating Council (NPCC) CO-8 Operations Managers calls prior to, during, and after Winter Storm Elliott to discuss system operations between neighboring Reliability Coordinators. The NPCC geographic region includes the State of New York and the six New England states, along with the Canadian provinces of Ontario, Québec, and the Maritime provinces of New Brunswick and Nova Scotia.

Projected reserves, loads, and challenges were discussed on the calls, as were additional reserves available in the event that energy would need to be shared between NPCC areas.

40. The SERC Reliability Corporation (SERC) also conducted communications between PJM and neighboring Reliability Coordination, and PJM participated and exchanged information with it. And as discussed *supra*, there are regular daily morning conference calls with TVA, VACAR, MISO, PJM, and FRCC, NYISO and MISO. These calls continued to occur during this period.

41. Regarding transmission outages, PJM initiated near-term analysis studies three business days before the start of the outage. Once the Cold Weather Alert was issued, PJM evaluated the need to recall any existing outages and/or to deny any scheduled outages. It was determined that one outage, which occurred on the Black Oak – Hatfield 500 kV line (eDART # 1053409), should be denied due to a conflict and the impending cold weather. This would allow for additional power transfer across PJM's high-voltage transmission backbone. PJM also conducted System Operations Subcommittee conference calls with transmission owners (SOS-T) on December 23 and 24 to communicate anticipated system conditions and challenges. Further, PJM was in coordination with Transmission Owners regarding major outages that were scheduled to return. As a result of said coordination, PJM was able to work with multiple Transmission Owners to restore both a 500 kV & 765 kV transmission line on December 23, an earlier turnaround than originally estimated.

I. ROCK SPRINGS PERFORMANCE DURING WINTER STORM ELLIOTT

1. During the December 23 PAI and the First Two Hours of the December 24 PAI, PJM Did Not Schedule Essential Power Rock Springs Solely Due to its Long Lead Times

42. I have reviewed the Nautilus Complaint.[29] As I explain here, the reason PJM did not dispatch Essential Power Rock Springs, LLC (Rock Springs) Springs to operate during the Performance Assessment Intervals on December 23, 2022 and for the first two hours of the December 24, 2022 PAI (the Relevant Period) was their very limiting long lead times. The Nautilus Complainants are incorrect in asserting that "PJM did not call or dispatch Rock Springs at all on December 23, likely because the operation of Rock Springs adversely affects a constraint at the Nottingham Series Reactor . . . on the PJM system[.]"[30]

43. As PJM operators worked diligently to maintain reliability and keep the lights on in the face of very challenging conditions, including a rapidly increasing forced outage rate occurring on December 23 through December 24, PJM could not schedule Rock Springs to operate during the Relevant Period to meet the emergency conditions solely due to the long lead times specified in their operating parameter limitations.

[29] *See, e.g.*, Nautilus Complaint at 29-30.

[30] *Id*. at 29.

44. Rock Springs had a range of long lead times, varying by hour, for the resources' time-to-start parameters (notification plus startup time) across both December 23 and December 24. Specifically, on December 23, 2022 as of the time the December 23 PAI started, Rock Springs reported to PJM a time-to-start of [redacted] hours. On the same operating day, Rock Springs's time-to-start parameter went as high as [redacted] hours (for the hour beginning 20:00 during the December 23 PAI). At the start of the PAI on December 24, Rock Springs's parameters reflected a time-to-start of [redacted] hours. These long notification plus start times carried Rock Springs's unavailability [redacted], and certainly [redacted] hours of the December 24 PAI which started at 04:25. Under these facts, for scheduling and dispatch purposes, PJM cannot count on a resource to be online and capable of providing energy until after the notification and startup time has elapsed.

45. At the times PJM would have needed to contact Rock Springs—in accordance with its operating parameter limitations—for those resources to help address emergency conditions, forecasted system conditions did not support dispatching those resources. As discussed, on the morning of December 23, PJM saw 29 GW of capacity reporting as available.[31] Accordingly, PJM dispatchers would have needed perfect foresight of the unexpectedly fast-changing weather conditions and the unprecedented scale of forced outages to dispatch Rock Springs sufficiently in advance of the emergency conditions that PJM declared at 17:30 December 23.[32] But PJM dispatchers do not have perfect foresight. Instead, they rely on the data in front of them and a reasonable expectation that Capacity Resources will fulfill their obligation to perform during emergency conditions.

46. To respond to the rapidly changing conditions, including the number of resources failed to show up with little or no warning on December 23, PJM operators called on resources with as short a lead time as possible to alleviate the conditions sooner. Even though PJM needed Rock Springs (and countless other generators) to provide energy to help alleviate the emergency conditions, PJM could not call on Rock Springs because it would take too long to arrive. System conditions can be very fast-moving as demonstrated by the unprecedented generator failure rate of the PJM fleet during this event. Had Rock Springs been available with much shorter notification plus startup times it could have helped PJM manage those rapidly evolving conditions during Winter Storm Elliott, and PJM would have dispatched its resources.

47. After the evening peak of December 23, PJM Dispatch started to evaluate all available units which could be online for the upcoming morning peak of December 24. Roughly, this was any unit with a [redacted]-hour or less notification plus startup time. At 06:37 on December 24, 2022, Rock Springs informed PJM by telephone that it would take [redacted] hours for it to come online. Five minutes later, Rock Springs called again, this time informing PJM that it would actually take [redacted] hours. PJM's dispatchers scheduled Rock Springs to come online, and Rock Springs confirmed this schedule. Twenty minutes after that, at

[31] Generation resources show availability (or unavailability) through PJM's Dispatcher Application and Reporting Tool (eDART) and the Markets Gateway.

[32] PJM issued a Pre-Emergency Load Management Reduction Action and Maximum Generation Action at 17:30 on December 23.

07:02 on December 24, Rock Springs spoke to PJM and said, "Um, just wondering, uh, you guys called on our, uh, Rock Springs CTs 2, 3, and 4, and, um, we have the min runtime [redacted] for those units." In that same call, PJM told Rock Springs, "we just need the megawatts" and PJM indicated it would honor that minimum run time.

48. As is discussed further below, Rock Springs never actually ran on December 24. Rock Springs' long lead time is driven by its inherent physical characteristics, and not outside forces. That is, Rock Springs elected to commit to provide capacity from resources that take a very long time from when PJM asks them to provide energy until they are capable of doing so. Rock Springs unquestionably assumed the performance risk associated with such commitments.

2. During the Remainder of the December 24 PAIs Rock Springs Failed to Operate Because it Had No Fuel

49. Rock Springs concedes it had no fuel for all other periods of the December 24 PAI. [33] At 10:30 on December 24, Rock Springs called PJM and said, "regarding Rock Springs CT 2, 3, and 4, uh, those units were requested online for start today. There is no fuel supply available for those units right now. We're going to have to put those in forced outage and they'll be unavailable until Monday at 10:00 a.m." Consistent with that communication, Rock Springs never ran on December 24. .

50. Responsibility for procuring fuel and updating its status and operating parameters in the PJM systems rests with Capacity Market Sellers such as Rock Springs. PJM does not arrange or direct fuel procurement and can only act on the information Capacity Market Sellers have provided as to their generating units.

51. PJM's Capacity Performance rules put on Capacity Market Sellers the responsibility for Capacity Resources to perform, and the risk of Non-Performance Charges if they do not perform. In my experience, Capacity Market Sellers or their energy managers have options to mitigate resource performance risks associated with fuel supply through measures such as firm fuel supply and transmission contracts, adding dual-fuel capability to the plant, or maintaining a multi-day supply of fuel on site. But PJM does not make decisions about fuel procurement, fuel transportation, or fuel storage risk for the generators. In fact, PJM instructs its operators they are *not* to direct generators to purchase fuel. This specific instruction came out of the 2014 Polar Vortex events and subsequent litigation concerning PJM instructions to certain generation owners.[34]

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[33] The Nautilus Complaint concedes that at approximately 06:30 on December 24, "PJM called Rock Springs and asked it to operate Units 2, 3, and 4" and that, in response to that call, "Rock Springs informed PJM that it would not be available until 15:00 EPT at the earliest" because of lack of fuel. Nautilus Complaint at 30.

[34] *Old Dominion Elec. Coop.*, 151 FERC ¶ 61,207 (2015), *reh'g denied*, 154 FERC ¶ 61,155 (2016), *aff'd, Old Dominion Elec. Coop. v. FERC*, 892 F.3d 1223 (D.C. Cir. 2018).

52. From the perspective of PJM Dispatch, when a Capacity Market Seller or its energy manager rebuffs a PJM request to run a Capacity Resource in accordance with its offer parameters (whether or not in an emergency), the resource is unavailable, and it is incumbent on the Capacity Market Seller or its energy manager to reflect that status in PJM's systems by submitting a forced outage ticket. Capacity Market Sellers are expected to provide accurate, updated information to PJM, through PJM's Markets Gateway and eDART[35] systems as their parameters or status change(s), so that PJM operators can make sound operating choices based on current, accurate information. PJM operators can only make decisions based on the information provided to them, and Capacity Market Sellers or their energy managers, who best know the status of their resources and their parameters, are the best source of that information.

53. During Winter Storm Elliott, PJM operators found that they did not have current, accurate information because Capacity Market Sellers were not proactively updating their units' status and parameters in Markets Gateway and eDART. Instead, PJM had many Capacity Market Sellers inform PJM of their operating status, fuel status, or operating parameter changes only when talking with PJM operators. Rock Springs fit this pattern of behavior.

54. Even though PJM issued multiple Cold Weather Advisories and Alerts, Rock Springs made no effort to procure fuel so that it could perform if needed. Rock Springs could have been in a position to meet its Capacity Performance obligations during the Performance Assessment Intervals by making the choice to self-schedule the units. Even if PJM does not dispatch a Capacity Resource, the seller can request approval from PJM to self-schedule it and be granted to the ability to come online and generate, while not subject to PJM dispatch. PJM evaluates such requests to determine whether the self-schedule will affect reliability. For example, to accommodate a self-schedule request, PJM may need to redispatch other generation resources to manage the flows generated by the self-scheduled resource. But PJM's standard for denying a self-schedule request is relatively high. If, and only if, allowing the self-scheduled resource to come online would cause uncontrollable reliability issues would PJM deny the request.

55. At a time when PJM needed every MW it could call online, Rock Springs made its facility unavailable for the entire day on December 24, 2022.

56. This concludes my affidavit.

[35] eDART (Dispatcher Application and Reporting Tool) is a PJM mechanism that allows generation and transmission owners to submit generation and transmission outage requests. eDART allows its users to manage their outage data by viewing the status of their outages and obtaining outage reports. *See eDart*, PJM Interconnection, L.L.C., https://www.pjm.com/markets-and-operations/etools/edart (last visited May 24, 2023).

PUBLIC VERSION

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Power OPP, LLC, *et al.*	)	
Complainants	)	
	v.)	**Docket No. EL23-53-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Aurora Generation, LLC, *et al.*	)	
Complainants	)	
	v.)	**Docket No. EL23-54-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Coalition of PJM Capacity Resources	)	
Complainant	)	
	v.)	**Docket No. EL23-55-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	

VERIFICATION

I, **Donald Bielak**, state, under penalty of perjury, that I am the Donald Bielak referred to in the foregoing document entitled "Affidavit of Donald Bielak on Behalf of PJM Interconnection, L.L.C.," 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.

_____
Donald Bielak

Exhibit 3

Affidavit of Joseph Mulhern

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Power OPP, LLC, *et al.*	)	
Complainants	)	
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PJM Interconnection, L.L.C.	)	
Respondent	)	

AFFIDAVIT OF JOSEPH MULHERN
ON BEHALF OF PJM INTERCONNECTION, L.L.C.

1. My name is Joseph Mulhern. My business address is 2750 Monroe Blvd., Audubon, Pennsylvania, 19403. I currently serve as Lead Engineer, Market Coordination for PJM Interconnection, L.L.C. (PJM). I am submitting this affidavit to support PJM's separate Answers to the complaints filed by the "Nautilus Entities,"[1] the "ComEd Zone Generators,"[2] and the Coalition of PJM Capacity Resources[3] that are being filed today in

[1] The Nautilus Entities are Essential Power OPP, LLC (OPP), Essential Power Rock Springs, LLC, and Lakewood Cogeneration, L.P..

[2] The ComEd Zone Generators are Aurora Generation, LLC, Elwood Energy, LLC, Jackson Generation, LLC, Lee County Generating Station LLC, Lincoln Generating Facility, LSP University Park, Rockford Power, LLC, Rockford Power II, LLC, and University Park Energy, LLC.

[3] The members of the Coalition of PJM Capacity Resources are: Ad Hoc Committee of Certain Noteholders of Talen Energy Corp.; Clean Energy Future – Lordstown, LLC Competitive Power Ventures Holdings, LP; Hickory Run Energy, LLC; Lanyard Power Holdings, LLC; Lightstone Marketing LLC; Orion Power Holdings, LLC; Parkway Generation Operating LLC; Brunner Island, LLC, H.A. Wagner LLC, Montour, LLC, Camden Plant Holding, L.L.C., MC Project Company LLC; Talen Energy Marketing, LLC; Red Oak Power, LLC; and South Field Energy LLC.

the captioned proceedings. For ease of reference, I will use the term "Complainants" when referring to all three groups of complainants.

2. As part of my current work for PJM I am focused on facilitating accurate load forecasting by configuring and training models, optimizing input data, assessing performance, and communicating load forecast information to PJM dispatchers. My work also involves improving load, wind, and solar forecast accuracy and facilitating the successful integration of renewables by enhancing the use of forecast data, evolving business rules, and educating stakeholders.

3. Starting in 2010 I have held positions at PJM as a Senior Engineer I and II, Generation, Engineer II, Outage Analysis Technologies, and Engineer I, Operations Planning. My work in these roles has often involved load forecasting issues. As an Engineer I and II, I was responsible for performing transmission outage analysis studies, in which I used load forecast data to model the system. As an Engineer II through Senior Engineer II, I served as project manager for an extensive capital project to refresh PJM's seven forecast applications that manage the complex flow of data for load, weather, wind, solar, and interchange forecasting. My hands-on load forecasting experience began in 2020 when assessing COVID-19 impacts on load, and expanded to include providing daily advice to Dispatch. During this time, I designed multiple tools to assess load and weather forecast error, and was instrumental in creating PJM's load forecasts for Christmas Eve and Christmas in 2021 and Thanksgiving in 2022, all of which performed far better than the default model (by 39%, 72%, and 69%, respectively).

4. I have a Master's Degree in Business Administration—Strategic Management from Villanova University and a Master of Engineering—Energy Systems Engineering from Lehigh University. I also have a Bachelor of Science in physics from Villanova University.

5. I was directly involved in preparing, and subsequently reviewing, the PJM load forecasts for December 23 and 24, 2022, i.e., the two days at issue in this proceeding, which are commonly known as Winter Storm Elliott.[4]

6. The purpose of this affidavit is to show that Complainants' various claims that PJM's load forecasts for December 23 and 24 were "inaccurate" or otherwise materially flawed are wrong. Complainants' mischaracterizations of the quality of PJM's forecasts reflect, at best, serious misunderstandings of load forecasting and the difficulty of anticipating conditions as exceptional as those that existed during Winter Storm Elliott.

7. I take issue with any notion that PJM "failed" at forecasting for December 23 and December 24, 2022. As I will explain, PJM's load forecasts for the relevant days proved to be less accurate than normal for a variety of reasons. That does not change the conclusion that PJM's forecasts were reasonable given the information available to PJM at the time that they were made. It is simply not correct to assert that PJM "failed" to fulfill

[4] *See* https://www.pjm.com/markets-and-operations/winter-storm-elliott (collecting PJM's public statements addressing Winter Storm Elliott's impact on PJM's operations and markets).

its load forecasting responsibilities in connection with Winter Storm Elliott. PJM used its state-of-the art load forecasting model and followed good forecasting practices.

8. I also think that it would be a serious mistake to conclude that the forecasts for December 23 and 24 indicate that there is some material defect in PJM's load forecasting overall. On the contrary, the weather and load conditions on December 23 and 24 could not have reasonably been anticipated because, by every objective measure, those conditions were extremely abnormal.

A. Introduction

9. Like other Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs), PJM produces a load forecast for each of its transmission zones for the next several days. Load forecasting attempts to determine how much electricity demand there will be using weather forecast data and historical observations of load and weather. Uncertainty is inherent in any forecast. This is especially true of load forecasting because of its dependence on weather forecasts, which are famously uncertain, and on unpredictable human behavior patterns.

10. PJM uses sophisticated software, combined with informed human review and frequent human intervention, to forecast load as accurately as is practicable notwithstanding the innate fallibility of any human attempt to predict the future. PJM also reviews forecast performance on a daily basis, analyzes days with significant error, and actively participates in load forecasting working groups with other ISOs and RTOs.

11. PJM diligently maintains high quality forecast systems and produces well-developed forecasts. PJM continuously strives to meet a specified accuracy threshold. PJM reviews this load forecasting metric and performance with market participants on a monthly basis.

12. While the results of the load forecasting process can provide insight into how much generation might be required on a future day, the load forecast is not all that PJM uses to make generation commitments. Reserves, operator-entered case adjustments, and additional capacity commitments are used to account for uncertainty.

B. How PJM Load Forecasts Are Created

13. PJM's hourly load forecast covers the remainder of the current day as well as the next six days. The forecasting process begins with the hourly retrieval of weather forecast data from three separate private weather companies. PJM uses three reputable vendors, because of the strong benefits doing so has for reliability and accuracy. Using multiple vendors promotes redundancy in the event of failure of one or two vendors, and by averaging the vendor forecasts together, it allows for any significant error from any one vendor's forecast to be moderated by the other forecasts. PJM operations staff pay close attention to weather vendor performance, and use a daily report to monitor and compare performance on a daily

basis. Output of this report is used to inform decisions about how much weight is given to each weather vendor in the averaging process.

14. After the vendor forecasts are combined for 28 designated weather stations in the PJM footprint, the resultant forecasts become inputs into another weighted average calculation that determines a singular weather forecast value for each hour in 10 forecast zones for each hour.

15. The zonal weather forecast dataset is then used as input into the load forecast. For this, PJM uses a load forecasting algorithm that is widely used in the industry. The system runs on in-house computers and produces a series of outputs for each transmission zone for each hour in the outlook timeframe (remainder of current day plus next six days). There are multiple outputs because the system runs a wide suite of models, including the following:

- Models created by the algorithms designer are combined into an ensemble, where models with better recent performance are weighted higher, which then becomes PJM's default forecast before any manual adjustments are applied:
    - A neural network model that uses temperature as an input.
    - A neural network model that uses temperature as an input and is optimized for sudden changes in temperature.
    - A pattern matching algorithm that creates a load forecast by applying a weighted average to days with similar weather that occurred in the past.
- Models created internally by PJM:
    - A neural network model that uses effective temperature (which accounts for wind speed) as an input.
        - In the summer months, this model uses temperature humidity index instead of effective temperature.
    - A neural network that replaces recent historical load and weather data with forecasted values.

16. Output from all of these models are visualized in an in-house tool called LoadCast. LoadCast is prominently displayed in the control room on the desktop of the operator responsible for making manual adjustments to the published forecast, and also used extensively by support engineers who provide advice on how to make these manual adjustments.

17. The LoadCast tool also offers the ability to manually create a load forecast by plotting individual historical days with similar temperature profiles. This mimics a legacy load forecasting approach and provides a useful sanity check to verify the output of the models.

18. PJM uses multiple tools to visualize weather data. A custom in-house weather dashboard presents temperature, effective temperature, wind speed, cloud cover, and other parameters for weather stations and forecast zones for the current day and next six days. The dashboard features charts that compare vendor forecasts and show the 24 hour change in temperature; and daily written reports describing forecasted weather conditions in each of

three major zones in PJM. A dashboard with maps of the United States and parts of Canada shows real-time temperature, radar, dew point, and infrared and forecasted temperature deviations from normal for the current day and next 14 days. A custom Dispatch interactive mapping tool shows weather radar and satellite; temperature, wind speed, dew point, and relative humidity observations; local storm reports; National Weather Service bulletins; and a variety of severe conditions.

C. How PJM Optimizes Accuracy in Load Forecasting

19. PJM Operations staff closely monitor load forecast accuracy and model performance. A company forecast metric requires that 91% of days in the calendar year have a daily average load forecast error of less than 3%. The following table summarizes compliance with that goal. Forecast accuracy in 2021 and 2022 surpassed the three preceding years, and accuracy in 2023 is 97.16% as of May 22, 2023, which is better than the past five years.

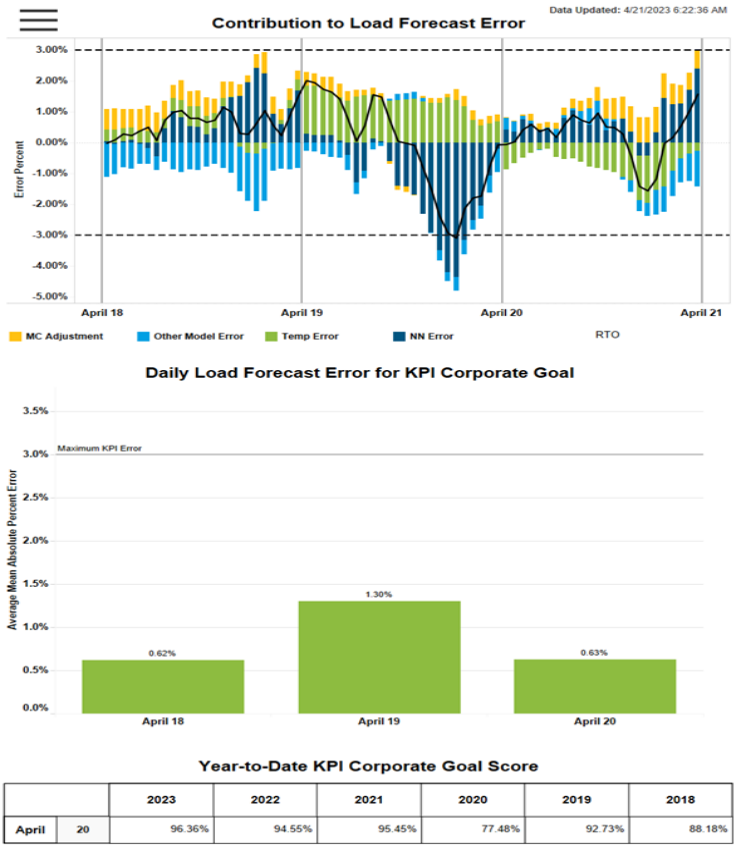
Table 1: Percentages of Days with Load Forecast Error Under 3%

2023	N/A
2022	91.51%
2021	92.60%
2020	85.52%
2019	90.36%
2018	91.23%

20. Each morning, PJM operations staff and leadership review a report of forecast performance from the previous day. The report contains the day's load forecast score and a chart that depicts the contributions to load forecast error from weather forecast error, model error, and human adjustments. These contributions are quantified by running a backcast algorithm and computing the difference between various outputs. This information allows control room staff to observe trends, such as under- or over-forecasting that repeats at certain times of day, and correct for them in future forecasts.

21. Figure 1 below presents an example of a recent daily report addressing load forecasting errors.

Figure 1: Sample Load Forecast Error Report



D. "Training" the PJM Load Forecasting Model

22. PJM Operations staff trains the neural network models on three years of historical load and weather data. A three year term is the industry standard for model training. It appropriately balances having enough historical data to adequately capture the way load responds to a variety of weather conditions and not including obsolete data that does not reflect the current load/weather relationship. The latter concern has become more pronounced in recent years as COVID-19, energy efficiency, and increased behind-the-meter solar and data center load have all contributed to reshaping the load profile. The models then continue to learn and adapt from new data that comes in after the end of the training period.

23. The current training period spans from July 2019 to June 2022. That period went into effect in August 2022 after weeks of testing.

E. Winter Storm Elliot and PJM's Load Forecasts

24. Winter Storm Elliott was an unusually severe winter storm that struck the PJM Region between December 23 and December 24, 2022. Winter Storm Elliott presented

extraordinary reliability challenges by causing an extremely rapid drop in temperatures at a time of record-breaking high loads for the Christmas holiday. Winter Storm Elliott had a major, and in many ways unanticipated, impact not just on PJM but on much of the rest of the Eastern Interconnection. Thus, I think that it is a mistake to suggest that Winter Storm Elliott was a routine storm that "played out as forecast."[5]

25. Two factors beyond what PJM normally encounters were the largest contributors to the greater-than-normal difference between PJM's load forecasts and actual load during Winter Storm Elliott.

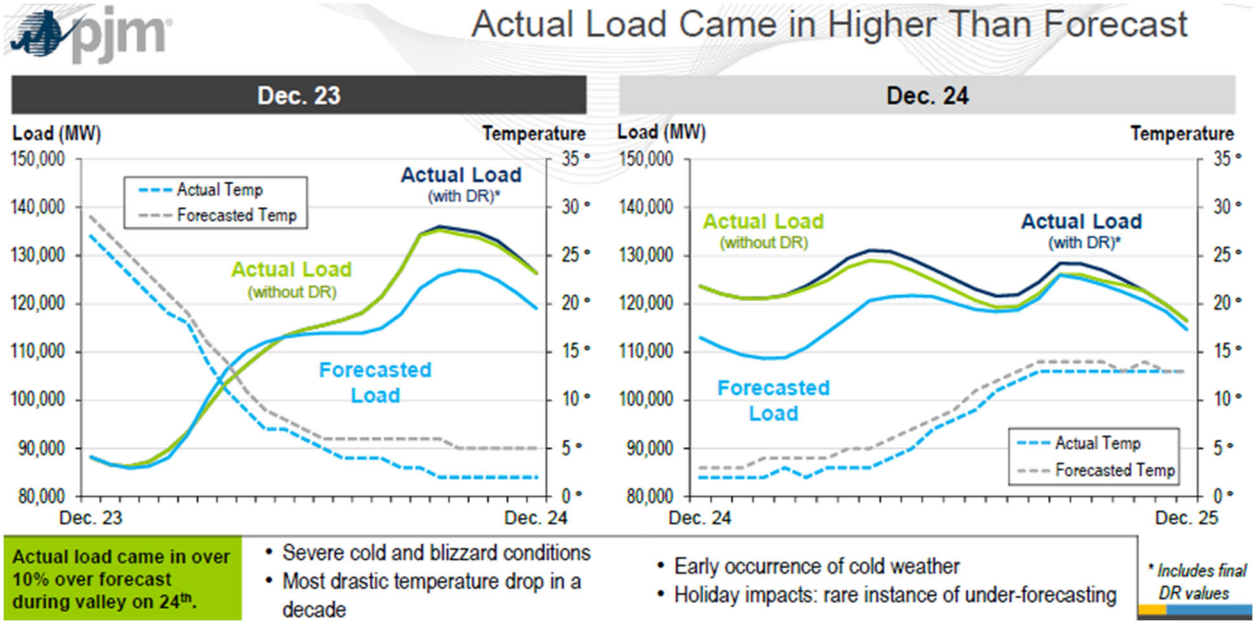
26. First, the proximity to the Christmas holiday, and ongoing changes in patterns of human behavior during holiday periods, meant that PJM's load forecasting model faced an unusual challenge. In particular, load has traditionally been over-forecasted by models in the days leading up to Christmas. As discussed below, PJM realized that Winter Storm Elliott could deviate from historic trends and established a higher-than-usual load forecast for early Winter. But actual load unexpectedly came in much higher than even PJM's atypically high projection.

27. Second, the extreme weather associated with Winter Storm Elliott's movement into and across the PJM region was outside the bounds of anything the model had seen before in its training data. Not only were the temperatures colder than any in the model's history for the time of year, but the rate of the temperature decrease, an abrupt 29° F in just 12 hours, was faster than for any cold weather event for more than a decade (which encompasses the entire model training history of PJM's current suite of forecasting tools). In some parts of PJM, the highest temperatures on December 24 were the coldest in recorded history for that date.

28. As shown below in Figure 2, actual loads in PJM were higher than forecast, with the evening peak on December 23 and morning peak on December 24 both underestimated by approximately 7%.

[5] *See, e.g.*, Complaint of The Coalition of PJM Capacity Resources (Coalition Complaint) at 8, Docket No. EL23-55 (filed Apr. 4, 2023).

Figure 2: 12/23-24 Actual Load vs. Load Forecast

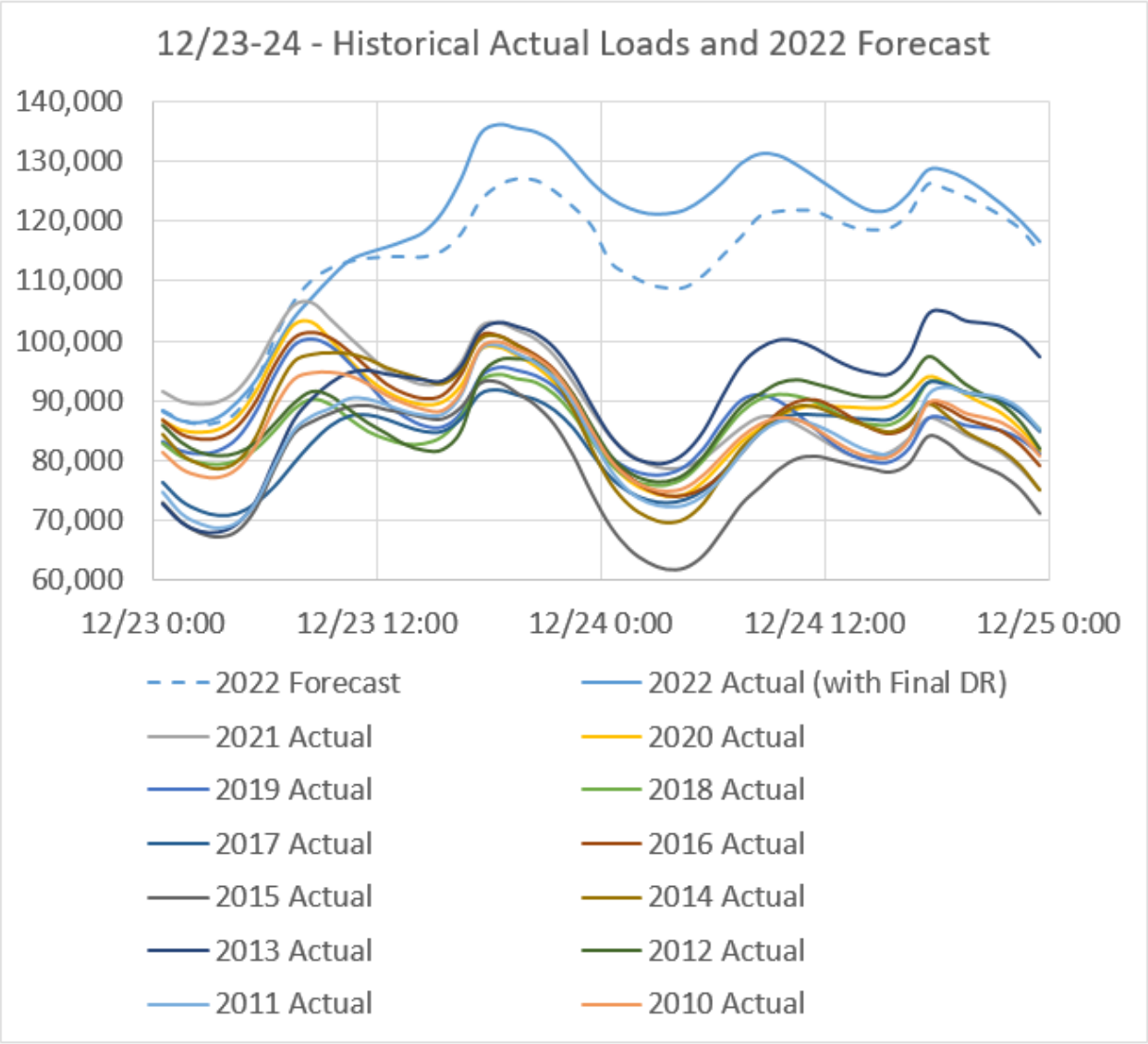


29. PJM's peak forecasted load for 18:00 on December 23 was 126,968 MW. PJM called over 155,750 MW into the operating capacity for the day. PJM reasonably believed that it was guarding against potential uncertainty as further described in Mr. McGlynn's affidavit.

30. PJM's peak forecasted load for 18:00 on December 24 was 126,007 MW.

31. These peak forecasts are both over 20,000 MW higher than peak loads observed on these days in the last 13 years. As a whole, PJM's load forecasts correctly predicted very high load levels for both days, but did not capture the full magnitude of how unprecedented actual load would prove to be. The difference is captured by Figure 3 below.

Figure 3: Historical Actual Loads and Forecast for December 23 and 24



32. As Figure 3(a) demonstrates, the 2022 holiday weekend load during Winter Storm Elliott was an extreme outlier in both magnitude and timing. The actual hourly load was 136,010 MW on December 23 (hour ending 19:00) and 131,113 MW on December 24 (hour ending 09:00). Load also stayed unusually high overnight from December 23 to December 24. The "Christmas Eve Valley" in the early morning hours on December 24 was 40,000 MW higher than the next highest over the last decade. In fact, the load "valley" on December 24 was 15,000 MW higher than any peak load on that date in a decade. Figure 3(b) in turn shows PJM's December 1 – January 15 Loads since 2012.

Figure 3(a): 2022 Holiday Weekend Load

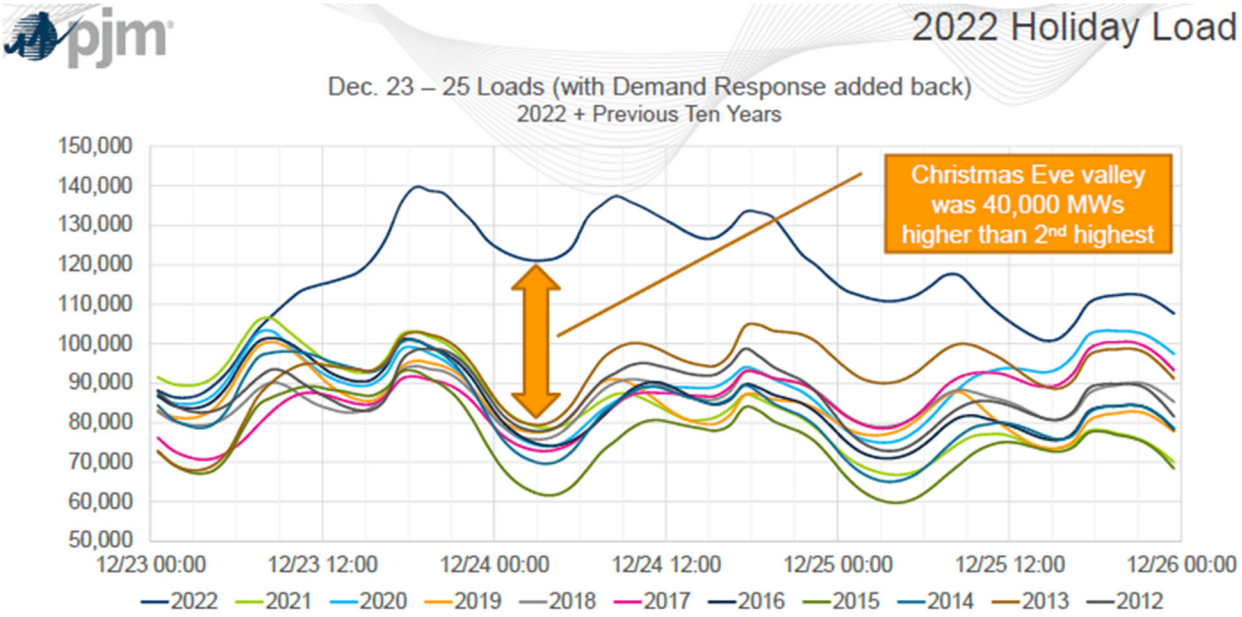
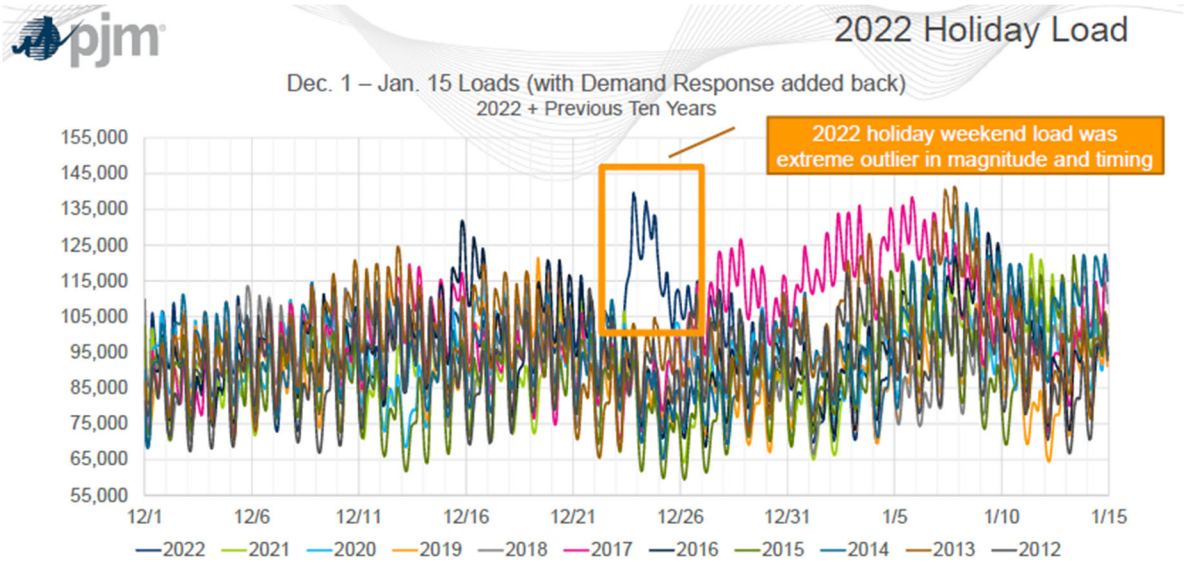


Figure 3(b): 2022 December 1 – January 15 Loads, 2012-2022



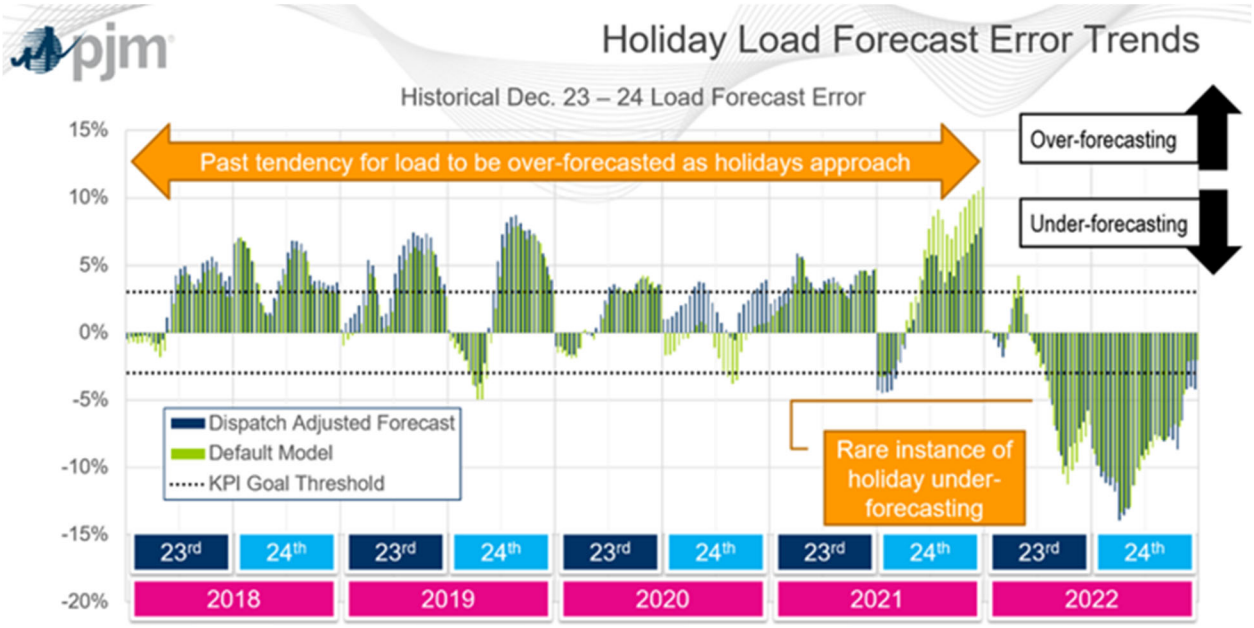
33. The load forecast for December 24 was off by less than 2% at the evening peak. But the morning peak that day was under-forecasted—partially due to a temperature forecast error, such cold temperatures (and sudden temperature drops) not existing for the early winter timeframe in the model's history, and potentially other reasons.

34. December 24 has historically been one of the most difficult days of the year to forecast even with normal seasonal weather because of the Christmas Eve holiday. The holiday's impact on human behavior is hard to anticipate and directly relevant historical data is

relatively scant because load on weekends differs greatly from weekdays and the last time that December 24 fell on a Saturday was 2016.

35. Figure 4 below illustrates the pattern of Christmas holiday load forecasting error over the last five years. In particular, it shows how the under-forecast for Winter Storm Elliott was a departure from usual holiday period over-forecasts.

Figure 4: Holiday Load Forecasting Error Trends

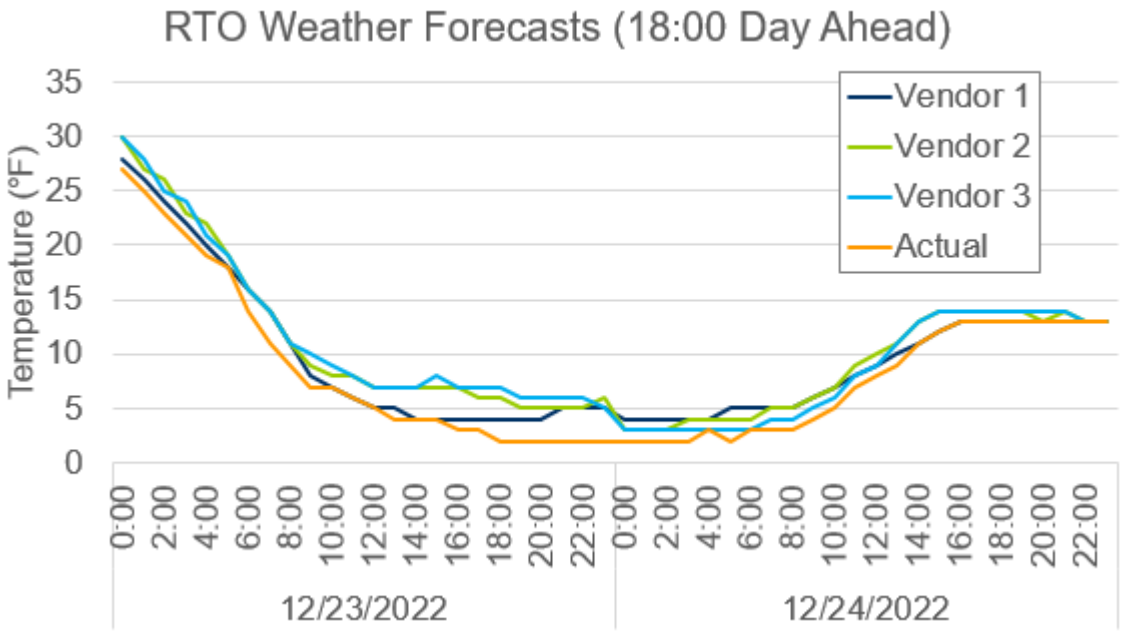


36. On December 23, actual temperatures were materially colder than predicted by PJM or any of its vendors. During the second half of the day, the RTO average was 4 degrees colder than the 18:00 day ahead forecast, with the most severe over-forecasting in the central and northeastern part of the footprint, where several cities came in 6 or more degrees colder for at least two hours (Erie, PA; Harrisburg, PA; Morgantown, WV; Pittsburgh, PA; Bowling Green, KY; Newark, NJ; Williamsport, PA; Johnstown, PA).

37. Temperatures were 1-3 degrees colder than PJM's most conservative vendor forecast for all but two hours from 00:00 on December 23 through 13:00 on December 24. There were three consecutive hours of a three-degree temperature forecast error from late on December 23, leading to a significant valley load forecast error. A three-degree error would be expected to have a material impact on load because load is very sensitive to temperature forecast at the tail ends of the distribution.

38. Figure 5 below captures the temperature forecast error for 18:00 on December 23-24.

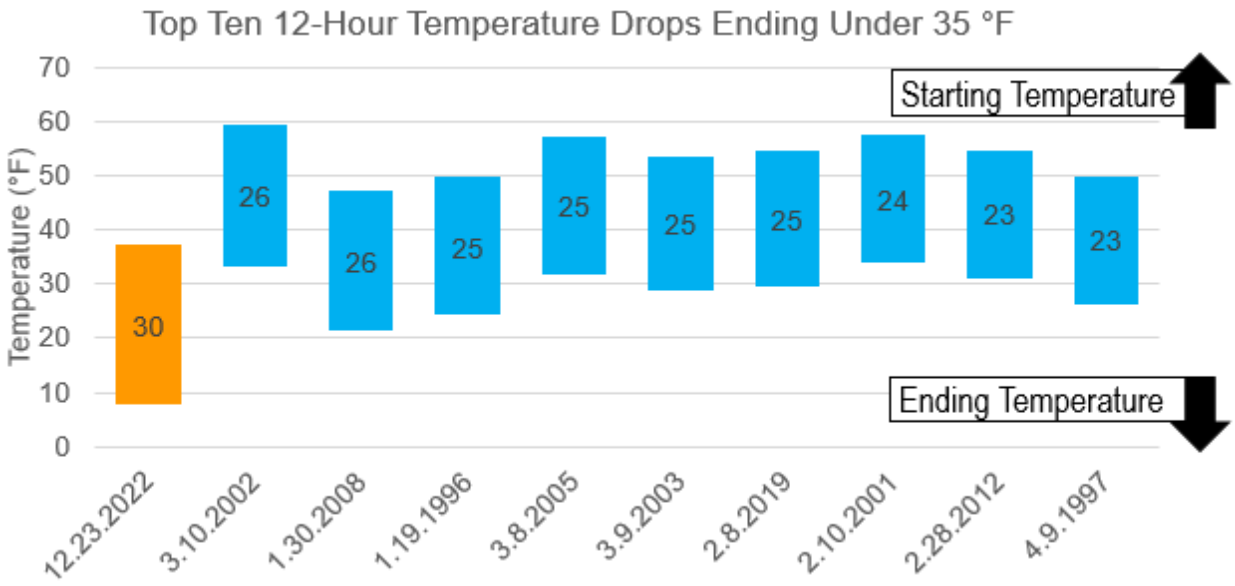
Figure 5: Forecast Error for December 23 – 24, 18:00



39. The rapidity of the temperature drop associated with Winter Storm Elliott was at least as significant as its magnitude. The twenty-nine-degree temperature drop that occurred on December 23 was the most significant temperature decrease over a 12-hour period that ended below 15°F dating back to at least 1996 and was seven degrees (i.e., 30%) greater than the temperature drop during the Polar Vortex in 2014.

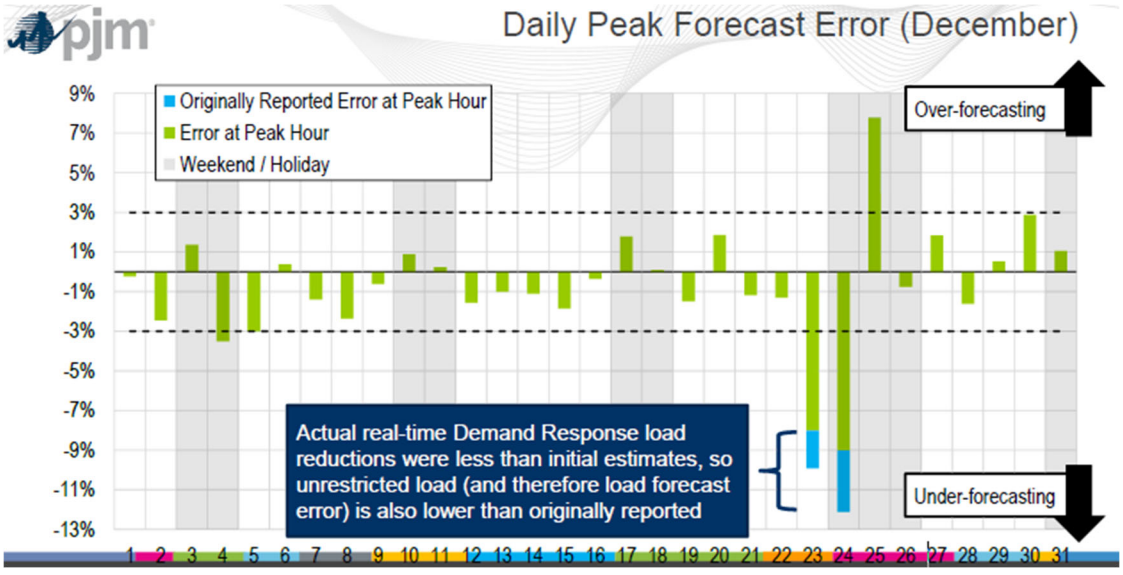
40. Figure 6 below depicts the speed and significance of the temperature drop on December 23 compared to other drastic temperature drops since 1996.

Figure 6: Most Significant Temperature Drops Since 2014



41. In short, and as shown by Figure 7, below, exceptional weather and load conditions during Winter Storm Elliot were the principal causes of PJM's under-forecasting. The fact that PJM's load and temperature forecasts were at their normal levels of accuracy before Winter Storm Elliott, and returned to those levels afterwards, reinforces this conclusion.

Figure 7: December Daily Peak Forecast Error



42. Given all of these considerations, I do not think it is accurate to suggest that PJM's load forecasts were unreasonable in light of the available weather forecasts or for any other

reason.[6] It is overly simplistic to suggest that PJM should have been able to predict record-breaking high holiday loads without reference to the aforementioned difficulties of predicting Christmas Eve loads or the fact that forecasts have traditionally over-estimated loads at that time of year.[7]

F. PJM's Neighbors Experienced Comparable Forecasting Difficulties During Winter Storm Elliott

43. As PJM's separate Answers to the Complainants each discuss in detail,[8] PJM was not the only region to encounter load forecasting challenges due to Winter Storm Elliott. The Tennessee Valley Authority, the VACAR portion of the SERC Reliability Corporation, Midcontinent Independent System Operator, Southwest Power Pool, Duke Energy, and Louisville Gas & Electric/Kentucky Utilities all under-forecasted Winter Storm Elliot loads to an extent comparable to PJM. In my view, the fact that neighboring regions produced similar under-forecasts when confronting the same set of exceptional circumstances demonstrates that PJM's forecasts were reasonable given the information available at the time. The similarity in forecasting results also confirms my view that Winter Storm Elliott did not expose some unknown defect in PJM's load forecasting procedures.

44. At the end of the day, PJM goes to great lengths to make its load forecasts as accurate as possible. But forecasting is an inherently uncertain activity. Forecasts will inevitably sometimes be off by a greater-than-usual amount. In my view, it was clearly the confluence of exceptional circumstances related to Winter Storm Elliott that caused PJM's larger-than-normal under-forecasts for December 23 and 24. And as further described in Mr. McGlynn's affidavit, given the unusual weather and forecast uncertainty, operating plans reflected the potential for higher than normal forecast error.

45. This concludes my affidavit.

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[6] *See, e.g.*, Coalition Complaint at 11-12; Attach. 4: Aff. of Paul M. Sotkiewicz, at PP 11-26.

[7] *See, e.g.*, Coalition Complaint at 12 ("PJM projected temperatures for December 23 and 24 that were likely to be similar to previous winter weather events in its region, which should have been an indication to PJM that load forecasts should also be comparable."); Sockiewicz Aff. at P 23 ("The apparent lack of situational awareness on the part of PJM's on-duty operations staff regarding the mismatch between the weather and load forecast is incomprehensible given the available weather and load history.").

[8] *See* Section II.C of each PJM Answer in the captioned proceedings.

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Respondent	)	

VERIFICATION

I, **Joseph Mulhern**, state, under penalty of perjury, that I am the Joseph Mulhern referred to in the foregoing document entitled "Affidavit of Joseph Mulhern on Behalf of PJM Interconnection, L.L.C.," 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.

/s/ Joseph Mulhern
Joseph Mulhern

Exhibit 4

Affidavit of Christopher Pilong

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Respondent	)	

AFFIDAVIT OF CHRISTOPHER PILONG
ON BEHALF OF PJM INTERCONNECTION, L.L.C.

A. Introduction

1. My name is Christopher Pilong. My business address is 2750 Monroe Blvd., Audubon, Pennsylvania, 19403. I am Senior Director, Operations Planning, of PJM Interconnection, L.L.C. (PJM). I am submitting this affidavit on behalf of PJM to discuss the overall poor performance of generators during Winter Storm Elliot. Specifically, in this affidavit I show that the poor performance by generators was a major contributing factor to the need for the Pre-Emergency Load Management Reduction Actions and Emergency Actions taken by the operators. As I discuss, not only did generators perform poorly in terms of their availability, but their failure to follow rules designed to provide transparency to PJM operators made decision-making regarding dispatch and interchange especially challenging. In addition, the actions of Complainants[1] in the above-captioned proceedings were deficient and were a contributing factor in the duration and intensity of the emergency.

[1] For clarity, this affidavit will refer to the "Nautilus Entities," the "CZG Complainants," and the "Coalition" when referencing arguments made by the individual complainants in Docket Nos. EL23-53-000, EL23-54-000, and EL23-55-000, respectively. Likewise, when the parties present the same or similar claims, I will refer to the "Complainants."

2. I joined PJM in November of 2001. Currently, as Senior Director, Operations Planning, I am responsible for the Transmission Operations Department, Generation Department and Outage Analysis Technologies Department. These departments perform near-term transmission outage analysis and approvals, generation outage analysis and approvals, facilitate annual Black Start Unit commitments, and perform gas-electric coordination activities. The teams also perform seasonal reliability assessments, support the various tools and applications utilized in these processes, and coordinate directly with the Market Services Division and System Planning Division.

3. Previously, as Director, Dispatch, I was responsible for the oversight and operation of the Valley Forge and Milford Control Centers. This function included ensuring the reliable operation of the power grid, in accordance with all PJM and North American Electric Reliability Corporation (NERC) reliability standards pertaining to the functions of Reliability Coordinator, Balancing Authority, and Transmission Operator. In addition, I was responsible for ensuring the efficient economic dispatch of the system under the existing PJM market rules and neighboring Joint Operating Agreements.

4. Prior to that position, I served as a Reliability Engineer and then Manager – Reliability Engineering. As Manager for the Reliability Engineering Group, I managed the group responsible for coordinating Day-Ahead and Real-Time operating plans among PJM staff, PJM Transmission Owners, PJM Generation Owners, and our neighboring entities. I performed these functions directly in my earlier role as a Reliability Engineer. I hold a Bachelor of Science degree in Electrical Engineering from Lehigh University and a Master of Business Administration degree from Villanova University.

B. Prior to Declaring Pre-Emergency and Emergency Actions, PJM's Operators Reasonably Believed that Most Generators Would Operate as Expected Under the PJM Tariff and Manuals

5. Prior to the onset of Winter Storm Elliott, PJM's operators reasonably believed that most generators would meet the performance expectations established in the PJM Open Access Transmission Tariff (Tariff) and Manuals. More specifically, when PJM surveyed the generation owners as to whether they were properly prepared for the winter season and had completed the Cold Weather Preparation Guideline and Checklist listed in Attachment N of Manual 14D, over 99.9% of the resource owners responded "yes." Those standards are designed to promote robust generator performance during cold weather events and include explicit obligations requiring generator transparency regarding the status of their units during cold weather conditions. Unfortunately, these expectations were not realized and the performance of numerous generators fell far short of their obligations to PJM customers under the Tariff, PJM governing agreements, and PJM Manuals.

C. PJM's Capacity Performance Requirements

6. Attachment DD of the Tariff establishes Capacity Performance rules that are intended "to provide greater assurance of delivery of energy and reserves during emergency

conditions."[2] The need for these Capacity Performance reforms was precipitated by the poor performance of generators within the PJM footprint that occurred during the Polar Vortex in the winter of 2013-2014. As the Commission explained, "[t]he Polar Vortex events of the winter of 2013-14, when 22 percent of the generation in the PJM region failed to respond on the peak winter day, illustrated the severity of [Capacity Resource] performance deterioration."[3] Unfortunately, as I will discuss in greater detail later, overall Capacity Resource performance during Winter Storm Elliott was even worse than during the 2014 Polar Vortex, reaching a forced outage rate as high 24% during peak periods.

7. The Capacity Performance mechanism penalizes Capacity Resources that fail to operate at expected levels during emergencies by imposing Non-Performance Charges.[4] The amounts collected by PJM in Non-Performance Charges are then distributed to Capacity Resources whose production exceeds expected output and to generators that did not assume a capacity commitment but that operated during the emergency.[5] The Non-Performance Charges and the opportunity for bonus payments are designed to incentivize Capacity Resources to take steps to be available when emergency conditions occur.[6]

8. Under Capacity Performance, generators decide what steps to take in order to meet their commitments. In the stakeholder process leading up to the Capacity Performance filing, there was controversy over the eligibility requirements to become a Capacity Resource. Some stakeholders argued in favor of "hard" eligibility requirements such as requirements for specific quantities of on-site fuel or firm gas delivery contracts. Other stakeholders took the position that the most efficient way to improve generator performance during emergencies was to create a robust penalty/incentive structure. They argued that this approach would enable generators to decide on the most cost-effective steps to improve reliability without being bound to a narrow set of possible solutions. Ultimately, PJM opted for the more flexible approach. As PJM explained in its Capacity Performance filing at FERC:

> Capacity Market Sellers that now will face more harsh financial consequences for a failure to perform during emergencies (with no limit on when such emergencies arise) will likely need to invest in plant design changes or new equipment, or increase operating budgets to accommodate more staff, firm fuel delivery arrangements, greater inventories, or changed operating practices. PJM is not prescribing how sellers ensure their resources will perform. Rather, the market rules should allow sellers to

[2] *PJM Interconnection, L.L.C.*, 151 FERC ¶ 61,208 at P 6 (2015) (Capacity Performance Order).

[3] *PJM Interconnection, L.L.C.*, 155 FERC ¶ 61,157 at P 11 (2016) (Capacity Performance Rehearing and Compliance Order Order).

[4] Tariff, Attach, DD, § 10A(e).

[5] *Id.* § 10A(g).

[6] *See infra* notes 9, 10, 12, 13 and accompanying text.

> make those determinations for their resources, and then compete against other sellers making the same determinations for their resources.[7]

9. The Commission accepted the "fundamental logic of tying capacity revenues to performance during critical hours" and found that "each market seller must determine how best to meet the risks it faces."[8]

10. The level of the potential penalty charge under Capacity Performance was deliberately set at a high level in order to create the necessary incentives for generators. As PJM explained:

> For the PJM region, a stringent Non-Performance Charge is critical to ensure that sufficient incentive exists for Capacity Market Sellers to invest the increased capacity payments they will receive as a result of the Capacity Performance proposal in preparing their resources to be capable of providing energy to the system when they are most needed for reliability.[9]

The Commission agreed, stating that "[w]ithout more stringent penalties, PJM has shown there is little incentive for a seller to make capital improvements, or increase its operating maintenance for the purpose of enhancing the availability of its unit during emergency conditions."[10]

11. The Non-Performance Charge Rate for Capacity Performance is derived from the Net Cost of New Entry (Net CONE) of the reference generating unit and is intended to represent "the expected full cost of replacement capacity for any [Emergency Action hours of a commitment period]."[11] Setting the penalty rate in this manner "is more likely to prevent non-performing resources from receiving positive net capacity revenues over the long run" which the Commission found "is consistent with the overall Capacity Performance market design that aims to provide incentives for resource owners to make appropriate investments and maintain their resources."[12] Further, the Commission found that "a Non-Performance Charge rate based on Net CONE is likely to discourage non-performing resources from taking on capacity obligations, because over time the penalties are likely to fully offset the capacity revenues from the capacity market auctions."[13]

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[7] *PJM Interconnection, L.L.C.*, Docket Nos. ER15-623-000, *et al.*, Transmittal Letter at 53 (Dec. 12, 2014) (PJM Capacity Performance Filing).

[8] Capacity Performance Order at P 128.

[9] *PJM Interconnection, L.L.C.*, Docket Nos. ER15-623-000, *et al*., Response to Deficiency Letter at 20 (Apr. 11, 2015).

[10] Capacity Performance Order at P 45.

[11] *Id.* P 159.

[12] *Id.*

[13] *Id.*.

12. The narrow scope of excuses for non-performance during times of acute system need is also intended to incentivize Capacity Resource availability during extreme system conditions. In fact, Capacity Performance excuses non-performance in only two cases: (i) the unit was on an approved planned or maintenance outage, or (ii) the PJM operators made an economically-based decision within the security constrained dispatch process that a unit should not operate or, if the unit were already online, that the unit should reduce its output, provided that operators' decision was not based on seller-specified offer parameters that were incompatible with PJM's needs, and not based on the seller having submitted a market-based offer price that was higher than its cost-based offer. Many parties argued in the Capacity Performance dockets that non-performance should be excused more broadly. But the Commission resisted these efforts to soften its strict compliance regime, including PJM's proposal to excuse performance shortfalls by resources that comply with previously-approved ramping limitations.[14]

13. To be clear, under Capacity Performance, a unit is *not* excused from being assessed Non-Performance Charges because: (i) it lacks fuel; (ii) the cost of available fuel is very expensive; (iii) it cannot obtain natural gas in a timely manner because of pipeline nomination cycles; or (iv) the unit faces operational challenges due to cold weather conditions. These are not acceptable excuses under the Capacity Performance regime.

14. PJM's Capacity Performance proposal also provided a means for generators to recover the costs of making themselves available in emergency conditions. The reforms permitted generators to include certain costs associated with meeting Capacity Performance obligations in the unit-specific Avoidable Cost Rate (ACR) formula for setting offer caps in the capacity auction.[15] Allowed expenses included costs to enhance fuel security and to winterize generating units, as well as costs associated with the risk of non-performance during Performance Assessment Intervals (PAIs). The Commission accepted these modifications, finding that the ACR "should reflect the cost of becoming a capacity resource under the new capacity market construct and that, for some resources, the overall physical and capital expenditures required to ensure performance during emergency operations are extensive, presenting additional costs which are not currently reflected in the [ACR] calculation."[16] Specifically, the Capacity Performance Order accepted "revisions to the formula to include Avoidable Fuel Availability Expenses and Capacity Performance Quantifiable Risk."[17] Notably, the Commission "f[ou]nd it reasonable that

[14] PJM proposed that "a resource that followed PJM dispatch in accordance with its approved ramp rate will be excused of any Non-Performance Charges resulting from its ramping capabilities." *PJM Interconnection, L.L.C.*, 155 FERC ¶ 61,213 at P 3 (2016). The Commission, however, rejected even this modest enlargement of grounds for excusal, finding that "[p]arameter limits should not be viewed as a permanent entitlement to under-perform." *Id.* P 24.

[15] *See* Tariff, Attach. DD, § 6.8(a).

[16] *See* Capacity Performance Order at P 353.

[17] *Id.* P 352

resources are able to reflect fuel security costs as the availability of fuel is an integral component of resource performance."[18]

15. Resources also have the ability to avoid potential Non-Performance Changes by self-scheduling their resources in advance of potential pre-emergency or Emergency Actions resulting in PAIs, or during PAIs. In such cases, the self-scheduling unit may propose an operating schedule and the PJM operators will attempt to accommodate the request. This is not necessarily the behavior that Capacity Performance was intended to elicit, but it is an available strategy for minimizing the risk that units will not meet their Capacity Performance commitments.

D. Increased Transparency of Generator Status During Emergencies

16. Other reforms developed in response to the problems encountered during the 2014 Polar Vortex relate to measures designed to assure that PJM operators have up-to-date information about the status of units in order to make the most effective dispatch and curtailment decisions. Of particular importance to PJM operators, generation owners are directed to "[d]etermine if start-up times longer than currently modeled in Markets Gateway are required and update PJM dispatch and Markets Gateway if applicable."

17. Manual 13 also includes provisions designed to assure that PJM operators have up-to-date information about the status of generators during cold weather conditions when the risk of an emergency is elevated and when emergencies are occurring. These include the following:

- During extreme or severe weather, the overall obligations of generators include:
  - "Participants monitor their fuel supplies, emission hours, demineralized water, cooling water, and other consumables inventories and keep PJM updated about station/units that are experiencing or projected to experience resource limitations via Markets Gateway, as described in [greater detail elsewhere in Manual 13]."[19]
  - "[N]atural gas-fired units should reflect [supply/transportation] fuel restrictions when updating their unit offer parameters within Markets Gateway, and report unplanned outages if they are unable to run."[20]

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[18] *Id.*

[19] *See* PJM Manual 13: Emergency Operations, § 3.1 (Nov. 3, 2022), https://pjm.com/-/media/documents/manuals/archive/m13/m13v86-emergency-operations-11-03-2022.ashx. Because the Complainants' plants are primarily gas-fired units and because gas-fired units were the worst performers during Winter Storm Elliott, I am focusing here on fuel availability by gas-fired generations. Reporting requirements for other fuels are addressed elsewhere in the Tariff.

[20] *Id.*§ 6.4 at 118.

- Following issuance of a Cold Weather Advisory, "Members are to update Markets Gateway by entering unit specific operation limitations associated with cold weather preparedness. Operating limitations include:
    - Generator capability and availability
    - Fuel supply and inventory concerns
    - Fuel switching capabilities
    - Environmental constraints
    - Generating unit minimums (design temperature, historical operating temperature or current cold weather performance temperature as determined by an engineering analysis[.]"[21]
- Following a Cold Weather Alert, generator obligations include:
    - "Generation dispatchers update their unit parameters, including the Start-up and Notification, Min Run Time, Max Run Time, Eco Min, Eco Max, etc. in Markets Gateway time, max run time, cost and price schedule."[22]
    - "Generation dispatchers monitor and report projected fuel limitations to PJM dispatcher and update the unit Max Run field in Markets Gateway if less than 24 hours of runtime remaining."[23]
    - "Generation dispatcher contact PJM Dispatch if it is anticipated that spot market gas is unavailable, resulting in unavailability of bid-in generation."[24]
    - "[N]atural gas-fired units should reflect these fuel restrictions when updating their unit offer parameters within Markets Gateway, and report unplanned outages if they are unable to run."[25]

18. Manual 13 also underscores the extent to which operators are dependent upon the accuracy of generator submittals during cold weather conditions. For example:

- During a Cold Weather Alert, "PJM Dispatch reviews [various factors including] generator Times to Start (Start-Up + Notification in Markets Gateway) to confirm if the Day Ahead Market will be able to clear sufficient generation that can be on-line to meet the reliability needs of the system for the operating day. If sufficient

[21] *Id*. § 3.3.1 (Cold Weather Advisory) at 54 (reformatted for clarity).

[22] *Id*. § 3.3.2 (Cold Weather Alert) at 58.

[23] *Id*. at 59.

[24] *Id*.

[25] *Id.* § 3.1; *id.* § 6.4 (Resource Limitation Reporting) at 118.

generation cannot be cleared in the Day Ahead market based the start-up + notification time, [an alternative process] will be used to commit generation in advance of the Day Ahead Market."[26]

- If an alternative commitment process is used during a Cold Weather Alert because insufficient generation is available in the Day-Ahead Market, "[a]ny discussions on unit commitment outside of the Day Ahead Market must be predicated on the unit parameters listed in Markets Gateway which include: notification/start-up time, min run time, max run time, cost and price schedule."[27]

E. Recommended Unit Operational Exercise

19. PJM recommends that generation owners self-schedule their generation resources that have not operated in the eight weeks leading up to December 1 of a given year.[28] This provides an opportunity to determine whether they are capable of reliably operating on both primary and alternate fuels and responding to PJM's dispatch instructions. PJM prefers resources to self-schedule in the Day-Ahead Market, but tests can also be conducted in real-time if approved by PJM Dispatch with appropriate notice.[29]

20. PJM further recommends this exercise be conducted during the month of December, when temperatures are forecasted to be 35 degrees or lower to assist in identifying and correcting any start-up, operational, and fuel switching problems that may arise.[30] Suitable opportunities for generators to run this exercise were presented throughout the PJM footprint before Winter Storm Elliott occurred.[31] PJM's records indicate that no generation owners performed this test in December.

Dispatcher Application and Reporting Tool

21. The rules governing the Dispatcher Application and Reporting Tool (eDART) make generators responsible for providing updates of their status to PJM. Specifically, eDART allows users to manage their outage data by viewing the status of their outages and obtaining outage reports. Generation resources are required to report outages in advance

[26] *Id.* § 3.3.2 at 56.

[27] *Id.* at 58.

[28] Manual 14-D: Generator Operational Requirements, § 7.5.1 (Generation Resource Operational Exercise) (Dec. 21, 2022).

[29] *Id.*

[30] *Id.*

[31] All weather stations in the PJM footprint from which PJM receives weather measurements experienced temperatures 35 degrees or lower between December 1 and 22 for at least one period of 12 consecutive hours, with 84% of stations seeing at least five of these periods. Over half of the stations experienced multiple days in a row in which temperatures did not rise above 35 degrees.

of the operating day (when known) and in real-time through the eDART application.[32] This reporting is required to include the cause of the outage as indicated in PJM Manual 14D.[33] Further, PJM also requires more detailed after-the-fact reporting of all outages in the Generator Availability Data System (eGADs) system by the twentieth day of the following month.[34] Generation owners may augment previous eDART submissions to reflect *additional* forced outages, but retroactive eDART changes to remove or reduce previously-submitted forced outages are not permitted.[35]

F. Overall Generator Performance During Winter Storm Elliott Was Far Below Expectations

22. Overall, the performance of generators located within the PJM footprint was far below what PJM operators expected both in terms of the availability of units and in terms of the transparency of their status. Many generators do not appear to have taken adequate steps to achieve the winter preparedness levels expected under Capacity Performance, especially as regards gas-fired generators' generally poor efforts to ensure their own fuel security. Similarly, the almost universal response by generators that they had met the criteria specified in the Cold Weather Preparation Guideline and Checklist was not borne out by performance.[36] In addition, many generators failed to comply with Manual requirements that they provide updates regarding their operating parameters and availability. In fact, many units did not update parameters in advance and also failed to update their parameters during the operating day, even after specific instructions from PJM dispatch to do so. This failure greatly contributed to the challenges faced by the PJM operators.

23. For the Dec. 23, 2022 operating day, the Day-ahead Market committed over 138,639 MW, including approximately 11,000 MW of Combustion Turbines (CTs) scheduled economically and 1,270 MW committed for reliability for reliability purposes to control constraints. PJM also scheduled an additional 3,168 MW in the RAC runs. In addition, there was another 16,000 MW in CTs available for dispatch in real-time.

24. Heading into the operating day on Dec. 23, 2022, had approximately 158,000 MW of available generation to meet a forecasted load of 127,000 MW. However, the situation deteriorated rapidly.

25. Forced outages were much higher than expected. PJM started the operating day of December 23 with 12,000 MW of unplanned outages. These outages were primarily due to various equipment problems at generation facilities. PJM did expect additional

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[32] *See* Manual 14D, § 7.3.3 (Unplanned Outage); *id*. § 7.3.4 (Generating Unit Reactive Capability Reporting) at 72-73.

[33] *Id.* § 7.3.3.

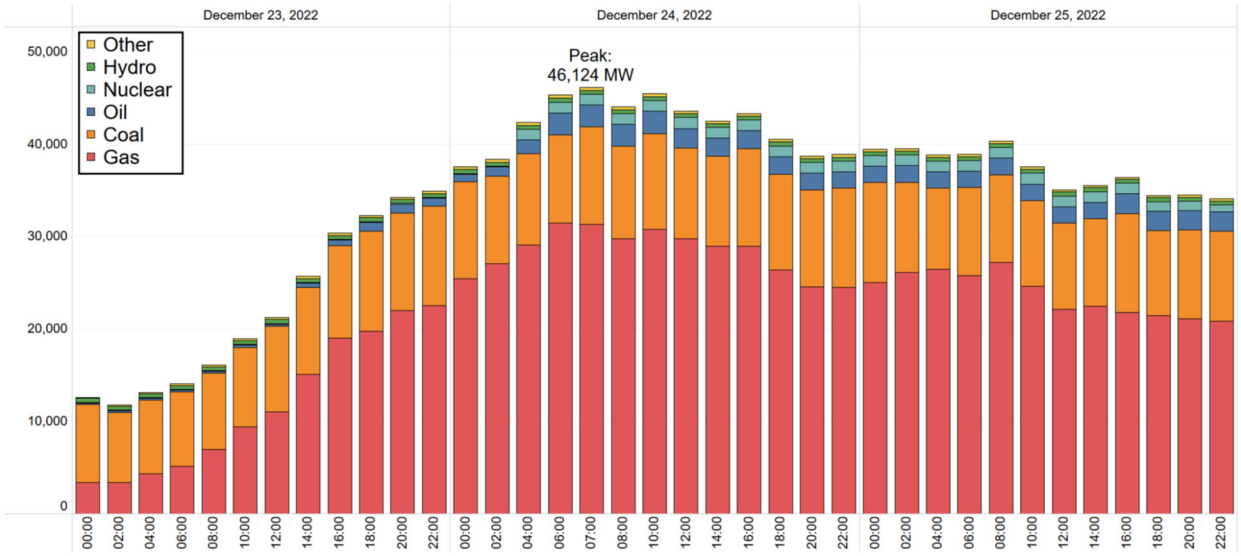
[34] *See* eGADs User Guide, § 2.2.1.

[35] *See* PJM Manual 10: Pre-Scheduling Operations, § 2.1.1 (eDART Generation MW Ticket Procedure) (Dec. 21, 2022).

[36] *See* Aff. of Donald Bielak, Ex. PJM-002 at P 13.

unplanned generation outages due to the increasingly cold temperatures and high winds. For reference, the historic forced outage rate for winter is ~4.7%. The peak outage rate for the 2020/2021 winter was 7.9%,[37] and for the 2021/2022 winter, the peak outage rate was 7.6%.[38] For PJM's 2022/2023 OATF winter assessment, a forced outage rate of 8.5% (16.5GW) was calculated based on recent historic peak winter generator performance.[39] But the outages experienced during Winter Strom Elliott were much higher than historical norms. As depicted in Figure 1 below, outage levels grew steadily throughout the day on December 23 into the early morning hours of December 24 and reached a peak of 46,124 MW during hour 08:00 of the morning of December 24. Resource outages reached approximately 35,000 MW on December 23, and 46,000 MW on December 24.

Figure 1: Forced Outages/Derates by Fuel Type[40]



26. As Figure 1 illustrates, outages experienced by gas-fired generators represented the largest share of the forced outage increases. About 70% of all outages were natural gas, about 16% coal, and the remainder were in "other" categories. At its highest, over 24% of the PJM fleet was experiencing a forced outage, which is higher than PJM experienced during

[37] PJM, Winter Operations of the PJM Grid: December 1, 2020 – February 28, 2021, 38 (Apr. 8, 2021), https://pjm.com/-/media/committees-groups/committees/oc/2021/20210408/20210408-item-14-winter-operations-review.ashx.

[38] PJM, Winter Operations of the PJM Grid: Dec. 1, 2021 – Feb. 28, 2022, 29 (Apr. 14, 2022), https://www.pjm.com/-/media/committees-groups/committees/oc/2022/20220414/item-27---winter-operations-review.ashx.

[39] *See* PJM, Operations Assessment Task Force 2022-23 Winter Study 3 (Nov. 3, 2022) https://www.pjm.com/-/media/committees-groups/committees/oc/2022/20221103/item-15---winter-oatf-review.ashx.

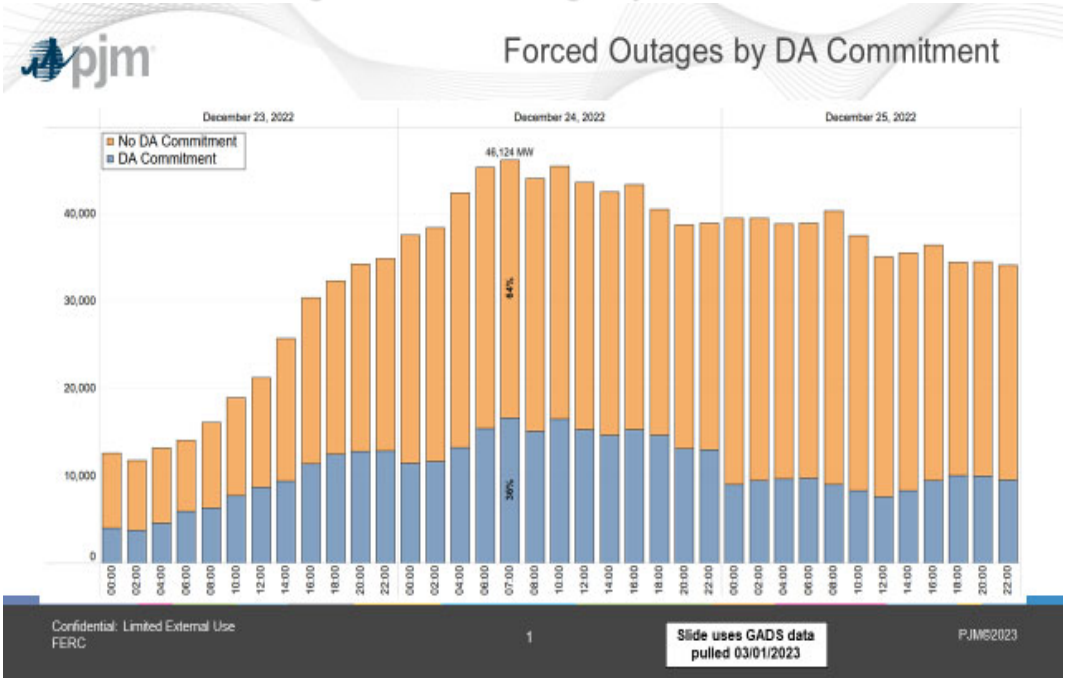
[40] *See* Winter Storm Elliott FERC/NERC Briefing 23 (Apr. 11, 2023).

the Polar Vortex in 2014, when the PJM fleet had a 22% forced outage rate. After hour 08:00 on December 24, outage levels gradually decreased but approximately 39,000 MW of generation was still experiencing a forced outage at hour 22:00 on December 24, or a forced outage rate of approximately 20%--still a very high level.

27. In addition to identified forced outages, approximately 6,000 MW of steam generation was called but was not online as expected for the morning peak on December 24. Also, high generator outage rates limited PJM's ability to replenish pond levels for pumped storage hydro prior to the morning peak on December 24. Taken together, because of the poor generator performance, PJM was facing approximately 57,000 MW of generator availability for the morning peak on December 24.

28. In addition to the causes of the forced outages and the outages by fuel type, presented in Figure 2 are the outages for units based on Day Ahead commitments. This is an important piece of the puzzle to understand with respect to PJM's planning for the operating day. PJM always expects that some resources will fail. On cold weather days in particular, this expectation is incorporated into PJM's operational planning, as noted in PJM Manual 13. However, as Figure 2 shows, over 16,000 MWs of generation that was committed in the Day-ahead Market failed to perform.

Figure 2: Forced Outages by DA Commitment



29. When scheduling replacement energy to account for the missing 16,000 MWs, PJM was relying on the unit information submitted by Generation Owners to evaluate the amount of available reserves and the timelines needed to schedule those units if/when needed, i.e., 15-minute notice, 30-minute notice, 1-hour notice, etc. As noted previously, PJM requires Generation Owners to update their parameters to reflect any changes from normal

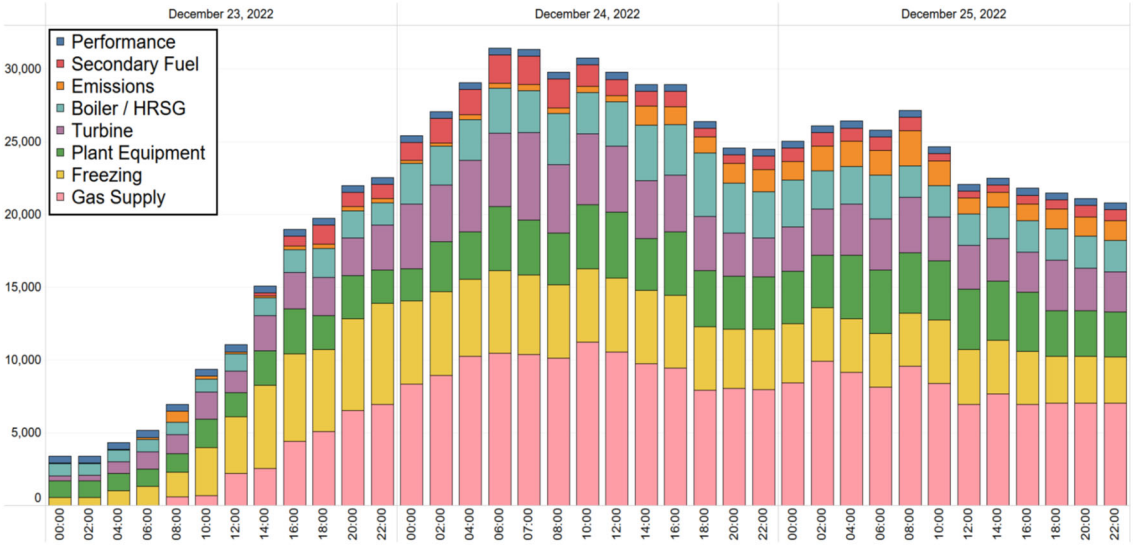
operating conditions so that the reserve calculations are accurate. However, in the case of Winter Storm Elliott, these parameters were not updated.

30. More specifically, the following information was not updated to align with actual operating conditions – longer notification times, extended minimum run times, inflexibility in dispatch range, etc. This was predominately related to gas-fired generators where pipeline constraints were not properly reflected in generator operating parameters, despite the ability to utilize Temporary Exceptions or Real Time Values (PJM Manual 11 Sections 2.3.4.3 and 2.3.4.4) to convey this information properly to PJM. While some of this information was at times conveyed in telephone calls (usually initiated by PJM dispatch), this was time-consuming for the PJM operators, which added to the difficulties of making operational decisions. Operators had to keep track of information conveyed to them orally that was different than what they were seeing in Markets Gateway and eDART. In fact, it was not uncommon for the operators to request generator dispatchers to update their information and either they failed to do so or did so only hours later.

31. For the December 23 operating day, only 6% (37 out of 578) of the gas-fired generators in the PJM system submitted increased notification time requirements. All others were reported as available to operate with their normal operating parameters in place. This lack of timely and accurate information led to extremely challenging conditions for the PJM System Operators that continued through the end of the day on December 25. As presented in Figure 3, the failure of so many Day-ahead Market committed units, coupled with the lack of generator parameter updates, led to a high volume of natural gas generators that had no Day-ahead Market commitment becoming forced outages due to lack of fuel.

32. The reasons for the forced outages experienced by gas units are depicted in the chart below:

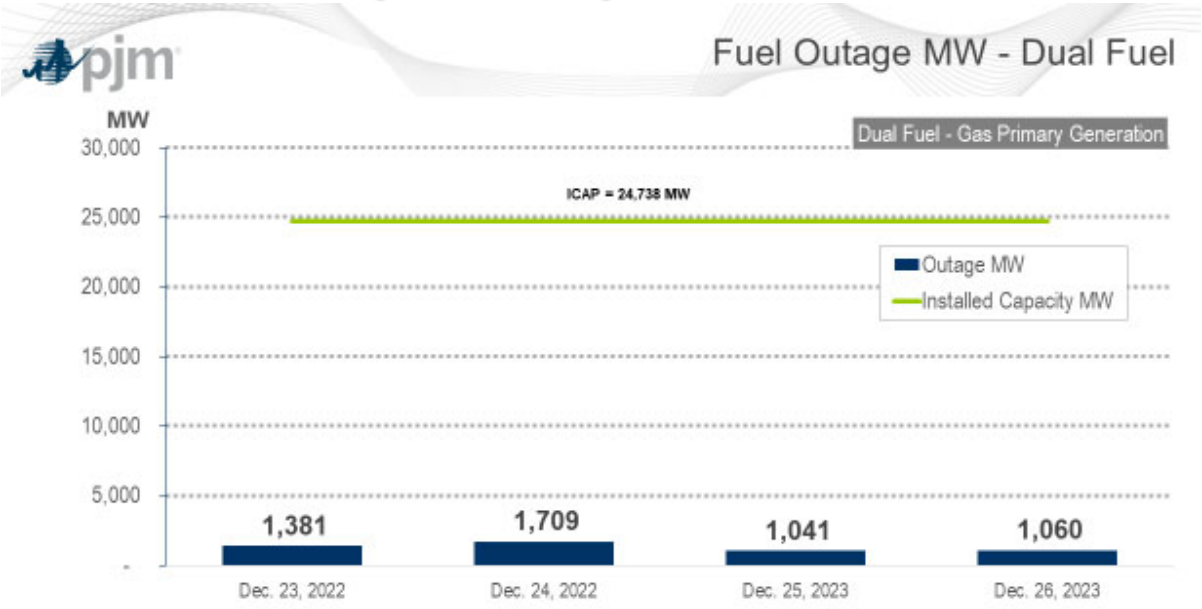
Figure 3: Gas - Forced Outages/Derates by Cause[41]



33. As shown by Figure 4, a large share of the outages experienced by gas units were fuel supply and freezing issues related to the cold weather conditions.

34. But as also shown by Figure 4, gas-fired generators with dual fuel capability, i.e., capable of burning oil as a secondary fuel, had low outage rates due to fuel unavailability:

Figure 4: Fuel Outage MW – Dual Fuel



[41] *Id.* at 24.

35. The conversations that PJM Dispatch held with generation dispatchers confirms that natural gas availability and a lack of winter preparedness, including the generators' failure to secure sufficient natural gas supplies, was a major problem. For example, one pattern that operators observed was that units were waiting to see if PJM would call them to discuss their status and *then*, if PJM gave them a schedule, they would be willing to seek a gas supply.

36. As I discussed above, Capacity Performance was intended to place all of the fuel risk on generators to be prepared for emergency conditions. The type of behavior described in the preceding paragraph is not what was envisioned.

37. The uncertainty that PJM dispatchers had over gas supply persisted well into December 24. For example, on December 24 at 6:45, the PJM dispatcher called the generation dispatcher for a status update on the [redacted] END CUI//PRIV units. He was advised that none of the units would be available that day but that they might be available at the beginning of the gas day at 10:00 on December 25, but the generator dispatcher was "not sure." Also, BEGIN CUI//PRIV [redacted] END CUI//PRIV even advised PJM on December 24 at 19:39 that it was seeking authorization to shut down units 1 to 5 due to "fuel limitations."

38. Further, PJM needed to bring on many units that had not run in months: close to 50,000 MW (approximately 175 to 200 units) in a short period and during extreme cold. Further, based on eDART data, no units that had not run in the 8 weeks prior to December 1, 2022, had conducted the operation exercise recommended in Manual 14D during the month of December.

39. Based on the generator availability data, I can only conclude that many generators, at the very least, did not take the Capacity Performance penalty/bonus incentive structure seriously. As I explained above, excuses for failure to perform under the Capacity Performance regime are very narrow: lack of fuel needed to operate does not excuse lack of timely availability. Similarly, the high number of cold weather related failures such as freezing and problems related to operating on alternative fuels suggests a lack of adequate winterization.

40. As I discussed above, the vast majority of generation fuel supply issues were an inability of gas-fired generators to obtain gas, and generators were obligated to report this information in Markets Gateway and eDART applications. However, PJM Dispatch learned of most of these fuel limitations only when PJM called the units to come online. There was little or no notification from the generators that they were fuel limited. In fact, over 92% of the outages were reported to PJM with less than an hour's notice or no notice at all. As a result, instead of being properly notified and having an opportunity to deliberate before making dispatch decisions and decisions regarding potential export curtailments as contemplated by the PJM Manuals, PJM was forced to act very quickly to maintain reliable operations based on the often hazy and unreliable information that generators provided.

41. To underscore the difficulties that the generators' poor transparency caused for PJM operators, as I mentioned before, approximately 6,000 MW of steam generators were called

for on the morning of December 24 that were shown to be available but were not online for their expected start time during the morning peak. This should be put into perspective. The PJM system was already stretched nearly to its limits as were the Tennessee Valley Authority and Duke-Carolinas systems to the south. PJM operators were suddenly and without warning thrust into finding the non-performing 6,000 MWs in an extremely narrow window of opportunity if more drastic emergency actions were to be avoided. To further underscore the challenges that the lack of accurate and timely generation data posed, there were numerous instances where PJM operators had calls with generation dispatchers in which they specifically directed generators to update their parameters on Markets Gateway and/or to update their availability status in eDART, and *the generators still failed to meet their obligations.* Operators thus were attempting to dispatch the system and make decisions regarding interchange while being faced with data that they sometimes knew were incorrect or that showed conflicting data in the Markets Gateway and eDART applications.

G. The CZG Complainants Attempt to Reallocate the Assignment of Risk Under Capacity Performance

42. The CZG Complainants' witness, Dr. Harvey, claims that if PJM's operators had acted properly by calling over 155,750 MW of generation for the December 23, 2022 operating day, PJM should also have "t[old] long start units that did not have day-ahead market schedules or RAC schedules to be prepared to come online at [a] particular time."[42] This argument seems to suggest that the CZG Complainants were somehow treated unfairly because, in their view, PJM should have given them advance notice to operate. Likewise, the Nautilus Entities' claim that "PJM knew, or should have known given its long experience with gas supply issues, that the natural gas fired generators in PJM would need notice of PJM's potential need for their units well in advance of the weekend in order to be able to procure gas."[43] And the Coalition goes so far as to suggest that PJM "inhibited" generators' ability to procure fuel by under-forecasting load, not making RAC commitments in advance of starting System Wide Capacity Commitments on December 23, and other alleged failures.[44]Each of these arguments ignores Complainants and Nautilus Entities' Capacity Performance obligations. In fact, by making these arguments, they are simply providing further acknowledgment that they did not take the clear-cut requirements of Capacity Performance seriously.

43. As I discussed above, Capacity Performance assigns the risk of generator availability during emergency conditions to the generators. The only exceptions are two narrowly prescribed exceptions not relevant to the Complainants' claims. PJM called upon Complainants' generating units when they were needed during the Pre-Emergency Load Management Reduction Action and Emergency Actions that triggered PAIs and Complainants' units were not available. This is simply the risk that the Complainants bore under Capacity Performance as the Tariff and the Commission's orders make abundantly

[42] Complaint of the ComEd Zone Generators, Test. of Dr. Scott Harvey, Ex. CZG-0001, at P 21.

[43] Complaint of the Nautilus Entities at 38.

[44] Coalition Complaint at 15; *see generally* Coalition Complaint at 15-23.

clear. Complainants chose not to take the steps needed to make their units available in circumstances such as those that occurred during Winter Storm Elliott notwithstanding that other generating units, i.e., Complainants' competitors, did so. In particular, nothing stopped Complainants from including the costs of enhancing the fuel security of their units in their capacity market bids. There is nothing unfair or unreasonable about enforcing Non-Performance Charges against the Complainants as a result of their own decisions.

H. Overview of the Complainants' Contributions to the Challenges PJM Faced

44. Complainants' failure to perform contributed to the challenges faced by PJM operators during Winter Storm Elliott. Although not at the heart of the specific allegations at issue in the Complaints filed by the Nautilus Entities, the CZG Complainants, and the Coalition, I reference below additional information about specific entity performance failures for a representative sampling of the complainant entities in the three Complaints. PJM reserves the right to supplement this representative sampling with additional examples of these generators poor performance during Winter Storm Elliott. If the Commission believed such information would be of assistance in resolving this Complaint, PJM is prepared to furnish that information.

45. As to Nautilus Entities' poor performance, please reference PJM's Answer in Docket No. EL23-53, and the Bielak Declaration beginning at Paragraph 43 filed in the complaint proceedings initiated by the Nautilus Entities, the CZG Complainants, and the Coalition. Reference should also be made to the Nautilus Entities' own Complaint filed in Docket No. EL23-53 on March 31, 2023, which concedes those units' performance failures justifying the imposition of Non-Performance Charges.

46. As to the CZG Complainants, for almost all units, parameters required to be submitted in Markets Gateway were not updated in a timely manner, if at all. And in some cases, the updated parameter information that was submitted was incorrect. The collective impact of the failures of the CZG Complainants' units was significant. Of the 29,000 MW of capacity above the load forecast that PJM believed to be available going into the December 23, 2022 operating day, the CZG Complainants' units comprised 6,110 MW or 21.5 per cent. But before the calendar day was over, all of the units were reported as being unavailable. As explained by Mr. McGlynn, if these units had operated consistent with their submitted parameters, they would have been of material assistance to PJM in meeting the evening peak on December 23 and the morning peak on December 24. Moreover, the failures of the CZG Complainants' units to provide up-to-date information further complicated the already difficult decisions that operators had to make. By way of further information, please consult the Affidavits of Donnie Bielak that PJM has submitted on May 26, 2023 in connection with the complaint proceedings initiated by two of the CZG Complainants – Lee County Generating Station LLC and Lincoln Generating Facility, LLC.[45]

[45] *Lee County Generating Station, LLC v. PJM Interconnection, L.L.C.*, FERC Docket No. EL23-57; *Lincoln Generating Facility, LLC v. PJM Interconnection, L.L.C.*, FERC Docket No. EL23-59.

47. As to the Coalition, they represent a combined total of approximately 27,500 MW of installed generating capacity combined. Although that Complaint does not clearly identify all units included in the Coalition, it does identify at least sixteen different entities all of whose poor performance caused them to be "informed by PJM of PJM's intent to assess Non-Performance Charges against them, respectively, arising from the December 23 PAIs and the December 24 PAIs."[46] By way of further information, please consult the Affidavits of Donnie Bielak that PJM has submitted on May 26, 2023 in connection with the complaint proceedings initiated by two of the Coalition complainants – Talen Energy Marketing, LLC and Parkway Generation Keys Energy Center LLC.[47]

48. This concludes my affidavit.

[46] Coalition Complaint at 4-5.

[47] *Talen Energy Marketing, LLC v. PJM Interconnection, L.L.C.*, FERC Docket No. EL23-56; *Parkway Generation Keys Energy Center LLC v. PJM Interconnection, L.L.C.*, FERC Docket No. EL23-60 (see, e.g., footnote 7 of the Docket No. EL23-60 Complaint linking that docket's complainant to the Coalition).

PUBLIC VERSION

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Power OPP, LLC, *et al.*	)	
Complainants	)	
v.	)	**Docket No. EL23-53-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Aurora Generation, LLC, *et al.*	)	
Complainants	)	
v.	)	**Docket No. EL23-54-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Coalition of PJM Capacity Resources	)	
Complainant	)	
v.	)	**Docket No. EL23-55-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	

VERIFICATION

I, **Christopher Pilong**, state, under penalty of perjury, that I am the Christopher Pilong referred to in the foregoing document entitled "Affidavit of Christopher Pilong on Behalf of PJM Interconnection, L.L.C.," 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.

/s/ Christopher Pilong
Christopher Pilong

Exhibit 5

Affidavit of Paul McGlynn

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Power OPP, LLC et al	)	
Complainants	)	
v.	)	**Docket No. EL23-53-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Aurora Generation, LLC, et al.	)	
Complainants	)	
v.	)	**Docket No. EL23-54-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Coalition of PJM Capacity Resources	)	
Complainant	)	
v.	)	**Docket No. EL23-55-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	

AFFIDAVIT OF PAUL F. MCGLYNN
ON BEHALF OF PJM INTERCONNECTION, L.L.C.

1. My name is Paul F. McGlynn. My business address is 2750 Monroe Blvd., Audubon, Pennsylvania, 19403. I currently serve as Executive Director System Operations for PJM Interconnection, L.L.C. (PJM). I am submitting this Affidavit to support PJM's separate answers to the complaints in the above-captioned proceedings that are being filed today. For ease of reference, I refer to the three groups of generators that have filed the above-captioned complaints collectively as "the Complainants."[1]

2. I have been employed by PJM since 2007. As part of my current work for PJM, I am responsible for managing the System Operation Division to ensure the secure, reliable, economic and coordinated operation of the PJM Interconnection system. In this role I direct and oversee all System Operation Division activities for the efficient and reliable operation and coordination of the PJM bulk power system including load forecasting, scheduling and dispatch of generating units, coordinating generating unit and transmission outages, scheduling power interchange transactions with neighboring systems and monitoring and control of the loading and voltages of the system within established reliability standards.

[1] For clarity, this affidavit will refer to the "CZG Complainants," the "Coalition", and the "Nautilus Entities" when referencing arguments unique to those parties.

3. Prior to assuming my position in System Operation, I was the senior director of System Planning for PJM Interconnection. In that role I was responsible for the development of the PJM Regional Transmission Expansion Plan (RTEP) including transmission planning, interregional planning and the analytic activities in support of the interconnection process. My responsibilities included assessing long-term transmission system adequacy and reliability, and recommending bulk transmission system expansions and enhancement options.

4. Prior to joining PJM, I was employed by PECO Energy, a subsidiary of Exelon Corporation, for 21 years where I began working as an Engineer in the Electrical Engineering Division. I was promoted to Manager of Engineering in Transmission and Substations in 1995. I transferred to System Operations in the Operations Planning Department in 1998. I was promoted to Shift Manager in System Operations in 1999 and to Manager in Operation Planning in 2001. I became Manager in Transmission control in 2003.

5. At PECO, I was responsible for engineering and designing transmission and substation equipment, including protective relay systems; providing engineering and technical support for PECO's transmission and substation organization; short-term transmission system planning studies, developing operating procedures and preparing and presenting training courses; directing the real-time operation of the Transmission System; short-term transmission planning, outage coordination, dispatcher training, procedure development and real-time control room support; and managing the real-time personnel and activities of the transmission control center.

6. I am a licensed Professional Engineer in the Commonwealth of Pennsylvania. I hold a Bachelor of Science degree in Electrical Engineering from the Pennsylvania State University and a Master of Science degree in Electrical Engineering from Drexel University.

7. I was directly involved in overseeing, and subsequently reviewing, PJM's operational decisions during "Winter Storm Elliott."[2] That storm precipitated a major reliability emergency both in PJM and other portions of the Eastern Interconnection on December 23 and 24, 2022.

8. The purpose of this Affidavit is to explain how PJM's actions in response to Winter Storm Elliott were consistent with the PJM Open Access Transmission Tariff (Tariff), Operating

[2] "Winter Storm Elliott" was an unusually severe winter storm that struck the PJM Region between December 23 and December 24, 2022. Winter Storm Elliott presented extraordinary reliability challenges by causing an extremely rapid drop in temperatures at a time of record-breaking high loads for the Christmas holiday. It had a major, and in many ways unanticipated, impact not just on PJM but on much of the rest of the Eastern Interconnection. See https://www.pjm.com/markets-and-operations/winter-storm-elliott (collecting PJM's public statements addressing Winter Storm Elliott's impact on PJM's operations and markets).

Agreement (OA),[3] PJM Manual 13: Emergency Operations (Manual 13)[4] and all other applicable requirements. These authorities all provide PJM with broad operational flexibility to preserve reliability within PJM, and to assist neighboring systems, in emergencies. All of PJM's efforts were reasonable attempts to contend with the confluence of unexpected and unprecedented abnormal events during Winter Storm Elliott, including the poor communications and performance by Capacity Resources.

A. PJM's Actions Successfully Met the Serious Challenges Presented by Winter Storm Elliott

9. At a time when millions of Americans in the PJM Region were preparing for the Christmas holiday, PJM recognized the impending reliability threat posed by Winter Storm Elliott. As discussed in the Bielak Affidavit, PJM initiated extensive preparatory efforts that were a call to action to PJM's generation fleet. PJM's Load Forecasts for December 23 anticipated that the coming storm could bring significant temperature drops and anticipated high loads. Operators scheduled conservatively, making a conscious decision to carry a large amount of additional capacity going into the December 23 operating day. But these efforts were insufficient because many Capacity Resources, including Complainants, unexpectedly failed to perform when they were most needed to support reliable system operations.

10. In the face of widespread and unacceptable non-performance by generators, PJM staff spent the days leading up to Christmas working tirelessly to keep the lights on. PJM operators repeatedly had to make difficult reliability decisions in real-time while in the midst of unprecedented circumstances and significant uncertainties that were exacerbated by generator failures. There was a very real risk on both December 23 and December 24 that PJM would be forced to shed load to avoid widespread outages. Winter Storm Uri is a recent reminder of how devasting the human and economic consequences of load shedding in freezing winter conditions can be.

11. PJM has included a timeline of the various actions that it took before, during and after Winter Storm Elliott. The timeline is included as Exhibit 1 to PJM's answers to the above captioned proceedings. The timeline is accurate to the best of my knowledge.

12. The PJM actions referenced in the timeline include issuing: (i) Cold Weather Advisories and Cold Weather Alerts; (ii) NERC Emergency Alerts Level 1 (EEA1) and 2 (EEA2), including Pre-Emergency Load Management Reduction Actions, Emergency Load Management Reduction Actions, loading Maximum Emergency Generation and Maximum Emergency Generation Alerts/Load Management Alerts; (iii) issuing Voltage Reduction Alerts and Voltage Reduction Warnings; and (iv) making public appeals for conservation. PJM also received requests for assistance from neighboring systems that were also experiencing capacity emergencies and had reached NERC level EEA3, i.e., load shedding.

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[4] PJM Manual 13: Emergency Operations (Manual 13). See https://www.pjm.com/~/media/documents/manuals/m13.ashx.

These terms are all described in Manual 13 and in NERC documents. But for ease of reference, they are collected in Exhibit 1 to PJM's Answer in the captioned proceeding.

13. PJM is traditionally a net exporter of energy. But at times during Winter Storm Elliott, PJM determined that it must recall non-firm exports to neighboring systems that were themselves shedding, or on the brink of shedding, load in order to manage the risk of load shedding in PJM. At other times, on December 24, PJM itself received assistance in the form of imports from the Northeast Power Coordinating Council (NPCC).

14. Because of its actions, PJM was able to keep the lights on notwithstanding the incredibly challenging system conditions. PJM did not shed a single megawatt of load on December 23 and December 24. Consistent with Good Utility Practice, NERC reliability standards, and other legal obligations, PJM also continued to serve a critical role in supporting the reliability needs of its neighbors, despite having to recall exports to neighboring Balancing Authorities at times.

B. PJM Complied with the Tariff, OA, and Manual 13 Throughout Winter Storm Elliott

15. PJM must comply with the Tariff, OA (as informed by the PJM Manuals), mandatory NERC and regional reliability standards, and the dictates of the Good Utility Practice standard. All PJM dispatch staff are NERC-certified system operators and receive extensive training throughout the year on the reliable operation of the Bulk Electric System including, but not limited to, emergency procedures.

16. The Tariff, OA, NERC standards, and the implementing PJM Manuals ultimately exist to protect reliability. PJM's foremost obligation as a FERC-regulated Transmission Provider, as well as a registered NERC Reliability Coordinator, Balancing Authority, and Transmission Operator, is to maintain reliability.

17. PJM, like other entities with comparable reliability responsibilities, must be allowed flexibility to make operational decisions based on the information available to them in real-time. Dispatchers have to think in terms of multiple time frames simultaneously, e.g., very short time intervals, such as almost minute-by-minute, longer times frames such as hour-by-hour, and still longer time frames spanning 24 hours or longer.

18. I am familiar, as are the collective PJM Dispatch staff, with the provisions of the Tariff, OA, and Manual 13 (and other PJM Manuals) that delineate PJM's emergency reliability authority and procedures as well as the related NERC reliability standards. It is well understood by PJM's operators, but still should be noted given the position taken by Complainants in the above-caption proceedings, that these authorities all clearly provide PJM with flexibility to address emergencies. They leave PJM with broad flexibility to act as needed. They do not establish absolute prohibitions on actions that operators may take beyond making the avoidance of load shedding the operators' paramount objective.

19. Section 1.7.11 of the OA makes PJM responsible "for declaring the existence of an Emergency, and for directing the operations of Market Participants as necessary to manage, alleviate or end an Emergency," and further clearly states that a PJM "declaration that an

Emergency exists or is likely to exist . . . shall be binding on all Market Participants" until PJM "announces that the actual or threatened Emergency no longer exists." Section 1.7.15 instructs that "[c]onsistent with Good Utility Practice, [PJM] shall be authorized to direct or coordinate corrective action, whether or not specified in the PJM Manuals, as necessary to alleviate unusual conditions that threaten the integrity or reliability of the PJM Region, or the regional power system."

20. Manual 13 is PJM's emergency operations manual. Section 1.1 of Manual 13 emphasizes that "[t]he policy of PJM is to maintain, at all times, the integrity of the PJM RTO transmission systems and the Eastern Interconnection and to give maximum reasonable assistance to adjacent systems when a disturbance that is external to the PJM RTO occurs." Section 2 gives PJM dispatchers, "the flexibility of implementing the emergency procedures in whatever order is required to ensure overall system reliability" including "the flexibility to exit the emergency procedures in a different order than they are implemented when conditions necessitate." Section 2.3.2 of Manual 13 reiterates that "[d]ue to system conditions and the time required to obtain results, PJM dispatchers may find it necessary to vary the order of application [of various measures including recalling non-capacity backed off-system sales and load relief measures] to achieve the best overall system reliability." Section 2.3.2 also expressly notes that, "[t]he Real-Time Emergency Procedures section [i.e., section 2.3.2 itself] combines Warnings and Actions in their most probable sequence based on notification requirements during extreme peak conditions. Depending on the severity of the capacity deficiency, it is unlikely that some Steps would be implemented."

21. To be clear, Manual 13 addresses five different types of emergencies. PJM experienced a "capacity emergency" during Winter Storm Elliott. Capacity emergencies are the subject of section 2 of Manual 13. The circumstances of Winter Storm Elliott did not give rise to a circumstance where warnings/actions were warranted on a Control Zone or a subset of a Control Zone basis. As discussed *infra*, the performance of the ComEd generators would have significantly mitigated (if not eliminated) the emergency conditions in the PJM Region during the storm. I also note that section 2.2 of Manual 13 indicates that, "PJM issues capacity emergencies across the entire PJM RTO." Load Dump Warnings/Actions were not necessary during Winter Storm Elliott.

22. In addition, NERC reliability standard IRO-014-3 R7 specifies that, "[e]ach Reliability Coordinator shall assist Reliability Coordinators, if requested and able, provided that the requesting Reliability Coordinator has implemented its emergency procedures, unless such actions cannot be physically implemented or would violate safety, equipment, regulatory, or statutory requirements." This NERC requirement is addressed in more detail in the Bryson and Naumann Affidavits. I will say here, however, that IRO-014-3 R7 reinforces the PJM-specific authorities noted above, which also make helping neighboring systems in duress a very high priority. PJM's operators are well-aware of this requirement, which is grounded in the utility industry's long tradition of providing mutual assistance when facing emergencies.

23. I am also familiar with the well-established concept of "Good Utility Practice," which is expressly referenced in some of the PJM sources that I quote above and is also generally applicable to virtually all of PJM's operational actions under the Tariff.

24. The Tariff defines "Good Utility Practice" as "any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition." The definition also notes that "Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather is intended to include acceptable practices, methods, or acts generally accepted in the region." My understanding is that this is identical to the definition used in other regions under FERC's *pro forma* Open Access Transmission Tariff.

25. PJM exercised reasonable judgment in light of the facts known at the time of its Emergency Actions during Winter Storm Elliott. PJM's decisions accomplished the "desired result" under the Good Utility Practice standard of the reliable operation of the bulk electric system and avoiding load shedding in PJM while providing as much help as practicable to neighboring systems in duress. My understanding is that the Good Utility Practice Standard did not require PJM to use the "optimum practice, method, or act to the exclusion of all others" and that reasonably-based decisions made by the operators will be viewed as consistent with this standard. Hindsight is always 20/20. But even if there were some theoretical optimal approach that could have been used, that would not change the determination that the Good Utility Practice standard was met.

26. The fact that Emergency Actions triggered Non-Performance Charges is something that PJM operators understood. Operators also know that under the Capacity Performance construct, generators are responsible for winter preparedness (including fuel supply) and excuses for non-performance by Capacity Resources are extremely limited. Going into Winter Storm Elliott operators expected that Capacity Resources would be available consistent with the performance incentives incorporated into the Capacity Performance construct.

27. I have reviewed all three complaints, including the assertions that PJM violated Manual 13. The Complainants' claims are not valid. They second-guess real-time operational decisions with the benefit of 20/20 hindsight. They are also based on economic arguments that operators were not, and should not have been, considering even if the information underlying those arguments had been readily available to them in real-time.

28. PJM's operators fully satisfied their compliance obligations in advance of and for the entire duration of Winter Storm Elliott. If the Complainants' restrictive and unrealistic interpretations of Manual 13 was adopted, it would have an adverse impact on the reliability of bulk electric system and would seriously inhibit PJM operators' ability to keep the lights on.

C. PJM's Actions During Winter Storm Elliott Were Reasonable and Justified in Light of the Information that Was Available to PJM Operators at the Time that They Were Making Decisions

29. This section of my Affidavit briefly discusses the actions that PJM took in connection with Winter Storm Elliott and the reasons why they were taken.[5]

1. December 23

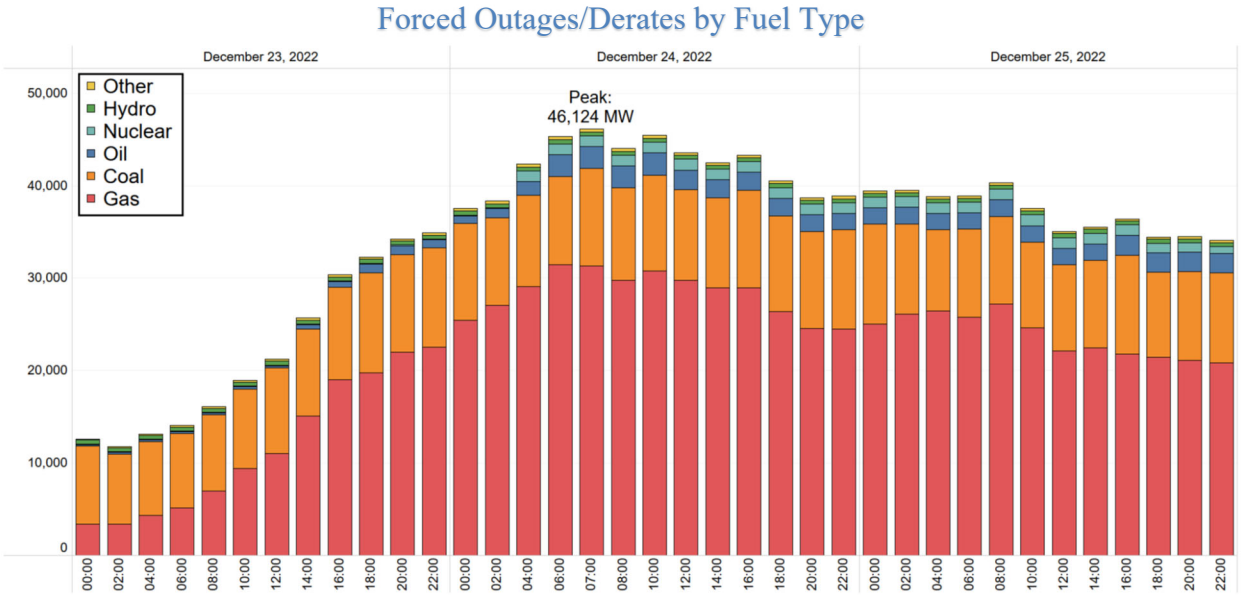
30. PJM put generators on notice through Cold Weather Advisories and Cold Weather Alerts of the need for heightened readiness as Winter Storm Elliott approached. As noted in Exhibit 1 to PJM's Answer, these advisories and alerts were issued between 9:00 on December 20 and 17:30 on December 22. These communications are discussed in more detail in the Bielak Affidavit. .

31. PJM entered the December 23 operating day in the reasonable belief, based on Markets Gateway and eDart data, that it had a substantial cushion for meeting load even taking account of potential variations in the peak load and expected higher-than-normal generation outages due to the cold weather. As explained in the Pilong Affidavit, "PJM entered the operating day on December 23, 2022 with the understanding that it had a total of approximately 158,000 MW of available generation to meet a forecasted load of 127, 000 MW."

32. Starting approximately 3:00 in the morning on December 23, generation forced outages/derates increased substantially. This happened at the same time as PJM load was increasing. PJM struggled to meet the consistently growing load inside PJM with the rapidly diminishing fleet of available generation. It also became apparent that many generators were not updating their offer parameters in Market Gateway or their status in eDart in a timely manner. On many occasions, PJM only learned of generators that were not able to operate after the operators called them to come on line. In some instances, the dispatch agent told the PJM dispatcher that the unit could not start during the same phone call requesting that unit to start. The operators thus could not rely upon what they were seeing on their screens.

33. The chart below shows the steadily rising levels of forced outages that PJM experienced through December 23. As depicted there, gas fired generators represent the largest segment of units experiencing higher outage rates. As discussed in the Pilong Affidavit, lack of natural gas as fuel was a growing problem.

[5] I note that there is no basis for Dr. Scott Harvey's assertion in the complaint proceeding brought by the CZG Complainants that PJM took actions because it had an ulterior motive such as a desire "to go short on PJM reserves relative to the reliability requirement in order to export more power to adjacent balancing areas." Harvey Aff. at n. 70.



The increase in load occurring at the same time as the performance of the generation fleet deteriorated caused the operational situation to become increasingly dire during the afternoon of December 23. Eventually, there were about 34,500 MW of forced outages at peak load of 135,000 MW on December 23.

34. PJM experienced two spinning reserves events on December 23 to address a low Area Control Error (ACE). These events are indicative of the stress that was being placed on the system at this time. ACE is a measure of how well the Balancing Authority is matching generation to the load. If load and generation are perfectly balanced, then ACE is zero. When a generator within a Balancing Authority trips off-line the ACE goes negative.[6] PJM experienced these events because load was increasing as generators tripped or failed to start. The December 23 spinning reserve events are depicted on the chart below in which PJM deployed Synchronized Reserves[7] to recover the ACE:

[6] NERC Standard BAL-002, Disturbance Control Performance, requires PJM, in its role as a registered NERC Balancing Authority, to ensure that is able to utilize its contingency reserve to balance resources and demand, and to return Interconnection frequency to within defined limits following a Reportable Disturbance. NERC defines a Reportable Disturbance as any event that causes an ACE change greater than or equal to 80 percent of a Balancing Authority's or reserve sharing group's most severe contingency.

[7] PJM defines "Synchronized Reserves" as "the reserve capability of generation resources that can be converted fully into energy or Demand Resources whose demand can be reduced within ten minutes from the request of the [PJM] dispatcher, and is provided by equipment that is electrically synchronized to the Transmission System." OA, §1 – Definitions. "Synchronized Reserves" are supplied from both 10-minute synchronized generating resources (i.e., the Spinning Reserves referenced above) and 10-minute demand-side response resources. *See* Manual 13, §1 at 15.

Event Start (EST)	Event End (EST)	Duration	Zone	Reason	PAI in effect
12/23/22 10:14	12/23/22 10:25	00:11:07	RTO	Low ACE	No
12/23/22 16:17	12/23/22 18:09	01:51:29	RTO	Low ACE	Yes (1730-1809)

Spinning reserve events to recover ACE do not occur often. To have one last the duration of the second event is very rare and is indicative of the extreme difficulties the system was facing as it headed into the December 23 evening peak. In fact, during my entire career in system operations, I have never before encountered an instance in which a spinning reserve event was needed for almost two hours.

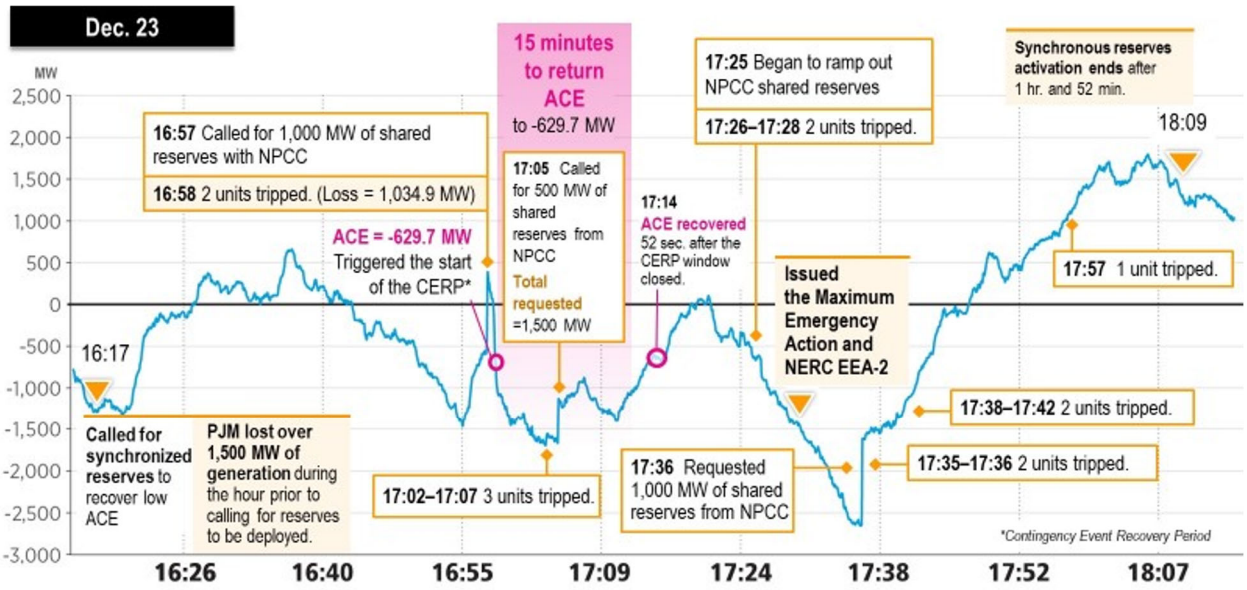
35. In addition, responses by Synchronized Reserves to Winter Storm Elliott was generally poor. The chart below captures the performance of Synchronized Reserves on December 23.

Assigned Reserve Performance

Event Start	Event End	Synch Reserve Assignment (MW)	Synch Reserve Response (units with assignment) (MW)	Shortfall to Assignment (MW)	Response to Assignment (%)
12/23/22 10:14	12/23/22 10:25	1,791	1,547	244	86.4%
12/23/22 16:17	12/23/22 18:09	1,846	945	901	51.2%

The performance of the Synchronized Reserve Units is yet another indication of the problems that generators were encountering.

36. The chart below depicts the level of the ACE along with specific events and actions that affected it. As the chart illustrates, while PJM acted to recover the ACE as load grew, trips by multiple generators worked against those efforts. Notably, PJM ACE was dangerously low at nearly -3000 MW at a time when load was still continuing to increase. It was not until the impact of the Pre-Emergency Load Management Action and the Maximum Emergency Generation Action (that I describe below) were felt, that ACE truly recovered.



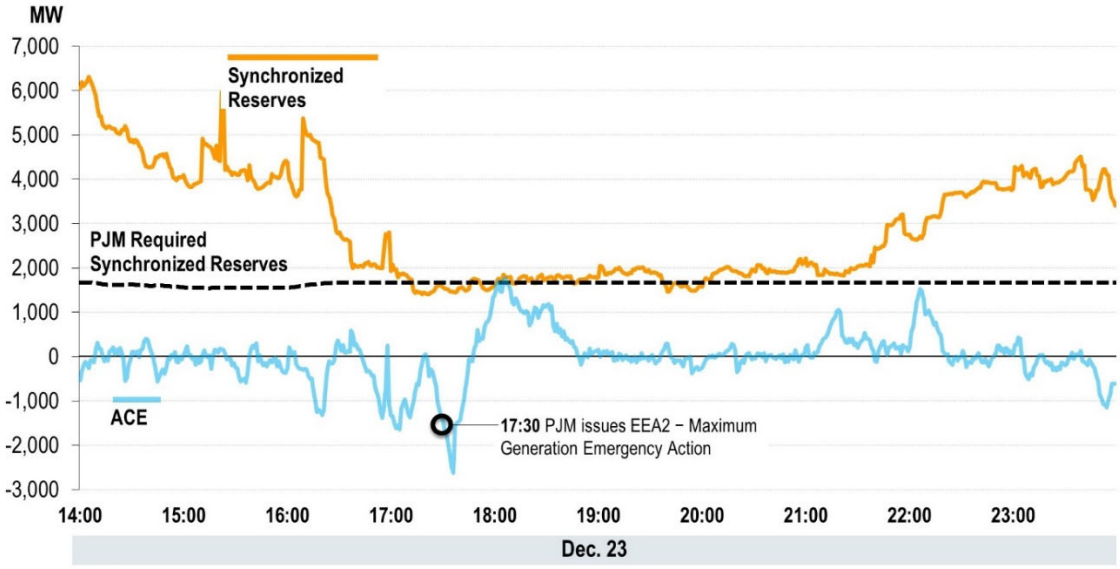
37. Given the on-going poor performance by Capacity Resources being observed in real-time, the remaining reserves available, the increasing load and the declining ACE, PJM dispatchers needed to take immediate action to address the situation. At 17:30, PJM issued a Maximum Emergency Generation Action, a Pre-Emergency Load Management Reduction Action[8] and issued a NERC EEA2. It was apparent that reducing off-system energy interchange alone would not be able to be implemented quickly enough and, in any event, would not be adequate to address the situation. Additional relief through emergency procedures was required. Consistent with section 2.2 of Manual 13, the Pre-Emergency Load Management Reduction Action, the Maximum Generation Action and the EEA2 encompassed the entire PJM footprint.

38. As discussed in the Bryson Affidavit, the action at 17:30 was validated by the supply/demand conditions that were present at that time. Mr. Bryson shows that cutting non-firm exports alone would not have been sufficient to preserve reliability.

39. The Emergency Action's impact on ACE can also be seen in the chart below. In particular, it depicts the difficult conditions facing PJM's operators between 14:00 and the end of the day on December 23. It clearly shows how available spinning reserves on the system were being depleted, how the PJM ACE was becoming progressively harder to control, and how spinning reserves dipped below the normal target level before PJM issued its EEA2. While PJM was taking actions to recover the ACE as load grew, the tripping of multiple

[8] PJM has three Load Management products: a thirty minute product, a sixty minute product and a 120 minute product. PJM requested the 30 minute and 60 minute Load Management product to be implemented. The 120 minute Load Management product was not requested as it would not have been effective until after the evening peak on December 23.

generators worked against those efforts. It was not until the impact of the Pre-Emergency Load Management Action and the Maximum Emergency Generation Action were felt, that ACE truly recovered.[9]



40. System conditions stabilized sufficiently by 22:00 so that PJM ended the EEA2 at that time. Both the Pre-Emergency Load Management Action and Maximum Emergency Generation Actions were cancelled and the PAIs were no longer triggered.

41. At 23:00 on December 23, PJM issued a Maximum Generation Alert/Load Management Alert and an EEA1 effective at 0:00 on December 24. PJM took this action in light of both forecasted conditions for the next day and the enormous uncertainty resulting from unprecedented system conditions that had emerged on December 23. Moreover, neighboring systems continued to face reliability challenges on the evening of December 23. For example, TVA was back in an EEA3 that evening and stayed at that level through 12:11:56 on December 24. MISO declared an EEA 2 at 18:00. The VACAR South Reliability Coordinator issued an EEA1 for DEC beginning at 20:25.

42. Simply stated, PJM had to account for the prospect that very challenging conditions would continue on December 24. As far as PJM could tell given the information available on December 23, it was very possible that historically high load levels could recur again on December 24. The poor operating performance, as well as lack of transparency, by many Capacity Resources on December 23 was a major factor weighing on the PJM operators. They were concerned that PJM might have to reach deep into its emergency procedures in order to serve load on December 24.

[9] It should be noted that PJM is a centrally dispatch single Balancing Area. PJM tracks ACE and manages the system to comply with ACE requirements for the entire PJM region. PJM does not track separate ACE values for portions of the PJM footprint, such as the ComEd Zone. PJM dispatches all resources in the RTO to serve all load in the RTO.

2. December 24

43. Generator outage levels in PJM continued to increase early on December 24. At 08:00, over 24% of the PJM fleet (approximately 46,000 MW) was experiencing a forced outage, which is higher than the 22% level that PJM experienced during the Polar Vortex in 2014. After 08:00, outage levels gradually decreased. but approximately 35,000 MW of generation was still experiencing a forced outage at 22:00 on December 24 which was still a very high forced outage rate of approximately 20%.

44. In addition, approximately 6,000 MW of steam generation was called but was not online as expected for the morning peak on December 24. Ultimately, over 16,000 MWs of generation that was committed in the Day-ahead Market failed to perform.[10] Further, high generator outage rates had limited PJM's ability to replenish pond levels for pumped storage hydro prior to the morning peak on December 24. Taken together, because of the poor generator performance, PJM was facing approximately 57,000 MW of generator unavailability for the morning peak on December 24.

45. Meanwhile, outside of PJM neighboring systems continued to face load shedding and to need assistance during the morning of December 24. VACAR South issued EEA3s for Dominion South Carolina at 05:59 on 12/24, for Duke Energy Carolinas at 06:17 on 12/24, for Duke Energy Progress at 06:40 on 12/24, and for South Carolina Public Service Authority at 07:20 on 12/24. For example, TVA shed as much as 3,200 MW on the morning of December 24. If PJM had provided less assistance than it did, the levels of load shed within that Balancing Area undoubtedly would have been higher.

46. On December 24, PJM again called for Synchronized Reserves to contend with low ACE in two cases and the loss of a unit in another case. Again, these events were unusual in terms of frequency and duration, with the third event lasting more than one hour, indicating that the PJM system was under stress. Also, as was the case the day before, the response by generators was disappointing and, unfortunately, confirmed the observations and concerns of the PJM operators regarding generation performance and how well generators would address future system threats that might arise.

47. The charts below encapsulate the disappointing results of PJM's Synchronized Reserves deployments on the morning of December 24.

[10] *Id.* at P 24.

Event Start (EST)	Event End (EST)	Duration	Zone	Reason	PAI in effect
12/24/22 0:05	12/24/22 0:30	00:25:43	RTO	Low ACE	No
12/24/22 2:23	12/24/22 2:54	00:30:35	RTO	Unit Trip	No
12/24/22 4:23	12/24/22 5:51	01:27:32	RTO	Low ACE	Yes (0425—0127)

Event Start	Event End	Synch Reserve Assignment (MW)	Synch Reserve Response (units with assignment) (MW)	Shortfall to Assignment (MW)	Response to Assignment (%)
12/24/22 0:05	12/24/22 0:30	1,767	930	837	52.6%
12/24/22 2:23	12/24/22 2:54	1,665	535	1,130	32.1%
12/24/22 4:23	12/24/22 5:51	1,007	169	838	16.8%

As can be seen from the chart, the response for the Synchronized Reserves event beginning at 4:23 was especially poor with only a 16.8% response rate.

48. At 04:00 on December 24, PJM issued a call for conservation to last until 10:00 on December 25. PJM decided that this could be a useful measure on the evening of December 23 because it was apparent then that generator outages were climbing, were likely to increase further overnight, and that it could be challenging to meet the peaks on Saturday morning and Saturday evening. The call was distributed through the media and through direct communications with Transmission Owners and state regulators. PJM believes that responses to its call for conservation helped to reduce load beginning at about 07:15.[11]

49. PJM also recalled exports, with those actions peaking at 07:00 when PJM became a net importer. High PJM system costs incentivized interchange into PJM at the same time that the non-firm transactions were recalled. Had PJM's net interchange not become positive, PJM would likely have been required to take more drastic measures such as a Voltage

[11] *See* PJM FAQs at 19.

Reduction Action and a Manual Load Dump Warning to prepare for the possibility of shedding load if conditions continued to deteriorate.

50. At 04:20, PJM issued an EEA2 – Pre-Emergency Load Management Reduction Alert and an Emergency Load Management Reduction Action. In this instance, PJM requested all three Load Management products (i.e., 30 minute, 60 minute and 120 minute). This was promptly followed at 04:28 by the issuance of an EEA2 Maximum Generation Emergency Action. Load Management went into effect at 06:00.[12] Again, consistent with section 2.2 of Manual 13, these actions encompassed the entire PJM footprint. The Bryson Affidavit confirms that these actions would have been needed even if PJM cut all non-firm exports.

51. At 04:52, PJM issued a Voltage Reduction Alert, followed at 07:15 by a Voltage Reduction Warning and Reduction of Non-Critical Plant Load. PJM took these steps to give regional stakeholders notice that PJM might be forced to take drastic measures short of load shedding to address reliability problems that could emerge later in the day. Underscoring the challenges faced by the system during this time frame, PJM convened a Systems Operations Subcommittee call with the transmission owners at 7:30, at which time it advised the transmission owners to prepare for a Voltage Reduction Action and to be sure to have their load shed plans in place.

52. PJM also publicly encouraged Market Participants to submit bids to sell emergency energy into PJM at 06:17. This action reflects PJM's all-out effort to secure as many resources as possible given the performance failures of December 23.

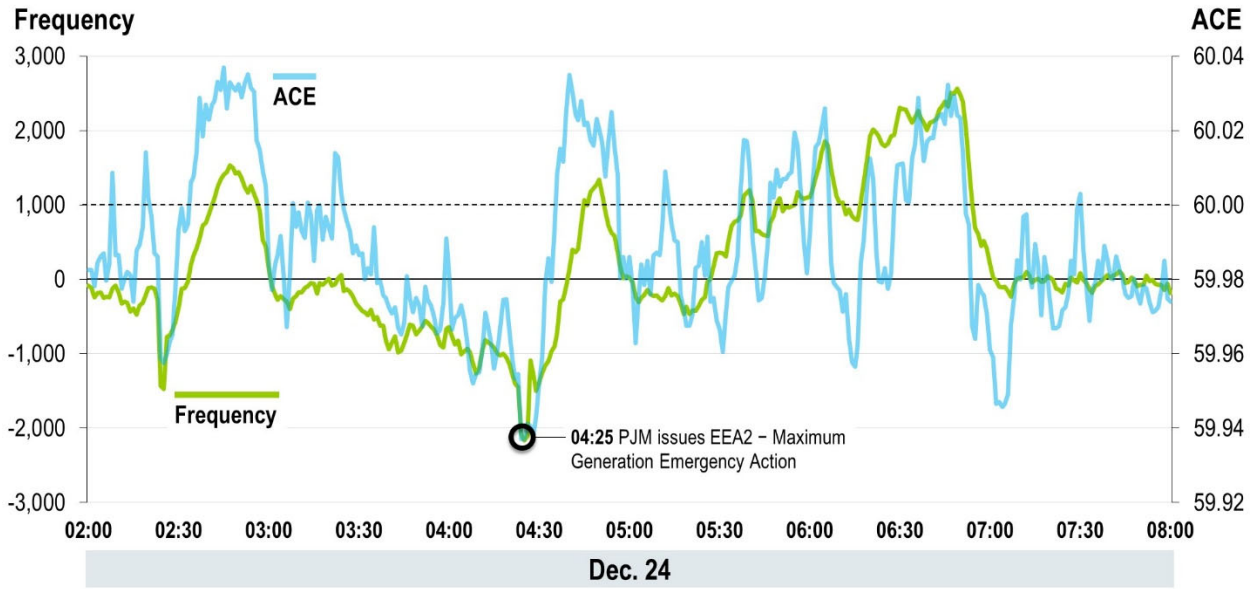
53. Around 06:30, PJM began receiving reports that generators were having to limit their output due to federal government environmental restrictions. PJM promptly sought relief and, at 17:30, PJM secured an order from the Department of Energy under section 202(c) of the Federal Power Act confirming that an emergency existed in PJM until Monday, December 26 at 12:00 and lifting certain emission restrictions for its duration.[13] The DOE order was received at 17:45 on Christmas Eve and immediately implemented.

54. The chart below illustrates the ACE and Frequency on the morning of December 24 from 02:00-08:00. Both values were sliding steadily notwithstanding that PJM deployed Synchronized Reserves between 4:23 and 5:31. Further, loads were growing over this period and, as it will be recalled from the earlier discussion, PJM was faced with approximately 57,000 MW of generator unavailability for the morning peak on

[12] This the earliest time of day that Load Management can be implemented.

[13] U.S. Dep't Energy, *Federal Power Act Section 202(c): PJM December 2022*, DOE Order No. 202-22-4, at 1 (Dec. 24, 2022) ("[A]n emergency exists in the electricity grid operated by PJM Interconnection, LLC (PJM) due to a shortage of electric energy, a shortage of facilities for the generation of electric energy, and other causes, and … issuance of this Order will meet the emergency and serve the public interest."), https://www.energy.gov/ceser/federal-power-act-section-202c-pjm-december-2022.

December 24. ACE and frequency began to recover after PJM entered into in EEA2 by loading Max Emergency generation and calling for Load Management to be implemented.



55. At 10:00, PJM began to restore exports to support neighbors. PJM held Load Management in anticipation of the potential for continuing generator outages which had been on an upward trajectory throughout the morning, and out of concern for being able to serve the load during the evening peak. In addition, retaining Load Management enabled PJM to allow pumped storage units that had been unable to run overnight to replenish their reservoirs so that they would be available for the evening peak. Based on the estimates supplied by the Curtailment Service Providers that administer the Load Management programs, the observed load was thought to be about 7,400 MW below what the levels that would have been experienced without Load Management. An increase in load of 7,400 MW would have posed a significant challenge for the system especially during peaks.

56. System conditions gradually began to improve during the day on December 24. But PJM operators had no guarantee in real-time that these positive trends would continue coupled with the fact noted above that Load Management was believed to be providing about 7,400 MW in load reduction. Uncertainties remained about the load forecast and whether PJM would experience another anomalously high peak in the evening. Just as important, generator outages remained at a high levels and many gas-fired generators were still having problems obtaining gas supplies even late in the day. PJM operators exercised their discretion to decide when and how to exit from emergency procedures to assure that reliability was maintained.

57. I agree with the observation made by Mr. Bryson that "[a]n overriding concern of PJM's operators during December 24, 2022, given what had happened on December 23 and early on December 24, was whether PJM could meet the evening peak for its footprint." PJM's ability to allow some non-firm exports to flow during the time leading up to the evening peak was not indicative of whether PJM could meet the December 24 evening peak without Emergency Actions even if all non-firm exports were recalled. Given the unprecedented

pre-holiday loads throughout December 23, PJM was reasonably concerned that loads might be as high or higher for the December 24 evening peak as those earlier peaks. And it was clear that many gas-fired generators did not have firm gas supplies and would be expected to have difficulty obtaining short-term gas supplies. Keeping both the Maximum Generation Emergency Actions and Pre-Emergency/Emergency Load Management Reduction Actions in effect throughout the day on December 24 were reasonable measures for addressing these risks.

58. Only after it became apparent that the dire conditions of December 23 and early on December 24 had not materialized by the evening of December 24 did PJM undo its pre-emergency and emergency steps for December 24. PJM ended the Voltage Reduction Warning and Reduction of Non-Critical Plant Load at 18:15 and the Voltage Reduction Alert at 18:34. PJM ended the Maximum Generation Emergency Actions and Pre-Emergency/Emergency Load Management Reduction Actions and returned to EEA0 at 22:00.

59. At 22:38 on December 24, PJM issued an EEA1 Maximum Generation Emergency/Load Management Alert for December 25. Like PJM's other actions on December 24, this was a prudent precautionary measure. Just as PJM could not have been sure if the unprecedentedly high holiday load conditions on December 23 would recur on December 24, it had to consider the possibility that December 25 might be another historically anomalous day. PJM had barely avoided load shedding and its potentially disastrous consequences on December 23, and the PJM system also strained to meet load on the morning of December 24. It was naturally and reasonably cautious for PJM not to simply assume that everything would be back to normal on December 25.

3. December 25

60. The Exhibit 1 timeline notes that at 11:10 on December 25, PJM issued a Cold Weather Alert from 07:00 through 23:00 on December 26 for PJM's Western Region Zones[14] only. This Cold Weather Alert ended as scheduled.

61. The Maximum Generation Emergency and Load Management Alert declared in the evening of December 24 also ended as scheduled at 22:00 on December 25 when PJM returned to EEA0. Similarly, PJM's call for conservation from December 24 expired as scheduled on December 25.

62. No PAIs were triggered on December 25. Accordingly, no Non-Performance Charges were assessed for that date.

63. In short, in my opinion, PJM's operational and reliability decisions fully complied with all applicable Tariff, OA, Manual 13, NERC requirements and other reliability requirements throughout Winter Storm Elliott. I believe that PJM's decisions were all reasonable and justified given the severity of the emergency, the information available at the time, and the need for PJM to be cautious to safeguard against load shedding within its footprint. I

[14] https://emergencyprocedures.pjm.com/ep/pages/regions.jsf

therefore cannot imagine how the propriety of PJM's Emergency Actions could reasonably be challenged as a justification for excusing any of the Complainants' generators from Non-Performance Charges.

D. Had the ComEd Generators Been Available, Their Output Could have Served the Rest of PJM

64. I disagree with the CZG Generators' contention supported by their witness Dr. Harvey that "there was persistent transmission congestion that did not allow resources in ComEd to increase output to serve the rest of PJM . . . . because the transmission lines from ComEd to the rest of PJM were constrained."[15] As I'll describe further below the CZG Complainants try to use LMP information to obfuscate the fact that their resources were not on and operating. The resources were not on because they failed to make adequate preparations to be available during extreme cold weather conditions and could not perform when needed.

65. The CZG generators try to develop an argument that the ComEd Zone had more generation than load during Winter Storm Elliott which somehow relieves them of their obligation to perform as Capacity Resources. PJM is a centrally dispatched balancing area. PJM does not dispatch the system based on individual transmission owner zones. ComEd and other transmission zones had more on-line generation than load during Winter Storm Elliott and other transmission zones had less on-line generation than load. That is completely irrelevant in PJM which is a centrally dispatched single balancing area. As I'll describe below, PJM uses all resources within PJM, regardless of the transmission zone in which they are located to serve the load within PJM.

66. First, Dr. Harvey concedes that "[t]he PJM FTR model is not a good model for estimating the impact of ComEd generation on PJM constraints[.]"[16] I agree. He relies upon a third-party's (Cambridge Energy Solutions) calculation of shift factors using the PJM Financial Transmission Rights (FTR) network model.[17] . Dr. Harvey correctly recognizes that this model "may be somewhat different from those in PJM's market model" and operations models.[18] In fact, the FTR model does not account for the real time outages and topology changes that existed during Winter Storm Elliott. The FTR model also does not consider external factors that would impact interregional congestion patterns. Dr. Harvey's flawed use of the FTR model and conclusion that the system was too constrained to utilize resources within the ComEd Zone based on that flawed data is incorrect.

67. Second, Dr. Harvey's selection of cherry-picked data lead to a biased and invalid conclusion. It is not uncommon for there to be constraints on the PJM system. Constraints on the system are managed by changing or adjusting the topology of the system and by

[15] CZG Complaint at 32-33

[16] Harvey Aff. at 104.

[17] *See* i*d*. at P 66

[18] Harvey Aff. at P 104..

adjusting the output of generation resources. The CZG Complainants suggest that PJM was not utilizing their resources due to the constraints on the system and as such they should be excused from PAI penalties. That is not correct. PJM was not utilizing the CZG Complainants' generator resources because they were not available. In fact, the constraints that we had on the system in the ComEd Zone in particular were due in large part to generators that had failed to start, tripped off-line or were otherwise not available during Winter Storm Elliott. Generation resources are used to manage constraints by lowering generators that aggravate a constraint and increasing the output of generators that help to relieve the flow on a constrained facility. As previously noted, many generators in the ComEd Zone including the CZG Complainant's generating resources failed to operate during Winter Storm Elliott. Had those resources been available, they would have helped to address the PJM-wide capacity emergency and they would have also helped to reduce the constraints in the ComEd Zone.

68. Although unnecessary to justify PJM's actions during Winter Storm Elliott, PJM has performed an engineering analysis using the real time Energy Management System (EMS) data from Winter Storm Elliott reflecting the system topology during the operating days. For three different representative times on the December 24 operating day, PJM's analysis utilized a real time snapshot of the system configuration which included all real time congestion, limits, flows, and topology.

69. The Elwood, Jackson Combined Cycle, Lee County, Lincoln, Aurora, University Park and Rockford facilities (6,552 MW) failed to perform at various times during Winter Storm Elliott, with most of the units having failed to perform at all. However, in PJM's after-the-fact analysis we assumed that they did operate. PJM's analysis found that on December 24, PJM's system would have reliably accommodated thousands of MW of energy from the CZG Complainants' generators had they performed, including the resources at Elwood, Jackson Combined Cycle, Lee County, Lincoln, Aurora, University Park and Rockford. As described above, the output of generating resources were adjusted to address constraints. As further described below, PJM's analysis showed that over 5,000 MW of additional resources, if available, could have been turned on to address the capacity emergency. Additional generation re-dispatch or other operating procedures may have been utilized during the event to further increase the output of these capacity resources. In summary, PJM's studies showed:

- For the snapshot of the system as of 4:45 on December 24, PJM could have reliably accommodated a net 5,845 MW from the ComEd generators;

- For the snapshot of the system as of 10:54 on December 24, PJM could have reliably accommodated a net 5,055 MW from the ComEd generators; and

- For the snapshot of the system as of 16:03 on December 24, PJM could have reliably accommodated a net 5,001 MW from the ComEd generators. Notably for the analysis run at 16:03, this energy is in addition to the net 540 MW of energy being produced at this time from five units, at Aurora and Elwood, included in the two prior analyses, that had not been operating earlier in the day.

70. It is critical to remember that the CZG Complainants' generating units were either on unplanned outages and not available, or were called on by PJM to operate but failed to do so, and later entered an unplanned outage. Had these generators performed, their output would have reduced the congestion in the ComEd Zone because a number of these generators that failed to perform would have provided counterflows on the constrained facilities. Thus, had PJM been able to bring those generators into operation, it would have significantly reduced the flows on many of the constrained facilities.

71. Further, had PJM been able to dispatch those units on, it likely would have reduced the interchange from MISO. This would have further reduced the flows on many of the constrained facilities.

72. It is my opinion that if the CZG Complainants' generating units had produced net outputs determined from the studies, not to mention outputs from the numerous other generators around PJM that failed to perform, this production would have significantly mitigated the capacity deficiency PJM was experiencing. It could have mitigated (if not eliminated) the need for many if not all of the Emergency Actions PJM implemented, and it would have reduced (if not eliminated) the risk of extensive PAIs.

73. Finally, in claiming that their generations could not have been dispatched (which PJM's studies show is untrue), the CZG Complainants ignore the fact that system conditions during the evening peak on December 24 would have been different if the anomalous peak load levels that occurred for the evening peak on December 23 and the morning peak on December 24 had happened again. Had the higher peak occurred, having the CZG Complainants' generators available could have been even more critical to the reliability of the PJM system.

E. PJM Did Not Violate Requirements R5 and R3 of COM—002-4 Concerning Three-Part Communications

74. The Coalition claims that PJM violated Requirements R5 and R3 of COM—002-4. They assert that PJM's instructions were not clear, but they have presented no evidence to support that allegation.[19] In addition, PJM followed all communication protocol requirements as set forth in PJM Manual 1, Section 4.5.3 Definitions, when issuing Operating Instructions per COM-002-4 R5 and other applicable NERC rules.

75. To the extent that the Coalition is claiming that discussion between PJM operators and generation dispatchers are a "command" requiring three-part communication, they are incorrect. As noted in PJM Manual 1, a discussion of general information and of potential options or alternatives to resolve Bulk Electric System operating concerns is not a command and is not considered an "Operating Instruction." Additional examples not considered to be Operating Instructions per PJM Manual 1 include confirming ratings or power flows, discussions of operational options, and discussions of generator status or

[19] Coalition Complaint at 30.

availability. The examples presented in the complaint concerned generator schedules and options of schedules, and as such, were not Operating Instructions.

F. Complainants' Arguments That PJM Acted Improperly Because it Failed to Properly Maintain Reserves in Certain Control Areas Does not Withstand Analysis

76. The CZG Complainants and Coalition contend that PJM failed to properly maintain reserve levels and claim that PJM should have curtailed both non-firm and firm exports to do so. According to Dr. Sotkiewicz, PJM violated the Tariff and Operating Agreement because "PJM allowed reserve levels fall below their requirements RTO-wide and within the Mid-Atlantic-Dominion ('MAD') reserve sub-zone frequently while supporting exports."[20] Specifically, Complainants cite the language of Tariff, Attachment K–Appendix Section 1.10.6 (c) and Operating Agreement Schedule 1, Section 1.10.6(c), which both state that "[t]he Office of the Interconnection shall curtail deliveries to an External Market Buyer if necessary to maintain appropriate reserve levels for a Control Zone as defined in the PJM Manuals, or to avoid shedding load in such Control Zone." The CZG Complainants claim that "because the OA trumps the manuals," the admonition to "curtail deliveries to an External Market Buyer if necessary to maintain appropriate reserve levels" prevents PJM from relying upon Manual 13, Sections 2.3.2 and 2.5, which both prevent PJM from cutting external sales "[i]f the net result of cutting off-system capacity sales would put the sink Balancing Authority into load shed . . . unless it would prevent load shedding within PJM."[21]

77. I disagree with Dr. Sotkiewicz's statement that PJM "allow[ed] reserves to go short increasing the likelihood of a loss of load event in PJM." PJM had options to address a large contingency occurring at times when level of reserves fell below the desired levels. PJM had the option to take a Voltage Reduction Action which would have made 1,701.7 MW of reserves available to PJM. At least 1,239.1 MW are available in 10 minutes or less, some of which are available in as little as 2 minutes. Also, a Voltage Reduction Action for the Mid-Atlantic-Dominion subzone would have made 1239.1 MW available in 10 minutes or less. These quantities are similar in terms of their operational characteristics to Synchronized Reserves since their source is currently operating resources synchronized to the system. Further, because this was a capacity shortage emergency and PJM had called a Maximum Generation Action, it had the ability to recall all PJM Capacity Resources being used to serve loads outside of PJM regardless of the type of transmission service, i.e., non-firm or firm, being used. Most of the exports are related to PJM Capacity Resources and thus could have been recalled by PJM if needed to serve its own customers' requirements.

78. Also, it is worthwhile to consider the requirements of the corresponding NERC standard to place this claimed transgression into perspective. "BAL-002-003—Disturbance Control Standard – Contingency Reserve for Recovery from a Balancing Contingency Event"

[20] CZG Complaint, Sotkiewicz Aff. at P 100.

[21] *Id.* at 30.

addresses, among other things, how long a Balancing Authority should take to restore reserves that have been deployed. Rule R3 provides:

> Each Responsible Entity, following a Reportable Balancing Contingency Event, shall restore its Contingency Reserve to at least its Most Severe Single Contingency, before the end of the Contingency Reserve Restoration Period, but any Balancing Contingency Event that occurs before the end of a Contingency Reserve Restoration Period resets the beginning of the Contingency Event Recovery Period. *[Violation Risk Factor: Medium] [Time Horizon: Real-time Operations]*

For the purposes of this provision, the "Contingency Reserve Restoration Period" is defined as "[a] period not exceeding 90 minutes following the end of the Contingency Event Recovery Period," and the "Contingency Event Recovery Period" is defined as "[a] period that begins at the time that the resource output begins to decline within the first one minute interval of a Reportable Balancing Contingency Event, and extends for fifteen minutes thereafter." The trip of a generating unit qualifies as a "Reportable Balancing Contingency Event."

Breaking this provision down, a Balancing Authority is supposed to restore reserves within 105 minutes[22] of the triggering event but that period resets itself every time that another triggering event occurs. As I noted above, PJM experienced a large number of generator trips throughout the entire Winter Storm Elliott event. Although PJM's practice is to restore reserve levels as quickly as possible, under the NERC standard, PJM had 105 minutes from each of those to restore reserves. For example in the context of the periods in which Dr. Sotkiewicz claims PJM was not compliant with reserves requirements, PJM would have had 105 minutes to recover its reserves but, since additional Balancing Continency Events, *i.e.*, generator trips[23] were occurring, this period was reset over and

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[22] This is the sum of the 90 minute "Contingency Reserve Restoration Period" and the 15 minute "Contingency Event Recovery Period."

[23] The definition of a Balancing Contingency Event is as follow:

> Any single event described in Subsections (A), (B), or (C) below, or any series of such otherwise single events, with each separated from the next by one minute or less. A. Sudden loss of generation: a. Due to i. *unit tripping*, or ii. loss of generator Facility resulting in isolation of the generator from the Bulk Electric System or from the responsible entity's System, or iii. sudden unplanned outage of transmission Facility; b. And, that causes an unexpected change to the responsible entity's ACE; B. Sudden loss of an Import, due to forced outage of transmission equipment that causes an unexpected imbalance between generation and Demand on the Interconnection. C. Sudden restoration of a Demand that was used as a resource that causes an unexpected change to the responsible entity's ACE.

(emphasis added).

over. Accordingly, PJM was compliant with this standard even accepting Dr. Sotkiewicz's claims that reserves fell below target levels.

79. This concludes my Affidavit.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Power OPP, LLC, *et al.*	)	
Complainants	)	
v.	)	**Docket No. EL23-53-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Aurora Generation, LLC, *et al.*	)	
Complainants	)	
v.	)	**Docket No. EL23-54-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Coalition of PJM Capacity Resources	)	
Complainant	)	
v.	)	**Docket No. EL23-55-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	

VERIFICATION

I, **Paul F. McGlynn**, state, under penalty of perjury, that I am the Paul F. McGlynn referred to in the foregoing document entitled "Affidavit of Paul F. McGlynn on Behalf of PJM Interconnection, L.L.C.," 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.

/s/ Paul F. McGlynn
Paul F. McGlynn

Exhibit 6

Affidavit of Michael E. Bryson

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Power OPP, LLC, *et al.*,	)	
Complainants	)	
v.	)	**Docket No. EL23-53-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Aurora Generation, LLC, *et al.*,	)	
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PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Coalition of PJM Capacity Resources	)	
Complainant	)	
v.	)	**Docket No. EL23-55-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	

AFFIDAVIT OF MICHAEL E. BRYSON
ON BEHALF OF PJM INTERCONNECTION, L.L.C.

A. Introduction

1. My name is Michael E. Bryson. My business address is 2750 Monroe Blvd., Audubon, Pennsylvania, 19403. I am the Senior Vice President of Operations for PJM Interconnection, L.L.C. (PJM). I am submitting this affidavit on behalf of PJM in support of PJM's Answers to the Complaints filed by the CZG and the Coalition of PJM Capacity Resources in the captioned proceedings.

2. I earned a Bachelor of Science in general engineering from the United States Military Academy at West Point, New York, focusing on computer science and electrical engineering, and have a Master of Business Administration from Saint Joseph's University in Philadelphia. I earned a graduate certificate in power engineering from the Worcester Polytechnic Institute.

3. Prior to my current position at PJM, I have held the positions of Executive Director of System Operations, General Manager of Dispatch Operations, and manager of the Transmission Department for the System Operations Division. I am the current chair of the Independent System Operator and Regional Transmission Organization Operating Committee. I also serve on the boards of directors of PJM Technologies, Inc., and PJM Repository Information Services, Inc. I previously served on the boards of directors of the ReliabilityFirst Corporation and Consortium for Electric Reliability Technology Solutions.

4. I am responsible for PJM's Operations Division, overseeing transmission operations for real-time systems. These operations include scheduling, transmission dispatch, generation dispatch, reliability coordination, training, and all engineering analysis required to run the system and support the critical energy management systems.

5. The purpose of my declaration is to address claims that PJM acted improperly during Winter Storm Elliott by exporting power to other Balancing Areas during periods in which PJM had declared Pre-Emergency Load Management Reduction Actions and Emergency Actions, including Maximum Generation Emergency and Emergency Load Management Reduction Actions. The CZG Complainants[1] allege that the Performance Assessment Intervals (PAIs) triggered by PJM's Emergency Actions were invalid, and requests that the Commission "eliminate the penalties assessed to the [CZG Complainants]," because, in their view, PJM's Emergency Actions during Winter Storm Elliott did not comply with the Tariff, Operating Agreement, or Manual 13.[2] Specifically, the CZG Complainants assert that "[1] PJM failed to curtail all non-firm exports before taking Emergency Actions, and [2] PJM incorrectly used Load Management/Demand Response to facilitate aid to adjacent control areas that triggered PAIs, in direct violation of its Tariff, Operating Agreement, and Manual 13."[3] The CZG Complainants assert that "there was no emergency in the ComEd region and therefore no need for Complainants' generation facilities,"[4] then go on to make the extraordinary claim that their failure to perform should be excused because "bringing more capacity online would have made system conditions worse."[5] Further, the CZG Complainants say that PJM was not permitted to assist other Balancing Authorities after PJM dispatched Load Management Reduction Actions.[6] The Coalition more or less repeats these arguments as relates to PJM's exports.[7] The Nautilus Entities take a slightly different approach and argue that curtailing all Non-Firm exports and issuing an EEA1 is just one of four prerequisites that Manual 13 requires before PJM may take Emergency

[1] For clarity, this affidavit will refer to the "ComEd Zone Complainants," the "Coalition," and the Nautilus Entities when referencing arguments unique to those parties. Likewise, when the parties present the same or similar claims, I will refer to the "Complainants."

[2] Complaint of ComEd Zone Generators (ComEd Zone Complaint) at 3.

[3] *Id.* at 3-4.

[4] *Id.* at 4.

[5] *Id.* at 5; *accord id.* ("Clearly, the generation should not have been dispatched as it would have made the situation worse, and clearly emergency demand response was not only unnecessary, but it, too, was making things worse in the ComEd zone.").

[6] *See, e.g.*, *id*. at 40; *id.*, Test. of Dr. Paul Sotkiewicz, Ph.D., Ex. CZG-0004, at P 97.

[7] *See* Complaint of the Coalition of PJM Capacity Resources (Coalition Complaint), at 25-26.

Actions.[8] They further contend that PJM's continuing exports to adjacent Balancing Areas is evidence that they were not "needed" to address the emergency, and thus cannot be liable for Non-Performance Charges.[9]

6. All of these claims are wrong. Complainants' assertions misstate the terms of the controlling documents, misrepresent or misunderstand the relevant facts, and ignore mutual assistance policies established by this Commission and the North American Electric Reliability Corporation (NERC). Specifically, Complainants misread the Tariff, Operating Agreement, and Manual 13[10] to impose irrational and counter-productive constraints on emergency operations that are entirely alien to my understanding of those documents and contrary to the manner in which our operators are trained to respond in emergency conditions. On the contrary, PJM acted properly and fully in compliance with its obligations to support neighboring Balancing Authorities in crisis by allowing the non-firm exports to those Balancing Authorities after PJM initiated Pre-Emergency Load Management Reduction Actions and Emergency Actions. Also, because PJM did not initiate Load Management procedures for the purpose of assisting other regions, PJM was not constrained from providing exports to regions experiencing or attempting to avoid capacity deficient conditions. Further, the CZG Complainants' claim that there was no emergency in the ComEd Zone or elsewhere in PJM to justify Emergency Actions is absurd on its face, as is their claim that bringing the Complainants' 6,552 MW of non-performing capacity resources on line would have exacerbated the emergency.[11]

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[8] Complaint of the Nautilus Entities (Nautilus Complaint) at 19.

[9] *Id.* at 32.

[10] PJM Manual 13: Emergency Operations (Nov. 3, 2022), https://www.pjm.com/-/media/documents/manuals/archive/m13/m13v86-emergency-operations-11-03-2022.ashx. References to all PJM Manuals herein are to the versions in effect during Winter Storm Elliott.

[11] As Mr. McGlynn explains in his affidavit:

- For the snapshot of the system as of 4:45 on December 24th, PJM could have reliably accommodated a net 5,845 MW from the ComEd generators;
- For the snapshot of the system as of 10:54 on December 24th, PJM could have reliably accommodated a net 5,055 MW from the ComEd generators; and
- For the snapshot of the system as of 16:03 on December 24th, PJM could have reliably accommodated a net 5,001 MW from the ComEd generators. Notably for the analysis run at 16:03, this energy is in addition to the net 540 MW of energy being produced at this time from five units, at Aurora and Elwood, included in the two prior analyses, that had not been operating earlier in the day.

McGlynn Aff. at P 24.

B. PJM Is Obligated To Provide Assistance to Other Regions And Is Entitled To Receive Assistance From Other Regions During Emergency Conditions

7. The Eastern Interconnection is one of the largest fully integrated transmission systems in the world. One of the advantages of its large scope is to provide enhanced reliability to all of the Balancing Areas that comprise it. In addition to the reliability benefits associated with having multiple redundant paths for power flows from generators to loads, there are also significant reliability benefits associated with diversity of load, generation, and geography. The benefit of geographic diversity is that over a large region such as the Eastern Interconnection, one region may not be as severely impacted by an event as an adjoining region. For example, one part of the Eastern Interconnection may be experiencing an extreme weather event when another potion of the Eastern Interconnection may be relatively less affected by the event. The Commission illustrated this point when commenting on the impacts of Winter Storm Uri in February 2021:

> ERCOT faced the greatest challenge [in Winter Storm Uri] due to the magnitude of unplanned generating unit outages in its area, coupled with its limited ability to import power to help offset generation shortfalls. . . . In contrast to ERCOT, some regions, such as MISO and SPP, had the ability to import power from the east, where weather conditions were less severe, to make up for a large portion of their generation shortfalls during the event. For example, PJM was exporting an unprecedented amount of electricity into MISO and SPP, reaching over 15,700 MW of interregional transfers on February 15, 2021.[12]

It would waste the Eastern Interconnection's capabilities to accept Complainants' artificial, needlessly formalistic, and counter-productive constraints on providing mutual assistance. Further, accepting Complainants' arguments would be inconsistent with the Commission's policies as embodied in the quoted passage.

8. NERC also has rules governing mutual assistance. PJM has NERC obligations as a Reliability Coordinator and as a Balancing Area that require PJM to provide assistance to other regions, particularly when PJM can do so without shedding load within its own footprint. Attachment 1 to NERC Standard EOP-011-1,[13] Section 2.3 provides: "During EEA 2, Reliability Coordinators and energy deficient Balancing Authorities have the following responsibilities: Other Reliability Coordinators of Balancing Authorities with available resources shall coordinate, as appropriate, with the Reliability Coordinator that has an energy deficient Balancing Authority." NERC Standard IRO-014-3 R7 likewise provides: "Each Reliability Coordinator shall assist Reliability Coordinators, if requested and able, provided that the requesting Reliability Coordinator has implemented its

[12] *Transmission Sys. Plan. Performance Requirements for Extreme Weather*, 179 FERC ¶ 61,195 at P 32 (2022) (footnotes omitted).

[13] NERC Standard EOP-011-1 was in effect during Winter Storm Elliott. NERC Standard EOP-011-2 superseded that standard on April 1, 2023.

emergency procedures, unless such actions cannot be physically implemented or would violate safety, equipment, regulatory, or statutory requirements."[14] Other Reliability Coordinators and Balancing Areas have reciprocal obligations to PJM under these same rules and, for that reason, PJM not only provided emergency energy to other Balancing Authorities during capacity shortages, but also received assistance from the Northeast Power Coordinating Council (NPCC) during the Winter Storm Elliott emergency.[15]

9. The Tariff and Operating Agreement also incorporate mutual assistance principles. They state that PJM "shall . . . [a]dminister . . . agreements for the transfer of energy in conditions constituting an Emergency in the PJM Region or in an interconnected Control Area, and the mutual provision of other support in such Emergency conditions with other interconnected Control Areas . . . ."[16] Further, PJM "shall . . . [c]oordinate the curtailment or shedding of load, or other measures appropriate to alleviate an Emergency, in order to preserve reliability in accordance with NERC, or Applicable Regional Entity principles, guidelines and standards, and to ensure the operation of the PJM Region in accordance with Good Utility Practice and this Agreement."[17]

10. PJM also has agreements with other regions that flesh out procedures to provide assistance during emergencies and potential emergencies. PJM has such agreements with Duke Energy Progress, LLC (Duke),[18] Midcontinent Independent System Operator (MISO),

[14] NERC Standard IRO-014-3, Coordination Among Reliability Coordinators, R7.

[15] Net Scheduled Imports to PJM were in excess of 2,000 MW/hr for most of the cold weather period and reached as high as 4,000 MW/hr.

[16] PJM Open Access Transmission Tariff (Tariff), Attach. K-App'x, § 1.6.2(vi); *see also id.*§ 1.7.11 ("The Office of the Interconnection, with the assistance of the Members' dispatchers as it may request, shall be responsible for monitoring the operation of the PJM Region, for declaring the existence of an Emergency, and for directing the operations of Market Participants as necessary to manage, alleviate or end an Emergency. . . . Actions by the Office of the Interconnection and the Market Participants shall be carried out in accordance with this Agreement, the NERC Operating Policies, Applicable Regional Entity reliability principles and standards, Good Utility Practice, and the PJM Manuals.").

[17] *Id.* § 1.6.2(vi).

[18] Amended and Restated Joint Operating Agreement Among and Between PJM Interconnection, L.L.C., and Duke Energy Progress, LLC (July 22, 2019) (PJM-Duke JOA), https://www.pjm.com/directory/merged-tariffs/progress-joa.pdf.

Inc,[19] Tennessee Valley Authority (TVA),[20] New York Independent System Operator, Inc. (NYISO),[21] and VACAR South Reliability Coordinator.[22] For example, the PJM-MISO JOA provides:

> In the event an emergency condition is declared in accordance with a Party's published operating protocols, the Parties agree to provide emergency assistance to each other and to facilitate obtaining emergency assistance from a third party. The Parties will coordinate respective actions to provide immediate relief until the declaring Party eliminates the declaration of emergency. The Parties will notify each other of emergency maintenance and forced outages that would have a significant impact on the other Party as soon as possible after the conditions are known. The Parties will evaluate the impact of emergency and forced outages on the Parties' systems and coordinate to develop remedial steps as necessary or appropriate. If the emergency response allows for coordinating with the other Party before action must be taken, the normal RTO to RTO request for action will be followed. The Parties will conduct joint annual emergency drills and will ensure that all operating staff are trained and certified, if required, and will practice the joint emergency drills that include criteria for declaring an emergency, prioritized action plans, staffing and responsibilities, and communications.[23]

As is typical in agreements of this type, the general goal is to coordinate operations during emergencies to alleviate the emergency condition. As Manual 37 states, "PJM directs actions to provide emergency assistance to all Reliability Coordination neighbors, during

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[19] Joint Operating Agreement Between the Midcontinent System Operator, Inc. and PJM Interconnection, L.L.C. (Dec. 11, 2008) (PJM-MISO JOA), https://www.pjm.com/directory/merged-tariffs/miso-joa.pdf.

[20] Joint Reliability Coordination Agreement Among and Between PJM Interconnection, L.L.C., and Tennessee Valley Authority (Oct. 15, 2014) (PJM-TVA JOA), https://www.pjm.com/-/media/documents/agreements/joint-reliabilityagreement-jrca-pjm-tva.ashx.

[21] Joint Operating Agreement Among and Between New York Independent System Operator Inc. and PJM Interconnection, L.L.C. (Sept. 16, 2019) (PJM-NYISO JOA), https://pjm.com/~/media/documents/agreements/nyiso-joa.ashx.

[22] PJM-VACAR South Amended Adjacent Reliability Coordinator Coordination Agreement (Mar. 7, 2018) (PJM-VACAR JOA), https://www.pjm.com/-/media/documents/agreements/executed-pjm-vacar-rc-agreement.ashx. The VACAR South RC Area includes the territories of the following companies: Cube Hydro Carolinas, LLC, Duke Energy Carolinas, LLC, Duke Energy Progress, LLC, Dominion Energy South Carolina, Inc. and the South Carolina Public Service Authority.

[23] PJM-MISO JOA, § 8.1.1.

declared emergencies, which is required to mitigate the operational concern to the extent that the same entities are taking in kind steps and the assistance would be effective."[24]

11. Mutual assistance concepts are also recognized in PJM Manual 13. One important provision concerns exports from PJM to other Balancing Authorities when PJM has declared a Maximum Generation Emergency. Section 2.3.2 includes among the steps taken by PJM in a Maximum Generation Emergency Action:

- PJM Dispatch determines the feasibility [of] recalling off-system capacity sales that are recallable (network resources).
    - PJM Dispatch will determine any limiting transmission constraints internal to PJM that would impact the ability to cut transactions to a specific interface.
    - PJM Dispatch will identify off-system capacity sales associated with the identified interfaces.
    - PJM Dispatch will contact the sink Balancing Authority to determine the impact of transaction curtailment.
- If the net result of cutting off-system capacity sales would put the sink Balancing Authority into load shed then PJM will not curtail the transactions unless it would prevent load shedding within PJM.[25]

This provision supplements the Operating Agreement and Tariff concerning PJM's obligations to provide mutual assistance by explaining the level of priority that off-system capacity sales will receive during a capacity emergency even while PJM itself is in near deficit conditions.

12. In addition, Manual 13 provides that:

> When adjacent Balancing Areas are deficient in generation and are requesting assistance from the PJM RTO, actions are taken, provided the adjacent Balancing Area has taken the same actions requested of PJM [including] as required, increased generation, including Maximum Emergency generation (with the exception of fuel limited and environmentally restricted capacity).[26]

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[24] Manual 37: Reliability Coordination (Mar. 22, 2023), Attach. A (PJM Reliability Plan, § 1.1, https://www.pjm.com/-/media/documents/manuals/m37.ashx.

[25] PJM Manual 13, § 2.3.2 (Step 4A – Maximum Generation Emergency Action) at 32; *accord id.* § 5.2 (Transmission Security Emergency Procedures) (Step 4A) at 93 (same).

[26] *Id.* § 2.5 at 51.

This provision allows PJM to initiate actions, including Emergency Actions, for the purpose of providing assistance to another Balancing Area provided that, when it does so, it must specifically indicate that the action is being done to support that region.[27]

C. Nothing in Manual 13 or NERC Standard EOP-011-2 Prevents PJM From Taking Actions that Trigger a Performance Assessment Interval While Making Non-Firm Exports

13. One of Complainants' central contentions is that PJM must curtail all non-firm exports as a "prerequisite" of calling a Maximum Generation Emergency Action or a Pre-Emergency or Emergency Load Management Reduction Action.[28] In support, they reference Manual 13 and NERC Standard EOP-011-1.[29] In fact, neither Manual 13 nor NERC Standard EOP-011-1 imposes such an obligation.

14. Manual 13, like all manuals, is supplementary to the Tariff and Operating Agreement. As discussed by Mr. McGlynn in his Affidavit,[30] PJM has broad authority under the Tariff and Operating Agreement to declare emergencies and decide what steps to take to avoid, mitigate, or shorten emergencies. Nothing in the PJM Manuals could limit the ability of the PJM Operators to address emergency conditions under the discretionary authority conferred in the Tariff and Operating Agreement.[31] In this case, however, there is no inconsistency to address because Manual 13 does not specify a requirement to curtail non-

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[27] *Id.* ("PJM Dispatch prefaces these procedures [when initiated to provide assistance to other regions] by the words 'due to PJM providing emergency assistance to an adjacent Control Area(s), PJM is issuing an (appropriate alert or action message.)'").

[28] CZG Complaint at 21-22 ("The evidence introduced by Dr. Harvey and Dr. Sotkiewicz demonstrates that th[e] prerequisite [of curtailing all non-firm exports] was not met, as PJM failed to curtail non-firm exports prior to taking Emergency Actions. In fact, during many of the PAIs, PJM was a net exporter of electricity including energy supported by Non-Firm transmission as shown by Dr. Sotkiewicz."); Coalition Complaint at 27-28 ("PJM's Tariff mandates the curtailment of these reservation exports *prior to* entering into the Maximum Generation Emergency Action, which PJM failed to do." (emphasis in original)); Nautilus Complaint at 19-20 (referring to PJM's "obligation to curtail all non-Firm exports prior to declaring a Maximum Generation Emergency Action").

[29] *See* CZG Complaint at 21; *id.*, Sotkiewicz Aff., CZG-0004, at P 4; Coalition Complaint at 26-27; Nautilus Complaint at 19.

[30] McGlynn Aff. at P 20.

[31] The ComEd Zone and Coalition Complainants argue that their respective misinterpretations of Manual 13 were incorporated into the PJM Tariff and Operating Agreement. However, I will note that if Complainants' arguments were to be accepted, *i.e.*, that Manual 13 is removes all operator discretion regarding actions during emergencies, then Manual 13 procedures it would simply overwrite and nullify other PJM documents, NERC rules, Reliability First principles, and long-standing practices regarding mutual assistance.

firm exports—or any other preliminary step—as a "prerequisite" to instituting either a Maximum Generation Emergency Action or a Pre-Emergency/Emergency Load Management Reduction Action. Manual 13 specifies that "[d]ue to system conditions and the time required to obtain results, PJM dispatchers may find it necessary to vary the order of application [of actions] to achieve the best overall system reliability."[32] Manual 13 further states, repeatedly, that "[a] NERC EEA2[33] is issued when the following has occurred: Public appeals to reduce demand, voltage reduction, interruption of non-firm load in accordance with applicable contracts, demand side management/active load management, *or* utility load conservation measures."[34] Thus, PJM Manual 13 does not mandate that Maximum Generation Emergency Action or a Pre-Emergency/Emergency Load Management Reduction Action may be taken only when all non-firm exports are curtailed.

15. Complainants' argument is also inconsistent with other provisions of Manual 13. As noted above, Section 2.3.2 of Manual 13 has a specific procedure for determining whether to cut transactions to other Balancing Areas if PJM has declared a Maximum Emergency Action. This provision gives such transactions, when made known to PJM, a priority almost as high as native load stating that "[i]f the net result of cutting off-system capacity sales would put the sink Balancing Authority into load shed then PJM will not curtail the transactions unless it would prevent load shedding within PJM."[35] Clearly, given this directive, there cannot be a mandatory requirement that PJM must cut all non-firm exports before taking an Emergency Action.

16. Complainants' reliance on NERC Standard EOP-011-1 is also misplaced. While NERC Standard EOP-011-1 states that curtailing "[n]on-firm wholesale energy sales (other than those that are recallable to meet reserve requirements)" may be a typical step before

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[32] Manual 13, § 2.3.2 at 28.

[33] EEA2 is a NERC procedure in which, *inter alia*, "[l]oad management procedures [are] in effect" and "[a]n energy deficient Balancing Authority has implemented its Operating Plan(s) to mitigate Emergencies." NERC Standard EOP-011-1, Attach. 1: Emergency Operations, § B(2). Nothing in NERC Standard EOP-110-1, Attach. 1, § B(2) references an expectation that the Balancing Authority will have curtailed non-firm exports before issuing the alert.

[34] Manual 13, § 2.3.2 (Step 2 - Emergency Load Management Reduction Action) at 30; *id*. (Step 7 - Deploy All Resources) at 37; *id*. (Step 9 - Voltage Reduction Action) at 40; *id*. § 2.5 (Transmission Security Emergency Procedures) (Step 2 - Emergency Load Management Reduction Action) at 90; *id*. (Step 7 - Deploy All Resources) at 98; *id*. (Step 9 - Voltage Reduction Action) at 100 (emphasis added); *see also id.* § 2.3.2 (Step 2 - Emergency Load Management Reduction Action) (Note 4, EEA Levels) at 30 (stating that a NEARC EEA2 "may be issued," rather than "is issued"); *id*. § 2.5 (Transmission Security Emergency Procedures) (Note 4, EEA Levels) at 91 (same).

[35] *Id.*

declaring an EEA1 alert,[36] the standard also specifies that "[t]he Reliability Coordinator may declare whatever alert level is necessary, and need not proceed through the alerts sequentially."[37] Therefore, declaring an EEA1 alert is not a prerequisite for declaring an EEA2 event such as the Maximum Generation Emergency Actions or the Pre-Emergency Load Management Reduction Actions that triggered PAIs during Winter Storm Elliott.

17. In addition to Complainants' failure to acknowledge that NERC Standard EOP-011-1 and Manual 13 give operators the discretion to skip or reorder steps to avoid or address emergency conditions, Complainants also wrongly treat a provision intended to be guidance as a mandate. I interpret the reference to curtailing non-firm load prior to declaring an EEA1 alert in Attachment 1, NERC Standard EOP-011-1, to mean that non-firm load should be curtailed when the operators have a reasonable expectation that doing so will address the emergency or potential emergency. Complainants' insistence that it is a strict rule regardless of its impact is unreasonable. In the situation faced by the PJM operators during Winter Storm Elliott, curtailing all non-firm exports for the entirety of the PAIs would not have alleviated the need for the Maximum Generation Emergency Actions or the Pre-Emergency/Emergency Load Management Reduction Actions taken by the PJM operators. Further, PJM operators also had to consider PJM's obligations to provide assistance to other regions and, in the circumstances present during Winter Storm Elliott, the non-firm deliveries were helping to alleviate reliability challenges being experienced in other regions. I will discuss both of these points in greater detail below.

D. Acceptance of Complainants' Assertion That Initiating Pre-Emergency Load Management Reduction Action Requires Curtailment of Non-Firm Exports Would Nullify the Flexibility Granted to PJM to Utilize This Tool

18. Acceptance of Complainants' contention that Manual 13 requires the prior curtailment of all non-firm exports before calling for a Pre-Emergency Load Management Reduction Action[38] would nullify the flexibility expressly granted to PJM under its Tariff to utilize this tool. The Tariff states that, "PJM will initiate a pre-emergency event *prior to* the declaration of a Maximum Generation Emergency or an emergency event *when*

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[36] NERC Standard EOP-011-1, Attach. 1, § B(1).

[37] *Id.* § B.

[38] *See* CZG Complaint at 4 ("Manual 13 requires PJM to curtail <u>all</u> non-firm exports before taking . . . Emergency Actions, including both Pre-Emergency and Emergency Load Management Reduction Actions . . . ." (alteration in original)); *id.* at 29 ("For the avoidance of doubt, <u>these Emergency Actions include Pre-Emergency Load Management Reduction Actions</u>—i.e., Manual 13 requires PJM to curtail all non-Firm exports before taking Pre-Emergency Load Management Reduction Actions." (alteration in original)); CZG Complaint, Sotkievicz Aff. at P 90 ("Prior to initiating an Emergency Action such as call for Pre-Emergency . . . Load Management . . . PJM is required by Manual 13; . . to curtail all Non-Firm exports of energy."), Coalition Complaint at 25 ("PJM must curtail non-firm exports before taking capacity-related Emergency Actions."); Nautilus Complaint at 19.

practicable. A pre-emergency event is implemented when economic resources are not adequate to serve load and maintain reserves or maintain system reliability, and prior to proceeding into *emergency procedures*."[39] Further, as the Commission stated in its order approving the Pre-Emergency Load Management Reduction Program, "it is reasonable for PJM to seek some added flexibility to dispatch these resources in response to system conditions, *without* the added step of declaring a system emergency."[40] Complainants' contention that there is a rigid prerequisite surrounding the use of this program is completely at odds with both the Tariff and the Commission's findings. Further, Manual 13 refers to the potential step of curtailing non-firm exports only in connection with "emergency procedures"[41] which, in the Tariff passage quoted above, comes *after* PJM has initiated "a pre-emergency event."

E. PJM Acted Properly During Winter Storm Elliott By Allowing Non-Firm Exports Following PJM's Declaration of Maximum Generation Emergency Actions and the Pre-Emergency and Emergency Load Management Reduction Actions

19. During Winter Storm Elliott, PJM acted consistently with its obligations by allowing non-firm transactions during periods in which Maximum Generation Emergency Actions and the Pre-Emergency and Emergency Load Management Reduction Actions were in effect. As I discussed above, PJM is obligated to provide assistance to other Balancing Areas when it can do so and when those regions are facing emergencies or potential emergency conditions.[42] During Winter Storm Elliott, PJM operators sought to help adjacent Balancing Areas to the extent feasible without shedding load in PJM. As I will detail below, PJM operators were successful in their efforts as PJM avoided load shedding and the assistance that PJM provided to other regions enabled them either to avoid or mitigate shedding their customers' load. Finally, while I disagree with the CZG Zone Complainants' claim that the reliability issues facing the ComEd Zone can be evaluated separately from the rest of PJM under the facts here, I will show that, accepting this premise, there was no impediment to the initiation of Pre-Emergency and Emergency Actions in the ComEd Zone even under Complainants' erroneous Tariff interpretation.

1. Curtailing All Non-Firm Exports Would Not Have Enabled PJM To Avoid Taking Pre-Emergency and Emergency Actions

Curtailing all non-firm transactions would not have alleviated the conditions that compelled the decision of the PJM operators to take Emergency Actions. As explained in greater detail in Mr. McGlynn's Affidavit, one of the reasons why the PJM operators took these steps related to the uncertainty of the load forecast—both in terms of the weather

[39] Tariff, Attach. K App., § 8.5 (emphasis added).

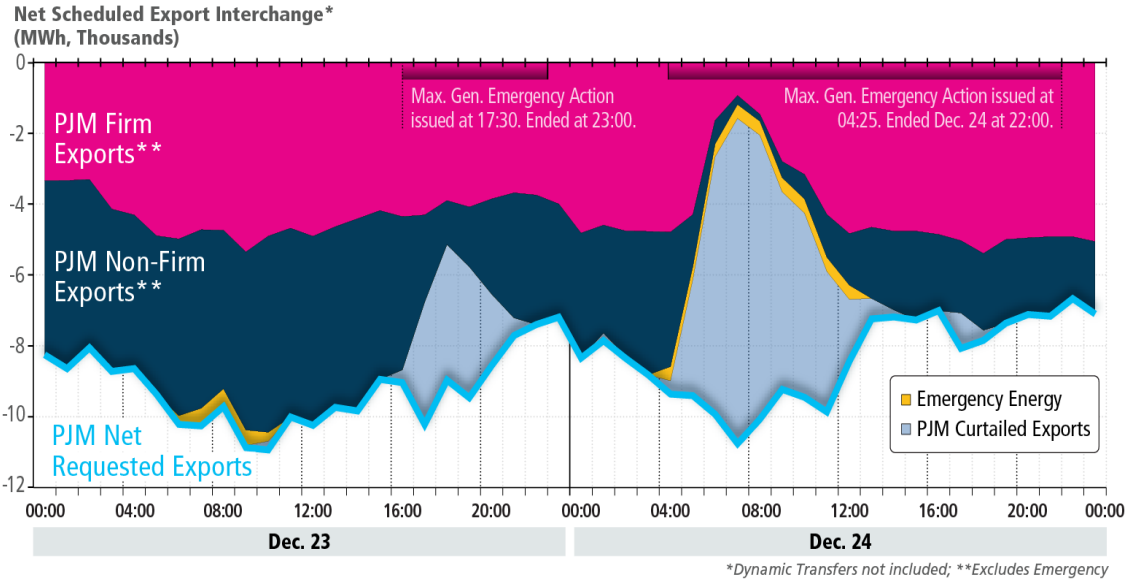
[40] *PJM Interconnection, L.L.C.*, 147 FERC ¶ 61,103 at P 38 (2014) (emphasis added).

[41] The term "emergency procedures" is sometimes capitalized in Manual 13 and sometimes in lower case. *See e.g.*, Manual 13, § 2.3 at 28.

[42] *See supra* at P 8.

forecast and uncertainty regarding how loads would respond to the weather conditions.[43] The most important reason, however, was the spectacular failure of generators to be available consistent with PJM's expectations of them as Capacity Resources subject to Capacity Performance obligations. As discussed by Mr. Pilong in his affidavit, "because of the poor generator performance, PJM was facing approximately 57,000 MW of generator unavailability for the morning peak on December 24."[44] Not only did many generators fail to produce power as expected but they also failed in many cases even to update their parameters so that operators had the information they needed to make the most effective dispatch decisions. In fact, about 24% of the PJM generation fleet was not available which actually was worse than PJM experienced during the 2014 Polar Vortex that was the precipitating event for adopting the Capacity Performance construct. Based upon these general considerations alone—the uncertainty of the load forecast and the shockingly poor performance of generators—the operators were justified in taking Emergency Actions instead of risking that PJM could avoid load-shedding by curtailing non-firm exports.

20. The operators' decisions to initiate Emergency Actions, moreover, are validated by the supply/demand conditions that were present. The graph below depicts the levels of exports from PJM during Winter Storm Elliott:



21. Comparing the values in this graph to the supply/demand conditions that PJM actually experienced confirms that PJM could not have met system demand only by cutting non-firm exports. On December 23, 2022, at 17:30, PJM issued a Pre-Emergency Load Management Reduction Action for the 30 minute and 60 minute Demand Resources that resulted in load reductions of about 1,100 MW. At the same time, PJM operators also

[43] McGlynn Aff. at P 56.

[44] Pilong Aff. at P 26.

issued a Maximum Generation Emergency Action that resulted in an average of 2,372 MW of additional generation.[45] In total, these actions had about 3,472 MW of impact. In comparison, for hour 18:00 non-firm exports were 1,241MW and for hour 19:00 non-firm exports were 1,683 MWs. Accordingly, even if the operators had cut all non-firm exports there would have been a deficit of at least 1,789 MW needed to satisfy PJM load and firm exports. Pre-Emergency and Emergency Actions thus would have been necessary to satisfy capacity needs even if all non-firm exports had been cut.

22. The situation for December 24, 2022 is similar. At 04:20 on December 24, 2022, PJM issued a Pre-Emergency Load Management Reduction Action and an Emergency Load Management Reduction Action that covered all Demand Resources and resulted in about 2,400 MW of load reduction. And at 04:28, PJM issued a Maximum Generation Emergency Action that it resulted in an average of about 2,879 MW in additional generation.[46] In total, these actions had 5,279 MW of impact. In comparison, for hour 05:00, non-firm exports were 1,820 MW falling to a low of 591 MW in hour 8:00 and increasing to a maximum level of 2,359 MW in hour 19:00 before the PAIs ended at 22:00. Accordingly, even if the operators had cut all non-firm exports there would have been a deficit between about 4,688 MW and 2,920 MW during this period needed to satisfy PJM load and firm exports. Pre-Emergency and Emergency Actions thus would have been necessary even if all non-firm exports had been cut.

23. These graphs also show that PJM prioritized meeting its own load by cutting exports—both firm and non-firm—when necessary. The graph shows a significant number of hours in which the assistance requested by other regions was not supplied. This correlates to the periods when PJM needed most of its generation for internal loads notwithstanding that during some these times other regions were seeking emergency supplies.

24. The Complainants also fail to acknowledge that PJM's operators were simultaneously considering PJM's potential needs over multiple time frames.[47] The ComEd Zone Complainants focus on the period after 06:00 on December 24, 2022, claiming that "there was no emergency in ComEd Zone beginning at least as of 06:00 on December 24 and thereafter"[48] and asserting that there was "excess generation" in the ComEd Zone.[49] Likewise, the Coalition faults PJM for issuing Maximum Generation Emergency Actions across the entire RTO and failing to distinguish generators in less-affected areas.[50] The

[45] This is hourly total MW operating above Ecomax for the Maximum Generation Emergency period.

[46] This is hourly total MW operating above Ecomax for the Maximum Generation period.

[47] *See, e.g.*,Pilong Aff. at 21-22, 29.

[48] CZG Complaint at 34 (quoting Test. of Dr. Scott Harvey, Ex. CZG-0001, at P 70).

[49] *Id.* at 35.

[50] Coalition Complaint at 37.

Nautilus Entities argue that the OPP and Rock Springs units were not needed between 12:00 and 24:00 on December 24, citing PJM's exports as evidence for that claim. [51]But looking at the totality of the circumstances, PJM's operators acted consistently with Good Utility Practice in retaining the Pre-Emergency Load Management Reductions and Maximum Emergency generation based on the information they had at the time. PJM operators had to continue to assume that more generation in the ComEd Zone and the entire PJM footprint would continue to experience outages for the rest of the weekend.

25. An overriding concern of the operators during December 24, 2022, given what had happened over the previous day and in the morning, was whether PJM could meet the evening peak in the RTO. PJM's ability to allow some non-firm exports to flow during the time leading up to the evening peak was not indicative as to whether PJM could meet the evening peak without Emergency Actions even if all non-firm exports were curtailed. PJM was reasonably concerned that loads might be as high or higher as the earlier peaks experienced on December 23 and 24.[52] Keeping both the Maximum Generation Emergency Actions and Pre-Emergency/Emergency Load Management Reduction Actions in effect throughout the day on December 24, 2022 were reasonable measures to address this possibility.

26. In particular, operators were concerned that if the Maximum Generation Emergency Action and the Pre-Emergency/Emergency Load Management Reduction Action were rescinded and PJM attempted to reinstate them in the face of a high evening peak on December 24, there could be a significantly lower response rate. If allowed to go offline, some generators might not restart due to the cold weather conditions or units running on gas might resell their gas supply. In addition, if Demand Resources were released and allowed to resume normal power consumption, PJM operators were concerned that they would not be willing and able to redeploy if called again prior to the evening peak. The fact that the evening peak came in at a relatively lower level does not undermine the validity of the operators' decisions under the Good Utility Practice standard based on the information they had when those decisions were made.

27. The validity of the PJM operators' decision to continue with Pre-Emergency/Emergency Load Management Reduction Actions and the Maximum Generation Emergency Action until PJM experienced the evening peak becomes even more plain when taking into account the operators' understanding regarding Demand Resources during the event. When the PJM operators called for Pre-Emergency Load Management Reduction Actions for the 30 minute and 60 minute participants on December 23, 2022, load reductions of about 4,300 MW were expected based on the estimates provided by the Curtailment Service Providers (CSPs). And, when PJM called for Pre-Emergency Load Management Reduction Actions and Emergency Load Management Reduction Actions for all participants, PJM expected load reduction of about 7,400 MWs based on the estimates provided by the CSPs. Until PJM received the data to determine actual load management response weeks later,

[51] Nautilus Complaint at 51-52.

[52] McGlynn Aff. at PP 56-57.

operators reasonably assumed that the actual reductions would be in line with the CSP estimates. Accordingly, when the operators decided to retain pre-emergency and Emergency Actions until the evening peak on December 24, the data they possessed indicated that the unrestricted peaks on the evening of December 23 and the morning of December 24 would have been approximately 139,300[53] MW and 137,400 MW,[54] respectively. The *perceived* impact of load management therefore was considerably greater than the actual impact of load management based on performance data, so the *perceived* risk of meeting the evening peak on December 24, 2022 was elevated even beyond what an *ex post* analysis of the actual supply/demand balance shows.

2. PJM's Decision To Permit Non-Firm Power to Flow When There Was Sufficient Generation to Meet That Demand Was Not Only Reasonable, But Was Also Necessary For PJM to Fulfill Its Obligations To Assist Adjoining Balancing Areas

28. Complainants provide no justification or rationale for their claim that Manual 13 and NERC rules prohibit PJM from employing Emergency Actions unless non-firm exports have been cut to zero. In fact, accepting the Complainants' interpretation would lead to inefficient outcomes and could adversely affect reliability. Essentially, Complainants' argue that if two adjoining Balancing Areas are experiencing a capacity shortage and, after taking Emergency Actions under their respective tariffs, one of the Balancing Areas has sufficient capacity to provide non-firm service requested by the other Balancing Area to assist in meeting load, then the Balancing Area with the available capacity must turn down the request for help or, alternatively, must end its own emergency declaration. As I indicated earlier, the only sensible reading of Manual 13 and NERC Standard EOP-011-1 is that a Balancing Authority experiencing or approaching a capacity shortage emergency should curtail non-firm exports to the extent that doing so will help alleviate the emergency. However, after the Balancing Authority takes Emergency Action and has the capacity to provide non-firm service requested by another Balancing Authority to avoid shedding load, it would be inefficient and undermine reliability in the Eastern Interconnection to impose an arbitrary restriction preventing it from doing so. But that is exactly what Complainants claim is the rule.

29. In the situation posited here, the Balancing Authority with the extra capacity took the Emergency Action to meet the needs of its own system and thereby *incidentally* created capacity capable of serving load in another Balancing Authority. This was the situation faced by PJM during Winter Storm Elliott, in particular on December 24, 2022, after the morning peak. PJM took Pre-Emergency and Emergency Actions to meet its own needs, which created more capacity than it needed on a minute-by-minute basis, and it supplied

[53] Actual peak of about 135,000 MW plus expected :Load Management response of 4,300 MW.

[54] Actual peak of about 130,000 MW plus expected Load Management response of 7,400 MW.

some of that capacity to other areas that needed it through non-firm exports (as well as firm exports and emergency sales).

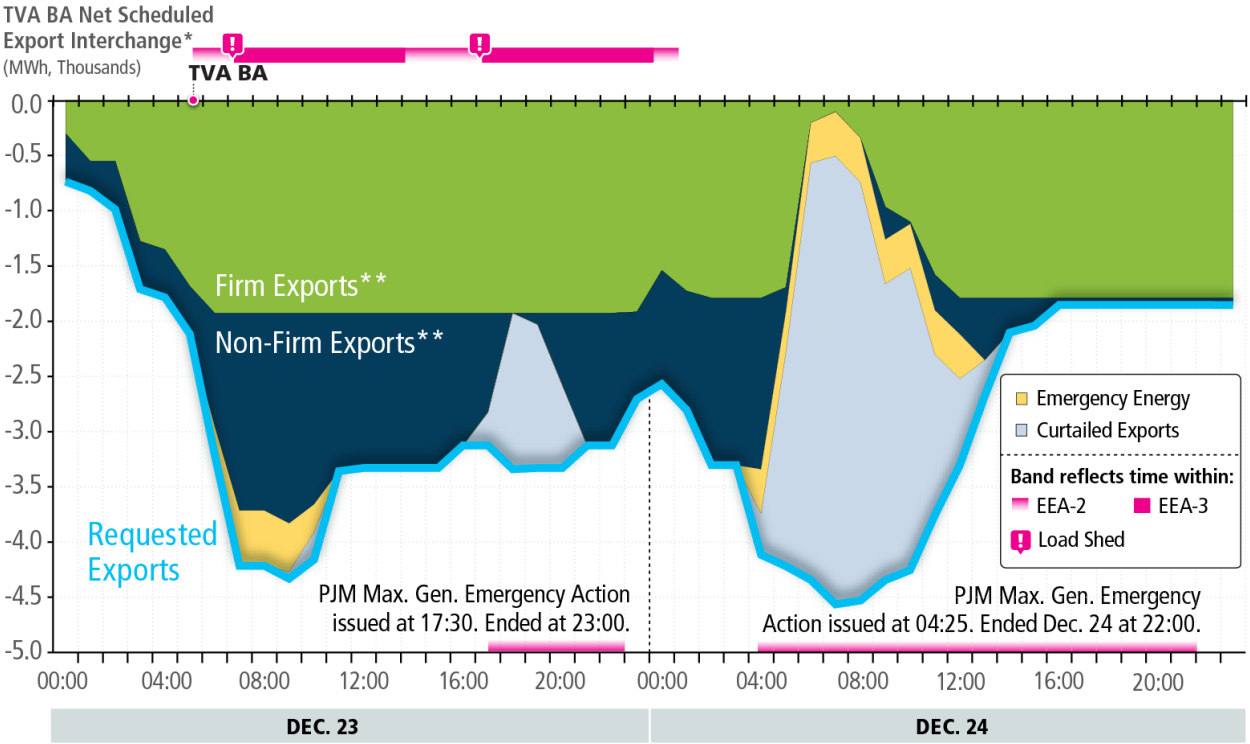
30. PJM's purpose in initiating and maintaining Pre-Emergency Emergency Actions on December 24, 2022, through the evening peak was not directed towards providing non-firm exports. But once PJM had sufficient capacity to provide assistance to other Balancing Areas, it was obligated to do so. As I noted above, NERC Standard IRO-014-3 R7 provides that "[e]ach Reliability Coordinator shall assist Reliability Coordinators, if requested and able . . . .[55] PJM met this obligation, in part, when it was "requested and able" to make non-firm exports to other Reliability Coordinators such as VACAR and TVA. Further, as also noted above, Manual 13 specifically contemplates that "[i]f the net result of cutting off-system capacity sales would put the sink Balancing Authority into load shed then PJM will not curtail the transactions unless it would prevent load shedding within PJM."[56] As shown below, this was exactly the situation presented to the PJM operators. With this in mind, Dr. Sotkiewicz's, as well as the CZG Zone Complainants and the Coalition, assertion that "[i]f PJM felt comfortable enough to allow Non-Firm exports of energy, the logical implication is that there really was no Emergency Condition"[57] is a complete misunderstanding of PJM's obligations under Manual 13 and distorts the logic undergirding Section 2.3.2.

31. The non-firm exports supplied to TVA provided assistance during periods when TVA was in a capacity deficient condition. The graph below shows the non-firm exports made to TVA:

[55] NERC Standard IRO-014-3 R7.

[56] Manual 13, § 2.3.2.

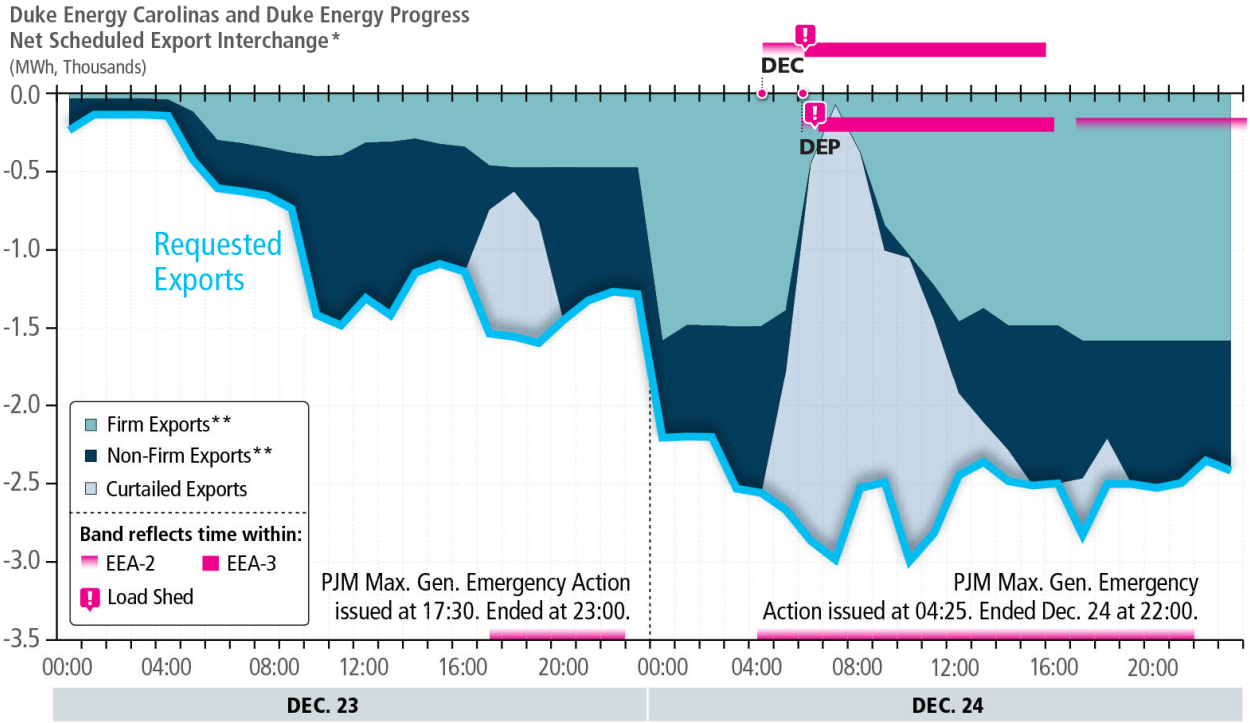
[57] CZG Complaint, Sotkiewicz Aff., Ex. CZG-0004, at P 96; Coalition Complaint, Sotkiewicz Aff., Attach. 4, at P 130.



*Dynamic Transfers not included; **Excludes Emergency

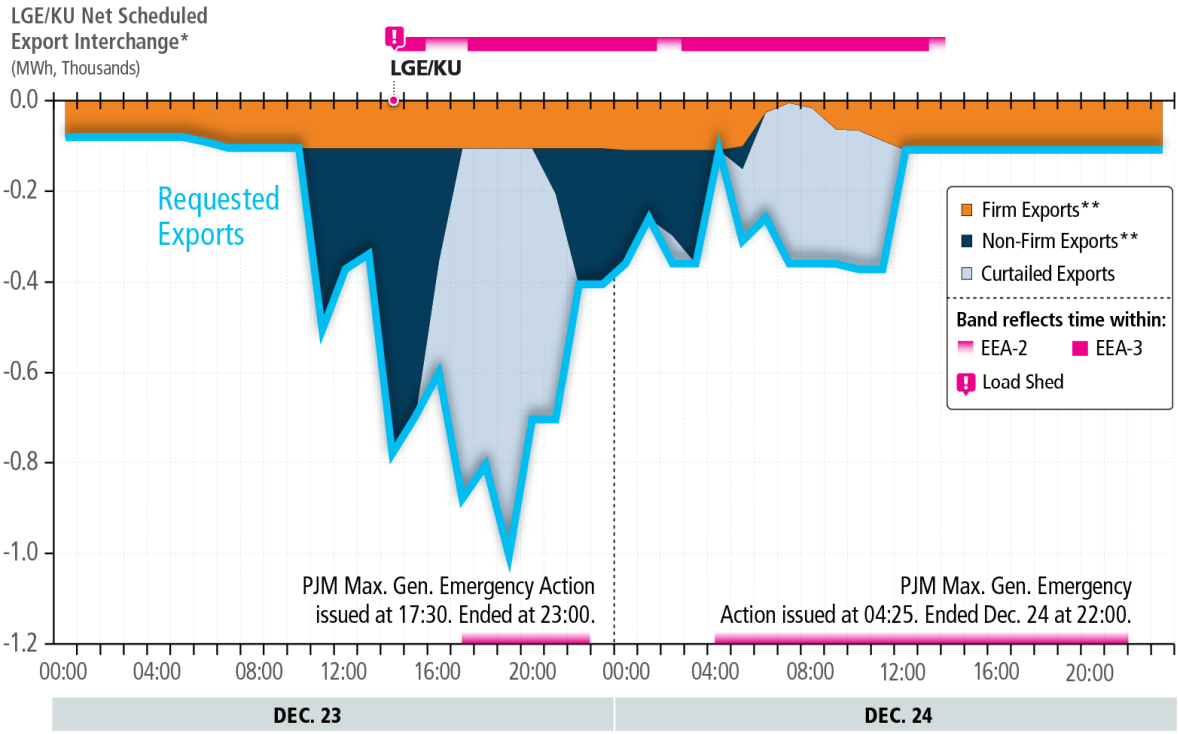
As can be seen by the chart, PJM was able to assist TVA by providing non-firm expoerts during times that the TVA system was shedding load. Had PJM not done so, it is likely that TVA would have been required to engage in additional load shedding than actually occurred.

32. Similarly, the non-firm exports supplied to Duke Carolinas and Duke Energy Progress provided assistance to those systems when they were experiencing capacity deficient conditions as shown in the chart below:



As depicted above, PJM was also able to provide assistance by making non-firm exports to Duke Carolinas and Duke-Energy Progress when they were shedding load. Again, if PJM had not provided this assistance, in all likelihood Duke Carolinas and Duke Energy Progress would also have had to engage in more load shedding.

33. Finally, Louisville Gas and Electric Company and Kentucky Utilities Company (LGE/KU) also received non-firm exports when they were experiencing capacity deficit conditions as shown in the chart below:



*Dynamic Transfers not included; **Excludes Emergency

Once again, PJM made non-firm deliveries to LGE/KU when the region was shedding load. Had PJM not made these exports, additional load shedding would likely have been needed.

F. PJM Acted Properly By Providing Assistance to Adjoining Balancing Areas After It Initiated Load Management Actions

34. The CZG Complainants and the Coalition assert that PJM violated a provision in Section 2.5 of Manual 13 that prevents PJM from calling Load Management Actions for the purpose of providing assistance to another region. According to these Complainants, this violation occurred because PJM made non-firm exports after it implemented Load Managements Actions. The factual support for their claims consists of pointing to timelines for December 23, 2022 and December 24, 2022 showing that non-firm exports occurred after the Load Management events began. The CZG Complainants' and the Coalition's argument is a gross misreading of Manual 13 that is inconsistent with the text of the manual and which, if accepted, would prevent PJM from providing *any* assistance to other Balancing Areas during virtually any capacity shortage event that PJM might ever experience.

35. The obvious purpose of Section 2.5 of Manual 13 is to prohibit PJM from initiating Load Management *for the purpose* of providing assistance to another region. Section 2.5 provides: "When adjacent Balancing Areas are deficient in generation and are requesting assistance from the PJM RTO, actions are taken, provided the adjacent Balancing Area has

taken the same actions requested of PJM."[58] Subject to certain restrictions, actions may include "Maximum Emergency generation [and] a 5% Voltage Reduction to provide the required assistance . . . ." To be clear, this provision assumes that PJM is not itself experiencing an emergency condition when it is invoked. As stated in Manual 13, "PJM Dispatch prefaces these procedures [steps taken to assist other Balancing Areas under this provision] by the words 'due to PJM providing emergency assistance to an adjacent Control Area(s), PJM is issuing an (appropriate alert or action message).'"[59] The events that occurred during Winter Storm Elliott therefore do not fall within the scope of this section of Manual 13.

36. PJM *itself* needed Load Management Actions to meet its own needs. During Winter Storm Elliott, PJM never initiated a Load Management Action for the purpose of providing assistance to another region. Even assuming that Load Management might have had the incidental effect of facilitating some non-firm exports when PJM was experiencing emergency conditions, the Manual 13 guidance not to initiate Load Management Actions *for the purpose* of assisting other regions simply does not apply.

37. In fact, accepting the CZG Complainants' and the Coalition's interpretation, PJM could never provide emergency assistance of any sort to another Balancing Area if it previously called for Load Management Actions. There is nothing in Section 2.5 of Manual 13 that would limit the (claimed) prohibition of providing assistance to other regions after initiating Load Management Actions to non-firm exports. The sentence cited by these Complainants states: "PJM load management programs are not to be used to provide assistance to adjacent Balancing Areas."[60] If the CZG Complainants' and the Coalition's reading is correct, this limitation would mean that PJM could not provide firm exports or even emergency sales to another Balancing Area experiencing a capacity shortfall after PJM initiated a Load Management Action. The only time PJM could assist another region in any respect would be if no Load Management Actions were taken. Given that PJM would be expected to call for Load Management Action during any capacity shortage (including during pre-emergency conditions) PJM would be side-lined in virtually any wide-area capacity event that included its territory. Such an interpretation of this manual provision would be irrational.

G. Complainants' Arguments That PJM Failed to Properly Maintain Reserves in Certain Control Areas Do Not Support their Claims

38. The CZG Complainants and Coalition contend that PJM failed to properly maintain reserve levels and claim that PJM should have curtailed both non-firm and firm exports to do so. According to Dr. Sotkiewicz, PJM violated the Tariff and Operating Agreement because "PJM allowed reserve levels to fall below their requirements RTO-wide and within the

[58] Manual 13, § 2.5.

[59] *Id.* (emphasis omitted).

[60] *Id.*

Mid-Atlantic-Dominion ('MAD') reserve sub-zone frequently while supporting exports."[61] Specifically, Complainants cite the language of Tariff, Attachment K–Appendix Section 1.10.6 (c) and Operating Agreement Schedule 1, Section 1.10.6(c), which both state that "[t]he Office of the Interconnection shall curtail deliveries to an External Market Buyer if necessary to maintain appropriate reserve levels for a Control Zone as defined in the PJM Manuals, or to avoid shedding load in such Control Zone."[62] The CZG Complainants claim that "because the OA trumps the manuals,"[63] the admonition to "curtail deliveries to an External Market Buyer if necessary to maintain appropriate reserve levels" prevents PJM from relying upon Manual 13, Sections 2.3.2 and 2.5, which both prevent PJM from cutting external sales "[i]f the net result of cutting off-system capacity sales would put the sink Balancing Authority into load shed . . . unless it would prevent load shedding within PJM."[64] But even if Dr. Sotkiewicz's analysis were correct (and I do not concede that it is), it fails to help Complainants' basic thesis that PJM's pre-emergency and Emergency Actions were not justified. Further, the Complainants' asserted dichotomy between the Operating Agreement, Tariff, and Manual 13 is invalid. Complainants badly misread each of those provisions, which do not conflict.

39. As an initial matter, I disagree with Dr. Sotkiewicz's statement that PJM "allow[ed] reserves to go short increasing the likelihood of a loss of load event in PJM." [65] PJM had options to address a large contingency occurring at times when level of reserves fell below the desired levels. PJM had the option to take a Voltage Reduction Action which would have made 1,701.7 MW of reserves available to PJM.[66] At least 1,239.1 MW are available in 10 minutes or less, some of which are available in as little as 2 minutes.[67] Also, a Voltage Reduction Action for the Mid-Atlantic-Dominion subzone would have made 1239.1 MW available in 10 minutes or less. These quantities are similar in terms of their operational characteristics to Synchronized Reserves since their sources are currently operating resources synchronized to the system. Further, because this was a capacity shortage emergency and PJM had called a Maximum Generation Action, it had the ability to recall all PJM Capacity Resources being used to serve loads outside of PJM regardless of the type

[61] CZG Complaint, Sotkiewicz Aff., Ex. CZG-0004, at P 100; Coalition Complaint, Sotkiewicz Aff., Attach. 4, at P 131 & n.93.

[62] CZG Zone Complaint at 19 & n.57 (quoting and citing the Tariff and OA); Coalition Complaint at 25, 32.

[63] CZG Complaint at 30.

[64] *Id.* at 30 (quoting Manual 13, § 2.3.2 at 32); Manual 13, § 2.5 at 92.

[65] CGZ Complaint, Sotkiewicz Aff., Ex. CZG-Ex-004, at P 117.

[66] *See* Manual 13 § 2.3.2 (Step 9 (Real-time)" Voltage Reduction Action at 39, *id*. at 26-27 (tables describing available amounts).

[67] *Id.* at 26-27 (tables describing available amounts).

of transmission service, *i.e.*, non-firm or firm, being used.[68] Most of the exports are related to PJM Capacity Resources and thus could have been recalled by PJM if needed to serve its own customers' requirements.

40. Dr. Sotkiewicz claims that all or most exports should have been curtailed at various times on December 23 and December 24, 2022, but he nowhere explains how much curtailment was necessary, so the impact of taking this extraordinary step contrary to Manual 13 cannot be determined. Even more importantly, Dr. Sotkiewicz does not even claim that if PJM had curtailed non-firm and firm exports, PJM would not have needed either Pre-Emergency Load Reduction Actions or Emergency Actions. As I have explained already, the PJM's operators' reasons for taking Pre-Emergency and Emergency Actions related mainly to uncertainty in the load forecast and the surprisingly poor overall performance of generation. Further, as I have also explained, an important reason for extending pre-emergency and emergency procedures after the morning peak ended on December 24, was the PJM operators' concern about meeting the evening peak. Even if PJM should have curtailed external exports to maintain RTO Primary Reserves during certain times between 02:00 and 06:00 on December 24, 2022 (which I do not concede is correct), that would not have addressed the valid concerns the operators had about meeting the evening peak. In fact, about half the identified period on December 24, 2022, falls outside of the times that PJM took pre-emergency and Emergency Actions. The main focus of this portion of Dr. Sotkiewicz's affidavit is the claim that "PJM's failure to curtail exports to maintain reserves in accordance with the Tariff led to reserve shortages and higher reserve prices than needed to be the case."[69] But the ComEd Zone Complainants and Coalition are seeking to avoid Non-Performance Charges; they do not seek redress for cost impacts associated with PJM's alleged violation of the requirement to maintain reserves.

41. The CZG Complainants' assertion that Dr. Sotkiewicz's affidavit sets up a conflict between a controlling tariff provision and an inferior manual provision is also misleading. PJM's Tariff and Operating Agreement both provide for "the mutual provision of . . . support in . . . Emergency conditions with other interconnected Control Areas" and require PJM to "[c]oordinate the curtailment or shedding of load, or other measures appropriate to alleviate an Emergency."[70] The Manual 13 guideline is an implementation detail for the

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[68] *See PJM Interconnection, L.L.C.*, 84 FERC ¶ 61,224 at 62,081 (1998) ("PJM explains that the curtailment provisions [i.e., those proposed for Operating Agreement Section 1.11.3A Maximum Generation Emergency] relate to generation curtailments, not transmission curtailments. [PJM's] right to call upon the output of Capacity Resources is already a requirement applicable to the owners of Capacity Resources (i.e., they are permitted to make only nonfirm, recallable sales from Capacity Resources) . . . ., and that this provision merely clarifies that fact. We find that PJM's explanation adequately addresses Cargill-Alliant's concerns and agree that the curtailment terms at issue here relate to generation sales, not transmission service, and simply clarify the existing arrangement.").

[69] CZG Complaint, Sotkiewicz Aff., Ex. CZG-0004, at P 109.

[70] Tariff § 1.6.2.

performance of PJM's obligations under the Tariff and Operating Agreement. Assuming a conflict between PJM's Tariff/Operating Agreement duties to sustain internal reserves and its Tariff/Operating Agreement commitment to provide assistance to prevent load shed in another area, the task faced by the PJM operators would be to balance, the achievement of these two goals when feasible and consistent with the Good Utility Practice Standard. Specifically, under the facts here, the PJM operators would need to balance the the reserves violations the CZG Zone Complainants and Coalition allege occurred against the load shedding damage that cutting firm transactions to other regions would have caused or failed to mitigate. This is very different than the analysis framed by these Complainants. Even accepting the CZG Complainants' and Coalition's claim that the reserves shortages occurred, opting instead to prevent or mitigate load shedding in neighboring regions during an extreme cold weather event would been the most reasonable choice.

42. This concludes my affidavit.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Power OPP, LLC, *et al.*	)	
Complainants	)	
v.	)	**Docket No. EL23-53-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Aurora Generation, LLC, *et al.*	)	
Complainants	)	
v.	)	**Docket No. EL23-54-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Coalition of PJM Capacity Resources	)	
Complainant	)	
v.	)	**Docket No. EL23-55-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	

VERIFICATION

I, **Michael E. Bryson**, state, under penalty of perjury, that I am the Michael E. Bryson referred to in the foregoing document entitled "Affidavit of Michael E. Bryson on Behalf of PJM Interconnection, L.L.C.," 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.

/s/ Michael E. Bryson
Michael E. Bryson

Exhibit 7

Affidavit of Steven A. Naumann

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Power OPP, LLC, *et al.*,	)	
Complainants	)	
v.	)	**Docket No. EL23-53-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Aurora Generation, LLC, *et al.*,	)	
Complainants	)	
v.	)	**Docket No. EL23-54-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	
	)	
Coalition of PJM Capacity Resources	)	
Complainant	)	
v.	)	**Docket No. EL23-55-000**
PJM Interconnection, L.L.C.	)	
Respondent	)	

AFFIDAVIT OF STEVEN T. NAUMANN, P.E.
ON BEHALF OF PJM INTERCONNECTION, L.L.C.

1. My name is Steven T. Naumann. My business address is 8210 Tripp Avenue, Skokie, Illinois 60076. I am a self-employed consultant. In 2019, I retired from Exelon Corporation (Exelon) where I served as Vice President, Transmission and NERC Policy for Exelon Business Services Company. In that role, I provided the electric delivery utilities owned by Exelon advice and guidance on regulatory questions relating to system planning, design, operation, and reliability, and rates, terms, and conditions of service that are subject to federal regulation or that concern boundaries and classifications of assets, services, and authority between federal and state jurisdiction. I also provided advice and guidance on reliability and security policy to Exelon Generation, then the generation subsidiary of Exelon.

2. I have over 40 years of experience in planning, operations, reliability and regulatory aspects of electric power systems. I was part of the Exelon executive team leading the integration of Commonwealth Edison Company (ComEd) into PJM. My knowledge of transmission and generation issues in PJM, particularly in the ComEd Zone, is directly relevant to the arguments advanced by the ComEd Zone Generators in this proceeding.

3. I am licensed in Illinois, both as a Professional Engineer and as an attorney, although I do not practice law. I hold a Bachelor of Science degree in Electric Power Engineering and a Master of Engineering degree in Electric Power Engineering, both from Rensselaer Polytechnic Institute in New York, as well as a Juris Doctor from Chicago-Kent College

of Law. My biographical summary, attached as Exhibit PJM-007.1, provides more detail on my qualifications, my publications, and my previous testimony.

4. I am submitting this Affidavit in support of PJM Interconnection, L.L.C. (PJM) in response to the complaints filed in the above captioned proceedings.

Conclusions

5. PJM's primary responsibility is to manage the assets that it operates in a reliable and safe manner. This responsibility is above all others. PJM's mission statement declares that its "primary task" is "to ensure the safety, reliability, and security of the bulk electric power system."[1] As PJM's President and CEO has stated, "[k]eeping the power flowing and the grid reliable is the core mission for PJM and our member companies."[2]

6. Based on over 40 years of experience, the primary responsibility of all entities that plan and operate the electric power grid is to keep the lights on. This task may be challenging when system operators face severe conditions, especially where decisions need to be made within a short period of time and circumstances are rapidly changing. It should be no surprise that operators may take actions in real-time to address difficult problems that others may question after the fact as being overly conservative or uneconomic. At such times, delaying actions can result in unnecessary loss of load. Furthermore, it is important for operators to be proactive—i.e., stay ahead of potential problems, not reactive after problems occur—to ensure reliability, especially during periods of severe stress.

7. Winter Storm Elliott was an unusually severe winter storm that struck the PJM Region between December 23 and December 24, 2022. The storm presented extraordinary reliability challenges by causing an extremely rapid drop in temperatures coincident with unexpectedly record-breaking high loads for the Christmas holiday.[3] It had a major impact not just on PJM but on much of the rest of the Eastern Interconnection. There have been a number of large-scale disturbances that have resulted in wide-area loss of load dating back to the Northeast Blackout of 1965.[4] One of the more remarkable features of PJM's

[1] PJM, *About PJM: Who We Are*, https://pjm.com/about-pjm.

[2] *PJM 2021 Annual Report, Operations* (June 2022), https://services.pjm.com/annualreport2021/operations/. PJM's emphasis on reliability has remained unchanged for the past two decades. For example, in April 2004, the Exelon executive team met with the PJM executive team to finalize the steps of PJM integrating ComEd into PJM on May 1, 2004. At that meeting, I recall that Exelon's then-CEO, John Rowe, asked PJM's then-CEO, Phil Harris, to promise not to go forward with the integration if there was anything not yet completed that would threaten reliability. Mr. Harris, of course, reassured the Exelon team that PJM would ensure reliable operations before completing the switchover.

[3] *See* PJM, *Winter Storm Elliott Info*, https://www.pjm.com/markets-and-operations/winter-storm-elliott (collecting PJM's public statements addressing Winter Storm Elliott's impact on PJM's operations and markets).

[4] *See* FERC and NERC, Regional Entity Staff Report, The February 2021 Cold Weather Outages in Texas and the South Central United States 47-50 (Nov. 2021) (February 2021 Cold

performance during Winter Storm Elliott is that PJM, unlike its neighboring Balancing Authorities, was able to navigate Winter Storm Elliott without forcing customers to shed load.[5]

8. While each operating situation is different and the information that operators have to make decisions varies, it is important to put the performance of PJM during Winter Storm Elliott in context of severe cold weather events over the past decade.[6] Following the February 2011 cold weather event in ERCOT and the Southwest, the FERC-NERC Staff Report made 26 recommendations for the electric system including the need for generator winterization.[7] Next was the 2014 Polar Vortex, after which NERC made a number of recommendations, generator winterization again among them.[8] In January 2018, similar high outage rates occurred during the extreme cold in the South Central United States, including MISO and TVA, which connect to PJM.[9] A more recent incident is the situation in Texas during Winter Storm Uri, in February 2021, when ERCOT was forced to shed over 10,000 MW of load in less than an hour to avoid a blackout of the entire ERCOT

Weather Report) (describing previous cold weather events), https://www.nerc.com/news/Pages/Final-Report-on-February-2021-Freeze-Underscores-Winterization-Recommendations.aspx; FERC and NERC Staff Report, Arizona-Southern California Outages on September 8, 2011 (Apr. 2012), https://www.nerc.com/pa/rrm/ea/Pages/September-2011-Southwest-Blackout-Event.aspx; U.S.-Canada Power System Outage Task Force, Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations § 7 at 103-07 (Apr. 2004) (describing seven large-scale disturbances), https://www.energy.gov/oe/articles/blackout-2003-final-report-august-14-2003-blackout-united-states-and-canada-causes-and.

[5] *See infra* P 23 & notes 47-51 (detailing emergency actions and substantial forced load shedding in PJM's neighboring Balancing Authorities on December 23 and December 24 as documented by NERC, the Department of Energy, and the Reliability Coordinator Information System).

[6] Other types of historical weather events also highlight the risk of operators waiting too long to take emergency actions and how dramatic such actions may need to be in a crisis. A particularly noteworthy example occurred in July 1977, when the New York electric grid suffered transmission line outages due to lightning from thunderstorms north of New York City, which was importing power. After a number of outages, the Consolidated Edison operators delayed shedding load, and, after separating from the rest of the Eastern Interconnection, nearly the entire city suffered a blackout. *See, e.g.*, Victor K. McElheny, *Improbable Strikes by Lightning Tripped Its System, Con Ed Says*, N.Y. TIMES (July 15, 1977).

[7] *See* FERC and NERC, Report on Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 2011, 197-212 (Aug. 2011), https://www.nerc.com/pa/rrm/ea/Pages/February-2011-Southwest-Cold-Weather-Event.aspx.

[8] *See* NERC, Polar Vortex Review 19-20 (Sept. 2014), https://nerc.com/pa/rrm/january%202014%20polar%20vortex%20review/polar_vortex_review_29_sept_2014_final.pdf.

[9] *See* FERC and NERC, Staff Report, The South Central United States Cold Weather Bulk Electric System Event of January 17, 2018 (July 2019), https://www.nerc.com/pa/rrm/ea/Documents/South_Central_Cold_Weather_Event_FERC-NERC-Report_20190718.pdf.

system.[10] ERCOT came within minutes of a full blackout due to a combination of generator outages and high load.[11]

9. These events prompted regulators and public utilities, including PJM, to develop guidelines to avoid or mitigate cold weather emergencies. Starting in 2012, NERC issued three versions of winter preparedness guidelines culminating in a comprehensive guideline in 2020[12] and Level 2 Alerts providing recommendations to industry prior to the 2021-2022 and 2022-2023 winter seasons.[13] After a decade of alerts, guidelines, training, and lessons learned, PJM's generator owners and operators were well aware of the need to winterize their assets and that extreme cold was going to be more common than previously thought. In fact, the Commission recently pointed this out stating "we also emphasize that industry has been aware of and alerted to the need to prepare their generating units for cold weather since at least 2011."[14] And PJM's generators certainly were aware that FERC had approved modifications to three NERC reliability standards, even though those standards would not be effective until April 1, 2023.[15]

10. Nevertheless, many generators failed to perform once again when Winter Storm Elliott struck PJM on December 23-24. They failed despite mandatory reliability standards that were just over the horizon, numerous examples of cold weather events where large amounts of natural gas-fired generation were unavailable, and a wide array of alerts, reports, lessons learned, guidelines and training in which generators were told repeatedly what they needed to do to operate during extreme cold.

11. For example, NERC's Generating Unit Winter Weather Readiness Guideline lists 16 "typical problem areas," that may result in operational issues due to cold and/or freezing

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[10] *See* February 2021 Cold Weather Report, Fig. 73, at 137.

[11] *See id*. at 47-50.

[12] *See* NERC, Reliability Guideline, Generating Unit Winter Weather Readiness – Current Industry Practices – Version 3 (Dec. 15, 2020) (Generating Unit Winter Weather Readiness), https://www.nerc.com/comm/RSTCReliabilityGuidelines/Reliability_Guideline_Generating_Unit_Winter_Weather_Readiness_v3_Final.pdf.

[13] *See* Recommendation to Industry, Cold Weather Preparations for Extreme Weather Events – II (Sept. 12, 2022), https://www.nerc.com/pa/rrm/bpsa/Alerts%20DL/NERC%20Alert%20R-2022-09-12-01%20Cold%20Weather%20Events%20II.pdf; Recommendation to Industry, Cold Weather Preparations for Extreme Weather Events (Aug. 18, 2021), https://www.nerc.com/pa/rrm/bpsa/Alerts%20DL/NERC%20Alert%20R-2021-08-18-01%20Extreme%20Cold%20Weather%20Events.pdf.

[14] *See N. Am. Elec. Reliability Corp*., 182 FERC ¶ 61,094 at P 88 (2023) (approving Extreme Cold Weather Reliability Standards).

[15] *See N. Am. Elec. Reliability Corp*., 176 FERC ¶ 61,119 (2021) (approving Cold Weather Reliability Standards); Recommendation to Industry, Cold Weather Preparations for Extreme Weather Events – II at 1 ("The Cold Weather Reliability Standard becomes enforceable on April 1, 2023") (in red and bold in original).

weather.[16] In turn, PJM has documented a Cold Weather Preparation Guideline and Checklist that includes a detailed list of typical problem areas for generators to include in their winterization plans.[17]

- Personnel Preparation
- Staffing
- Equipment Preparation
- Maintain Substation Equipment
- Fuel and Environmental Preparation

Under equipment protection, PJM has listed 33 detailed, albeit not exclusive actions, including:

- Review cold weather scenarios affecting equipment taking into account the effects of precipitation and wind
- Consider pre-warming, operating at full speed no load, early start-up, and/or putting on turning gear scheduled units prior to a forecasted severe winter weather event
- Prepare units that have been off line for lengthy periods of time for start-up and operation during severe winter weather events

To refer to the events of Winter Storm Elliott as *déjà vu* all over again would be an understatement.[18]

12. With this history in mind, Winter Storm Elliott presented PJM operators with extremely high rates of generator outages and derates related to extreme cold weather and fuel supply problems—problems that the training, guidelines, and most importantly, the Capacity Performance market-based framework[19] were supposed to solve. PJM operators had to deal with these facts and could not assume that, if the next generator(s) tripped, sufficient generation would be able to come on line at the times needed to stabilize the system with enough energy plus reserves. The risk was too high.

13. The seriousness of generation failures during a decade of cold weather events and lack of preparedness, has led NERC to issue an unprecedented level 3 alert "to target a critical risk,

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[16] *See* Generating Unit Winter Weather Readiness, at 3-5.

[17] *See* PJM Manual 14D: Generator Operational Guidelines, Attach. N: Cold Weather Preparation Guideline and Checklist, at 148-54 (Rev. 62, Dec. 21, 2022).

[18] Yogi Berra purportedly made this statement following back-to-back home runs by Mickey Mantle and Roger Maris in 1961.

[19] *See PJM Interconnection, L.L.C.*, 151 FERC ¶ 61,208 (Capacity Performance Order), *order on reh'g & compliance*, 155 FERC ¶ 61,157 (Capacity Performance Rehearing and Compliance Order), *pet'n for rev. denied sub nom. Advanced Energy Mgmt. All. v. FERC*, 860 F.3d 656 (D.C. Cir. 2017).

cold weather preparations for extreme weather events to reliability."[20] Of the eight Essential Actions, six require responses by Generator Owners. These actions include (1) calculating the Extreme Cold Weather Temperature (ECWT), as defined in the Alert and in new standard EOP-12-1, for each plant; (2) identifying the cold weather preparedness plan the critical components and freeze protection measures to be implemented for the next winter season; (3) identifying which units are capable of operating at the ECWT, which units require additional freeze protection and which can be implemented prior to next winter; (4) identifying units that experienced a Generator Cold Weather Event during the 2022-2023 winter and (a) identify the cause; (b) determine applicability to similar units; (c) determine corrective actions that can be implemented prior to next winter; and (d) identify temporary operating limitations; and (5) providing information to the relevant Reliability Coordinators, Balancing Authorities and Transmission Operators. [21] While I am not implying that the PJM generators should have been in compliance with Reliability Standard EOP-012-1, which the Commission did not approve until after the events of Winter Storm Elliott,[22] generators certainly were aware of the requirements prior to the start of the 2022-2023 winter season.

14. The ComEd Zone Generators contend that PJM was required to curtail all non-firm exports prior to initiating capacity-related emergency procedures.[23] The Coalition of PJM Capacity Resources (Coalition) makes this same argument. [24] This is a faulty interpretation of the PJM OATT and PJM Manual 13. The ComEd Zone Generators and the Coalition are arguing that PJM has no flexibility in the steps it takes before a Performance Assessment Interval (PAI) is triggered. In the first instance, both Complainants come to this conclusion by misreading the PJM OATT and PJM Manual 13. While the ComEd Zone Generators correctly cite the definition of Emergency Action, which encompasses "*any* emergency action for locational or system-wide capacity shortages,"[25] the ComEd Zone Generators go on to argue that, because "PJM did not take *all* steps before taking Emergency Actions that triggered the PAIs," the penalties should not have been triggered.[26] For example, the

[20] NERC Board of Trustees Agenda, Agenda Item 6b (Mar. 11, 2023).

[21] NERC, Essential Actions to Industry, Cold Weather Preparations for Extreme Weather Events III (May 15, 2023), https://www.nerc.com/pa/rrm/bpsa/Alerts%20DL/Level%203%20Alert%20Essential%20Actions%20to%20Industry%20Cold%20Weather%20Preparations%20for%20Extreme%20Weather%20Events%20III.pdf.

[22] *See N. Am. Elec. Reliability Corp*., 182 FERC ¶ 61,094. A number of the Complainants voted against approval of EOP-12-1. *See* Ballot Name: 2021-07 Extreme Cold Weather Grid Operations, Preparedness, and Coordination EOP-012-1, https://sbs.nerc.net/BallotResults/Index/649.

[23] Complaint of ComEd Zone Generators at 21-22, Docket No. EL23-54 (Apr. 4, 2023).

[24] Complaint of the Coalition of PJM Capacity Resources (Coalition Complaint) at 27-33, Docket No. EL23-55 (filed Apr. 4, 2023).

[25] Complaint of ComEd Zone Generators at 18, Docket No. EL23-54 (Apr. 4, 2023) (citing PJM OATT, § 1, Definitions, Definitions E – F) (emphasis added).

[26] Complaint of ComEd Zone Generators at 19 (emphasis added).

ComEd Zone Generators, the Coalition and the Nautilus Entities argue that Section 2.3.2 of PJM Manual 13 *requires* that "prior to entering into capacity related Emergency Procedures, PJM *must* 'curtail all non-Firm exports.'"[27] The Coalition repeats this argument and also claims, erroneously, that Section 2.3.2 requires PJM to issue an Energy Emergency Alert Level 1 (EEA 1).[28] But Section 2.3.2 says no such thing.

15. Inventing a requirement to take *all* steps prior to taking Emergency Actions is contrary to the express language of Section 2.3.2 of PJM Manual 13. First, Section 2.3.2 explicitly states, "[d]ue to system conditions and the time required to obtain results, PJM dispatchers may find it necessary to vary the order of application to achieve the best overall system reliability."[29] Section 2.3.2 goes on to state that the actions taken prior to entering into capacity related emergency procedures are "the most probable sequence" and, depending on the severity of the capacity deficiency, "it is unlikely that some Steps would be implemented."[30] Moreover, as I explain below, such a reading is inconsistent with the flexibility that PJM operators must have to deal with emergencies, especially those faced by PJM during Winter Storm Elliott.

16. The operators have to make decisions based on current conditions, expected conditions, and the uncertainty of various elements of the system with an eye to preventing loss of load. They must have flexibility. For example, given the quickly changing weather and the large amount of gas-fired generation then unavailable, inaccurate and untimely information provided by generators, the fact that neighboring regions did not have excess capacity to supply to PJM if additional PJM generation tripped, and the uncertainty of the level of load, maintaining non-firm exports when PJM had additional resources to do so must be considered Good Utility Practice.[31] If some generators that were delivering energy had tripped or were forced to derate, or load unexpectedly increased, PJM could then

[27] Complaint of ComEd Zone Generators at 21 (underlining in original, italics added); *see also* Complaint of Coalition Complaint at 25, 27, Docket No. EL23-55 (filed Apr. 4, 2023); Complaint of Nautilus Entities at 42, 56 and Affidavit of Christopher H. Jordan at P 42, Docket No. EL23-53 (filed Mar. 31, 2023).

[28] Coalition Complaint at 25, 27.

[29] PJM Manual 13, § 2.3.2, at 28.

[30] *Id*.

[31] The "Good Utility Practice" standard has been in place for decades and applies to all FERC-jurisdictional transmission providers. The PJM OATT includes the standard definition of "Good Utility Practice" as "any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, *in the exercise of reasonable judgment in light of the facts known at the time the decision was made*, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather is intended to include acceptable practices, methods, or acts generally accepted in the region; including those practices required by Federal Power Act section 215(a)(4)." PJM OATT, § 1, Definitions, Definitions G – H (emphasis added).

interrupt non-firm exports and utilize the energy from the remaining generators that are on-line to maintain service to PJM load.[32] Similarly, PJM operators had to consider the probability that generators would not start when called upon or that start-up would be delayed. This concern was not theoretical. When PJM called for resources to support the peak the morning of December 24, approximately 6,000 MW of steam generation did not come on-line at the expected time to support the load.[33] Furthermore, PJM found numerous instances of generators either not providing accurate data on availability or not updating data. PJM only found out about generators inability to run, to start when needed, or derates when PJM called on those generators to operate. This lack of accurate information increased the difficulty for PJM to serve the load.[34] PJM was in a position of having to make critical operating decisions but could not trust the information provided by many generators. Having generation running and synchronized, as well as additional generation available for such contingencies is, by definition, Good Utility Practice.

17. The conditions in ERCOT during Winter Storm Uri are an example of what can happen under similar extreme cold conditions. During a three-hour period, the load in ERCOT increased and over 6,000 MW of generation was lost.[35] As stated in the February 2021 Cold Weather Report, "[d]ue to the unrelenting generating unit losses during this period, the actions ERCOT BA operators took to restore Physical Responsive Capability and maintain normal frequency (initially, calling on demand response, then ordering small blocks of firm load shed) could not keep up, and frequency continued to drop. ERCOT BA operators were forced to shed larger blocks of firm load, and within minutes of one another, to restore frequency."[36] PJM operators could not allow a similar situation to occur. They had to be proactive, not reactive.

18. Dr. Sotkiewicz's analogy to the airline safety instruction concerning putting on your mask before helping others is incorrect.[37] PJM operators did, in fact, keep the PJM system reliable and helped keep their neighbors reliable. Furthermore, to the extent reserve levels

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[32] As it turns out, the concerns of PJM operators were well founded. Between the evening of Friday, December 23, when 34,500 MW of generation were forced out, and the morning of Saturday, December 24, another 12,500 MW of generation were forced off line. Other generation issues raised the total amount of "missing" generation to 57,000 MW on the morning of December 24. *See* PJM, Winter Storm Elliott, Frequently Asked Question 3 (updated Apr. 12, 2023), https://www.pjm.com/-/media/markets-ops/winter-storm-elliott/faq-winter-storm-elliott.ashx.

[33] PJM Presentation to Market Implementation Committee "Winter Storm Elliott" at 12 (Jan. 11, 2023), https://www.pjm.com/-/media/committees-groups/committees/mic/2023/20230111/item-0x---winter-storm-elliott-overview.ashx; Christopher Pilong Aff., Ex. PJM-004 at PP 26.

[34] Pilong Aff. at PP 47-65.

[35] *See* February 2021 Cold Weather Report, Figs. 69-70, at 130-31.

[36] *Id*. at 133.

[37] Sotkiewicz Aff., Ex. CZG-0004, at PP 123-24; Coalition Complaint, Attach. 4, Aff. of Paul M. Sotkiewicz, Ph.D, at P 152.

in PJM were below what Dr. Sotkiewicz believes were required, PJM temporarily shared the oxygen in their masks with their neighbors when it was safe to do so, rather than allowing them to pass out.

19. Dr. Sotkiewicz's argument that PJM violated its tariff and NERC Standards by continuing with non-firm exports during Emergency Actions is incorrect for several reasons.

20. First, Dr. Sotkiewicz repeats the mistaken interpretation that section 2.3.2 of Manual 13 *requires* PJM to curtail *all* non-firm energy exports prior to initiating Emergency Action.[38] As I stated above,[39] this interpretation is incorrect.

21. Second, Dr. Sotkiewicz, in support of the ComEd Zone Generators, takes a similar inflexible reading of the PJM Operating Agreement and Tariff sections that state PJM "shall curtail deliveries to an External Market Buyer if necessary to maintain appropriate reserve levels."[40] The Coalition makes this same argument.[41] Again, Dr. Sotkiewicz and the Coalition assume that the term "appropriate reserve levels" leaves no room for PJM to assist its neighbors when it can while retaining the ability to recall non-firm transactions when necessary. In fact, PJM Manual 13 contemplates this situation stating that "[i]f the net result of cutting off-system capacity sales would put the sink Balancing Authority into load shed then PJM will not curtail the transactions unless it would prevent load shedding within PJM."[42]

22. Third, Dr. Sotkiewicz's claim that while PJM can "come to the aid of neighboring control areas [sic]" PJM put its system "in a jeopardized reliability situation . . . by extending PAIs through December 24"[43] ignores PJM's obligations to support other Reliability Coordinators. The Coalition goes further and contends that "PJM was *obligated, then, not to assist other zones* after it entered into its own emergency."[44] Complainants' arguments disregard Requirement R7 of NERC Reliability Standard IRO-014-3, which states that "[e]ach Reliability Coordinator *shall* assist Reliability Coordinators, if requested and able,

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[38] *Id*. at P 122. Dr. Sotkiewicz, in support of the Coalition goes further and claims that Section 2.3.2 of PJM Manual 13 "mandated" that PJM curtail all non-firm exports and "reasonably allowed" PJM to recall daily firm exports. *See* Coalition Complaint, Attach. 4: Sotkiewicz Aff., at P 72.

[39] *See supra* PP 15.

[40] Sotkiewicz Aff., Ex. CZG-0004, at P 100 (citing parallel provisions in PJM OATT, Attach. K – App'x § 1.10.6(c) and PJM Operating Agreement, Schedule 1, § 1.10.6(c)).

[41] Coalition Complaint at 32-33.

[42] Manual 13, § 2.3.2 at p. 32.

[43] Sotkiewicz Aff., Ex. CZG-0004, at P 99. Although Manual 13 uses the term "control areas," I assume Dr. Sotkiewicz is referring to neighboring Reliability Coordinators or possibly Reliability Balancing Authorities as NERC has assigned functions formerly performed by control area functions to specific registered entities to whom the standards are applicable.

[44] Coalition Complaint at 32 (italics added).

provided that the requesting Reliability Coordinator has implemented its emergency procedures, unless such actions cannot be physically implemented or would violate safety, equipment, regulatory, or statutory requirements."[45] This is exactly what PJM did – assisted TVA (the Reliability Coordinator for TVA and LGE/KU) and VACAR-South (the Reliability Coordinator for Duke Progress and Duke Carolinas).

23. There is no question that these neighboring systems were implementing emergency steps, up to and including firm load interruptions under Energy Emergency Alert Level 3 (EEA 3),[46] and that PJM was able to assist. These EEA 3 actions and load-shedding are well-documented by NERC,[47] the Department of Energy,[48] and the Reliability Coordinator Information System (RCIS).[49]

Emergency Energy Alerts Level 3[50]

[45] NERC Standard IRO-014-3 – Coordination Among Reliability Coordinators (2015).

[46] NERC defines EEA 3 to mean that "Firm Load Interruption is imminent or in progress." NERC, Attachment 1-EOP-011-1 (Energy Emergency Alerts) at 12, https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-011-1.pdf.

[47] *See* NERC, Winter Storm Elliott: Bulk Power System Awareness Observations, at 5-8 (Mar. 22, 2023) (listing preparatory actions, EEA 3 actions, and load shed quantities in neighboring Balancing Authorities), https://www.nerc.com/comm/RSTC/AgendaHighlightsandMinutes/RSTC_Meeting_Materials_Package_March_22_2023.pdf.

[48] U.S. Dep't of Energy, OE-417 Electric Emergency and Disturbance Report – Calendar Year 2022, at 37 (showing SERC (Tennessee) shedding 100 MW or more of firm load on Dec. 23 and SERC (South Carolina and North Carolina) shedding 1,960 MW of firm load on Dec. 24), https://www.oe.netl.doe.gov/download.aspx?type=OE417PDF&ID=83.

[49] *See* PJM, RCIS-EEA 12/20/2022 00:00 – 12/26/2022 00:00. Specifically, PJM's neighboring Reliability Coordinators—including TVA and VACAR South—declared EEA3 and lower levels of system emergencies during Winter Storm Elliott. Specifically, TVA declared EEA-3 for the TVA BA at 06:15 on 12/23; and for the LGE/KU BA at 1456 on 12/23. The TVA BA went down and then back to EEA3 at 17:21 on 12/23. Similarly, VACAR South declared EEA-3 for Dominion South Carolina at 05:59 on 12/24, for Duke Energy Carolinas at 06:17 on 12/24, for Duke Energy Progress at 06:40 on 12/24, and for South Carolina Public Service Authority at 07:20 on 12/24.

[50] NERC, Winter Storm Elliott, *supra* note 47, at 7.

Reliability Coordinator	Balancing Authority	Fri	Sat	Sun
Tennessee Valley Authority	TVA BA	●	●	
Tennessee Valley Authority	LG&E/KU	●	●	
VACAR South	Duke Energy Carolinas		●	
VACAR South	Duke Energy Progress		●	
VACAR South	Dominion South Carolina		●	
VACAR South	Santee Cooper		●	●

24. NERC summarized the load loss as follows:[51]

Friday, December 23		
06:12	TVA BA	1,270
09:31	Memphis Light Gas and Water*	200
16:18	TVA BA	3,200
14:36	LG&E/KU	350
Saturday, December 24		
06:10	Duke Energy Carolina	1,000
06:15	Dominion South Carolina	86.3
06:35	Duke Energy Progress	961
Total (all reports) load shed		**7,067.3 MW**

* TVA BA is the Balancing Authority for MLGW.

25. Had PJM not provided assistance, PJM's neighboring Reliability Coordinators would have been required to shed additional firm load with possible devastating consequences. For example, between around 16:11 on December 23, TVA told PJM dispatchers several times that if PJM were to curtail roughly 2,500 MW of exports, "that would put [TVA] back into an EEA3, essentially shedding loads"[52] and that doing so would "put the bulk electric grid at risk."[53] Later, around 17:11, TVA, when discussing curtailing those transactions, told PJM "we're trying to keep people alive over here."[54] For PJM not to provide assistance when it was able would have been a violation of Requirement R7 which documents one of the most important obligations of operating entities in an interconnection – to assist others

[51] *Id.* at 8 (showing over 5,000 MW of load shed in the TVA BA and LG&E/KU BA on December 23 and over 2,000 MW of load shed in the Duke Carolina, Duke Progress and Dominion Carolina BAs on December 24).

[52] Transcript, Tennessee Valley Authority Call to PJM (Dec. 23, 2022) (on file with author) P 0206 at 13-14.

[53] *Id*. P 0208 at 11-12.

[54] *Id.* p. 74 at l-2.

when they are able to without endangering their own reliability. The Violation Severity Level of not complying with Requirement R7 is "Severe." Unlike most other NERC Standards, there are no lesser degrees of non-compliance. The standard is clear – help your neighbors if you can without endangering your system.

26. As FERC reiterated when it approved the first version of IRO-014, one of the purposes of this standard is to "preserve the reliability benefits of interconnected operation."[55] In spite of Dr. Sotkiewicz's assertions, it is clear to me that PJM operated in accordance with Good Utility Practice while maintaining the reliability of the PJM system under very stressful conditions.

27. The Coalition claims that NERC Reliability Standard EOP-011-2 [sic] and PJM Manual 13 require PJM to issue an EEA1 "before Emergency Actions are taken."[56] But this ignores the express language of Attachment 1 – EOP-011-1 which explicitly states "The Reliability Coordinator may declare whatever alert level is necessary, and need not proceed through the alerts sequentially."[57]

28. The Coalition also makes an amorphous claim that PJM violated Requirement R1 of NERC Reliability Standard IRO-001-4 which states that "[e]ach Reliability Coordinator shall act to address the reliability of its Reliability Coordinator Area." It argues that "PJM had an obligation to use its position to operate a reliable grid. It did not."[58] In spite of the fact that unlike many of its neighbors, PJM did not shed load,[59] the Coalition bases its conclusion on *post hoc* conclusions as to actions that PJM should have taken, such as scheduling long-lead generation further in advance.[60] Similarly, the Coalition's claims that "PJM "inserted uncertainty into a situation when certainty was needed" and "gave incomplete or inaccurate guidance to the available resources" including exactly whether, when and for how long generators would be needed.[61] But, as stated in more detail in P 29 below, Complainants' arguments in each case are made after the fact, knowing all the events that have transpired, rather than looking at the decision PJM made in real-time faced with many uncertainties. PJM was facing uncertainties about available generation as generators were failing before the operators eyes in spite of over 10 years of notice concerning winter weather readiness and uncertainty as to load levels in the face of "a

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[55] *Mandatory Reliability Standards for the Bulk-Power System*, 118 FERC ¶ 61,218 at P 993 (2007).

[56] Coalition Complaint at 38-39. EOP-011-1 was in effect during Winter Storm Elliott. The current version, EOP-011-2, did not become effective until April 1, 2023. If EOP-011-2 had been in effect at the time of Winter Storm Elliott, the registered entities comprising the Coalition would have been subject to Requirements R7 and R8 concerning cold weather preparedness.

[57] *See* Attachment 1 – EOP-011-1, Emergency Energy Alerts, § B.

[58] Coalition Complaint at 39.

[59] *See supra* P 7.

[60] Coalition Complaint at 39-40.

[61] *Id*. at 41-42.

historic extratropical cyclone [that] created winter storm conditions including blizzards, high winds, snowfall, and record cold temperatures.[62] The Coalition's claim that PJM operators should have had perfect foresight simply cannot be squared with the standard of Good Utility Practice which makes clear that actions are judged "*in light of the facts known at the time the decision was made*."[63]

29. The ComEd Zone Generators argue that PJM did not operate in a reasonable manner based on their own *post hoc* economic analysis months after Winter Storm Elliott has passed.[64] The essence of their argument is that, because not enough bad things actually happened, the actions of PJM's operators to be prepared for foreseeable contingencies were not only wrong, but also a violation of PJM's tariffs and manuals.[65] Complainants' approach in each case is fundamentally misguided. This type of *post hoc* economic analyses and other varieties of "Monday morning quarterbacking" are irrelevant to the question of whether operators acted reasonably and in accordance with Good Utility practice with the knowledge they had at the time they had to make decisions. While post event analyses are useful to better understand the event, and can be used to improve rules and processes *going forward*, they cannot upset real-time decisions.[66]

30. The ComEd Zone Generators contend that PJM should not have taken Emergency Actions in the ComEd Zone because there was no capacity deficiency within the ComEd Zone.[67] The Coalition makes a similar argument that (1) because PJM Manual 13 *allows* PJM to target Emergency Actions to specific zones; and (2) because "PJM had never issued an RTO-wide PAI in the history of its emergency procedures," PJM's decision to implement Emergency Actions for the entire RTO were "unprecedented and unreasonable."[68] The

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[62] *See* NERC, Winter Storm Elliott: Bulk Power System Awareness Observations, at 3.

[63] *See supra* note 31.

[64] Complaint of ComEd Zone Generators at 19; Harvey Aff., Ex. CZG-0001, at P 78.

[65] For an extreme example based on after-the-fact simulations, the NTSB determined that US Air 1549 could have returned to LaGuardia following the loss of both engines if the aircraft had "been turned toward the airport immediately after the bird strike." However, the National Transportation Safety Board also found that "[t]he immediate turn did not reflect real-world considerations." *See* NTSB, Accident Report NTSB/AAR-10/03, Loss of Thrust in Both Engines After Encountering a Flock of Birds and Subsequent Ditching on the Hudson River, US Airway Flight 1549, § 2.3.2, at 89 (May 4, 2010).

[66] Good Utility Practice is analogous to the Commission's prudence standard, which rejects the type of *post hoc* analysis pushed by the ComEd Zone Generators here. *See, e.g.*, *Big Sandy Peaker Plant, LLC. v. PJM Interconnection, L.L.C.*, 154 FERC ¶ 61,216 at P 50 (2016); *PPL EnergyPlus, LLC v. PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,338 at P 33 (2006); *see also Midcontinent Indep. Sys. Operator, Inc.*, 144 FERC ¶ 61,129 at P 37 (2018).

[67] Complaint of ComEd Zone Generators at 31 (citing Harvey Aff., Ex. CZG-0001, at P 65). The Coalition makes a similar, albeit more generic argument, focusing on Virginia versus Ohio and Kentucky. Coalition Complaint at 35-37.

[68] Coalition Complaint at 35.

Coalition further argues that PJM (1) did not distinguish temperature differences between zones covering Ohio and Kentucky from Virginia;[69] and (2) did not provide adequate justification for its "economically inefficient decision to apply the Emergency Action orders to the entire RTO."[70] Nautilus Entities focus on conditions at specific times in Maryland and New Jersey, where its generators are located.[71]

31. These arguments are deeply flawed. During Winter Storm Elliott, PJM faced unprecedented operating conditions in the form of rapidly failing generators, inaccurate and untimely information from generators, fuel supply problems, increasing load, and continuing uncertainty. It is absurd to suggest that because PJM had not issued an RTO-wide PAI in the past, it was unreasonable to do so under the conditions presented in Winter Storm Elliott. Moreover, Dr. Harvey's own testimony concedes that prior to PJM Capacity Performance rules, PJM did, in fact, declare RTO-wide capacity emergencies.[72] PJM operators are not handcuffed by the past, but must address the system conditions they actually face. Nor must PJM operate in a Balkanized manner where PJM must not consider generation available in some specific areas (Illinois, Virginia, Maryland and New Jersey). The opposite is true. PJM operates as a centrally dispatched Balancing Area that dispatches its aggregate generation resources to serve the aggregate load in the RTO. PJM has an obligation to ensure the reliability of each of its control zones and its entire system.[73] Because PJM *may* limit Emergency Actions to specific zones does not mean that under every and all conditions PJM *must* tie its hands and take risks to the reliability of the rest of PJM.

32. As I noted above, PJM Manual 13 section 2.3.2 states, "[d]ue to system conditions and the time required to obtain results, PJM dispatchers may find it necessary to vary the order of application *to achieve the best overall system reliability*."[74] This is consistent with Good Utility Practice and the need for system operators to maintain flexibility to address emergencies in real-time. PJM operators needed to make decisions in real-time to ensure that the load was served in the entire RTO. Because of the large increase in failures of (mostly) gas-fired generation, PJM operators needed to ensure that all generation, other than those on approved planned and maintenance outages, were available on-line or at least available to run when needed. The fact that specific zones were not at some point short of generation did not relieve PJM operators from acting in the best interest of the entire RTO, as is their obligation. Recall that between the evening of December 23 and the morning of

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[69] *Id*. at 35-36.

[70] *Id.* at 37.

[71] Complaint of Nautilus Entities at 43-44.

[72] PJM declared an Emergency Generation Action during the 2014 Polar Vortex. *See* Ex. CZG-0003, Tbl. C-10, at 6-7; Harvey Aff., Ex. CZG-0001, at PP 92-93 ("[B]efore the establishment of PJM's capacity performance rules [emergency declarations] were also *generally* limited to a subset of PJM zones.") (emphasis added).

[73] *See* McGlynn Aff., Ex. PJM-005.

[74] PJM Manual 13, § 2.3.2, at 28 (emphasis added).

December 24, PJM had seen a significant increase in unavailable generation. One just has to look at how quickly the situation deteriorated in ERCOT during Winter Storm Uri to understand PJM's need to continue emergency conditions RTO-wide until PJM had assurance that the emergency had passed.

33. In effect, the ComEd Zone Generators are saying that PJM should have rolled the dice, wagering that generation from their units would not be needed for the duration of the emergency because the Complainants' *post hoc* analysis suggests those units were not arguably needed to supply load to the ComEd Zone. The key flaw in this approach is that it treats the successful performance by *other* generators as a given; however, the PJM operators had no such luxury when they were managing the emergency in real time. Had events transpired differently, and one or more units had tripped, the consequences would have fallen on PJM's customers.[75] Once again, Good Utility Practice, especially during extremely stressed conditions, requires maximum flexibility on the part of system operators.

34. The ComEd Zone Generators assert that because transmission was constrained east of the ComEd Zone, bringing the ComEd Zone Generators' resources on line could not have helped to increase the supply of energy available to other PJM zones in the east. As discussed below, they are incorrect. Moreover, the *post hoc* argument by Dr. Harvey[76] presents an incomplete and misleading view of the operating situation. First, even if transmission was constrained east of ComEd at particular times, PJM operators had to be prepared to have sufficient generation available in other time periods and also in the event of foreseeable contingencies that would have required increases in generation in the ComEd Zone.[77] For example, Dr. Harvey is literally correct when he states that "from the standpoint of transmission flows from ComEd to eastern PJM, a load reduction in [the] ComEd [zone] has the same effect on net exports from the zone as an increase in ComEd [zone] generation output."[78] But PJM operators had to be concerned about the converse situation—an unexpected increase in load in the ComEd Zone, which, to use Dr. Harvey's language, would have the same effect on net exports from the ComEd Zone as a decrease in generation in the ComEd Zone, which would relieve the constraints. Second, PJM system operators had to be concerned that more generation, possibly even large nuclear units, would trip, causing the same impact.[79] The fact that those contingencies were

[75] *See* Bryson Aff., Ex. PJM-006 at P 24.

[76] *See* Harvey Aff., Ex. CZG-0001, at P 65.

[77] *See* Bryson Aff., at P 38 (PJM operators need to consider future time frames).

[78] Harvey Aff., at P 64.

[79] All nuclear units in the ComEd Zone operated at full output during Winter Storm Elliott. *See*, U.S. Nuclear Regulatory Commission, Power Reactor Status Report for 2022 (specifically for the Braidwood, Byron, Dresden, LaSalle and Quad Cities units on December 23, 24 and 25), https://www.nrc.gov/reading-rm/doc-collections/event-status/reactor-status/2022/index.html. However, PJM operators had seen that at 2:22 am on December 24 a large nuclear unit had tripped in Eastern PJM. *See* U.S. Nuclear Regulatory Commission, Event Notification Report for Dec. 27, 2022 (Event No. 56286 showing Salem Unit 2 tripped at 02:22 EST on Dec. 24, 2022),

avoided does not mean that PJM operators should not have had more generation available to deal with severe and changing conditions.

35. Third, ComEd Zone Generators ignore the fact that, had their units been available, PJM could have increased the generators on-line within the ComEd Zone. Doing so would have given PJM more assurance of avoiding start-up risk that it had already encountered.[80] Finally, had as much as 5,000 MW of generation in the ComEd Zone been available, PJM could, at various times, have utilized that generation to address the needs within PJM and could have redispatched generation within the ComEd Zone to relieve transmission constraints.[81]

36. I would make a final point in response to an argument made in a related Winter Storm Elliott complaint proceeding that I think is relevant here. Mr. Berardesco, on behalf of Lee County Generating Station, LLC, in Docket No. EL23-57-000, contends that PJM's Operating Instruction for Lee County to enter into a forced outage was inconsistent with NERC's definition. While Mr. Berardesco correctly states NERC's definition of Forced Outage in NERC's Glossary of Terms Used in NERC Reliability Standards,[82] he never explains why this definition applies to anything other than reliability standards. As the title of the Glossary explicitly states, these terms are for use in NERC Reliability Standards, not anything else.[83] However, PJM has not incorporated the NERC definition of Forced Outage as part of its Capacity Performance mechanism.

37. This concludes my affidavit.

38. I hereby certify under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge, information, and belief:

Executed on: May 26, 2023

/s/ Steven T. Naumann
Steven T. Naumann

https://www.nrc.gov/reading-rm/doc-collections/event-status/event/2022/20221227en.html. As I stated in P 33, while the *post hoc* analysis by the ComEd Zone Generators had the luxury of knowing that these units performed, PJM operators could not make that assumption in real-time.

[80] *See supra*, note 32; Bryson Aff. at P 27.

[81] *See* McGlynn Aff. at PP 69-72. While the analysis detailed by Mr. McGlynn was performed after Winter Storm Elliott, it simply confirms the obvious – that having the additional generation within the ComEd Zone would have provided PJM operators with additional flexibility to mitigate transmission constraints and provide energy to PJM zones to the east.

[82] *See* Declaration of Charles A. Berardesco on Behalf of Lee County Generating Station, LLC at P 4, Docket No. EL23-57 (filed Apr. 5, 2023).

[83] Following immediately after the document title, NERC states "[t]his Glossary lists each term that was defined in one or more of NERC's continental-wide or Regional Reliability Standard."