186 FERC ¶ 61,080
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Willie L. Phillips, Acting Chairman;
Allison Clements and Mark C. Christie.

PJM Interconnection, L.L.C. Docket Nos. ER24-99-000
ER24-99-001

ORDER ACCEPTING TARIFF REVISIONS SUBJECT TO CONDITION

(Issued January 30, 2024)

1. On October 13, 2023, as amended on December 1, 2023, PJM Interconnection, L.L.C. (PJM) submitted proposed changes to its Open Access Transmission Tariff (OATT) and Reliability Assurance Agreement Among Load Serving Entities (RAA),[1] pursuant to section 205(d) and (e) of the Federal Power Act (FPA),[2] to modify aspects of its Reliability Pricing Model (RPM), including resource adequacy risk modeling, capacity accreditation, testing requirements for capacity resources, and the Capacity Performance stop loss (Modeling Enhancements Filing). In this order, we accept PJM's Modeling Enhancements Filing effective December 12, 2023 as requested, subject to the condition that PJM submit a compliance filing within 30 days of the date of issuance of this order.

I. Background

A. Reserve Requirement Study

2. PJM performs an annual Reserve Requirement Study to evaluate the Installed Reserve Margin necessary to comply with the Reliability Principles and standards defined in the PJM RAA,[3] i.e., a loss of load expectation (LOLE) no greater than one

[1] Capitalized terms that are not defined in this order have the meaning specified in the OATT and RAA.

[2] 16 U.S.C. § 824d.

[3] *See* PJM, Intra-PJM Tariffs, RAA, Schedule 4 (0.2.0) (specifying guidelines for determining the PJM Region Installed Reserve Margin and FPR). The FPR reflects the required Installed Reserve Margin expressed on an Unforced Capacity basis. PJM, Intra-PJM Tariffs, RAA, Schedule 4.1 (1.0.0).

occurrence in ten years.[4] The PJM Board approves the final required Installed Reserve Margin based on the results of the Reserve Requirement Study and consultation with PJM stakeholders.[5] Then, PJM converts the Installed Reserve Margin to a Forecast Pool Requirement (FPR) based on the average forced outage rate of generators in the PJM region.[6] The FPR reflects PJM's installed capacity requirement in Unforced Capacity (UCAP)[7] terms and forms the basis of the PJM Region Reliability Requirement, which PJM uses to determine the shape of the Variable Resource Requirement (VRR) Curve, i.e., the capacity market demand curve.[8] Therefore, the results of PJM's Reserve Requirement Study directly influence the amount of capacity PJM procures through its capacity market.

3. PJM's Reserve Requirement Study uses a probabilistic risk model that considers, among other factors, forecasted load, load variability, generating capability and type for every existing and proposed unit, scheduled generator maintenance outages, generator forced outage rates, and the capacity benefit of interconnection ties with other regions.[9] PJM currently uses a computer program called the Probabilistic Reliability Index Study

[4] *See* PJM Resource Adequacy Planning, *2022 PJM Reserve Requirement Study* (Oct. 4, 2022), https://www.pjm.com/-/media/planning/res-adeq/2022-pjm-reserve-requirement-study.ashx.

[5] PJM, Intra-PJM Tariffs, RAA, Schedule 4.B (0.2.0).

[6] PJM, Intra-PJM Tariffs, RAA, Schedule 4.1 (0.1.0).

[7] The PJM RAA defines Unforced Capacity as "installed capacity rated at summer conditions that is not on average experiencing a forced outage or forced derating, calculated for each Capacity Resource on the 12-month period from October to September without regard to the ownership of or the contractual rights to the capacity of the unit." PJM, Intra-PJM Tariffs, RAA, Article 1 – Definitions (42.0.0).

[8] PJM, Intra PJM Tariffs, OATT, attach. DD, § 5.10 (31.0.0), § 5.10(a)(i).

[9] *See* PJM, Intra-PJM Tariffs, RAA, Schedule 4.C (1.0.0); PJM, *Manual 20: PJM Resource Adequacy Analysis*, at 16 (Aug. 25, 2021), https://www.pjm.com/~/media/documents/manuals/m20.ashx (PJM Manual 20).

Model (PRISM) to simulate the LOLE of its system and determine the Installed Reserve Margin necessary to achieve a LOLE no greater than one occurrence in ten years.[10]

4. While PJM's Reserve Requirement Study assumes the absence of any transmission constraints within PJM, PJM conducts separate analyses of individual areas to ensure that capacity resources are deliverable to load.[11] Specifically, PJM uses similar probabilistic modeling to determine a Capacity Emergency Transfer Objective for an area, which reflects the amount of electric energy that a given area must be able to import in order to achieve an LOLE of one event in 25 years when the area is experiencing a localized capacity emergency.[12] PJM compares each individual Locational Deliverability Area's (LDA) Capacity Emergency Transfer Objective to its Capacity Emergency Transfer Limit, which reflects the capability of the transmission system to support deliveries of electric energy to a given area.[13] Based on the Capacity Emergency Transfer Objective, PJM establishes a separate LDA Reliability Requirement for each LDA and, if certain criteria are met, a separate VRR Curve for the LDA.[14]

B. Capacity Accreditation

5. Capacity accreditation refers to the process PJM uses to determine a resource's UCAP, which reflects the amount of capacity a resource provides after accounting for its forced outage rate, intermittency, and/or limited output duration capability. Resources are allowed to offer into the capacity market up to their UCAP (for thermal resources) or the maximum of their Accredited UCAP or their Capacity Interconnection Rights (for variable resources).[15] PJM currently uses different methods to accredit the amount of UCAP specific resource types may offer into the PJM capacity market.

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[10] PJM Manual 20 at 19; *see* PJM Capacity Adequacy Planning Department, *PJM Generation Adequacy Analysis: Technical Methods* (Oct. 2003), https://www.pjm.com/-/media/planning/res-adeq/20040621-white-paper-sections12.ashx.

[11] PJM Manual 20 at 31.

[12] PJM, Intra-PJM Tariffs, RAA, Article 1 – Definitions (42.0.0) (defining Capacity Emergency Transfer Objective).

[13] PJM, Intra-PJM Tariffs, RAA, Schedule 10.1 (10.0.0).

[14] *See* PJM, Intra-PJM Tariffs, OATT, attach. DD, § 5.10 (31.0.0), § 5.10(a)(ii).

[15] *See PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,056, at P 53 (2021) ("[A]fter PJM has determined ELCC Resources' Accredited UCAP, PJM will limit an ELCC Resource's capacity market offer to be no greater than its Capacity Interconnection

6. For Unlimited Resources,[16] PJM calculates UCAP based on the probability that the resource will experience a forced outage. First, PJM calculates the resource's Equivalent Demand Forced Outage Rate (EFORd), which is a measure of the probability that the resource will be unavailable due to an unplanned outage.[17] Second, PJM calculates the resource's UCAP by multiplying its maximum generating capability in MW by the probability that the resource will be available (i.e., 1 – EFORd).

7. PJM uses an Effective Load Carrying Capability (ELCC) analysis to calculate the Accredited UCAP value for Variable Resources (e.g., wind and solar), Limited-Duration Resources (e.g., storage), and Combination Resources (e.g., solar/storage hybrids) (collectively, ELCC Resources).[18] Specifically, PJM calculates the Accredited UCAP of ELCC Resources using a four-step process.[19] First, PJM uses an ELCC analysis to calculate the ELCC Portfolio UCAP, which reflects the installed capacity of a group of Unlimited Resources with no outages that yields the same annual LOLE as the group of ELCC Resources that are expected to offer into a given capacity auction. Second, PJM allocates the ELCC Portfolio UCAP among individual ELCC Resource Classes (e.g., 4-hour storage, 10-hour storage, wind, tracking solar, etc.) by conducting additional ELCC analyses that consider the reliability value of ELCC Classes in the presence and absence of other ELCC Classes. The result of this allocation process is an ELCC Class UCAP for each ELCC Resource Class. Third, PJM converts the ELCC Class UCAP for each class to an ELCC Class Rating, using procedures described in its RAA. Finally, PJM calculates an Accredited UCAP value for each individual ELCC Resource based on the resource's ELCC Class Rating, its nameplate capacity, and a resource-specific ELCC Resource Performance Adjustment (RPA) factor.

8. PJM has previously described its ELCC approach as an "adjusted class average" method, because it allocates the total ELCC of the subject resource portfolio among resource classes, in contrast to a "marginal" ELCC approach, which accredits resources

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Rights, ensuring that the capacity market clearing process will not give an ELCC resource a capacity supply obligation that exceeds the capacity the resource can physically deliver.").

[16] PJM's RAA defines an Unlimited Resource as a generating unit with "the ability to maintain output at a stated capability continuously on a daily basis without interruption." PJM, Intra-PJM Tariffs, RAA, Article 1 – Definitions (42.0.0).

[17] *See* PJM, Intra-PJM Tariffs, RAA, Schedule 5 (2.0.0).

[18] *See* PJM, Intra-PJM Tariffs, RAA, Schedule 9.1 (2.0.0).

[19] PJM, Intra-PJM Tariffs, RAA, Schedule 9.1 (2.0.0), §§ C-F.

based on their marginal contribution to system resource adequacy given the target resource mix.[20]

9. For Demand Resources, PJM calculates UCAP as the product of the FPR and the Demand Resource's Nominated Value,[21] which depends on the peak load contribution of customers on the Demand Resource registration and their committed Firm Service Level or Guaranteed Load Drop.[22] Similarly, the UCAP of an Energy Efficiency Resource is the product of the FPR and the resource's Nominated Energy Efficiency Value,[23] which is the resource's expected average load reduction during certain hours defined in the RAA.[24]

C. Capacity Performance

10. PJM designed its existing capacity market construct (the RPM), to ensure resource adequacy on a forward-looking basis, at a reasonable cost, through the use of an annual auction (the Base Residual Auction or BRA) followed by two Incremental Auctions.[25] During the 2014 Polar Vortex, PJM's fleet experienced an unexpectedly high number of outages that threatened reliability. In response, PJM proposed, and the Commission accepted, PJM's Capacity Performance construct, which is designed to reward capacity resources capable of providing sustained, predictable energy and reserves in an emergency condition.[26]

11. Under the Capacity Performance construct, capacity resources that perform poorly during certain stressed conditions designated as Performance Assessment Intervals (PAI) are subject to a Non-Performance Charge, which is then used to fund Performance Bonus Payments credited to resources whose performance exceeds a certain threshold. Individual performance is measured against the resource's committed capacity (i.e.,

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[20] *See* PJM, Filing, Docket No. ER21-2043-000, at 22-23 (filed Jun. 1, 2021).

[21] PJM, Intra-PJM Tariffs, RAA, Schedule 6.B (18.0.0).

[22] *See* PJM, Intra-PJM Tariffs, RAA, Schedule 6 (18.0.0), § 6.I.

[23] PJM, Intra-PJM Tariffs, RAA, Schedule 6 (18.0.0), § 6.L.3.

[24] *See* PJM, Intra-PJM Tariffs, RAA, Schedule 6 (18.0.0), § 6.L.2.

[25] *See PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,331 (2006).

[26] *See PJM Interconnection, L.L.C.*, 151 FERC ¶ 61,208, at P 28 (2015) (Capacity Performance Order), *order on reh'g*, 155 FERC ¶ 61,157 (2016) (Capacity Performance Rehearing Order).

capacity supply obligation) multiplied by a measure of average fleet performance referred to as the Balancing Ratio. Resources that perform below this threshold are subject to the Non-Performance Charge, while resources performing above this threshold receive Performance Bonus Payments. There are limited penalty exemptions given to resources that cannot perform during PAIs (e.g., a Maintenance Outage), while resources that fail to perform for other reasons (e.g., a Forced Outage) are subject to penalties (i.e., the Non-Performance Charge).

12. PJM determined the current Non-Performance Charge rate such that a resource that fails to perform during any PAI in a given delivery year pays the expected full cost of replacement capacity. The Commission approved PJM's use of Net CONE in the Non-Performance Charge Rate as a reasonable estimate of the cost of providing replacement capacity.[27] The Non-Performance Charge is evaluated on a 5-minute basis, based on an estimated 30 hours of emergency actions (i.e., 12 x 30 or 360 PAI intervals) in a given delivery year, resulting in an estimated Non-Performance Charge at Net CONE/360 during the delivery year.

13. PJM limits a resource's total financial exposure to Non-Performance Charge risk during the delivery year through a Non-Performance Charge Limit, i.e., a "stop loss" equal to 1.5 times Net CONE. In accepting PJM's current stop loss, the Commission found that PJM's overall proposal should put at risk a resource's full capacity auction revenues if the resource fails to perform during Performance Assessment Hours.[28] PJM's current level of stop loss meets this criterion as it is equal to the maximum clearing price allowed by PJM's VRR curve.

D. Fixed Resource Requirement

14. Under PJM's existing rules, the capacity requirements of a load serving entity may be met either through participation in PJM's capacity auctions, or through the submission of an alternative Fixed Resource Requirement plan (FRR Plan), i.e., through a self-supply arrangement providing for the long-term commitment of resources.[29] PJM's rules require a Fixed Resource Requirement (FRR) entity to submit an FRR Plan at least one month prior to the BRA and subject that entity to insufficiency charges to the extent the FRR

[27] Capacity Performance Order, 151 FERC ¶ 61,208 at PP 159-160.

[28] *Id.* P 164.

[29] *See* PJM, Intra-PJM Tariffs, RAA, Schedule 8.1 (3.0.0). A load-serving entity seeking to satisfy its capacity obligation through such plan is required to obtain sufficient capacity for all load and expected load growth in its service area.

Plan is insufficient to meet the FRR entity's planning requirement and deficiency charges to the extent the FRR entity's portfolio remains deficient during the delivery year.

II. Filing

15. PJM proposes a number of revisions to its capacity market design that PJM states will enable it to facilitate the energy transition while maintaining resource adequacy in a cost-effective manner.[30] PJM explains that, historically, the PJM region has been able to maintain resource adequacy by setting target procurement levels (i.e., the Installed Reserve Margin) at the peak load plus a reserve margin and accrediting generation resources based on their EFORd. However, PJM states that recent operating experiences such as Winter Storm Elliott have demonstrated that modeling approaches focused on peak load conditions and average generator performance do not fully capture all of the risks that impact resource adequacy needs and resource performance. Therefore, PJM argues that, without enhancements in these areas, the capacity market will provide insufficient incentives to retain and attract sufficient capacity resources necessary to maintain reliability.[31]

16. PJM states that the purpose of its filing is to refine and improve PJM's risk modeling framework to improve PJM's understanding of when and how risk occurs, and to change how both supply and demand are accounted for in the capacity market construct to better align their market representation with resource adequacy fundamentals.[32] PJM explains that its proposed enhancements adopt a more temporally granular, hourly framework for assessing risk drivers and probabilities of resource and energy inadequacy throughout the year rather than only during periods associated with peak loads, as under PJM's current approach. PJM asserts that this new resource adequacy paradigm will allow PJM to identify the least-cost, efficient portfolio of resources that in aggregate provide resource and energy adequacy in every hour of the year, across all potentially anticipatable scenarios, up to the target reliability metric.[33]

17. More specifically, PJM proposes to: (1) replace its current adjusted class average ELCC capacity accreditation approach with a marginal ELCC approach and extend

[30] Transmittal at 10.

[31] *Id.* at 10-11.

[32] *Id.* at 16.

[33] *Id.* at 17 (citing Graff Aff. ¶ 18).

ELCC accreditation to all Generation Capacity Resources;[34] (2) update its resource adequacy risk modeling to evaluate risk on a more granular, hourly level;[35] (3) enhance its capacity resource testing requirements;[36] (4) index the Non-Performance Charge Limit ("stop loss") to the BRA clearing price rather than Net CONE;[37] (5) better synchronize the FRR alternative rules with the capacity auction rules;[38] (6) require that Planned Generation Capacity Resources submit a binding notice of intent to offer before the capacity auction parameters are posted;[39] and (7) make other conforming and ministerial tariff revisions.[40] Section IV summarizes the details of PJM's proposed reforms.

18. PJM states that the capacity market reforms proposed in this filing are just and reasonable because they address known and reasonably foreseeable challenges to maintaining resource adequacy at a reasonable cost.[41] PJM asserts that the filing presents a substantial step forward in improving the status quo, helping PJM to maintain resource adequacy over the near- and long-terms.[42] At the same time, PJM states that PJM and its stakeholders are committed to continuing to assess the design of PJM's capacity construct, including whether and how a seasonal capacity construct could help support reliability and efficiency in the PJM region.

19. On November 17, 2023, Commission staff issued a Deficiency Letter advising PJM that additional information was necessary to process its filing (Deficiency Letter).[43]

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[34] *Id.* at 23-55.

[35] *Id.* at 55-71.

[36] *Id.* at 80-91.

[37] *Id.* at 92-97.

[38] *Id.* at 98-104.

[39] *Id.* at 72-77.

[40] *Id.* at 77-80; 103-104.

[41] *Id.* at 19.

[42] *Id.* at 20.

[43] *PJM Interconnection, L.L.C.*, Docket No. ER24-99-000 (Nov. 17, 2023) (delegated order).

On December 1, 2023, PJM filed a response to the Deficiency Letter, which amended its filing (Deficiency Letter Response).[44]

III. Notice of Filing and Response Pleadings

20. Notice of PJM's filing was published in the *Federal Register*, 88 Fed. Reg. 72,059 (Oct. 19, 2023), with interventions and protests due on or before November 3, 2023. On October 27, 2023, the Commission extended the deadline for interventions and protests up to and including November 9, 2023.[45] Notices of intervention and timely-filed motions to intervene were submitted by the entities listed in the Appendix to this order.[46] Red Oak Power, LLC filed an out-of-time motion to intervene. Comments and protests were submitted by numerous entities, as summarized below. Answers were submitted by PJM, Vistra, and Constellation. Additional answers were submitted by AEMA, AMP, Vistra, the IMM, Public Interest Organizations, and PJM.

21. Notice of PJM's Deficiency Letter Response was published in the Federal Register, 88 Fed. Reg. 85,607 (Dec. 8, 2023), with interventions and protests due on or before December 22, 2023. Calpine submitted comments in support of PJM's Deficiency Letter Response. Protests were submitted by the IMM, AMP, LSP Development, Public Interest Organizations, and Vistra.

IV. Discussion

A. Procedural Matters

22. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2023), the timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding.[47]

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[44] *PJM Interconnection, L.L.C.*, Deficiency Letter Response, Docket No. ER24-99-001 (filed Dec. 1, 2023).

[45] PJM Interconnection, L.L.C., Notice of Extension of Time (issued Oct. 27, 2023).

[46] The abbreviated names or acronyms by which these entities are referred to in this order are noted in the Appendix.

[47] Entities that filed comments and/or protests but did not file a notice of intervention or motion to intervene are not parties to this proceeding. *See* 18 C.F.R. § 385.211(a)(2) (2023) ("The filing of a protest does not make the protestant a party to the proceeding. The protestant must intervene under Rule 214 to become a party."). Republican Members of the Pennsylvania Senate Environmental Resources and Energy

23. Pursuant to Rule 214(d) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214(d), we grant Red Oak Power, LLC's late-filed motion to intervene given its interest in the proceeding, the early stage of the proceeding, and the absence of undue prejudice or delay.

24. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2023), prohibits an answer to a protest or an answer unless otherwise ordered by the decisional authority. We accept the answers filed in this proceeding because they have provided information that assisted us in our decision-making process.

B. Substantive Matters

25. As discussed more fully below, we conditionally accept PJM's Modeling Enhancements Filing, subject to PJM submitting a compliance filing within 30 days of the date of this order. We find that PJM's proposal is just and reasonable because it will help to ensure that PJM's capacity market design more accurately represents the PJM system's reliability needs, as well as the expected ability of both individual resources and the fleet as a whole to meet those needs. In the sections that follow, we consider the specific elements of PJM's proposal.

1. Capacity Accreditation

a. Filing

26. PJM proposes to replace its current "average" ELCC capacity accreditation method with a "marginal" ELCC approach that accredits all Generation Capacity Resources and Demand Resources based on their marginal Expected Unserved Energy (EUE) benefit.[48] PJM argues that determining UCAP values for resources through the

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Committee (Pennsylvania Representatives), and the Ohio House Public Utilities Committee and Ohio Senate Energy and Unity Committee (Ohio Representatives) filed comments but did not file a motion to intervene. Chief Power Transfer Parent, LLC and Keycon Power Holdings, LLC (Chief Parent Companies) filed comments but did not file a motion to intervene; though, their subsidiaries Chief Conemaugh Power, LLC and Chief Keystone Power, LLC (Chief Companies) did file a timely motion to intervene. As part of Clean Energy Coalition's comments, Advanced Energy United and MAREC Action filed comments but did not file a motion to intervene. Although we do not grant party status to Pennsylvania Representatives, Ohio Representatives, Chief Parent Companies, Advanced Energy United, and MAREC Action, we address their pleadings in this order.

[48] Transmittal at 26-28. PJM explains that EUE measures the expected MWh of load that a system cannot meet (i.e., loss of load measured in MWh) due to resource

marginal ELCC framework will best align the expected performance of Generation Capacity Resources and Demand Resources with their accredited capacity levels during periods of resource adequacy risk. PJM states that such alignment will result in selecting more reliable resources in the capacity market and more efficient capacity price signals that promote resource adequacy at the lowest reasonable cost.[49]

27. PJM explains that, in a marginal ELCC accreditation framework, resources are accredited based on their marginal contribution to system resource adequacy across a number of simulated scenarios given the anticipated resource mix.[50] PJM states that the marginal ELCC framework exclusively considers the output of resources in hours of system risk identified after adding the last resource to the expected system portfolio, and therefore it better identifies which resource types will provide more reliability benefit given the expected system resource mix. PJM states that, generally speaking, a marginal ELCC framework can develop an economically efficient signal to the market for entry and exit, because it sends investment signals that are consistent with the marginal reliability benefit of a resource.[51] PJM explains that these signals result in strong incentives to invest in resources that directly improve resource adequacy and steer investors away from resources that are relatively more costly when considering the incremental reliability they provide.[52]

28. More specifically, PJM explains that its marginal ELCC framework will compare the expected hourly load levels on the PJM system with the expected hourly output of the future resource mix across a range of possible future system conditions to identify the relative marginal resource adequacy value of each individual ELCC Class.[53] PJM states that it will model load uncertainty based on the hourly load scenarios from PJM's Load Forecast using weather data from June 1, 1993 onwards.[54] PJM contends that this

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adequacy insufficiency, while LOLE (PJM's current resource adequacy metric) measures the number of days that are expected to have some level of resource insufficiency, regardless of the duration and magnitude. Rocha-Garrido Aff. ¶ 22.

[49] Transmittal at 26 (citing Graf Aff. ¶ 50).

[50] *Id.* at 28.

[51] *Id.* at 29 (citing Keech Aff. ¶ 19).

[52] *Id.* at 29 (citing Graf Aff. ¶ 26).

[53] *Id.* at 41-42.

[54] *Id.* at 43.

practice is an improvement over its current Reserve Requirement Study approach, which has historically used at most 15 years of weather data.

29. PJM notes that it considered potential methods to adjust historical weather data for climate change but is not proposing any adjustment at this time because it observed no clear or consistent trend in the period 1993-2022.[55] To model resource output uncertainty, PJM states that it will derive the hourly output of Variable Resources and Unlimited Resources in each hourly load scenario based on the weather associated with that scenario, including effects such as ambient derates, planned outages, and maintenance outages.[56] PJM states that it will model the output of Limited Duration Resources, Combination Resources, and Demand Resources based on an hourly simulated dispatch that depends on other system conditions for that same hour.[57] PJM explains that software limitations prevent PJM from simulating an economic dispatch in the ELCC model at this time, so PJM proposes a simulated dispatch based on the order of operations that PJM Operations would follow under emergency circumstances.

30. PJM proposes to maintain the existing defined ELCC Classes for Variable Resources and Limited Duration Resources, and to define new ELCC Classes for Unlimited Resources and Demand Resources.[58] Specifically, PJM proposes to add the following classes: Nuclear Class, Coal Class, Gas Combined Cycle Class, Gas Combustion Turbine Class, Gas Combined Cycle Dual Fuel Class, Gas Combustion Turbine Dual Fuel Class, Diesel Utility Class, Steam Class, Other Unlimited Resource Class, and Demand Resource Class. PJM proposes to require that a dual fuel resource seeking to qualify for a Dual Fuel ELCC Class be capable of starting and operating independently on an alternate, onsite fuel source up to its maximum capacity level during the winter season of the applicable delivery year in which it is providing capacity, and capable of operating on the alternate fuel for two 16-hour periods over two consecutive days at its maximum capacity level. PJM states this requirement is reasonable because empirical observations of the 2014 Polar Vortex and Winter Storm Elliott in 2022 show that two-day events occur. Further, PJM states that being capable of operating for 16 hours on two consecutive days is consistent with emergency dispatch operations detailed

[55] *Id.* at 43-44 (citing Rocha-Garrido Aff. ¶ 20(a)).

[56] *Id.* at 44-45.

[57] *Id.* at 45-46.

[58] *Id.* at 39-41.

in PJM Manual 13[59] and the fuel assurance standards the Commission recently accepted for Black Start resources.[60]

31. PJM proposes to derive ELCC Class Ratings for ELCC Classes in two steps.[61] First, PJM will enter the hourly load scenarios and resource output scenarios into its ELCC model and iteratively adjust the load scenarios until the LOLE criterion of 0.1 days per year is achieved. PJM states that it will then calculate the EUE associated with this scenario and designate this EUE as the Portfolio EUE, which forms the baseline in determining marginal ELCC Class Ratings. Second, PJM will calculate ELCC Class Ratings as the ratio between the EUE improvement from adding an incremental quantity of the subject ELCC Class to the baseline model and the EUE improvement from adding an Unlimited Resource with no outages to the baseline model.

32. For most resource types, PJM proposes to calculate Accredited UCAP based on the marginal ELCC Class Rating of each class. Specifically, for Variable Resources and Limited Duration Resources, PJM proposes to calculate Accredited UCAP as the product of their Effective Nameplate Capacity, ELCC Class Rating, and ELCC Resource-Specific Performance Adjustment (RPA).[62] Similarly, for Unlimited Resources, PJM proposes to calculate Accredited UCAP as the product of their installed capacity, ELCC Class Rating, and ELCC RPA. PJM proposes to define the ELCC RPA for these resources based on a metric consisting of the weighted average hourly output of the resource in the ELCC model, with weights corresponding to the modeled probability of losing load in that hour.[63] PJM states that this metric will base the adjustment on how well the resource performed in the hours with high resource adequacy risk.

33. PJM also proposes to continue to cap the modeled output (i.e., in the ELCC model) of a Variable Resource at the greater of its Capacity Interconnection Rights

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[59] *Id.* at 40 (citing PJM, *Manual 13: Emergency Operations*, § 6.4 (Aug. 24, 2023), https://www.pjm.com/-/media/documents/manuals/m13.ashx).

[60] *Id.* at 40-41 (citing PJM, Intra-PJM Tariffs, OATT, Schedule 6A (14.1.0), § 18; *PJM Interconnection, L.L.C.*, 185 FERC ¶ 61,013 (2023)).

[61] *Id.* at 47-49.

[62] *Id.* at 50.

[63] *Id.* at 51.

(CIRs) and transitional system capability for the May through October summer period.[64] However, PJM proposes a "slight tweak" to the current approach of capping a Variable Resource's output during the winter period at its "winter deliverability MW, as defined in the PJM Manuals," to "assessed deliverability, as defined in the PJM Manuals," which PJM states will better account for "light load deliverability MW."[65] Similarly, for Unlimited Resources, PJM proposes to cap modeled output in any hour of the year at the greater of the resource's CIRs and transitional system capability.[66]

34. For Demand Resources, PJM proposes to calculate Accredited UCAP as the product of the resource's Nominated Value and its ELCC Class Rating.[67] PJM does not propose a resource-specific performance adjustment for Demand Resources because PJM states that the general lack of continuity of the end-users comprising a Demand Resource from year to year may render the use of historical performance misleading.

35. PJM proposes to determine resource-specific ELCC ratings for Combination Resources, resources in the Hydropower with Non-Pumped Storage Class, the Complex Hybrid Class, the Other Unlimited Resource Class, and any other ELCC Class whose members are so distinct from one another that a single ELCC Class Rating would fail to capture their physical characteristics.[68] PJM states that individual resources within these classes are unique and include parameters that affect their potential dispatch, and therefore they do not lend themselves to be modeled as part of a class in an aggregate fashion.

36. PJM notes that it is not proposing to apply marginal ELCC accreditation to Energy Efficiency Resources because the impact of energy efficiency is largely already included in PJM's load forecast models.[69] Therefore, PJM argues that it would be inappropriate to include these resources again in the ELCC analysis, which considers the PJM load

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[64] *Id.* at 51-52; PJM, Intra-PJM Tariffs, Proposed RAA, Schedule 9.2 (0.1.0), §§ D, H.

[65] Transmittal at 52 (citing PJM, *Manual 14B: PJM Region Transmission Planning Process*, attach. C, § C.3.1.3 (Jul. 26, 2023), https://www.pjm.com/-/media/documents/manuals/m14b.ashx).

[66] *Id.* at 53.

[67] *Id.* at 53.

[68] *Id.* at 49.

[69] *Id.* at 26.

forecast to accredit capacity.[70] PJM states that including Energy Efficiency Resources in the ELCC model would double-count their energy efficiency impact, improperly affect modeled system risk patterns, mislead PJM's assessment of risk patterns, and distort the assessed capacity accreditation of all other modeled resources.

37. PJM proposes to annually reevaluate each resource's marginal ELCC Accredited UCAP, because a resource's marginal reliability contribution changes as a result of factors specific to the resource (e.g., maintenance and upkeep) and external factors (e.g., the resource's synergistic and antagonistic relationship with other resources on the system).[71] PJM states that annually reevaluating Accredited UCAP values, or "capacity values," will appropriately assign the risk of a resource's capacity value to investors, who have the ability to choose between resource types, rather than such risk being borne by consumers. PJM states that as a result, investors will be more incented to invest in resources that are better able to perform during hours with greater resource adequacy risk.

38. PJM argues that its proposed marginal ELCC framework will improve the efficiency of capacity market outcomes and better ensure reliability in three ways.[72] First, PJM states it will assign a higher capacity value to resources that provide a higher marginal reliability benefit, thereby signaling to investors to build more of this type of resource if cost-effective. Second, PJM states it will assign a lower capacity value to resources that PJM's risk modeling shows are not likely to perform during EUE events, thereby ensuring that the committed capacity load pays for will actually be available when needed most.[73] Finally, PJM states it will ensure that each MW of capacity provides the same reliability value and therefore is substitutable one-for-one with other MW of PJM-accredited capacity.[74]

39. PJM argues that it is appropriate to extend marginal ELCC accreditation to all Generation Capacity Resources and Demand Resources because PJM's current approach of accrediting Unlimited Resources based solely on their historical EFORd and accrediting Demand Resources based solely on their Nominated Value fails to properly account for the actual reliability benefit these resources provide during hours of expected

[70] *Id.* at 26-27.

[71] *Id.* at 30.

[72] *Id.* at 30-31.

[73] *Id.* at 31.

[74] *Id.* at 31.

system risk.[75] In particular, PJM states that the correlation of forced outages with cold weather, projected continued increase in renewable penetration, and the rise of "just-in-time fuel resources" call for a change to PJM's existing capacity accreditation methods. PJM also notes that its current accreditation practice for Demand Resources assumes they provide 100% performance at any time. PJM states that, to achieve competitive market outcomes, a MW of capacity offered by one resource must be comparable to a MW of capacity offered by another resource, and PJM argues that a more robust analysis than the conventional EFORd metric is required to achieve that objective.[76]

40. PJM also states that its proposal is comparable to the marginal ELCC approach the Commission found just and reasonable for the New York Independent System Operator, Inc. (NYISO).[77] PJM explains that NYISO proposed to accredit resource types based on their marginal contribution to system reliability, and to calculate a resource's unforced capacity as the product of its capacity accreditation factor and the resource's individual performance or availability factor. PJM contends that, like NYISO's marginal ELCC approach, PJM's proposed marginal ELCC approach is a just, reasonable, and not unduly discriminatory improvement over the current approaches for accrediting the capacity capability of Generation Capacity Resources and Demand Resources.

b. Overall

i. Responsive Pleadings

41. Several commenters support the proposed changes to PJM's accreditation methodology.[78] Some describe the proposed reforms as "critical"[79] and as "significant and meaningful steps toward addressing challenges with respect to resource adequacy in

[75] *Id.* at 33-34.

[76] *Id.* at 34-35.

[77] *Id.* at 31-33 (citing *N.Y. Indep. Sys. Operator, Inc.*, 179 FERC ¶ 61,102 (2022) (*NYISO*)).

[78] *See*, *e.g.*, Buckeye and EKPC Comments at 3; Calpine Comments at 1, 7-11; Constellation Comments at 6-9; FRR Coalition Comments at 5; Ohio FEA Comments at 8-9; Pine Gate Comments at 6-7; PSEG Companies Comments at 10; Public Interest Organizations Protest at 11-14.

[79] Ohio FEA Comments at 8-9; Republican Members of the Pennsylvania Senate Environmental Resources and Energy Committee Comments at 3; Ohio House Public Utilities Committee and Ohio Senate Energy and Utility Committee Comments at 1-2.

PJM."[80] Others contend that the proposed reforms will allow PJM to assess more accurately an individual resource's reliability contribution and enable the capacity market to procure the most efficient resources to achieve reliability.[81] Some commenters indicate general or conceptual support for PJM's accreditation proposal but seek additional detail or clarification for different aspects of the proposal,[82] or ask the Commission to require PJM to provide additional information or make additional filings to address specific deficiencies.[83] Protesters raise concerns with specific aspects of PJM's proposal, which we address by topic in the sections that follow.

ii. Determination

42. As discussed more fully below, we find that PJM's proposed marginal ELCC capacity accreditation framework is just and reasonable and not unduly discriminatory or preferential. PJM's marginal ELCC capacity accreditation framework reasonably values resources' capacity based on their expected incremental contribution to resource adequacy across reasonably anticipated load, weather, and resource availability scenarios given the expected resource mix. We find that PJM's proposal will allow its markets to better value the ability of individual resources to address tight system conditions and emergencies, as well as resource adequacy challenges associated with correlated resource outages and an evolving resource mix. Specifically, we find that PJM's marginal ELCC framework is just and reasonable because it: (1) incorporates the risk of correlated outages, especially in cold weather conditions, of all supply-side resources, including thermal resources;[84] (2) reflects the fact that dual fuel resources are more likely to be available than gas-only resources during certain system conditions; (3) accounts for the fact that highly correlated resources such as solar and short-duration storage resources generally provide less reliability value as more of those resources are added to the system; and (4) accredits all resources within an ELCC class with identical performance characteristics equivalently. The result is that PJM's marginal ELCC framework

[80] PSEG Companies Comments at 10.

[81] Ohio FEA Comments at 3; Constellation Comments at 6-9.

[82] *See*, *e.g.*, AES Comments at 6; ODEC Comments at 4-6; P3 Comments at 4-6; Ørsted Comments at 2-3.

[83] *See*, *e.g.*, LSP Development Comments at 1-2; 4-14; P3 Comments at 4-6; Renewable Energy Coalition Comments at 6-9.

[84] *See* Rocha-Garrido Aff. ¶ 27 (explaining that PJM's marginal ELCC accreditation will capture correlated forced outages and ambient derates as a function of weather).

provides a reliability-neutral basis for comparison between different resource types that will allow PJM's capacity market to substitute one resource type for another on the margin without affecting reliability, even considering present and future resource adequacy challenges.[85]

43. Certain protesters argue that PJM's proposed marginal ELCC capacity accreditation framework is unjust and unreasonable. For the reasons discussed in the sections that follow, we are not persuaded by these arguments. We agree with PJM and other commenters that PJM's proposed marginal ELCC accreditation framework is a just and reasonable accreditation approach for the reasons described above. Furthermore, as we have found previously, the marginal ELCC accreditation approach sends more accurate investment signals to market participants about the reliability value of various resource types as compared to the average accreditation approaches, and such investment signals will guide more efficient entry and exit decisions and help investors understand the reliability impacts of adding or removing incremental capacity.[86]

44. The following sections summarize and respond to specific arguments raised in the record.

c. Transparency and Implementation Details

i. Responsive Pleadings

45. Vistra states that PJM's accreditation proposal does not satisfy the rule of reason and is inconsistent with Commission precedent.[87] Specifically, Vistra contends that PJM's proposed RAA provisions pertaining to the calculation of the ELCC RPA and procedures for determining a resource's installed capacity provide little detail. Vistra argues that the determination of the RPA and a resource's installed capacity directly affect a resource's accredited capacity and, in turn, its capacity revenues and should be

[85] *See* Graf Aff. ¶ 28 ("Marginal accreditation establishes a framework where capacity resources are interchangeable or substitutable as they offer equivalent reliability contributions per accredited unit of capacity. This means that when one unit of accredited capacity is exchanged for another on the margin, the overall reliability of the system remains unchanged.").

[86] *NYISO*, 179 FERC ¶ 61,102 at P 80.

[87] Vistra Protest at 25-28.

included in the tariff, not in Business Practice Manuals.[88] Vistra states that the Commission has previously required accreditation implementation details that may be included in Business Practice Manuals to be established in conjunction with the associated tariff filing so that stakeholders may better anticipate their resource adequacy responsibilities.[89] Thus, Vistra asserts that, to the extent the Commission finds that essential terms and conditions are appropriately included in Business Practice Manuals, the Commission should direct PJM to file a compliance filing that provides additional specificity regarding its accreditation methodology for Commission (and stakeholder) review.

46. Similarly, LSP Development supports PJM's filing, subject to the Commission requiring PJM to provide additional information prior to the 2025/2026 BRA and to make future filings to address other specific implementation issues.[90] LSP Development argues that, while the detail provided about the ELCC methodology in the filing is adequate for the Commission to find the proposal just and reasonable, PJM has not yet developed Business Practice Manual provisions to implement this approach.[91]

47. AMP describes the proposed ELCC accreditation methodology as a "black box," arguing that implementation of the proposed ELCC accreditation methodology would be extremely complex, opaque, and highly dependent on assumptions about future system conditions.[92] AMP states that applying marginal ELCC for all resource classes except Energy Efficiency would introduce an exceptional amount of complexity to an already extraordinarily complicated administrative construct, raising concerns about unforeseen implementation difficulties and unintended consequences.[93]

48. Ørsted states that the only preliminary ELCC values available to stakeholders in the record are included in the Rocha-Garrido Affidavit, which provides sample annual

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[88] *Id.* at 26 (citing Transmittal, attach. B at Schedule 9.2(D)(2) and Schedule 9.2(G)).

[89] *Id.* at 27 (citing *Midwest Indep. Transmission Sys. Operator, Inc.*, 122 FERC ¶ 61,283, at P 400, *order on compliance*, 125 FERC ¶ 61,062 (2008)).

[90] LSP Development Comments at 4-14.

[91] *Id.* at 8-9.

[92] AMP Protest at 9, 12-13.

[93] *Id.* at 12 (citing Rocha-Garrido Aff. ¶16 (providing an overview of the ELCC analysis)).

ELCC values using the 2024/2025 resource mix grouped into the proposed ELCC class ratings.[94] Ørsted asserts that clarification is needed about when updated ELCC numbers will be provided for the 2025/2026 and forward delivery years and if they are expected to be in line with the values in both PJM's July presentation in the Critical Issue Fast Path initiative and the Rocha-Garrido Affidavit. Ørsted states that it is critical for generation resource owners to understand the calculations behind the pool-wide average Accredited UCAP Factor for their class rating as well as the criteria around each specific unit's Accredited UCAP Factor in order to understand the marginal impact of each resource. Ørsted contends that PJM could provide the ELCC class ratings and summer, winter, and annual equivalent marginal ELCC values (i.e., Pool-wide average Accredited UCAP Factor) for the 2025/2026 year and a forecast of values out to 2030 so resource owners can get a sense of the slope of the declining curve over time. Ørsted further states that PJM should also provide each individual unit's ELCC values so resource owners can understand the marginal impact. Ørsted argues that additional information along these lines would help provide regulatory certainty and inform capacity resources' economic decisions.

ii. Answers

49. Calpine disputes arguments that PJM's proposed accreditation framework is overly complex and contends that a complex market design does not render the proposal unworkable or unjust and unreasonable.[95] Calpine asserts the ELCC values would be calculated using industry-standard loss-of-load probability models, similar to the way market participants currently use industry-standard production cost models to forecast hourly energy prices.

50. In its response to the Deficiency Letter and protests thereto, the IMM states that PJM's proposal includes multiple vague and incompletely defined elements and defers many important elements of the stated rate to PJM for inclusion in manuals that should be included in the tariff. The IMM maintains that the level of uncertainty that would be created by accepting PJM's filings would be inconsistent with efficient and competitive markets both because key elements of the filings are not final and because, even if the

[94] Ørsted Comments at 3 (citing Rocha-Garrido Aff. ¶21).

[95] Calpine Comments on Deficiency Letter Response at 10-11 (citing *e.g.*, *NYISO*, 179 FERC ¶ 61,102 at P 108 (accepting marginal ELCC methodology and acknowledging that it may "involv[e] complex measurement and reliability methodologies")).

proposal works as intended, it will create significant and unnecessary levels of uncertainty for all market participants.[96]

51. Responding to criticisms that its proposed ELCC methodology is a "black box" and insufficiently transparent, PJM asserts that it posts on its website significant quantities of data for performing its current average ELCC approach that allows market participants to "replicate PJM's results and anticipate future ELCC values with reasonable accuracy."[97] PJM states that it plans to continue posting a significant amount of ELCC-related data under its proposed marginal ELCC approach. Specifically, PJM states that it intends to post: (1) hourly output shapes for every year in the model for unlimited, variable, limited duration, and combination resource types; (2) forced, planned, and maintenance outages for Unlimited Resources; (3) simulated dispatch of Demand Resources; (4) hourly load shapes for each year; and (5) temperature bins.[98] PJM argues that its approach is consistent with the Commission's prior determination that the posting of proprietary information is not needed.[99]

52. In response to criticisms that there is insufficient detail regarding its proposed methodologies in its tariff, PJM argues that its filing strikes the correct balance between detailing practices that significantly affect rates, terms, and conditions in its tariff and implementation details relating to study assumptions and parameters that will likely change over time being provided in its Business Practice Manuals.[100] Specifically, PJM notes that proposed RAA, Schedule 9.2 details the marginal ELCC methodology in eight

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[96] IMM Answer to the Deficiency Letter at 3-4.

[97] PJM Dec. 21 Answer at 13-14 (quoting *PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,056 at P 65). PJM further notes that it cannot post the forecasted resource mix and deployment data, as that data is proprietary to, and the intellectual property of, its outside vendor. PJM explains that it relies on the outside vendor to get the most accurate information possible, and requiring public disclosure of such data (to potential customers of the vendor) could harm PJM's ability to obtain the data it needs for the ELCC analyses (citing *PJM Interconnection, L.L.C.*, Motion for Leave to Answer and Answer of PJM Interconnection, L.L.C., Docket No. ER21-2043-000, at 3-4 (filed July 9, 2021)). PJM Dec. 21 Answer at 14 n.49.

[98] *Id.* at 13-14.

[99] *Id.* at 13-14 (citing, *e.g.*, *PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,056 at P 65; *ISO New England, Inc.*, 175 FERC ¶ 61,195, at P 82 n.159 (2021)).

[100] *Id.* at 14-15 (citing *Cal. Indep. Sys. Operator Corp.*, 122 FERC ¶ 61,271, at P 16 (2008)).

single-spaced pages, including the rules governing the marginal ELCC approach, the inputs, and the process, and identifies each ELCC Class and how PJM will calculate ELCC Class Ratings, Accredited UCAP, and ELCC RPAs. Further, PJM states that proposed Schedule 9.2 provides three pages detailing the methodology and administration procedures. PJM contends that the details for how PJM will implement this well-documented marginal ELCC approach will be properly located in the PJM Manuals.[101] In addition, PJM asserts that the Commission has already determined that its approach for describing ELCC methodologies in the tariff meets the rule of reason test, explaining that its proposed RAA, Schedule 9.2 is modeled on its existing RAA, Schedule 9.1, which details the average ELCC methodology, and which the Commission found met its Rule of Reason test, stating that "PJM's proposed formulaic ELCC methodology [set forth in RAA, Schedule 9.1] appears to largely strike the appropriate balance between providing sufficient detail in its tariff, while leaving PJM and stakeholders with sufficient discretion to improve various implementation details over time as they gain experience with the ELCC methodology."[102]

iii. Determination

53. We disagree with protests arguing that PJM failed to provide sufficient detail in proposed RAA Schedule 9.2 to satisfy the rule of reason. The Commission has broad discretion in applying the rule of reason, under which provisions that "significantly affect rates, terms, and conditions" of service, are realistically susceptible of specification, and are not generally understood in a contractual agreement, must be included in the tariff. [103] The tariff need not include "mere implementation details,"[104] which instead may be included only in the business practices manual.[105] "[E]ven specifiable practices that

[101] *Id.* at 15-16 (citing, *See, e.g.*, *Hecate Energy Green Cnty. 3 LLC v. FERC*, 72 F.4th 1307, 1314 (D.C. Cir. 2023) (*Hecate*)).

[102] *Id.* at 15-16 (citing *PJM Interconnection, L.L.C.*, 175 FERC ¶ 61,084, at P 65 (2021)).

[103] *Hecate*, 72 F.4th at 1314 (citing *City of Cleveland v. FERC*, 773 F.2d 1368, 1376 (D.C. Cir. 1985) (FPA's "amorphous," requirement that tariffs include "practices affecting rates" means Commission has "broad discretion" in giving Act "concrete application.")).

[104] *Id.* at 1312.

[105] *See, e.g., NYISO*, 179 FERC ¶ 61,102 at P 108 (finding NYISO's marginal capacity accreditation approach to be consistent with the rule of reason because it "provides sufficient detail to define 'marginal reliability contribution,' and in

significantly affect rates need not be included if they are clearly implied by the tariff's express terms."[106]

54. We find that PJM's proposed RAA Schedule 9.2 satisfies the rule of reason because it details the proposed ELCC methodology, process, and inputs for calculating ELCC Class Ratings, Accredited UCAP, and ELCC Resource Performance Adjustments. As we found in accepting PJM's existing RAA, Schedule 9.1,[107] on which PJM's proposal is modeled, PJM strikes the appropriate balance between providing sufficient detail in its Tariff and leaving implementation details to the PJM Manuals.

55. We further note that PJM commits to providing the necessary information and data for its marginal ELCC accreditation methodology. While such commitment is not required to comply with the rule of reason, this information will allow stakeholders to replicate PJM's results with reasonable accuracy. Specifically, PJM intends to post a model and sufficient data, consistent with PJM's confidentiality provisions, by which parties may continue to replicate PJM's results with reasonable accuracy, including: (1) hourly output shapes for every year in the model for unlimited, variable, limited duration, and combination resource types; (2) forced, planned, and maintenance outages for Unlimited Resources; (3) simulated dispatch of Demand Resources; (4) hourly load shapes for each year; and (5) temperature bins.

56. Regarding the requests from Ørsted and LSP Development that PJM provide additional information regarding resource accreditation values prior to the 2025/2026 BRA,[108] we note that PJM provided information about the preliminary ELCC class ratings for the 2025/2026 BRA, among other information, in its response to Commission staff's Deficiency Letter.[109]

57. We also direct a compliance filing to address an inadvertent omission. PJM explains in its Deficiency Letter Response that, in drafting the proposed RAA Schedule 9.2, PJM inadvertently omitted the transitional system capability concept from the cap on

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addition *sets forth the process* for calculating the marginal capacity accreditation" (emphasis added)).

[106] *Hecate*, 72 F.4th at 1314 (citing *City of Cleveland v. FERC*, 773 F.2d at 1376.

[107] *PJM Interconnection, L.L.C.*, 175 FERC ¶ 61,084, at P 65 (2021).

[108] *See* Ørsted Comments at 3-4; LSP Development Comments at 4-14.

[109] Deficiency Letter Response at 26-28 (citing Rocha-Garrido Aff. ¶ 48).

the modeled output of Combination Resources.[110] Accordingly, consistent with PJM's clarification, we direct PJM to submit a compliance filing within 30 days of the date of this order revising RAA Schedule 9.2, section I to add the transitional system capability concept back to the cap on the modeled output of Combination Resources.

58. For similar reasons, we reject the IMM's protests on transparency and concerns with the specificity of PJM's tariff changes, as discussed above, we generally find that PJM's proposed tariff revisions comply with the rule of reason and that the details left to the manuals "are clearly implied by the tariff's express terms."[111]

d. Resource Mix Considered in the ELCC Analysis

i. Responsive Pleadings

59. The IMM and Public Interest Organizations contend that a significant weakness of the proposed ELCC methodology is its reliance on an assumed resource mix that may not correspond to the actual resource mix achieved through the BRA.[112] Public Interest Organizations further assert that PJM's three-year forward construct makes this weakness more pronounced.

60. The IMM argues that the proposed ELCC analysis relies on important unstated and untested assumptions and, therefore, PJM has not demonstrated that the proposed changes are just and reasonable.[113] The IMM asserts that one key assumption is that the *ex ante* forecast of capacity offers will be sufficiently close to the resource mix of cleared resources such that any deviations in accredited values are not material. The IMM explains that conceptually, the capacity value of one resource type will vary with the level of a different resource type; thus, the complexity of calculating accreditation values increases as the number of resource types increases. The IMM asserts that the impacts of the difference between the resource portfolio used in the ELCC analysis and the resource portfolio that clears the auction must be "negligible" in order for PJM's proposal to be just and reasonable.

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[110] *Id.* at 24-25.

[111] *Hecate*, 72 F.4th at 1314 (citing *City of Cleveland v. FERC*, 773 F.2d 1368, 1376 (D.C. Cir. 1985).

[112] IMM Protest at 12-21; IMM Oct. 25 Answer at 3, 7-11; Public Interest Organizations Protest at 34-41.

[113] IMM Protest at 12-21.

61. The IMM states that a substantial redesign of the capacity market without adequate analysis of the impact of all the approximations in the estimation of the reliability requirement is not just and reasonable.[114] The IMM states that PJM's practice is to derive the installed reserve margin (IRM) using the "Solved Load" derived in the LOLE study. The IMM states that the derivation of "Solved Load" assumes a reliability profile based on the entire resource fleet. The IMM states PJM then applies that reserve margin to expected peak load to determine the PJM system Reliability Requirement, which the IMM asserts assumes that PJM will achieve the same level of targeted reliability under the expected peak load. The IMM asserts this assumption has never been tested.[115] The IMM asserts that the reliability profile of committed capacity from the auction likely will differ from that assumed in deriving the IRM and would likely result in committed capacity not achieving the target level of reliability.[116]

62. The IMM also disputes PJM's claim that the ELCC based accreditation "yields a reliability-neutral exchange rate and allows for a substitutable product definition where accredited capacity can be exchanged on the margin with no expected change in reliability" as unsupported.[117] The IMM asserts that the substitutability is only valid at the point where PJM's reliability criterion is satisfied and for relatively small substitutions and notes that PJM assumes that the "exchange rate" stays constant regardless of any deviation of committed capacity and cleared capacity, varying annual peak load, and for any size of resource substitution. The IMM explains that under the proposed approach, PJM would clear a capacity market where a 1,000 MW ICAP Gas Combined Cycle with an 84 percent marginal ELCC class rating unit is replaceable by four 1,000 ICAP MW Tracking Solar capacity resources with a 20 percent ELCC class rating. Noting that PJM's analysis of the distribution of EUE by month and hour reveals that more than half of EUE hours occur during night-time hours, the IMM asserts that there is no amount of solar capacity that can generate energy during those hours and therefore argues that PJM's statement that its methodology results in a "reliability-neutral exchange rate" among resources is implausible.

63. Public Interest Organizations state that, as proposed, PJM's ELCC accreditation values will be inaccurate whenever the cleared resource mix differs from the modeled resource mix and that the filing entails a real risk that the RPM auctions will incorrectly

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[114] IMM Protest at 11-12.

[115] *Id.* at 11.

[116] *Id.* at 12.

[117] IMM Protest at 21-22 (quoting Graf Aff. ¶ 6).

fail to clear large segments of a resource class.[118] Thus, Public Interest Organizations argue, while the capacity market would send correct long-term entry/exit signals, it will not correctly clear auctions whenever circumstances are such that the distinction between marginal and average ELCC is relevant. Public Interest Organizations state that PJM's proposed methodology simplifies this process by calculating ELCCs using a forecasted portfolio of resources likely to be offered into the RPM auction and applying those values to all resources. However, Public Interest Organizations assert that this approach violates the principle of marginal-value compensation because the relevant resource ELCC value should be calculated against all resources cleared previously, rather than against the total installed resource fleet as PJM proposes. Public Interest Organizations argue that the correct result would be to clear resources within a class until their declining ELCC value makes other resources more economic. However, Public Interest Organizations state that the result of PJM's methodology is that when a resource class saturation reaches the point where the market should signal no additional resources in the class are needed, the market instead signals that all resources in the class should retire. Public Interest Organizations further state that resolving these issues is technically challenging and PJM has not addressed the issue in its filing.

64. Furthermore, Public Interest Organizations state that, because the assumed fleet used to calculate marginal ELCC may differ significantly from the fleet that clears the RPM, the resulting resource mix may not meet the stated reliability targets.[119] Public Interest Organizations assert that this occurs because in PJM's filing UCAP is no longer a fungible value (so 1 MW of solar UCAP is no longer exactly equivalent to 1 MW of another resource's UCAP) because UCAP no longer directly measures the ability to serve load. Public Interest Organizations state that, at the extreme, the market design fails if the marginal ELCC of any resource class approaches zero. Public Interest Organizations argue that, for example, if the solar class ELCC approaches zero, a large amount of solar resources could fail to clear and an insufficient amount of replacement capacity could clear, resulting in a potentially large gap of missing energy. Public Interest Organizations assert that solutions to these implementation issues exist, such as adopting analyses as part of the auction process to confirm that the cleared resource mix meets the reliability requirements and iteratively re-running the ELCC and Reserve Requirement Study models and auction clearing until errors fall below an acceptable threshold.

ii. Deficiency Letter Response

65. In response to a question concerning implications of how differences between the assumed and the actual cleared resource mix and forecasted load affect resources' ELCC

[118] Public Interest Organizations Protest at 34-38.

[119] *Id.* at 38-41.

Class Ratings and PJM's compliance with the 0.1 days per year LOLE criterion, PJM agrees that differences between the assumed resource mix and the cleared resource mix can occur.[120] However, PJM asserts that its proposal minimizes any such deviation to the extent practicable. Further, PJM notes that any annual or seasonal accreditation approach that relies on an assumed resource mix and expected loss of load risk patterns is susceptible to these differences in accreditation results. Specifically, PJM states that such deviations can affect the loss of load risk patterns and model outputs (accreditation values and targeted UCAP). PJM further notes that the larger the deviation the more likely it is that there will be differences between the estimated UCAP and the actual UCAP.

66. PJM identifies two aspects of its proposal that PJM states help address concerns that such deviations adversely affect reliability. First, PJM states that it uses the best information and data available regarding load forecasts and likely resource mix to estimate the loss of load impacts, which then determine resource accreditation and the UCAP target.[121] Moreover, PJM proposes to require a Notice of Intent from planned resources to provide PJM with better insight into the resources expected to participate in the capacity auction at the time it performs its Reserve Requirement Study. Second, PJM argues that the Incremental Auctions occurring between the Base Residual Auction and the delivery year also reduce the potential impact of deviations between the assumed resource mix ahead of the BRA and that cleared in the BRA.[122] PJM notes that the Incremental Auctions use the cleared resource set of the prior auction(s) to revise its Reserve Requirement Study analysis and re-accredit resources. PJM asserts that this process minimizes the deviation to the extent practicable. Moreover, PJM also provides a hypothetical sensitivity analysis illustrating that the potential differences in the assumed versus cleared resource mix for the 2025/2026 Delivery Year result in less than a 2% difference in class ratings for most resources.[123]

67. As to whether differences between the assumed and actual cleared resource mix affects compliance with the LOLE criterion of 0.1 days per year, PJM explains that because the LOLE criterion is used to establish the target UCAP, there is no issue of compliance.[124] Using its sensitivity analysis, PJM concluded that differences between

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[120] Deficiency Letter Response at 31-34.

[121] *Id.* at 31.

[122] *Id.* at 33-34.

[123] *Id.* at 31-32.

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

assumed and actual cleared resource mix negligibly affect LOLE, increasing it by about 0.003 days/year.

iii. Comments on Deficiency Letter Response

68. Public Interest Organizations disagree with PJM's sensitivity analysis examining the effect of the cleared resource mix differing from the assumed resource mix on reliability.[125] Public Interest Organizations assert that PJM's sensitivity analysis demonstrates that, even under current conditions of low renewable penetration, discrepancies between the modeled and actual cleared resource mix can: (1) produce non-trivial errors in resource accreditation; and (2) result in significant changes in the Reliability Requirement, with no mechanism in place to confirm that the actual cleared resource mix meets the new requirement. Public Interest Organizations further state those errors will increase as renewable penetration increases. Public Interest Organizations argue PJM has not provided sufficient evidence to dismiss concerns about the accuracy of auction results.[126] While Public Interest Organizations renew their protest to reject PJM's proposal, they also explains that the proposal could be rendered reasonable if, after each auction, PJM were required to run an analysis similar to its simulation analysis and iterate the auction clearing until the calculated deviations in ELCC values or reserve margin fall within pre-established thresholds.

69. Calpine states that PJM squarely addresses the issue about the potential inaccuracies in accreditation values arising from differences between the assumed resource mix of the model and the actual cleared resource mix from the auction.[127] Calpine supports PJM's sensitivity analysis, which it states shows that differences between the assumed and cleared resource mix cause small differences in resources' accredited ELCC values. Calpine also emphasizes that any negative effects of resource mix differences are mitigated by PJM's Incremental Auctions, which use updated ELCC and Reserve Requirement studies.[128]

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[125] *Id.* at 7-10.

[126] *Id.* at 9 (citing Public Interest Organizations Protest at 36-37, 40-41).

[127] Calpine Comments on Deficiency Letter Response at 2-3 (citing Deficiency Letter Response at 31-32).

[128] *Id.* at 3 (citing Deficiency Response at 31).

iv. Answers

70. PJM states that criticisms regarding the use of a forecasted resource mix are fundamentally an attack on the basic principle of calculating *ex ante* resource accreditations and on not determining accreditation as part of the auction clearing process.[129] PJM further explains that, absent such assumptions, it would be unable to post accreditation values prior to the auction and notes that such advance determination and posting of auction parameters has been a feature of PJM's capacity market since RPM was established in 2006.[130] PJM states that the *ex ante* accreditation determination is not a change from the existing EFORd or average ELCC approaches, and thus protestors' challenges in this regard are arguably beyond the scope of this proceeding and should be rejected.[131] PJM further notes that the Commission has found that an "ex ante approach has the benefit of informing ELCC Resources of their capacity accreditation prior to the capacity auction, which will reduce uncertainty for ELCC Resource owners and provide them with better information to construct their capacity supply offers."[132] In particular, PJM states that the Commission should deny the IMM's suggestion to implement a new "negligible error" standard, for which no precedent is provided, that an *ex ante* accreditation approach must meet to demonstrate that it is just and reasonable.[133]

71. In response to arguments that the proposed marginal ELCC methodology is flawed because the resource mix used for accreditation is likely not the same resource mix that actually clears,[134] PJM asserts that the Commission previously rejected this same argument in approving PJM's existing average ELCC approach stating that "PJM can predict the resource quantities by class with sufficient accuracy five months in advance of

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[129] PJM Dec. 21 Answer at 11.

[130] *Id.* at 10-11 (citing, *e.g.*, PJM, Intra-PJM Tariffs, OATT, attach. DD, § 5.1 (2.0.0)).

[131] *Id.* at 11-12 (citing, *Cal. Indep. Sys., Operator Corp.*, 172 FERC ¶ 61,298, at P 23 (2020)).

[132] *Id.* at 11-12 (citing *PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,056 at PP 37-38).

[133] *Id.* at 12-13 (citing IMM Protest at 21 ("In order for the Commission to find the PJM ELCC method just and reasonable, it must be shown that the errors in the marginal ELCC ratings caused by the ex ante approach are negligible.")).

[134] *Id.* at 10 (citing, Public Interest Organizations Protest at 26-29; AMP Protest at 12-13; IMM Protest at 11-12).

the delivery year, when it will finalize ELCC Class Ratings."[135] PJM asserts that its process will minimize the deviations between the assumed and cleared resource mix by incorporating information from the proposed notice of intent process.[136] In addition, PJM states that it reaccredits resources in updated versions of the annual ELCC/Reserve Requirement Study analysis before the Third Incremental Auction, which will minimize, to the extent practicable, differences in Accredited UCAP and risk patterns.[137]

72. PJM, in response to Public Interest Organizations, explain that the sensitivity analysis indicates that while the FPR increases as a result of the resource mix change, so too do the accreditation of resources, and given that the Reliability Requirements and total Accredited UCAP values being evaluated are around 170,000 MW, the 115 MW difference between the *ex ante* assumed resource mix and the cleared resource mix is a difference of less than 0.068%.[138]

73. Public Interest Organizations state that they agree with PJM that discrepancies between projected and cleared resource mixes are likely to be small in the near term.[139] However, they ask the Commission to require a compliance filing reporting on this issue, to allow PJM, stakeholders, and the Commission to track the significance of this issue and to develop solutions as necessary; specifically, they ask that, within 60 days, PJM report modeled versus cleared MW and updated ELCC values for each ELCC class, an updated FPR, and cleared reserve margin based on the actual cleared resource mix, along with an analysis of how the updated values compare to those assigned before the auction, for each BRA and after the start of each delivery year through the 2035/2036 delivery year. As such, Public Interest Organizations state that they withdraw their protest on this issue, subject to PJM's agreement to compliance (which PJM has authorized be conveyed to the Commission).[140]

74. The IMM reiterates its concerns that differences between the modeled and cleared resource mix will create reliability issues. It argues that the reaccreditation process will not resolve these issues as it would continue to include all resources and continue to

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[135] *Id.* at 10 (citing *PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,056 at P 38).

[136] *Id.* at 10-11 (citing Rocha-Garrido Reply Aff. ¶ 5).

[137] *Id.* at 10-11 (citing Deficiency Letter Response at 33-34).

[138] PJM Jan. 12 Answer at 15-16 (citing Public Interest Organizations Protest to Deficiency Letter Response at 7-10; Deficiency Letter Response at 31-34).

[139] Public Interest Organizations Jan. 19 Answer at 2.

[140] *Id.* at 3.

ignore the cleared resource mix. It continues that *contra* PJM's assertions, PJM's analysis showed that a change in 2,000 ICAP MW of Tracking Solar and 300 ICAP MW of Storage will have substantial effects on resource accreditation, up to an order of magnitude higher than PJM states.

v. Determination

75. Protesters contend that PJM's proposed marginal ELCC framework is unjust and unreasonable due to the potential for differences between the forecasted and actual cleared resource mix to cause inaccurate capacity accreditation values. We disagree. By design, PJM's RPM aims to ensure resource adequacy for a future delivery year, and as such, there will inevitably be differences between the resource mix forecasted at the time of the auction and the actual, cleared resource mix. PJM's current EFORd and average ELCC methods are each susceptible to inaccuracies that can occur from differences between the modeled and cleared resource mix. Therefore, the question before the Commission is whether PJM's proposed marginal ELCC framework is susceptible to inaccuracies caused by differences between the forecasted and actual resource mix to such a degree that it is rendered unjust and unreasonable. For the reasons discussed below, we find that the potential for forecast error, which the record indicates should be minimal,[141] associated with the specific resources that are planned versus ultimately cleared in an auction does not cause capacity accreditation errors sufficient to render the proposal unjust and unreasonable. We, therefore, decline to require a compliance filing on this issue.[142]

76. First, we find that PJM has demonstrated that any differences between the forecasted and cleared resource mix are unlikely to introduce significant capacity accreditation errors. The sensitivity analysis PJM presents in its Deficiency Letter Response demonstrates that even reasonably significant discrepancies between the forecasted and cleared resource mixes would have little effect on resources' ELCC Class Ratings (i.e., an impact of 0%-3%).[143] Even if such errors were to materialize in the BRA under PJM's proposal, PJM would not finalize resources' ELCC accreditation until five months prior to the delivery year, i.e., one month before the Third Incremental Auction, allowing PJM to account for any forecast errors and their effect on resources' capacity

[141] PJM Jan. 19 Answer at 15-16 (citing Public Interest Organizations Protest to Deficiency Letter Response at 7-10; Deficiency Letter Response at 31-34).

[142] Public Interest Organizations Jan. 19 Answer at 2.

[143] Deficiency Letter Response at 31-33.

accreditation.[144] PJM has long used this same approach for updating EFORd data and resulting resource accreditations, which are also subject to change between the BRA and the Third Incremental Auction.[145] Moreover, as part of the instant proposal, PJM is also proposing enhancements to properly account for planned capacity resources by requiring such resources to submit a binding notice of intent to offer their capacity into the BRA before PJM finalizes its ELCC calculations, which will result in PJM having additional certainty as to the quantity of planned resources participating in the auction.[146] We also dismiss the IMM's argument that PJM's sensitivity analysis revealed larger changes between the forecasted and cleared resource mixes than PJM suggests. We agree with PJM that any change in the FPR would be associated with a change in the pool of cleared resources, which would in turn change each cleared resource's Accredited UCAP. As PJM shows, in a 170,000 MW system, the resulting difference between the forecasted and cleared resource mix would be 115 MW, or less than 0.068%, a negligible amount. Accordingly, we find that PJM has demonstrated that its proposal will accredit resources' capacity value with sufficient accuracy to be just and reasonable.

77. Second, we reaffirm the Commission's prior finding that an "*ex ante* approach has the benefit of informing ELCC Resources of their capacity accreditation prior to the capacity auction, which will reduce uncertainty for ELCC Resource owners and provide them with better information to construct their capacity supply offers."[147] We continue to find that providing resource owners with their capacity accreditation prior to the auction is a critical benefit of PJM's capacity accreditation approach. Therefore, any potential for inaccuracy caused by the *ex ante* approach—which we believe is not dispositive for the reasons discussed above—must be weighed against the significant benefits of providing sellers with their capacity accreditation prior to the capacity auction. Based on the record in this proceeding, we find that PJM's proposal strikes a just and reasonable balance. We note that in its January 19 Answer, Public Interest Organizations state that PJM has agreed to, within 60 days after each Base Residual Auction and after the start of

[144] In accepting PJM's average ELCC approach, the Commission found that "PJM can predict the resource quantities by class with sufficient accuracy five months in advance of the Delivery Year, when it will finalize ELCC Class Ratings." *PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,056 at P 38.

[145] *See* PJM, Intra-PJM Tariffs, RAA, Schedule 5 (2.0.0) ("For each Delivery Year, EFORd shall be calculated at least one month prior to the start of the Third Incremental Auction.").

[146] *See* PJM, Intra-PJM Tariffs, Proposed OATT, attach. DD, § 5.5 (5.0.0).

[147] *PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,056 (2021),, at P 38 (citing *PJM Interconnection, L.L.C.*, 175 FERC ¶ 61,084 (2021),, at P 55.

each delivery year through the 2035/2036 Delivery Year, report the forecasted MW versus cleared MW and updated ELCC values for each ELCC class, an updated FPR, and the cleared reserve margin based on the actual cleared resource mix, along with an analysis of how the updated values compare to those assigned before the auction.

78. Further, we note that any potential capacity accreditation errors under PJM's proposed marginal ELCC framework will likely be dwarfed by the known limitations of its existing accreditation frameworks. For example, PJM itself concedes that its current EFORd approach fails to properly account for the actual reliability benefit that conventional resources provide during hours of expected system risk, and Public Interest Organizations describe this failure as "the single greatest threat to reliability" in the PJM region.[148] In sum, we reject protestors' claim that the potential for forecast error in the marginal ELCC framework, which the record indicates should be minimal, renders PJM's proposal unjust and unreasonable. If anything, the record before us proves the opposite. It would seem that a capacity accreditation framework that responds to changes in the resource mix, such as PJM's proposed marginal ELCC framework, is clearly the more accurate alternative given the record evidence demonstrating that the resource mix can be determinative of resource adequacy risks.[149]

79. We reject the IMM's argument that PJM's proposal results in an unreasonable "exchange rate" between resource types.[150] By modeling resource performance on an hourly basis, and by using granular events in its reliability analysis, PJM's proposed accreditation increases the fungibility of capacity over its existing structure. As the IMM points out, different resource classes perform more reliably at different periods. For

[148] *See, e.g.*, Transmittal at 34 ("PJM's current approach of determining a resource's capacity capability based solely on that resource's historical average forced outage rate or nominated capability . . . fails to properly account for the actual reliability benefit that the resource provides during hours of expected system risk."); Public Interest Organizations Protest at 11 ("PJM's Accreditation Filing would improve the capacity market by more accurately accrediting thermal resources to reflect their poor performance during extreme winter weather — which is the single greatest threat to reliability in this region.").

[149] *See, e.g.*, Calpine Comments, Ming Aff. at A19 ("As penetrations of renewable and storage resources continue to grow on PJM's system, the distortions caused by the existing capacity market paradigm will also grow. The disconnect between times of historical loss-of-load risk (peak loads) and future loss-of-load risk (low resource availability) is present on PJM's system today but will continue to increase significantly as the portfolio continues to evolve. Thus, reforms to the existing paradigm are imperative for sound market design.").

[150] IMM Protest at 21-22.

example, a gas-only resource's reliability value may be lower during an extreme winter event than a nuclear unit or dual fuel unit if there is a natural gas supply disruption (e.g., reduced natural gas production or issues with the natural gas pipeline system). But, under the current EFORd accreditation, the gas only resource's UCAP would still be "exchangeable" with the nuclear or dual fuel resource's UCAP. In contrast, under PJM's proposed rules the amount of capacity accredited to the gas only resource would likely be lower than the capacity accredited to the dual fuel resource because PJM's proposal captures correlated outage effects causes by issues such as natural gas supply disruptions. We also note that PJM's proposed accreditation method is a clear improvement over the current approach for Unlimited Resources such as gas and dual fuel resources because it better captures a given resource's performance over a wider range of high risk periods. Because the accreditation is more reflective of resource performance during stressed periods, the MW are more exchangeable than they are under PJM's current rules.

e. Treatment of ELCC Classes and Resource Types

i. Responsive Pleadings

(a) Variable Energy Resources

80. Renewable Energy Coalition and Clean Energy Associations[151] support PJM's proposal to substitute the use of "winter deliverability MW" with "assessed deliverability" in determining the accreditation of variable resources because it will more accurately recognize deliverability in the system.[152] They state that this change will appropriately value the full contributions of variable resources to reliability.

(b) Dual Fuel and Natural Gas Resource Classes

81. ODEC states that it strongly supports PJM's proposal specifying a separate ELCC resource class for dual fuel resources capable of operating on the alternate fuel for two 16-hour consecutive periods at its maximum capacity level.[153] ODEC states that doing so recognizes the operational advantages of dual fuel resources, which can be expected to offer greater performance assurance than single fuel resources, and creates meaningful

[151] Clean Energy Associations are comprised of American Clean Power Association; Solar Energy Industries Association; Advanced Energy United; and MAREC Action.

[152] Renewable Energy Coalition Comments at 9-11; Clean Energy Associations Comments at 5 (citing Transmittal at 52-53).

[153] ODEC Comments at 5.

incentives for resources to invest in storage or other options that help maintain reliability. In contrast, The IMM and Vistra argue that PJM has not justified requiring resources to demonstrate the ability to run for two consecutive 16-hour periods in order to be classified as Dual Fuel Resources.[154] The IMM asserts that PJM's definitions of the ELCC Dual Fuel Resource Classes are unclear and are unenforceable.

82. Some commenters express concerns with PJM's proposed ELCC Classes for natural gas-fired resources.[155] The IMM states that, although PJM is not proposing a firm fuel requirement for capacity resources, PJM effectively requires firm fuel through its accreditation proposal.[156] P3 argues that PJM should provide more specificity regarding how fuel arrangements for non-dual fuel gas units will affect their accreditation, which P3 claims PJM has said it will provide in its manuals but which is not currently available or subject to Commission approval.[157] Vistra states that PJM's ELCC Resource Class definitions ignore the significant resource adequacy benefits provided by natural gas resources that have firm fuel supply arrangements and, therefore, the proposal is unjust, unreasonable, preferential and unduly discriminatory.[158] Vistra notes that the Commission, PJM, and NERC all have recognized that the firmness of a capacity resource's fuel supply plays an important role in whether the resource will be able to meet its performance obligations, particularly during stressed system conditions.[159] Vista points to PJM's Winter Storm Elliott Report, which showed that natural gas only resources with firm fuel supply arrangements had forced-outage rates of 13.8% as compared to 33.9% forced-outage rates for those resources with non-firm fuel supply arrangements.[160] Vistra notes that although PJM acknowledges that having secure fuel arrangements minimizes reliability risk,[161] PJM's proposed ELCC Resource Classes group all non-dual fueled gas resources in one class irrespective of the firmness of fuel

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[154] IMM Protest at 23; Vistra Protest at 19-20.

[155] *See*, *e.g.*, IMM Protest at 23; IMM Oct. 25 Answer at 12-14; Vistra Protest at 16-20; P3 Comments at 6.

[156] IMM Protest at 23; IMM Oct. 25 Answer at 12-14.

[157] P3 Comments at 6.

[158] Vistra Protest at 16-19.

[159] *Id.* at 17.

[160] *Id.* at 18 (citing PJM, Winter Storm Elliott Report at 59).

[161] *Id.* at 18 (citing PJM, Winter Storm Elliott Report at 59).

supply arrangements, thus failing to account for the relative reliability values of firm fuel supplied gas resources. Vistra states that this will likely underestimate the reliability value of firm-fueled gas resources and adversely affect those resources' accreditation. The IMM agrees with Vistra's argument that PJM has no basis for its decision to not define an ELCC Class for gas-fired generators with a firm supply of fuel.[162]

(c) Other Resource Types

83. Invenergy states that, while the proposed accreditation rules are appropriate for resources located in PJM, they will not provide accurate ELCC values for external resources, particularly renewable resources, that are physically and operationally distinct from internal resources due to different weather patterns and expected resource output.[163] Invenergy notes that PJM has taken into account similar factors when delineating separate resource classes for on-shore and off-shore wind resources. Invenergy states that, at a minimum, PJM should allow an external resource to propose and support a resource-specific ELCC value, as PJM proposes to do for hydropower with non-pumped storage and other types of resources.

84. AEMA and Clean Energy Associations argue that PJM should redefine the Demand Resource "performance" window, which defines when Demand Resources must be available for dispatch, so that it extends beyond the current 9 p.m. definition to incorporate PJM's assessment of evening winter reliability risk.[164] AEMA and Clean Energy Associations argue that doing so recognizes the contributions that Demand Resources can make to reliability. AEMA and Clean Energy Associations also assert that PJM should include the definition of the Demand Resource "performance" window in its tariff.

85. AEMA further notes that the current tariff provides that the Accredited UCAP of a Demand Resource is the product of its Nominated Value and the FPR, which recognizes that "PJM is not procuring reserves for the quantity of load demand responders are committing to reduce."[165] However, AEMA states that for Demand Resources, PJM's proposal for Accredited UCAP determination omits the FPR factor without explanation or justification, and PJM does not explain why the FPR should not continue to be

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[162] IMM Oct. 25 Answer at 12-14.

[163] Invenergy Comments at 4-7.

[164] AEMA Comments/Protest at 2-6 (citing Rocha-Garrido Aff., Figure at 47); Clean Energy Associations Comments at 8-9.

[165] *Id.* at 6 (citing PJM, Intra-PJM Tariffs, RAA, Schedule 4 (0.2.0)).

included in the Accredited UCAP determination. AEMA further states that the value of avoided reserves procurement is real and should be correspondingly credited to Demand Resources. AEMA states that PJM should clarify the application of FPR, or conversely, a similar factor that recognizes the value that Demand Resources offers in needing to procure fewer reserves, in the Accredited UCAP calculation for Demand Resources.

86. AEMA states that in its discussion of excluding Energy Efficiency Resources (EER) from an ELCC analysis, PJM erroneously asserts that EERs are "tied directly to load forecasts."[166] AEMA states that this misstatement could be misconstrued to imply that EERs should only be accounted for as load forecast reductions.[167] AEMA asserts that EERs are an effective Capacity Resource that supplies value to PJM's Capacity Market during a delivery year and during PAIs. Thus, AEMA argues that PJM should clarify that EERs are a valid Capacity Resource.

ii. Deficiency Letter Response

87. In response to the deficiency request to identify the language in PJM Manual 21 that defines the installed capacity of Variable Resources, PJM states that ICAP is defined in PJM Manual 21 as "the summer net capability of a generating unit as determined in accordance with PJM manual M-21, Rules and Procedures for Determination of Generation Capability and within the capacity interconnection right limits of the bus to which it is connected."[168] PJM adds that defining the calculation of ICAP for Variable Resources in PJM Manuals 21 and 21A is consistent with where the current definition of ICAP resides for most other generation resource types.

88. In response to the deficiency request to explain what mechanisms PJM will use to enforce its proposed requirements for a resource to qualify as dual fuel, PJM explains that it is the responsibility of the generation owner to provide truthful and accurate information on their resource to PJM, including in their attestation that they meet dual fuel requirements.[169] PJM states that any intentional misrepresentation of the unit's existing or planned capability could be subject to Commission referral and enforcement. Further, PJM explains that, to the extent a qualifying dual fuel resource does not mark its

[166] *Id.* at 7 (citing Transmittal at 26-27).

[167] *Id.* at 6-8.

[168] Deficiency Letter Response at 4-5 (citing PJM, *Manual 21: Rules and Procedures for Determination of Generating Capability*, § 1.2 (Jul. 26, 2023), https://www.pjm.com/-/media/documents/manuals/m21.ashx).

[169] *Id*. at 18-19.

energy market schedule on the alternative fuel as available for the required time, or is called upon but fails to operate on the alternative fuel due to reasons that would have prevented the owner from qualifying as duel fuel, the IMM and/or PJM could refer the seller to the Commission's Officer of Enforcement.

89. In response to the deficiency request to provide indicative 2024/2025 ELCC Class Ratings for the Gas Combined Cycle Dual Fuel Class and the Gas Combustion Turbine Dual Fuel Class, and the request to clarify whether the indicative ELCC Class Ratings provided for the "Gas CC" and "Gas CT" classes reflect the ELCC Class Rating of gas-only resources without dual fuel capability or a blended ELCC Class Rating of both dual fuel and gas-only resources, PJM provides indicative 2025/2026 ELCC Class Ratings for each Resource Class to supplement the 2024/2025 estimates provided in its filing.[170] PJM explains that these indicative values reflect updated assumptions and inputs, as well as changes to the methodology consistent with what was filed with the Commission relative to the preliminary values that were estimated during the stakeholder process and referenced in the Rocha-Garrido affidavit. PJM explains that the estimates for gas resources may change once those resource owners provide attestations regarding dual fuel status. PJM also provides "status quo" estimates for 2025/2026 assuming no changes to its current methodology.[171] PJM notes that certain indicative Resource Class rating estimates are more than 10% below the "status quo" estimates for those classes whose correlated unavailability consistently coincides with modeled periods of loss of load risk (e.g., some gas classes, solar classes, storage classes, and solar-storage hybrid classes). PJM explains that this is due to unavailability of these classes during the high-risk winter period, which currently is not properly reflected in the "status quo" resource accreditation.[172] PJM further notes that large increases in Resource Class ratings for onshore and offshore wind are also driven by the greater winter risk in the proposed model during which these resources typically have higher output. PJM states that the Demand Resource class also shows a significant decrease in accreditation due to (1) that rating being a function of the FPR, which is lower under the proposed methodology; and (2) the Demand Resource availability window, which does not align with the projected hours with a loss of load risk in the winter period.[173]

[170] *Id.* at 26-28 (citing Rocha-Garrido Aff. ¶ 48).

[171] *Id.* at 27.

[172] *Id.* at 28.

[173] *Id.* at 28.

iii. Comments on Deficiency Letter Response

90. A number of commenters opine on PJM's response to the Deficiency Letter including the IMM, Calpine, Vistra, and LSP Development.[174] The IMM argues that PJM's Deficiency Letter Response to questions about definitions of Variable Resource ICAP, Unlimited Resource ICAP, and "assessed deliverability" is inadequate because PJM does not commit to defining those terms clearly in its tariff, committing only to including those definitions in Business Practice Manuals.[175] The IMM claims that the proposed extensive restructuring of the PJM capacity market without clearly defining the essential elements that affect the performance of that capacity market is not just and reasonable.

91. Public Interest Organizations state that PJM's responses to staff's Deficiency Letter demonstrate an additional flaw in its proposed accreditation methodology.[176] Specifically, Public Interest Organizations argue that the proposal lacks any enforcement mechanism in its proposed attestation requirement for dual fuel resources as PJM's sole recourse for resources misrepresenting their capabilities would be to refer such resources to the Commission for potential enforcement. Public Interest Organizations assert that such referral is insufficient because making consequences for misrepresentation contingent on both a referral and a Commission enforcement action fails to signal to market participants that there will be consistent consequences. Public Interest Organizations further argue that PJM's proposed referral action would create an administrative burden and is inappropriate as PJM would need to infer "intention." Public Interest Organizations argue that the Commission enforcement policies do not require intent.

92. LSP Development argues that, in proposing only four ELCC classes for gas-fired resources, the classes are too broad to result in fair Accredited UCAP values, particularly without an effective RPA mechanism.[177] LSP Development states that the Deficiency Letter Response makes clear that PJM intends to overlook investments that do not alter the resource's ELCC class designation. LSP Development contends that PJM has failed to justify its focus on ELCC class designations rather than seeking to account for the

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[174] *See e.g.,* IMM Answer to Deficiency Letter Response at 9-10; Calpine at 2-11; Vistra at 6-9; LSP Development at 3-11, Sierra Club at 2-3; and AMP at 3-5.

[175] IMM Answer to Deficiency Letter Response at 9-10 (citing Deficiency Letter Response at 5, 9).

[176] Public Interest Organizations Protest of Deficiency Letter Response at 2-3.

[177] LSP Development Comments on Deficiency Letter Response at 7.

impact of investments to improve performance.[178] Furthermore, LSP Development suggests that PJM's proposal may actually discourage investments to improve performance. Moreover, even if those types of investments in operational performance are taken into consideration on a going forward basis, LSP Development posits, PJM fails to explain how long it will take for those investments to be reflected in a resource's accreditation.

iv. Answers

93. PJM states that it views protests that it has not defined an ELCC class for natural gas-fired resources with contracts for firm transportation and firm gas supply as raising issues of a potential future enhancement to its methodology.[179] PJM argues that the Commission need not entertain such requests at this time because these parties do not attempt to demonstrate that the proposed marginal ELCC approach would be unjust and unreasonable without the presence of such an ELCC Class. PJM agrees that there is potential merit in the further consideration of differentiating ELCC Class definitions based on fuel supply arrangements, but notes that the information needed to determine which entity has the requisite "firm" contracts is not as readily available as the protesters appear to believe. Further, PJM argues that its proposal does not ignore the benefits of firm gas supply and transportation contracts. PJM explains that the proposed ELCC RPA, which relies on historical performance data, will capture performance enhancements arising from having firm fuel supply contracts.[180] Finally, PJM states that it intends to continue evaluating the ELCC approach, the market as a whole, and how resources are being accredited and commits to proposing RAA changes to add or remove ELCC Classes, as necessary.[181]

94. PJM, responding to Public Interest Organizations' criticism that PJM's proposal lacks any enforcement mechanism in its proposed attestation requirement, describes the actions it will take to address that concern.[182] PJM clarifies that resources can be removed from a dual fuel ELCC Class for a given delivery year if PJM determines the resource is incapable of meeting the dual fuel class requirements before the Third

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[178] *Id.* at 8.

[179] PJM Dec. 21 Answer at 17-18 (citing, *e.g.*, Vistra Protest at 16-20).

[180] *Id.* at 18 (citing Rocha-Garrido Reply Aff. ¶¶ 17-18).

[181] *Id.* at 18.

[182] PJM Jan. 12 Answer at 18 (citing Public Interest Organizations Protest to Deficiency Letter Response at 2).

Incremental Auction. In addition, PJM states that the proposed enhanced testing requirements and charges will allow PJM to conduct tests of the operational and dual fuel capabilities of a resource if it suspects the resource has mischaracterized its dual fuel capabilities. Testing failures will result in financial penalties and possible referral to the Office of Enforcement. Finally, PJM disagrees with Public Interest Organizations' characterization of Office of Enforcement referrals, noting that the Office of Enforcement and the Commission may determine that the seller violated section 35.41(b) of the Commission's regulations, which prohibits Capacity Market Sellers from submitting false or misleading information.[183] PJM states that this regulation has provided the basis for the Office of Enforcement to agree to financial penalties and disgorgement with sellers that misrepresented the dual fuel capability of their Capacity Resources in PJM.[184]

95. PJM states that the proposed approach of using marginal ELCC to accredit Demand Resources and to retain the current definition of the Demand Resource availability window is also just and reasonable and argues that AEMA's proposed change to the definition of the Demand Resource availability window is beyond the scope of this filing.[185] PJM states that the current Demand Resource availability window accurately captures the time periods when Demand Resources would be required to interrupt if called upon.[186] In addition, PJM avers that the Demand Resource availability window is adequately defined in the RAA, contrary to AEMA's assertions otherwise, and therefore specifying the availability window in Demand Resource accreditation determination is unnecessary.[187]

96. Responding to AEMA's concern about the omission of the FPR from the proposed Demand Resource accreditation, PJM explains that the FPR factor is no longer necessary under its proposal to calculate the Accredited UCAP because it uses the Demand

[183] *Id.* at 20 (citing 18 C.F.R. § 35.41(b) (2023)).

[184] *Id.* at 20 (citing *Dynegy Mktg. & Trade, LLC*, 178 FERC ¶ 61,230 (2022) (approving consent and stipulation agreement regarding misrepresentations regarding the dual fuel capability of Capacity Resources in violation of section 35.41(b) and Part 1b of the Commission's regulations under which the seller agreed to pay disgorgement and civil penalties)).

[185] Bruno and Graf Reply Aff. ¶ 50.

[186] *Id.* at 53.

[187] *Id.* at 54.

Resource Class Rating in lieu of the FPR.[188] PJM states that this replacement is appropriate because its risk analysis reveals that some loss of load hours fall outside the Demand Resource availability window and are properly accounted for in the proposed marginal ELCC approach. PJM notes that this is similar to solar resources being unavailable at nighttime.

97. In releasing the preliminary ELCC class ratings for the 2025/2026 BRA, Vistra asserts that PJM has "painted a confusing picture" with respect to the reliability value of dual fuel resources. Vistra argues that because the chart that PJM released has no other contextual information, it is difficult to understand the basis for this significant difference in relative values between dual fuel CT and CC resources and their gas-only counterparts.[189] Vistra further argues that the lack of transparency also complicates the ability of asset owners to evaluate the impact of the ELCC RPA on their individual resources. Vistra states that in practice, this means that asset owners will have little insight into what factors make up the accreditation value of their individual resources and the impact of any reliability-based investments on that accreditation value, and that this fact undermines the entire aim of switching to a marginal ELCC framework, namely, to send clear signals of a resource's individual reliability value.[190]

98. Vistra avers that PJM's failure to separate out gas resources with firm supply and transportation arrangements into a class of their own, as well as the lack of transparency behind ELCC class ratings, only increases the importance of ensuring that there is a robust performance construct in place to provide incentives for resources to make the necessary investments to ensure reliability amidst extreme weather events.[191]

99. AEMA states that PJM's answer fails to address its observation that ELCC methods applied to demand resources incorporates a winter availability period that is inconsistent with PJM's evolving understanding of reliability risk—namely, significant increase in winter risk.[192] AEMA explains that current load management rules require availability during winter hours from 6am to 9pm, while in contrast PJM avers in the instant filing that there is increased reliability risk outside of those hours. AEMA states

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[188] PJM Dec. 21 Answer at 21 (citing AEMA Comments/Protest at 6; Rocha-Garrido Initial Aff. ¶ 36).

[189] Vistra Dec. 1 Answer at 11.

[190] *Id.* at 11-12.

[191] *Id.* at 12.

[192] AEMA Answer at 3.

that PJM's argument that the Annual Demand Resource definition includes a "performance" window that is immutable, even as PJM seeks to change numerous other RAA definitions, precludes demand resources from contributing to reliability.[193] Therefore, AEMA asks the Commission to direct PJM to address this by including an updated "performance" window in the load management definition.[194]

100. Vistra, responding to PJM's Answer in this proceeding, argues that PJM implicitly acknowledges that natural gas resources that have firm fuel contracts are more reliable than those using non-firm fuel contracts, yet nevertheless continues to assert that identifying a separate ELCC Class for Firm Resources is administratively difficult to administer, citing difficulty in ascertaining firm fuel commitments.[195] Vistra notes that PJM's argument that there are gradations of firm supply applies equally to dual fuel resources, for which PJM has defined a separate ELCC Class. Vistra argues that if an attestation of dual fuel capability is sufficient for assignment to the Dual Fuel Resource ELCC Class, then it should be sufficient for assigning a resource to a Firm Resource ELCC Class. Vistra asserts that to do otherwise is unduly discriminatory.[196]

101. Public Interest Organizations note that PJM stated that it "will be gathering data from generators' fuel arrangements, among other data points, that could be used as a basis for considering a separate ELCC class [Firm Fuel Gas Resource] in the future."[197] Public Interest Organizations state that the information PJM will collect is vitally important to ongoing discussions regarding the need for better coordination between the gas and electric systems.[198] Public Interest Organizations state that the Commission should require PJM to make information publicly available about the prevalence and characteristics of firm gas supply and transportation arrangements, and on how gas plants with and without firm gas supply perform when the grid is stressed. Public Interest Organizations argue this information is fundamental to assessing whether changes to

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[193] *Id.* Answer at 4.

[194] *Id.* Answer at 5.

[195] Vistra Jan. 8 Answer at 2-9.

[196] *Id.* at 8 (citing *Ala. Elec. Coop. v. FERC*, 684 F.2d 20 (D.C. Cir. 1982); *Complex Consol. Edison Co. of N.Y. v. FERC*, 165 F.3d 992, 1013–14 (D.C. Cir. 1999)).

[197] Public Interest Organizations Jan. 19 Answer at 4 (citing PJM Jan. Answer at 15).

[198] *Id.* at 4-5.

ELCC classes are needed to reflect the reliability value of firm fuel and to hold PJM accountable for its commitment to continually improve ELCC class definitions.

v. Determination

102. We agree with commenters and PJM that its proposed changes to substitute "assessed deliverability" for "winter deliverability MW" will appropriately capture the expected resource adequacy contributions of Variable Resources, mitigating what otherwise would be arbitrary under-accreditation, which would negatively impact the efficient use of the transmission system in meeting reliability targets. We also agree with PJM that defining the calculation of ICAP for Variable Resources in the PJM Business Practice Manuals is consistent with the location of definitions of ICAP for other generation resource types.[199]

103. We disagree with claims that PJM has failed to justify its proposed dual fuel ELCC class definitions. PJM points to empirical observations of event durations during the 2014 Polar Vortex and Winter Storm Elliott, as well as to its existing reliability requirements for energy-limited resources, to support its proposed definitions. Further, PJM considered an alternative three-day fuel requirement and found that the little additional resource adequacy benefit from having three days of stored fuel relative to the two days PJM proposed for the dual fuel class.[200] We find PJM's explanation sufficient to support that its proposed dual fuel class definitions are just and reasonable.

104. We also disagree with Public Interest Organizations' contention that PJM has no enforcement mechanism in place for confirming the proposed attestations of dual fuel capability or penalizing any market participant that misrepresents its resource's capability.[201] PJM routinely relies on market participant attestations in administering its tariff. Additionally, resources can be removed from a dual fuel ELCC Class for a given delivery year if PJM determines the resource is incapable of meeting the dual fuel class requirements before the Third Incremental Auction. Moreover, we find that PJM's proposed enhanced testing requirements and charges will allow PJM to evaluate the operational and dual fuel capabilities of a resource if it suspects the resource has mischaracterized its dual fuel capabilities. Further, PJM's tariff also allows PJM to refer

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[199] *See, e.g.,* Rated ICAP for steam units in PJM, *Manual 21: Rules and Procedures for Determination of Generating Capability*, § 1.2.1 (Jul. 26, 2023), https://www.pjm.com/-/media/documents/manuals/m21.ashx

[200] Transmittal at 41.

[201] Public Interest Organizations Protest to Deficiency Letter Response at 2-3.

the resource to the Office of Enforcement, as necessary.[202] With respect to Public Interest Organizations' suggestion that PJM should adopt additional provisions that invoke consequences for inaccurate or misleading attestations, because we find PJM's proposal to be just and reasonable, we need not address Public Interest Organizations' proposed alternatives.[203]

105. We reject protesters' arguments that PJM should create a separate ELCC class for gas resources with firm transportation or fuel agreements, because we find that parties have not demonstrated that PJM's proposal is unjust and unreasonable.[204] PJM has explained that information on the relative "firmness" of different gas contracts is not readily available, which indicates it may not currently be possible to accurately account for such distinctions in resource accreditation. Even if such information were more readily available, we agree with PJM that its proposal does not ignore the benefits of firm gas supply and transportation contracts because the proposed ELCC RPA, which relies on historical performance data, will capture performance enhancements arising from a resource's firm fuel supply contracts. We note that PJM has committed to gathering information that would be relevant to considering a separate ELCC Firm Fuel Gas Resource class in the future.[205] We agree with Public Interest Organizations that PJM should make public to the maximum extent possible the information gathered about the prevalence and characteristics of firm gas supply and transportation arrangements, and on how gas plants with and without firm gas supply perform when the grid is stressed.[206] We further agree with Public Interest Organizations that this information will be

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[202] PJM Deficiency Letter Response at 18-19.

[203] *See PJM Interconnection, L.L.C.*, 169 FERC ¶ 61,038, at P 12 (2019) (citing *OXY USA, Inc. v. FERC*, 64 F.3d 679, 692 (D.C. Cir. 1995) (finding that under the FPA, as long as the Commission finds a methodology to be just and reasonable, that methodology "need not be the only reasonable methodology, or even the most accurate one"); *Cities of Bethany v. FERC*, 727 F.2d 1131, 1136 (D.C. Cir. 1984) (when determining whether a rate was just and reasonable, the Commission properly did not consider "whether a proposed rate schedule is more or less reasonable than alternative rate designs")).

[204] *See* Vistra Protest at 16, 21-24; Vistra Jan. 8 Answer at 2-9; Public Interest Organizations Protest of Deficiency Letter Response at 3-6; LSP Development Comments at 11-14.

[205] PJM Jan. 12 Answer at 15.

[206] Public Interest Organizations Jan. 19 Answer at 4-5.

instructive for identifying structural barriers to obtaining the needed information and improving the ELCC class designations in the future.

106. We also reject Vistra's argument that modeling dual fuel resources separately, but not modeling firm fuel resources separately, is unduly discriminatory. Dual fuel resources are not similarly situated to gas resources with firm fuel supply arrangements as they are physically different (e.g., a dual fuel resource has on-site fuel oil storage and is capable of operating on both gas and oil and a gas-only resource with a firm fuel supply resource has no on-site storage and is only capable of operating on gas). Additionally, the quantity of on-site fuel storage for dual fuel resources can be readily measured and thus – because PJM also knows the heat rate of these resources – PJM could determine whether the facility has enough fuel stored on site to allow a resource to run long enough to qualify for the dual fuel class. As PJM points out, what constitutes a "firm" fuel contract is more ambiguous. We note, however, that PJM agrees that there is potential merit in considering further differentiation in ELCC Class definitions based on fuel supply arrangements and commits to proposing RAA changes to add or remove ELCC Classes, as necessary.[207]

107. As for AEMA's and Clean Energy Associations' observations about the Demand Response "performance" window definition, we note that the claim that PJM failed to include the Demand Resource availability windows in its tariff is incorrect. As PJM explains in its December 21 Answer, the Demand Resource availability window is included in the RAA definitions of Annual Demand Resource and Summer-Period Demand Resource. In addition, while they do not oppose PJM's filing in this regard, AEMA and Clean Energy Associations argue that PJM should have expanded the definition of the Demand Resource "performance" window because some Demand Resources are capable of performing in the later winter hours. We find that AEMA's and Clean Energy Associations' filings are outside the scope of this proceeding and, in any case, that they have not demonstrated that PJM's proposed changes in the accreditation methodology and the Reserve Requirement Study render the Demand Resource "performance" window unjust and unreasonable.

108. We reject Invenergy's arguments about the modeling of external resources, specifically that PJM should create a separate ELCC Resource class for resources located outside of PJM or allow those resources to propose resource-specific UCAP ratings.[208] We find that PJM's proposed resource-specific performance adjustment (i.e., the RPA) will account for a resource's improved performance relative to its class, regardless of whether it is located inside or outside the PJM footprint, because it accounts for a resource's actual historical individual performance or, for newer resources, a "putative

[207] PJM Dec. 21 Answer at 17-18.

[208] Invenergy Comments at 4-7.

output estimate." We note that PJM's proposed revisions state that: "For resources that have not existed each year since June 1, 2012, putative output is an estimate of the hourly output that resource would have produced in a historical hour if that resource had existed in that hour. This putative output estimate is developed based on historical weather data consistent with the particular site conditions for each such resource in accordance with the PJM Manuals."[209] Accordingly, we understand that to the extent a newer external resource may expect to have higher output due to historical weather data consistent with its particular site conditions, we interpret PJM's proposal to mean that these data will be considered as an input to the resource's accreditation.

109. Finally, we reject AEMA's request for PJM to clarify that Energy Efficiency Resources are "valid capacity resources.[210] We note that AEMA did not protest PJM's proposal to exclude Energy Efficiency Resources from ELCC accreditation and instead retain the current accreditation method. As PJM explained, retaining the existing Energy Efficiency Resource accreditation method avoids: double-counting the impact of those resources when PJM models the impact of Energy Efficiency resources in the load forecast; improperly affecting modeled risks patterns; and distorting the ELCC values of all other modeled resources. Furthermore, PJM did not propose to make Energy Efficiency Resources ineligible to become capacity resources, and as such we find AEMA's request is moot.

f. Resource Specific Performance Adjustment

i. Responsive Pleadings

110. The IMM asserts that PJM's RPA proposal is unjust and unreasonable because it uses RPA as a factor in a resource's accreditation calculation rather than using a resource-specific ELCC for each resource.[211] Other commenters identify implementation issues with PJM's proposed RPA.[212] Public Interest Organizations and Vistra assert that PJM has not adequately supported its proposed RPA. Public Interest Organizations state that, while PJM proposes to allocate resource class ELCCs to individual resources using a conceptually sound unit-specific RPA, many aspects of its implementation are unclear and the approach risks unreasonable and discriminatory accreditations if not implemented

[209] Proposed RAA Schedule 9.2(H).

[210] AEMA Comments/Protest at 6-8.

[211] IMM Protest at 22-23.

[212] Public Interest Organizations Protest at 17-2; Vistra Protest at 25-28; LSP Development Comments at 11-14; Duke Energy Kentucky Comments at 1-2.

properly.[213] Public Interest Organizations aver that PJM fails to demonstrate that its implementation of the RPA methodology will be just and reasonable and will send appropriate market signals. Public Interest Organizations state that transparency of the RPA process is necessary because those adjustments affect other elements of PJM's market design.[214] Public Interest Organizations argue that PJM has not included RAA provisions to ensure internal consistency across all procedures in which accreditation is an input. Public Interest Organizations state that the RPA for combined cycle resources should be reflected in Net CONE, which affects the VRR curve. Public Interest Organizations further state that the RPA should also be reflected in the calculation of the Capacity Performance Quantifiable Risk (CPQR).[215]

111. Public Interest Organizations argue that properly incentivizing firm fuel arrangements and weatherization requires accurately calculating the RPA and that PJM has not provided adequate explanation for what it will consider "valid" data, especially combined with the absence of transparency and reporting on what kinds of adjustments are made and on what basis.[216] Specifically, Public Interest Organizations state that relying on generator-supplied data risks inequitable treatment of generators and introducing data inconsistencies. Public Interest Organizations further state that there is no apparent mechanism to guarantee consistency in data used to support accreditation adjustments that should flow back into the class ELCC rating. Further, Public Interest Organizations state that because PJM does not propose to create ELCC classes based on fuel supply arrangements, only the RPA is available to ensure differentiation among individual resources.[217] Public Interest Organizations argue that PJM fails to make clear whether or how the RPA process would ensure that investments in better fuel supply or weatherization are rewarded. Furthermore, Public Interest Organizations state that the proposed RPA does not enable resources to be awarded on a prospective basis for making such investments, such as investing in firm fuel supply agreements after Winter Storm Elliott.

112. In addition, Vistra states that PJM's proposal must be rejected because its proposed accreditation methodology gives far too much weight to older data that is not

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[213] Public Interest Organizations Protest at 17-23.

[214] *Id.* at 23-25.

[215] *Id.* at 24-25 (noting that CPQR is an issue in the companion docket, Docket No. ER24-98).

[216] *Id.* at 17-23.

[217] *Id.* at 21-23.

reflective of how resources are likely to perform going forward and will result in both inaccurate accreditation values and disincentives for future investments in resource performance.[218] Vistra asserts that a resource's recent performance provides a stronger indicator of future performance. Further, Vistra argues that relying on older data will significantly devalue investments in performance enhancements to existing resources, thereby failing to provide an incentive for such investments. Vistra suggests in the alternative a methodology using a rolling, 3-year data set for performance or an approach that assigns more weight to a resource's more recent performance.

113. LSP Development argues that the proposed formula for calculating Accredited UCAP is unclear about the extent to which an individual resource's accredited capacity will depend on its RPA value versus the performance of its ELCC Class.[219] LSP Development further argues that PJM's proposed use of historical data will not give appropriate weight to recent investments made to improve performance, specifically for thermal resources. In addition, LSP Development states that the RPA methodology does not appear to account for permit limitations or transient system conditions, such as changes to transmission system constraints and topology, that may skew historical performance and not be representative of future operating prospects. LSP Development asserts that such concerns highlight the importance of giving adequate weight to the RPA factor in the calculation of a resource's accredited capacity and to the need to appropriately differentiate individual resources within a Resource Class.

114. Duke Energy Kentucky similarly argues that PJM's proposal to rely on historical performance data may create inaccurate resource accreditation values.[220] Duke Energy Kentucky states that historical data is limited because such data cannot provide an accurate representation of resources that changed technology in more recent years. Duke Energy Kentucky states that PJM has indicated it will give greater weight to hourly output data for the years that a resource added dual fuel technology when calculating the RPA. Duke Energy Kentucky seeks confirmation that PJM will clarify this in its Business Practice Manuals.

115. The IMM argues that there is an implementation problem with PJM's accreditation proposal related to the use of RPA to allocate ELCC Class Ratings to individual resources in the class.[221] The IMM states that PJM's proposed ELCC analysis does not produce resource specific capacity values. Instead, the RPA, which is calculated

[218] Vistra Protest at 16, 21-24.

[219] LSP Development Comments at 11-14.

[220] Duke Energy Kentucky Comments at 1-2.

[221] IMM Protest at 22-23; IMM Oct. 25 Answer at 14-15.

based on individual resources' estimated hourly output weighted by the loss of load probability during the hour, is used to allocate a Resource Class's ELCC to individual resources. The IMM asserts this method bases the allocation of a Resource Class's ELCC to individual resources on a small subset of the simulated hours having a non-zero loss of load probability and, therefore, it is not a reasonable methodology because it adds an unnecessary additional layer of randomness to final ELCC values.

ii. Deficiency Letter Response

116. In response to the deficiency request to explain how PJM will model hourly output for resources, PJM states that for resources that were in a different ELCC class at the beginning of the historical time period (June 1, 2012), it will not use the historical data of the resource but instead will derive putative output for the missing data.[222] For Unlimited Resources, PJM explains that it will rely generally on data from other resources in the same ELCC Class (e.g., forced outages, ambient derates) to generate the data. PJM indicates it will derive planned/maintenance outage schedules of the resource using a heuristic that levelizes reserves throughout the delivery year in each load scenario.[223] PJM also explains that it will estimate putative unavailability from an hourly backcast, which uses geographical location and plant characteristics as inputs for Variable Resources. Further, PJM states that the hourly output for Limited Duration Resources is not based on specific historical performance so a partial performance history is not significantly relevant. Instead, PJM states the maximum output for Limited Duration Resources is derated by EFORd, and for such resources without a full history back to June 1, 2012, PJM will calculate an EFORd using the individual resource's forced outage data and forced outage data of all resources in the relevant ELCC Class in a manner similar to that used to derive maintenance outage data for Unlimited Resources. Further, PJM explains that for a resource that makes an improvement that does not trigger a change in ELCC Class, it will not make adjustments to the historical performance data prior to the resource improvement date.[224]

iii. Comments on Deficiency Letter Response

117. Public Interest Organizations disagree with PJM's continued claim that its accreditation methodology, particularly the RPA, adequately address concerns that investments or other changes made to a resource to improve performance since 2012 will

[222] *Id.* at 20-22.

[223] *Id.* at 21 (citing Rocha-Garrido Aff. ¶ 27).

[224] *Id.* at 23.

be incorporated into the accreditation values.[225] Public Interest Organizations reiterate its arguments regarding the limitations of the RPA mechanism that will result in accredited values that will interfere with capacity market price signals, creating perverse incentives regarding resource behaviors that will worsen performance.

118. Referencing their earlier concerns with the accreditation process, LSP Development states that basing accreditation on broadly defined ELCC classes and a historical lookback at a resource's performance could unfairly penalize or reward resources based on their class or historical performance and fail to recognize steps taken to improve resource availability. Specifically, LSP Development states, for Unlimited Resources that begin operating after June 1, 2012, instead of focusing on the time the resource has been in operation, PJM will ascribe to that resource the historical performance of other resources in the same class. LSP Development argues that absent a reasonable approach to differentiate resources within an ELCC class, PJM's accreditation methodology cannot produce just and reasonable results.[226]

iv. Answers

119. PJM disagrees with protestors arguing that the proposed RPA mechanism will result in inaccurate accreditation values because the use of twelve years of historical data does not sufficiently weigh more recent resource performance data.[227] PJM explains that the use of historical data actually enhances the resource adequacy analysis and provides more accurate accreditation values because the key drivers of resource adequacy risk, including extreme weather events, are inherently infrequent and exclusion of the historical data would remove important data points from the analysis. PJM states that since 2012, it has experienced RTO-wide hot weather only in 2012, 2013, and 2019 and RTO-wide cold weather in 2014, 2015, 2018, 2019, and 2022 so that shortening the historical period to the most recent five years would inappropriately leave out valuable data and reduce an already small sample size of important performance data points to an even smaller sample.[228] PJM notes that historical experience and outage data indicates that the observed performance of thermal resources during recent years of mild weather does not provide an accurate representation of their performance during more extreme

[225] Public Interest Organizations Protest of Deficiency Letter Response at 3-6.

[226] LSP Development Comments on Deficiency Letter Response at 6.

[227] PJM Dec. 21 Answer at 18-20 (citing Vistra Protest at 21-22; Public Interest Organizations Protest at 22 and Wilson Aff. ¶ 33-34).

[228] *Id.* at 18-19 (citing Rocha-Garrido Reply Aff. ¶ 28.).

weather conditions. PJM states that it will continue to evaluate how and what historical data best characterizes future expected resource performance.

120. PJM states that the protests are based on the argument that PJM's marginal ELCC approach improperly evaluates all resources within the same class together, and therefore each resource's capacity accreditation is influenced by other members of the ELCC Class.[229] PJM explains that the proposed RPA can significantly affect an individual resource's accreditation value, noting that, based on sample ELCC RPA Coal Class statistics for the 2025/2026 Delivery Year, a 500 MW coal resource's Accredited UCAP can range between 334.9 MW and 464.5 MW, depending on how well the specific resource has performed relative to the rest of the Coal Class.[230]

v. Determination

121. We disagree with Vistra, Public Interest Organizations, and LSP Development's arguments that PJM's proposal to calculate the resource-specific performance adjustment using data beginning with June 1, 2012 may not appropriately consider more recent performance data (e.g., winterization improvements or improved performance due to fuel contract changes).[231] We find that PJM has demonstrated that its proposed historical sample period RPA is just and reasonable. In selecting the historical period, PJM must balance the benefits of using a longer historical sample – which captures a more diverse set of weather events (e.g., extreme weather events like the 2014 Polar Vortex and 2022 Winter Storm Elliott) against the downsides of doing so – which as protesters note may not fully capture the impact of more recent resource performance (e.g., improved availability due to resource upgrades). We find that PJM has demonstrated its proposal has struck a reasonable balance in selecting the historical sample period. As PJM's expert witness explains, expanding the historical performance considered back to 2012 allows PJM to reflect weather events that occur very infrequently but that nonetheless have a non-negligible probability of occurring. Further, recent experience has shown that extreme weather events can have significant impacts on resource availability; we therefore find it reasonable to include a longer history of extreme weather events in resource adequacy models and capacity accreditation, even if there have been changes in regulatory requirements, operational practices, or other factors that may affect resource availability. We agree with PJM that, while actions that increase a resource's expected availability (e.g., winterization measures, fuel supply arrangements, etc.) would not

[229] PJM Jan. 12 Answer at 11 (citing, e.g., LSP Development Protest at 5-7).

[230] *Id.* at 12-13 (citing Rocha-Garrido Reply Aff. ¶ 17).

[231] Vistra Protest at 16, 21-24; Public Interest Organizations of Deficiency Letter Response at 3-6; LSP Development Comments at 11-14.

necessarily result in an immediate improvement in its Accredited UCAP, its Accredited UCAP would nevertheless improve over time as any associated performance improvements are reflected in its historical performance data. We also find that PJM has demonstrated that the proposed RPA will meaningfully differentiate resources within an ELCC class based on their historical performance.[232] Having found that PJM's reliance on historical performance when such data is available is just and reasonable, we need not consider whether protesters' alternative proposals are superior to PJM's proposal.[233]

g. Compatibility with Capacity Performance

i. Responsive Pleadings

122. The IMM argues that, when applied to PJM's Capacity Performance framework, PJM's proposed accreditation methodology has the effect of penalizing solar resources for not producing energy in the middle of the night. The IMM asserts that, to ensure solar resources will not be subject to this "ludicrous requirement," PJM exempts intermittent resources from the must offer requirement. The IMM notes that PJM also proposes, in the companion docket, complex mechanisms to address this issue.[234] The IMM contends that PJM's insistence on using its ELCC approach leads to unnecessary and unreasonable risk in the market.

123. Public Interest Organizations state that, under the proposed methodology, PJM finds that it will only need to procure UCAP in an amount less than its forecast peak load and argues that this will result in a unreliable system unless some resources deliver more than their accredited UCAP during peak hours.[235] Public Interest Organizations further argue that a resource's capacity market obligations under the Capacity Performance framework are based on its committed UCAP, such that it is never obligated to provide more energy than its UCAP. Thus, Public Interest Organizations claim that PJM would only have enforceable rights to energy equal to less than its peak load, resulting in the

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[232] PJM Jan. 12 Answer at 12-13 (citing Rocha-Garrido Reply Aff. ¶ 17).

[233] *See PJM Interconnection, L.L.C.*, 169 FERC ¶ 61,038 at P 12 (citing *OXY USA, Inc. v. FERC*, 64 F.3d at 692 (finding that under the FPA, as long as the Commission finds a methodology to be just and reasonable, that methodology "need not be the only reasonable methodology, or even the most accurate one"); *Cities of Bethany v. FERC*, 727 F.2d at 1136 (when determining whether a rate was just and reasonable, the Commission properly did not consider "whether a proposed rate schedule is more or less reasonable than alternative rate designs")).

[234] *Id.* at 4 (referring to Docket No. ER24-98).

[235] Public Interest Organizations Protest at 29-31.

possibility that blackouts could occur even if load is within PJM's forecasts and all resources meet their UCAP obligations. Public Interest Organizations argue that this aspect of PJM's proposal makes it inconsistent with the *NYISO* precedent.

124. Furthermore, Public Interest Organizations argue that PJM's Capacity Performance Bonus and Penalty structure do not make sense under a marginal accreditation approach. Public Interest Organizations state that, because resources' limitations are already incorporated into their capacity accreditation, capacity suppliers will be charged penalties for failing to deliver a product they are not being paid for. Public Interest Organizations assert that periods when resources are expected to perform well are already considered in resources' capacity accreditations, and there is no justification for paying bonuses to resources that are merely fulfilling expectations. Public Interest Organizations conclude that applying the existing bonus/penalty structure in the context of marginal ELCC does not create an incentive for resources to perform as expected, but instead merely creates arbitrary windfalls and risks for suppliers, raising costs for no benefit.[236]

125. Finally, Public Interest Organizations argue that Limited Duration Resources, such as storage resources, will face perverse incentives under PJM's proposal and will seek to only provide their UCAP during an emergency event, rather than their full ICAP as PJM reliability planners expect. Public Interest Organizations state that Limited Duration Resources may behave this way to avoid potential penalties in later hours.[237]

ii. Answers

126. In response to protestors, PJM states that committed capacity resources are required to make their full capability available up to their resource's ICAP in accordance with the existing rules in the tariff.[238] PJM maintains that the energy market must-offer requirement for committed capacity resources, coupled with the combined incentives of energy market prices and capacity performance penalty and bonus incentives, will continue to ensure reliability under the proposed marginal ELCC construct. PJM also states that accredited and committed UCAP levels under the status quo significantly overstate the expected reliability contribution of certain resources during times of reliability risk, especially in winter. PJM contends that its proposal to base accreditation on marginal resource adequacy contribution is designed to better align the accreditation

[236] *Id.* at 31-33.

[237] *Id.* at 33-34.

[238] *Id.* at 8. *Id.* at 7 (citing PJM, Intra-PJM Tariffs, OATT attach. K-Appendix, § 1.10 (47.0.0), §1.10.1A(1)).

and committed UCAP of resources with their expected contribution during times of reliability risk.[239] PJM argues that during a PAI, in particular, the physical obligation and level needed to maintain reliability at that time is typically the ICAP equivalent of the full committed UCAP of the generation that is not on outage.[240]

127. In response, Public Interest Organizations further argue that, while current rules do provide strong financial incentives to resources to deliver energy, PJM's proposal does not. According to Public Interest Organizations, the proposal will place reliability "progressively more" on a must offer requirement that PJM itself has regarded as insufficient to incent performance, and "progressively less" on the capacity performance mechanism tied to UCAP that the Commission has deemed necessary for reliability.[241]

iii. Determination

128. We disagree with protests that contend that PJM's Capacity Performance construct or marginal ELCC accreditation proposal is unjust and unreasonable because, for example, solar resources cannot perform at night. As an initial matter, Variable Resources have been subject to the same non-performance charges as conventional resources under Capacity Performance since long prior to this filing.[242] PJM does not propose to change this aspect of its Capacity Performance design, and no party has demonstrated that PJM's proposal will unreasonably increase non-performance risks. Rather, we agree with PJM that resources' capacity accreditation under marginal ELCC will better align with their expected performance during a PAI, because marginal ELCC reflects a resource's expected performance during resource adequacy risk periods in the presence of all other resources on the system. Further, we note that resources may represent their non-performance risk in the Capacity Performance Quantitative Risk (CPQR) portion of their capacity supply offer. As such, we find that these protests are beyond the scope of this proceeding.

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[239] *Id.* at 8-9.

[240] *Id.* at 9.

[241] Public Interest Organizations Jan. 19 Answer at 4 (citing Capacity Performance Order, 151 FERC ¶ 61,208 at P 7).

[242] PJM, Intra-PJM Tariffs, OATT attach. DD, § 10A (0.0.0) does not differentiate between resource types in assessing penalties. Specifically it reads, "To the extent a committed capacity resource falls short of expected performance 'during all or any part of a clock-hour when an Emergency Action is in effect,' that capacity resource is assessed a Non-Performance Charge."

129. We disagree with Public Interest Organizations' contention that the proposed marginal ELCC capacity accreditation framework adversely affects resource incentives and, therefore, interferes with PJM's Capacity Performance framework and subsequently harms reliability and inflates costs. Specifically, Public Interest Organizations argue that, under its proposal, "PJM would only have enforceable rights to energy equal to 97.2 percent of their forecast peak load."[243] Further, Public Interest Organizations argue that Limited Duration Resources may be incented to behave strategically during PAI events and only provide their UCAP value (when they could provide more) as a hedging strategy against possible penalties if the event duration is longer.

130. First, we note that PJM is not proposing changes to these Capacity Performance requirements in this filing. Under the current rules, PJM obligates resources to perform at their UCAP level during a PAI for the purposes of calculating Capacity Performance penalties and bonuses. At the same time, PJM requires resources to offer their full physical capability into the energy market, and this physical capability generally exceeds the UCAP level.[244] Therefore, PJM would continue to retain a physical right to energy greater than resources' Accredited UCAP under its proposal, contrary to Public Interest Organizations' claim. Second, under its Capacity Performance construct, PJM levies penalties against resources that perform below their expected performance (adjusted by the Balancing Ratio) and distributes bonuses to resources that perform above their expected performance. Therefore, resources will continue to have a clear and significant incentive to perform above their Accredited UCAP during an emergency under PJM's proposal. Accordingly, we are not persuaded by Public Interest Organizations' concerns regarding harm to reliability. We also are not persuaded by concerns that a limited-duration resource may behave strategically during emergency events, which we regard as speculative and unsupported, and reiterate that PJM has not proposed any changes to the performance obligations of capacity resources in this filing.

h. Outage Data, Ambient Derates, and Thermal Uprates

i. Responsive Pleadings

131. The IMM states that PJM's current outage reporting data quality is not sufficient to support the changes PJM proposes to make to ELCC-based capacity accreditation.[245] The IMM explains that, after Winter Storm Elliott, it noticed significant discrepancies between the availability data submitted in energy market offers, the outages reported in

[243] Public Interest Organizations Protest at 30.

[244] PJM Deficiency Letter Response at 38.

[245] IMM Protest at 7-8.

eDART, and the outages reported in eGADS.[246] The IMM argues that the quality of PJM's outage data, especially during the high demand periods that determine ELCC values, must be carefully analyzed for accuracy and consistency and asserts that PJM has not done that analysis. The IMM states that if similar reporting issues to those found during Winter Storm Elliott occur in all other emergency situations, PJM's ELCC analysis will result in inaccurate accreditation.

132. The IMM further asserts that unverified summer derate data and the absence of winter derate/uprate data will result in inaccurate resource accreditations under PJM's proposed methodology.[247] The IMM explains that generators are not required to report these data and, when such reports are made, the data are not hourly but rather reflect only the highest expected daily derate. The IMM argues that the data are sufficient in PJM's existing capacity accreditation framework, where potential shortage hours are in the summer, yet the IMM contends that data quality issues defeat the purpose of PJM's proposed hourly analysis because they will cause inaccurate results. The IMM asserts that the absence of winter derate/uprate data means that some resources, especially Gas Combustion Turbine and Combined Cycle generators, will have inaccurately low winter capacity availability. The IMM explains in PJM's "Reserve Reliability Study," thermal generators are only available up to their summer ICAP, regardless of season. The IMM states that ignoring the fact that Gas Combustion Turbine and Combined Cycle generators have significant relative increases in capability during cold weather significantly underestimates winter capacity availability.[248]

ii. Answers

133. PJM agrees that there is room for improvement in the accuracy of the outage data, and that there have been extensive outage data reviews performed after every major system reliability event. PJM states that it has been working with the IMM on a tool to audit outage data across multiple systems. PJM disagrees with the IMM and states that all resources are required to report ambient derates. PJM agrees that generators are not

[246] eDART is PJM's Dispatcher Application and Reporting Tool, which enables generation and transmission owners to submit generation and transmission outage requests. eGADS is PJM's Generator Availability Data System, which supports the submission and processing of generator outage and performance data as required by PJM and NERC reporting standards.

[247] IMM Protest at 8-10; IMM Oct. 25 Answer at 3, 6.

[248] IMM Protest at 10. The IMM further states that PJM has estimated the class average summer accreditation value for gas combined cycle resources as 97% and winter accreditation value as 76%.

required to update the derate data more frequently than daily, but states that some resources do update the derate data more frequently than once a day. PJM commits to work with stakeholders to improve the quality of the ambient derate data.[249]

134. PJM argues that the IMM's concerns that ignoring ambient uprates in the winter underrates the capabilities of thermal resources are misplaced. PJM states that it performs its winter deliverability studies at the ICAP level for thermal generators. PJM goes on to argue that accounting for ambient uprates for thermal resources would result in output levels greater than ICAP. PJM continues that including output above ICAP in the resource adequacy studies, such as the ELCC and the Reserve Requirement Study, is not prudent because such output levels have not been studied as deliverable to the transmission system.[250]

iii. Determination

135. We disagree with the IMM's argument that the outage data that PJM proposes to use in its accreditation framework renders PJM's proposal unjust and unreasonable.[251] We note that PJM indicates that it routinely assesses data accuracy, particularly after a major system reliability event.[252] Further, as the IMM points out in its protest, PJM's request for updated outage data in response to Winter Storm Elliott revealed discrepancies between the availability data submitted in energy market offers, the outages reported in eDART, and the outages reported in eGADS. We find that PJM's ability to audit data, including data related to such extreme weather events, which pose significant reliability risks to the PJM system, will help to ensure that the data are accurate. More generally, all resources must accurately report outage data,[253] and PJM has committed to

[249] Rocha-Garrido Aff. ¶ 23-24.

[250] *Id.* ¶ 25.

[251] IMM Protest at 7-10.

[252] Rocha-Garrido Aff. ¶ 23-24.

[253] 18 C.F.R. § 35.41(b) (2023) ("A Seller must provide accurate and factual information and not submit false or misleading information, or omit material information, in any communication with the Commission, Commission-approved market monitors, Commission-approved regional transmission organizations, Commission-approved independent system operators, or jurisdictional transmission providers, unless Seller exercises due diligence to prevent such occurrences.").

work with both the IMM and its stakeholders to continue to improve outage data quality going forward.

136. For similar reasons, we reject the IMM's concerns that resources report their ambient derates on a daily, not hourly, basis, which the IMM argues undermines the accuracy of PJM's hourly accreditation model. As PJM points out, resources are already able to list their derates on an hourly basis, and some choose to do so. In short, we recognize PJM's commitment to use the best data that is available. Further, PJM states that it intends to work with its stakeholders to get them to report their ambient derates on an hourly basis instead of a peak daily basis.

137. We also disagree with the IMM's concerns that PJM's hourly modeling will unduly discriminate against thermal resources whose maximum output is higher in the winter. Thermal resources' hourly performance is capped at their level of CIRs, which is equal to their level of summer deliverability.[254] As PJM points out, honoring the IMM's request would require modeling thermal resources as being deliverable above their ICAP when such output levels have not been studied to be deliverable by the transmission system. Under PJM's proposal, thermal generators will have their modeled hourly output capped at their CIRs at all times of the year, because their studied generation deliverability in summer and winter correspond to the CIR level held by a resource.[255] We therefore disagree that PJM's proposal is unduly discriminatory against thermal resources. We continue to find that it is just and reasonable for PJM to consider deliverability limits within its ELCC framework to avoid relying on capacity that is potentially undeliverable to load.

i. NYISO Precedent

i. Responsive Pleadings

138. Some commenters argue that the NYISO precedent regarding marginal ELCC accreditation methods is not persuasive as it concerns PJM's filing. AMP and Public Interest Organizations argue that the NYISO precedent does not apply to PJM because

[254] PJM, Intra-PJM Tariffs, Proposed RAA, Schedule 9.2 D(2)(a) ("The output of an Unlimited Resource in any hour shall be capped at the greater of the resource's Capacity Interconnection Rights, or the transitional system capability as limited by the transitional resource MW ceiling as defined in the PJM Manuals, awarded for the applicable Delivery Year.").

[255] Deficiency Letter Response at 39.

the market structure fundamentals are significantly different between the RTOs.[256] AMP argues that the Commission has long recognized that market design rules may differ among the different regions and explicitly stated that "PJM's markets are fundamentally different from NYISO's, such that what may be appropriate for PJM is not necessarily appropriate for NYISO."[257] AMP identifies several ways the PJM capacity market differs materially from NYISO's. Noting that the PJM capacity market is a three-year forward market while NYISO operates "prompt" capacity auctions, AMP contends that the marginal accreditation approach may be more appropriate in instances where the forecast period is not as extensive. Further, AMP notes that PJM uses a Capacity Performance mechanism to incent resources to perform that is materially different from how NYISO incents performance.

139. Public Interest Organizations similarly argue that the NYISO precedent cannot support PJM's accreditation proposal.[258] Specifically, Public Interest Organizations assert that the NYISO capacity market and PJM capacity markets differ in ways that materially affect whether a marginal ELCC accreditation methodology is just and reasonable. Public Interest Organizations note that in the liquid PJM three-year forward auction where offer prices matter, not all resources clear, and the cleared resource mix is unknown prior to auction completion. Public Interest Organizations state that NYISO, however, runs a tight month-ahead spot market where the "vast" majority of resources submit price-taking bids and clear in the auction; therefore, the cleared resource mix is effectively known prior to the auction. Therefore, Public Interest Organizations assert that while the Commission rejected arguments in *NYISO* that marginal ELCC risked inaccurate accreditation finding that "the nature of NYISO's Spot Market Auction mitigates concerns that the resource fleet used to calculate Capacity Accreditation Factors would not closely resemble the resource fleet that clears the Spot Market Auction," that logic does not apply to PJM's proposal.[259]

140. Public Interest Organizations further state that another material difference between the NYISO and PJM capacity market designs affects the probability that marginal ELCC

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[256] AMP Protest at 15-16; Public Interest Organizations Protest at 25-28.

[257] AMP Protest at 15 (citing *N.Y. Pub. Serv. Comm'n v. N.Y. Indep. System Operator, Inc.*, 153 FERC ¶ 61,022, at P 78 (2015), *reh'g denied*, 154 FERC ¶ 61,088 (2016)).

[258] Public Interest Organizations Protest at 25-28.

[259] *Id.* at 26 (quoting *NYISO*, 179 FERC ¶ 61,102 at P 78).

accreditation will create a risk of reliability issues.[260] Public Interest Organizations explain that the Commission stated that NYISO's marginal ELCC accreditation methodology would not risk reliability because "NYISO's operating reserve demand curve will send a strong signal for resources to perform during shortage conditions regardless of their capacity payments."[261] However, Public Interest Organizations state that PJM relies on capacity obligations and Capacity Performance penalties as critical incentives for resource performance. Finally, Public Interest Organizations argue that the proposed marginal accreditation proposal raises an issue of first impression because it has important implications for cost allocation, an issue the Commission did not confront in NYISO's filing.[262]

141. By contrast, Constellation and Calpine agree that PJM's proposal is consistent with Commission precedent in *NYISO*.[263] Constellation states that the Commission accepted a similar approach in *NYISO* and agreed that a marginal capacity accreditation approach will send accurate investment signals about the reliability value of different resource types. Constellation notes that in *NYISO*, the Commission agreed that a resource that can only generate energy during certain hours of the day only provides a resource adequacy benefit to the extent that there is a risk of unserved load during those hours and notes that the Commission concluded that "[i]f the system has a large penetration of resources with correlated output such that there is little or no risk of unserved energy at times when those resources are generating, it is reasonable to assign commensurately lower capacity accreditation to those resources."[264] Calpine states that PJM's accreditation methodology is consistent with *NYISO* because it applies to all resource types, will accredit all resources based on their availability during peak loss-of-load probability hours, does not use subjective portfolio allocations (as the current average ELCC method does), and is technology neutral. Further, Calpine argues that PJM's proposed methodology is not unduly discriminatory because "any difference in outcome between resources would be a product of their physical and operational

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[260] *Id.* at 27.

[261] Public Interest Organizations Protest at 27 (quoting *NYISO*, 179 FERC ¶ 61,102 at P 81).

[262] *Id.* at 28. Discussed in detail at *infra* at IV.B.2.b.vii.

[263] Constellation Comments at 9 (citing *NYISO*, 179 FERC ¶ 61,102 at PP 75-82; Calpine Comments at 7-11; Calpine Comments on Deficiency Letter Response at 8-9.

[264] *Id.* at 9 (quoting *NYISO*, 179 FERC ¶ 61,102 at P 79).

characteristics and thus expected ability to meet the system's reliability needs, and would not reflect undue preference or discrimination."[265]

ii. Determination

142. As discussed above, we find that PJM's proposal will improve system reliability by more accurately evaluating its system's needs and its expected resources' capabilities. We also find that PJM's proposal is very similar to the marginal ELCC approach approved in NYISO. As further discussed above, we do not find that PJM's longer forward period, and any resulting differences between the forecasted and cleared resource mix, renders PJM's proposal unjust and unreasonable. For the same reason, we reject Public Interest Organizations' arguments that PJM's system having a larger percentage of uncleared, energy-only capacity than NYISO is a cause for concern. Beyond our previous discussion of differences in the forecasted and cleared resource mix, the existence of additional capacity beyond the Reliability Requirement should help to mitigate Public Interest Organizations' concerns that these differences may result in a reliability issue, not exacerbate them. We note that, PJM's operating reserve demand curve retains a scarcity pricing regime under which energy-only resources face a strong incentive to perform in response to real-time emergencies, not unlike NYISO's. More generally, we agree with Calpine and Constellation's enumeration of the benefits of PJM's proposal.[266]

2. Reserve Requirement Study

a. Filing

143. PJM proposes to expand its current resource adequacy risk modeling, i.e., the Reserve Requirement Study, to consider all hours of the delivery year under system supply and demand conditions consistent with meeting the one day in ten years LOLE target.[267] Specifically, PJM proposes to use the same hourly probabilistic model underlying its ELCC accreditation for the Reserve Requirement Study.

144. PJM explains that there are many similarities between the Reserve Requirement Study and the ELCC methodology: "both studies model load and resource performance uncertainty at the PJM Region level and use the LOLE criterion of one day in ten years,"

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[265] *Id.* at 10 (quoting *NYISO*, 179 FERC ¶ 61,102 at P 79).

[266] Calpine Comments at 7-11; Calpine Comments on Deficiency Letter Response at 8-9; Constellation Comments at 9.

[267] Transmittal at 17, 55.

and both calculations rely on the same set of inputs.[268] PJM states that, today, a full overlap between the ELCC and Reserve Requirement Study models is precluded only by the fact that only a subset of Capacity Resources are accredited using ELCC analysis and thus included in the ELCC model under the current rules. PJM states that its proposal in this filing to accredit all resources except Energy Efficiency Resources using ELCC resolves this issue and allows for PJM to use the same model for both ELCC and the Reserve Requirement Study.[269] PJM explains that using the same model for both analyses allows the Reserve Requirement Study to benefit from the interval modeling of all 8,760 hours in a year that is part of the ELCC model, in contrast to the current Reserve Requirement Study's approach of only analyzing the peak hour of each day.

145. As part of adopting the same model for the ELCC analysis and the Reserve Requirement Study, PJM proposes to calculate the FPR, i.e., the necessary Installed Reserve Margin in UCAP terms, based on the Pool-wide average Accredited UCAP Factor, in place of the current pool-wide EFORd.[270] PJM explains that use of the pool-wide EFORd is no longer appropriate, because EFORd will not be used to accredit Capacity Resources under PJM's proposal. PJM proposes to define the Pool-wide average Accredited UCAP Factor as the ratio of the total Accredited UCAP to total installed capacity of all resources.[271] Further, to allow time for updated information on planned generation resource participation and incorporation of other relevant data, PJM proposes to post the FPR 75 days in advance of each BRA, in place of the current three months in advance.[272]

146. To further enhance its resource adequacy modeling, PJM proposes to assess its resource adequacy risk using the EUE metric, keyed to meeting the traditional one day in ten years LOLE metric that PJM has historically employed.[273] PJM states that the current LOLE reliability criterion does not fully represent the three typical reliability dimensions: magnitude (MW), duration (hours), and frequency (numbers of events per time period).[274]

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[268] *Id.* at 57.

[269] *Id.* at 57-58.

[270] *Id.* at 58.

[271] PJM, Intra-PJM Tariffs, Proposed RAA, Schedule 4.1, (2.0.0), § C.

[272] Transmittal at 59.

[273] *Id.* at 60.

[274] *Id.* at 61.

In contrast, PJM states that EUE provides a much more granular metric that allows the resource adequacy analysis to clearly differentiate among events of different duration and magnitude, and to better identify the scope of loss of load risk throughout the year. Further, PJM argues that the changing resource mix, which increasingly will be composed of resources with greater hourly performance variability, further supports the need to include EUE in resource adequacy risk modeling.[275] To effectuate the adoption of EUE in its reliability planning, PJM proposes to revise the definition of "Reliability Principles and Standards" to make clear that it is PJM and not "NERC or an Applicable Regional Entity" that defines the "applicable probabilistic loss of load criteria" PJM will use.[276]

147. PJM states that its new ELCC and Reserve Requirement Study model will improve the accuracy of, and confidence in, the Installed Reserve Margin and the FPR.[277] Specifically, PJM explains that its new model will include: (1) weather history dating from June 1, 1993, providing greater confidence in the modeled load patterns and weather-dependent resource performance patterns; (2) correlated forced outage patterns of Unlimited Resources; (3) forced outage modeling of Unlimited Resources dating from June 1, 2012; and (4) modeling of any historical correlations between forced outages of Unlimited Resources and the unavailability of Variable Resources. PJM states that these improvements to the Reserve Requirement Study and ELCC model will provide greater confidence in PJM's capacity auctions and their ability to procure proper amounts of capacity, which should enhance price formation and efficient market outcomes.

148. PJM also proposes to employ the ELCC and Reserve Requirement Study model and adopt an EUE metric in the studies of the Capacity Emergency Transfer Objective, which represents the import capability required by an LDA.[278] Specifically, PJM proposes to replace its current LDA resource adequacy requirement of an LOLE of one day in 25 years with "a normalized [EUE] for the area that is equal to forty percent of the normalized [EUE] for the RTO when at the annual reliability criteria."[279] PJM explains that an EUE metric is appropriate for Capacity Emergency Transfer Objectives because it identifies the amount of load that cannot be served, regardless of how many loss of load

[275] *Id.* at 61-62.

[276] *Id.* at 62-63 (citing PJM, Intra-PJM Tariffs, Proposed RAA, Article 1 – Definitions (43.0.0)).

[277] *Id.* at 63-64.

[278] *Id.* at 69-70.

[279] *Id.* at 70-71 (citing PJM, Intra-PJM Tariffs, Proposed RAA, Article 1 – Definitions (43.0.0)).

events occur, and therefore provides greater comparability between heterogeneous LDAs. PJM also states that its proposed 40% EUE metric is comparable to the current LOLE metric of one day in 25 years, because it corresponds to the ratio of the current LOLE criteria for an LDA (0.04 days per year) and the current LOLE criteria for the RTO (0.1 days per year).

b. Responsive Pleadings

i. Overall

149. Several parties express support for PJM's proposed changes to its resource adequacy risk modeling framework. For example, P3, OPSI, Ohio FEA, and Constellation state that they support PJM's proposal to utilize an EUE metric in its reliability analyses.[280] Ohio FEA notes that NERC's technical reference report on Probabilistic Adequacy and Measures found that EUE is the only metric that considers the magnitude of loss of load events and addresses all reliability risk metrics, including frequency, duration, and magnitude.[281] Further, FRR Coalition and Renewable Energy Coalition agree with PJM that simply planning the reserve margin to meet summer peak is no longer adequate, given factors such as winter fuel constraints faced by gas-fired resources and the evolving resource mix.[282] More specifically, Renewable Energy Coalition argues that empirical data and enhanced reliability modeling both show that PJM currently substantially understates the risk that thermal outages pose to the power system, and states that PJM correctly proposes to model outages as correlated with weather and across the fleet, and to include extreme weather data in its reliability risk modeling.[283] Finally, Calpine argues that PJM's proposed updates to its risk modeling

[280] *See, e.g.*, P3 Comments at 6-7, OPSI Comments at 2-3, Ohio FEA Comments at 7, Constellation Comments at 9-11.

[281] Ohio FEA Comments at 7 (citing NERC, *Probabilistic Adequacy and Measures* (Jul. 2018), https://nercstg.nerc.com/comm/PC/Probabilistic%20Assessment%20Working%20Group%20PAWG%20%20Relat/Probabilistic%20Adequacy%20and%20Measures%20Report.pdf.)

[282] FRR Coalition Comments at 4-5, Renewable Energy Coalition Comments at 14-15.

[283] Renewable Energy Coalition Comments at 14-15.

are consistent with broadly accepted best practices, and are "must-have" reforms necessary to ensure reliability over the long term.[284]

150. Other parties raise concerns with PJM's proposed revisions to its resource adequacy risk modeling and associated revisions to the FPR calculation. For example, parties raise various concerns with the transparency and implementation of PJM's risk model,[285] including issues such as weather history,[286] load shapes,[287] and the Capacity Benefit of Ties.[288] Further, ODEC and the IMM question PJM's proposed method to derive Capacity Emergency Transfer Objectives under its revised risk model.[289] Finally, parties raise various concerns regarding PJM's proposed revisions to the FPR and associated cost allocation.[290]

ii. Transparency and Implementation Details

151. Public Interest Organizations state that the Rocha-Garrido Affidavit raises numerous questions about various assumptions in PJM's risk modeling, such as modeling of planned generator outages during high-risk periods, use of temperature bins (including the merging of bins with limited data to develop resource performance histograms), and adjustments to daily loads to account for errors in load forecasts, that are either questionable or completely unexplained.[291] Public Interest Organizations assert that the Commission must require PJM to produce additional information to substantiate these decisions before it can approve PJM's accreditation rules as just and reasonable.

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[284] Calpine Comments at 12.

[285] *See e.g.*, OCC Protest at 27; Public Interest Organizations Protest at 57-58.

[286] NOVEC Comments at 7; Public Interest Organizations Protest a 56-57.

[287] NOVEC Comments at 7-8; IMM Protest at 11-12.

[288] OCC Protest at 27-28.

[289] ODEC Comments at 11; IMM Protest at 24-25.

[290] *See, e.g.*, Public Interest Organizations Protest at 42-47; P3 Comments at 10; LSP Development Comments at 14-16.

[291] Public Interest Organizations Protest at 57-58.

iii. Weather History

152. OPSI states that the split between summer and winter risk has important implications for both the accuracy of resource accreditation and cost allocation and that PJM should continue to evaluate competing reliability risk modeling methods and data sources to ensure PJM's modeling accurately captures future reliability risks throughout the year.[292]

153. NOVEC states that because extreme weather events, including heat waves, are becoming more common, the Commission should require PJM to develop a mechanism that weighs recent data more heavily than older data, so its analyses account for changing weather trends.[293] NOVEC also asserts that PJM should be required to include a mechanism for developing, updating, and verifying load shapes based on forecasts of future conditions rather than historical behavior, as they will need to account for growing and changing demand such as EVs and data center development.[294]

154. Similarly, Public Interest Organizations assert that PJM fails to account for upward temperature trends within the 30 years of weather data that it proposes to use.[295] Public Interest Organizations state that this will lead to inaccurate assumptions about the likely future level and volatility of the future summer and winter extreme temperatures and will result in unnecessary reserve margins and a resource mix skewed more toward winter resources.[296]

155. Public Interest Organizations state that PJM fails to examine whether historical data regarding power plant performance is a good indicator of future performance, citing the improvement in thermal plant forced outage rates following the 2014 Polar Vortex.[297]

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[292] OPSI Comments at 5-6.

[293] NOVEC Protest at 7.

[294] *Id.* at 7-8.

[295] Public Interest Organizations Protest at 56.

[296] *Id.* at 56 (citing Wilson Aff. ¶ 27).

[297] *Id.* at 56-57 (citing Wilson Aff. ¶¶ 35-41).

156. Calpine states that it is just and reasonable to align PJM's risk modeling methodology with its marginal ELCC methodology, and strongly supports the proposal.[298]

iv. Capacity Benefit of Ties

157. OCC states that it is unclear why PJM is proposing to retain an "average" approach to determine the Capacity Benefit of the Ties for purposes of calculating the appropriate reserve requirement as part of its proposed marginal ELCC approach.[299] OCC asserts that it is possible that the use of consistent parameters could address any unknown and conservative assumptions about load diversity that determine capacity benefit margins.[300]

v. Capacity Emergency Transfer Objective

158. ODEC states that PJM's proposed change from a 1-day-in-25 years LOLE for its Capacity Emergency Transfer Objective (CETO) calculation to a EUE of 40% does not explain how resource adequacy will be maintained at reasonable cost.[301] ODEC asserts that PJM has not provided sufficient transparency and explanation of the need and impact of its proposed change in the CETO provisions for the Commission to determine that this aspect of the proposal is just and reasonable.

159. The IMM states that PJM's Capacity Emergency Transfer Limit (CETL)/CETO analysis assumes that all the planned generation in the queue that had completed the Interconnection Service Agreement at the time of calculating auction parameters would offer in the capacity market auction, but does not test if the CETO value satisfies the target reliability criteria of one loss of load event in 25 years on average with capacity committed through the auction.[302]

vi. Installed Reserve Margin and FPR

160. P3 and LSP Development argue that PJM has not adequately explained the extent to which arriving at an FPR less than one under its proposal, as described in the Rocha-

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[298] Calpine Comments at 12.

[299] OCC Protest at 27.

[300] *Id.* at 28.

[301] ODEC Comments at 11.

[302] IMM Protest at 23.

Garrido Affidavit, will maintain reliability.[303] P3 states that it is concerned that a FPR less than one would result in a target procurement less than the region's load forecast, and P3 requests that the Commission make clear to PJM that it should be procuring sufficient capacity to meet peak demand.[304] LSP Development argues that PJM should conduct additional studies to ensure that its model will result in the procurement of adequate capacity to maintain reliability in a broad array of circumstances, including when the system demand is at the modeled level. Similarly, Public Interest Organizations assert that under PJM's proposal, PJM could procure less UCAP than its forecasted peak load, meaning that some suppliers will be counted on to deliver more than their UCAP during peak hours to maintain reliability.[305]

161. In contrast, Calpine argues that there is no issue with an FPR that results in a total capacity requirement that is lower than gross peak load.[306] Specifically, Calpine states that, in assessing reliability risk on a system where loss-of-load risk has shifted away from periods of peak demand, both the numerator (available resources) and the denominator (load) of the planning reserve margin should be derived based on the periods with the highest loss-of-load risk, which are not necessarily periods of peak demand. Calpine explains that, though PJM and others may still discuss capacity requirements in terms of the familiar peak load rubric, that rubric will become less and less useful as the portfolio of resources changes. Calpine emphasizes that, if the highest loss-of-load risk periods are not periods of peak demand, that necessarily means that the system has sufficient resources to meet peak.

vii. Cost Allocation

162. Public Interest Organizations and SMECO argue that PJM has not adequately explained and justified how its proposed changes to the FPR would flow through to individual load serving entities' capacity requirements and remain consistent with cost allocation principles.[307]

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[303] P3 Comments at 10; LSP Development Comments at 14-16. *See* Rocha-Garrido Aff. ¶¶ 51-53.

[304] P3 Comments at 10.

[305] Public Interest Organizations Protest at 29-30.

[306] Calpine Comments at 8-9.

[307] *See* Public Interest Organizations Protest at 42-47; SMECO Comments at 3-5.

163. Specifically, Public Interest Organizations argue that PJM's proposal to calculate the FPR based on the pool-wide Average Accredited UCAP Factor, as determined by marginal ELCC, "improperly socializes investments in electricity supply."[308] Public Interest Organizations state that PJM's proposal would reduce the FPR from around 109% to around 96%, corresponding to a nearly 20 GW reduction in the RTO-wide UCAP requirement. Public Interest Organizations claim that this reduction in the UCAP procurement target is a necessary feature of any marginal accreditation approach and argues that PJM fail to consider how to justly and reasonably allocate this reduction among load serving entities.[309] Public Interest Organizations state that many of the resources expected to come online in PJM are renewable and storage resources supported by state energy policies with declining marginal ELCC curves that will cause a reduction in the UCAP requirement. Public Interest Organizations assert that PJM's proposal would socialize the UCAP reduction benefits of these investments across all of PJM, resulting in significant uncompensated contributions from states with aggressive decarbonization targets and significant benefits accrued by larger states with less aggressive decarbonization targets.[310]

164. Public Interest Organizations argue that socializing the UCAP requirement across all of PJM violates cost-causation principles in three ways. First, PJM's approach wrongly deprives consumers that have invested in renewable energy of the benefits of their investments.[311] Second, providing the benefit from one state's clean energy investments, i.e., a reduced capacity obligation, to consumers in another state wrongly forces states that have invested in clean energy to subsidize those that have not.[312] Third, PJM's proposal fails to ensure that benefits and costs are commensurate because it provides the benefits of clean energy investments to those who have not made those investments. Public Interest Organizations argue that equitable benefit allocation would require that the output of resources supported by state energy policies be netted against the load curves of utilities in that state prior to determining their resource adequacy needs.[313] Public Interest Organizations contend that this approach would produce outcomes consistent with those that would be obtained if the resources were "physically

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[308] Public Interest Organizations Protest at 44.

[309] *Id.* at 44-45.

[310] *Id.* at 45-46.

[311] *Id.* at 46 (citing *Old Dominion Elec. Coop.*, 898 F.3d 1254, 1255).

[312] *Id.* at 46 (citing *Ill. Com. Comm'n*, 576 F.3d 470, 475).

[313] *Id.* at 46-47.

netted" by being collocated with load, and consistent with much of the literature on marginal ELCC from western states.

165. More broadly, Public Interest Organizations argue that PJM's proposal is not just or reasonable without conforming changes to the capacity market cost allocation rules.[314] Public Interest Organizations state that PJM's filing reports that 64% of system risk on an EUE basis is now during winter, when load is relatively low, and only 36% of risk is during summer peak load periods.[315] Public Interest Organizations argue that, despite this significant change in how PJM will identify the need for capacity, PJM failed to propose changes to how it allocates capacity costs to load serving entities. Public Interest Organizations state that PJM's current rules allocate capacity costs solely based on load during the single peak hour of the year and argues that maintaining this approach runs afoul of established precedent that "approved rates reflect to some degree the costs actually caused by the customer who must pay them."[316]

166. However, Calpine argues that characterizing the marginal ELCC framework as creating a "free-rider" problem, whereby some load serving entities benefit by lowering their capacity requirements due to resource investments made by others, is incorrect.[317] Calpine states that this type of criticism is neither new nor valid, explaining that in PJM, load serving entities already are affected by others' investments in capacity resources because they currently procure capacity based on their coincident peak load contribution. Calpine contends that attempting to "remedy this perceived problem would result in discriminatory treatment of resources in contravention of Commission precedent."[318]

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[314] *Id.* at 42-43.

[315] *Id.* at 43 (citing Rocha-Garrido Aff. ¶ 47).

[316] *Id.* at 43 (citing *Midwest ISO Transmission Owners v. FERC*, 373 F.3d 1361, 1368 (D.C. Cir. 2004)).

[317] Calpine Comments at 10-11 (citing Ming Aff. ¶¶ 21:3-5, 14:16-18. and 25:12-13).

[318] *Id.* at 11 (citing, *e.g.*, *PJM Interconnection, L.L.C.*, 175 FERC ¶ 61,084 at P 108).

viii. Revision to Reliability Principles and Standards

167. ODEC argues that PJM's revision to the definition of Reliability Principles and Standards in the RAA appears overly broad.[319] Specifically, ODEC explains that PJM proposes to effectuate its adoption of the EUE metric by revising the definition of Reliability Principles and Standards to state "principles and standards established by the Office of the Interconnection" in place of the current reference to "principles and standards established by NERC or an Applicable Regional Entity"[320] ODEC contends that this proposal raises two concerns. First, ODEC states that it appears PJM is clarifying its view that it could change the 1-day-in-10-years LOLE criterion without any need for review by the Commission or even PJM stakeholders. ODEC requests that PJM clarify its intent with regard to possible changes to the LOLE criterion. Second, ODEC argues that PJM's proposed revision could result in confusion or unintended consequences because PJM has not identified and explained each instance where the term Reliability Principles and Standards appears in the RAA and tariff, so that the Commission can ensure that this change does not impact reliability matters that should be reserved for NERC and the applicable regional entity.[321] ODEC states that, based on a brief review of the RAA, there are several provisions that reference Reliability Principles and Standards where it may not be appropriate to eliminate NERC and the Applicable Regional Entity from any role.

c. Deficiency Letter Response

168. In its Deficiency Letter, Commission staff asked PJM to explain to what extent a FPR value less than one may result in PJM procuring less capacity than PJM's forecasted peak load.[322] PJM responds that there is nothing in the proposed marginal ELCC capacity accreditation framework that artificially lowers the FPR. Instead, PJM explains that the FPR reflects resource performance and load levels during hours with high EUE, and those hours may not always be hours with high gross loads.[323] PJM explains that the FPR has traditionally represented the percentage of UCAP reserves relative to the forecasted peak load needed to meet the 1-in-10 LOLE criterion. PJM notes that the

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[319] ODEC Comments at 8-9.

[320] *Id.* at 8-9 (citing PJM, Intra-PJM Tariffs, Proposed RAA, Article 1 – Definitions (43.0.0)).

[321] *Id.* at 9-10.

[322] Deficiency Letter Response at 35.

[323] *Id.* at 35-36.

decision to express the value relative to forecasted peak load is merely practical, and that under the current accreditation framework, the FPR usually has a value of 1.09.

169. Under a marginal ELCC framework, PJM explains, Accredited UCAP is representative of the hours of risk in the system considering the balance of both supply and demand. PJM states that, under an average ELCC, the FPR is, by design, representative of demand uncertainty only. PJM also argues that, under a marginal ELCC methodology, while resources' expected output in the loss of load hours ("at risk" hours) is closer to their Accredited UCAP values, their expected output during hours with high gross loads that are not "at risk" hours is higher, closer to their ICAP levels. PJM therefore argues that the level of committed ICAP that is cleared when meeting the reliability UCAP target is sufficient to meet the higher gross loads that do not see resource adequacy risk.[324]

170. Finally, PJM explains that, if the EUE were concentrated in the peak load hour, the marginal accreditation and the FPR will reflect this fact and that the FPR value would be much closer to the values seen using the current analysis methods where the vast majority of LOLE occurs during peak load conditions.

d. Answers

171. In response to commenters arguing that PJM provided insufficient information regarding how CETO and Reliability Requirements of individual Locational Deliverability Areas ("LDAs") will be calculated, PJM states that the proposed ELCC/RRS modeling changes will also be applied to the calculation of LDAs' CETOs and Reliability Requirements.[325] In addition, PJM describes the iterative process it uses to calculate CETO and then explains that the Reliability Requirement of an LDA is equal to its calculated CETO values plus the LDAs internal Accredited UCAP.[326] PJM states that it compared the 2025/26 CETO study results using the proposed and the current models and found that some CETOs in some LDAs were higher, and some were lower.

172. Contrary to the IMM's arguments,[327] PJM states that the level of thermal forced outages during Winter Storm Elliott, the load levels the system experienced, and the

[324] *Id.*

[325] Rocha-Garrido Aff. ¶¶ 22, 41-42.

[326] Rocha-Garrido Reply Aff. ¶ 20-22

[327] IMM Protest at 8.

correlation between the cold temperatures and levels of unavailability experienced by the overall PJM fleet are all included in the ELCC/RRS models.[328]

173. In response to Public Interest Organizations' questions about PJM's temperature bins, PJM describes the bins including the temperature ranges, and how many days would be in each bin based upon different historical periods. PJM explains its decision to merge some bins in order to strike a balance between the temperature range covered by the merged bin and the number of days to sample resource performance patterns from days that fall in the merged bin.[329]

174. With respect to cost allocation, PJM argues that the cost allocation outcomes from its proposal naturally follow value-based compensation for capacity benefits and roughly cost-based allocation for capacity costs.[330] PJM also argues that it does not propose to change its cost allocation methodology in this proceeding and therefore Public Interest Organizations' request is outside the scope of this proceeding. PJM argues that it does not have to alter its cost allocation methods each time it makes a major change to its capacity market citing the changes that underlay the Capacity Performance proposal were accepted without a change to cost allocation.[331] Regarding Public Interest Organizations' proposed alternative cost allocation methodology, PJM contends that there does not appear to be any legal mechanism by which "the output of resources supported by state energy policies [is] netted against the load curves of utilities in that state prior to determining their resource adequacy needs . . ." and argues that this approach would constitute clearly unduly discriminatory treatment across resources. PJM concedes that jurisdictions subsidizing declining marginal value resources are lowering the amount of capacity needed on the system, by shifting system risk to hours when gross load is below the gross load peak. Nonetheless, PJM argues that the compensation each resource receives should reflect the value that the resource brings to *that* system and not a hypothetical alternative system with lower penetration. PJM states that its proposal accomplishes this end.[332] Further, PJM states that its proposal allocates costs in a manner no different than that already found reasonable and "nearly

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[328] Bruno and Graf Reply Aff. at ¶ 35.

[329] *Id.* at ¶ 31.

[330] *Id.* at ¶ 35.

[331] PJM Jan. 12 Answer at 26-27 (citing *City of Winnfield v. FERC*, 744 F.2d 871, 877 (D.C. Cir. 1984) (*Winnfield*) and *Advanced Energy Mgmt. All. v. FERC*, 860 F.3d 656, 662 (D.C. Cir. 2017) (*AEMA*)).

[332] Bruno and Graf Reply Aff. ¶ 38.

incontrovertible" in the energy market, i.e., where energy price reductions caused by one resource investment (e.g., a large baseload clean energy resource) are enjoyed by all load and not only the load in the jurisdiction supporting the resource in question.[333]

175. Public Interest Organizations respond to PJM's Answer, stating that, because marginal ELCC accreditation results in an LSE's contribution to capacity needs being independent of its peak load, continuing to allocate capacity costs to LSE's on a peak load ratio share basis severs the cost causation link[334] because capacity needs are no longer caused by peak demand.[335] Public Interest Organizations state that PJM concedes that "declining marginal value resources are indeed lowering the amount of capacity needed on the system—because the load that system resources need to serve during periods of risk shift to hours when the gross load is below the gross load peak."[336] Public Interest Organizations argue that although PJM has not explicitly proposed changes to its cost allocation methodology in this proceeding, the proposed marginal ELCC accreditation framework directly affects the justness and reasonableness of the existing cost allocation methodology.[337] Public Interest Organizations assert that this issue is appropriately considered by the Commission in the context of a section 205 filing.

176. Public Interest Organizations state that PJM's reliance on legal precedents is misleading or irrelevant. Specifically, Public Interest Organizations assert that *City of Winnfield v. FERC* cannot remove PJM's burden to prove that its proposal is just and reasonable, as it did not hold, and does not suggest, that PJM can thwart the Commission's review by refusing to make its cost-causation change explicit.[338] Similarly, Public Interest Organizations state that PJM's reliance on *Advanced Energy Management Alliance v. FERC* is misleading.[339] Public Interest Organizations state that in *AEMA* the court explained that a proposed change to a tariff rendering an unchanged

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[333] *Id.* at 39.

[334] Public Interest Organizations Jan. 19 Answer at 7 (citing *e.g., El Paso Elec. Co. v. FERC*, 76 F.4th 352, 357 (5th Cir. 2023) (noting that allocated costs must "reflect to some degree the costs actually caused by the customer who must pay them").

[335] *Id.* at 9.

[336] *Id.* at 6 (citing PJM Dec. 21 Answer, Bruno and Graf Aff. ¶ 38).

[337] *Id.* at 5-9.

[338] *Id.* at 7-8 (citing *Winnfield*, 744 F.2d at 877).

[339] *Id.* at 8 (citing *AEMA,* 860 F.3d 656).

provision unjust and unreasonable is "not dispositive," because the Commission could still approve the proposal "[i]f the total effect of the rate order cannot be said to be unjust and unreasonable."[340] Public Interest Organizations argue that *AEMA* does not support PJM's effort to restrain the Commission from a holistic review of "the total effect of the rate order," including effects on cost-causation.[341] Finally, Public Interest Organizations dispute PJM's reliance on *Midcontinent Independent System Operator, Inc*. to assert that it has no burden to prove that purportedly unchanged cost-allocation provisions are just and reasonable.[342] To the contrary, Public Interest Organizations state that in *Midcontinent Independent System Operator, Inc*. the Commission did not ignore the effects on unchanged portions of the tariff, as PJM suggests. Rather, Public Interest Organizations state that the Commission found that the change at issue did not "affect[] the reasonableness of the other, unchanged features of the [] cost allocation method."[343] Specifically, Public Interest Organizations assert that the Commission supported this finding by considering whether the revision "materially modifie[d] the [existing] cost allocation methodology such that it calls into question the continued justness and reasonableness of unchanged [] provisions in the tariff."[344] Therefore, Public Interest Organizations conclude that far from supporting PJM's claimed ability to constrain the Commission's review, *Midcontinent Independent System Operator, Inc* supports exactly what Public Interest Organizations are calling for here.[345] Public Interest Organizations maintain that PJM has failed to provide analysis regarding the cost allocation concern, thus rendering the PJM proposal unjust, unreasonable, and unduly discriminatory.[346]

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[340] *Id.* at 8 (citing *AEMA*, 860 F.3d at 664).

[341] *Id.* at 8.

[342] *Id.* at 8 (citing PJM Jan. 12 Answer at 26–27 (citing *Midcontinent Indep. Sys. Operator, Inc*., 181 FERC ¶ 61,219, at P 32 (2022))).

[343] *Id.* at 8 (citing PJM Jan. 12 Answer at 26–27 (citing *Midcontinent Indep. Sys. Operator, Inc*., 181 FERC ¶ 61,219 at P 32)).

[344] *Id.* at 8-9 (*Midcontinent Indep. Sys. Operator, Inc*., 181 FERC ¶ 61,219 at P 34).

[345] *Id.* at 8-9.

[346] *Id.* at 5.

e. Determination

177. We accept as just and reasonable PJM's proposal to use the same hourly probabilistic model underlying its ELCC accreditation for the Reserve Requirement Study. Using the same model for determining the amount of capacity required and the amount of capacity a resource is capable of providing is a reasonable modeling methodology that allows risk to be evaluated on a more granular level and provides for consistency between the system's resource adequacy requirements and resource accreditation to meet those requirements. We agree with PJM that using the same model for both analyses allows the Reserve Requirement Study to benefit from the hourly interval modeling of all 8,760 hours in a delivery year that is used in the ELCC model, instead of just analyzing the peak hour of each day under the current Reserve Requirement Study model.[347] We also note that this proposal allows PJM to ensure that its determination of the level of capacity needed to maintain a given level of resource adequacy is consistent with its accreditation of the contribution of capacity resources that are procured to meet that level.

178. We find that Public Interest Organizations raise questions regarding various assumptions in PJM's risk modeling that are not included in PJM's proposed tariff revisions. We have found here that PJM's proposed ELCC model and, by extension, its resource adequacy risk model is just and reasonable. We do not find that it is necessary for the tariff to contain further detail because the Commission has found that "study assumptions and parameters" are appropriately included in manuals.[348]

179. For the same reason, we are not persuaded by arguments that PJM's proposal is unjust and reasonable because it does not account for the expected impact of climate change. PJM's proposed tariff language is not prescriptive regarding how PJM will consider historical weather in its Reserve Requirement Study and ELCC modeling processes.[349] We find that it is appropriate for PJM to have this discretion so that PJM

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[347] The importance of this type of more granular resource adequacy modeling has been highlighted by the North American Electric Reliability Corporation in its recent 2023 Long-Term Reliability Assessment. North American Electric Reliability Corporation, *2023 Long-Term Reliability Assessment*, at 11 ("Resource planners and wholesale markets must use enhanced modeling that accounts for energy risks, such as all-hours probabilistic assessments.), (December 2023), https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2023.pdf.

[348] *See Sw. Power Pool, Inc.*, 136 FERC ¶ 61,050, at P 37.

[349] *See, e.g.*, PJM, Intra-PJM Tariffs, Proposed RAA, Schedule 4.C (1.0.0), § C ("The projection of the Forecast Pool Requirement shall consider the following data and

may refine its treatment of historical weather data over time. We also are not persuaded by claims that PJM has not provided sufficient justification or documentation on its use of temperature bins. In developing its probabilistic models, PJM must attempt to account for a wide range of possible weather conditions to assess the system's resource adequacy risks and needs under various possible scenarios, including extreme scenarios. We find PJM's proposal to combine days with similar temperature levels together into bins will facilitate use of PJM's proposed probabilistic reliability and accreditation models, which as noted above, we find to be just and reasonable. Although different groupings might also be just and reasonable, we do not find PJM's proposal, which balances between temperature range and number of days in each bin, unjust or unreasonable.[350] In addition, PJM provided additional information on its temperature bins as part of its answer that respond to concerns about transparency.[351]

180. We disagree with Public Interest Organizations that the improvement in thermal plant forced outage rates following the 2014 Polar Vortex renders historical data regarding resource performance is no longer a good indicator of future performance. As described above, we find PJM's proposal to consider resource performance data beginning June 1, 2012 is just and reasonable because it allows PJM to capture relatively rare but significant resource adequacy events.[352]

181. With respect to P3 and LSP Development's argument that PJM has not adequately explained the extent to which arriving at an FPR less than one under its proposal will maintain reliability,[353] we disagree. In its Deficiency Letter Response, PJM explains that, under a marginal accreditation framework, an FPR less than one indicates that resource adequacy risk has shifted *away* from peak load hours and *toward* hours where resources

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forecasts as necessary: . . . hourly load shapes and variability, due to weather and other recurring and random factors, as determined by the Office of the Interconnection.").

[350] *See PJM Interconnection, L.L.C.*, 169 FERC ¶ 61,038, at P 12 (citing *OXY USA, Inc. v. FERC*, 64 F.3d at 692 (finding that under the FPA, as long as the Commission finds a methodology to be just and reasonable, that methodology "need not be the only reasonable methodology, or even the most accurate one"); *Sw. Power Pool, Inc.*, 158 FERC ¶ 61,063, at P 13 (2017) (acknowledging that "there can be more than one just and reasonable rate").

[351] Rocha-Garrido Reply Aff. ¶ 31.

[352] *Supra* P 121.

[353] P3 Comments at 10; LSP Development Comments at 14-16. *See* Rocha-Garrido Aff. ¶¶ 51-53.

tend to perform poorly, e.g., extreme winter conditions.[354] PJM explains that, in such a scenario, this shift in resource adequacy risk occurs precisely because resources are likely to produce significantly more than their Accredited UCAP during peak load hours, which causes those hours to have relatively modest resource adequacy risk. Therefore, we find that PJM has demonstrated that it will continue to have sufficient resources to reliably meet peak load even if the FPR falls below one under its proposal. Furthermore, we find that it is appropriate for PJM to adjust resources' accreditation and for the FPR to place greater emphasis on hours outside of the peak load period to the extent those hours are determinative of resource adequacy risk on its system.

182. We find that OCC mischaracterizes the Capacity Benefit of Ties as a value for which a "marginal" approach exists. The Capacity Benefit of Ties represents a reduction in the IRM that is possible due to load diversity between PJM and external areas.[355] This occurs prior to the calculation of the FPR or resource accreditation, and there is no "marginal" approach PJM can implement here, to our knowledge, nor has OCC demonstrated that PJM's proposed treatment of the Capacity Benefit of Ties is unjust or unreasonable.

183. We disagree with ODEC that PJM does not explain how its proposed change from a 1-day-in-25 years LOLE for its CETO calculation to a EUE of 40% will maintain resource adequacy at reasonable cost. As PJM states, this 40% value represents the ratio between the 1-day-in-25 years LOLE criteria for an LDA and the current 1-day-in-10 years LOLE criterion for the RTO, and should continue to ensure that the risk of unserved energy due to transmission or imports represents a small portion of its total risk.[356] Further, as we have found above, PJM's proposal will better reflect the system's expected needs and resource capabilities, and any capacity price impacts will reflect those needs.

184. We disagree with the IMM that the proposal is unjust and unreasonable for failing to test if the CETO value satisfies the target reliability criterion of one-day-in-25-years on average with capacity committed through the auction. Given that PJM develops auction parameters prior to the auction, auction parameters, by definition, must be developed without knowledge of the capacity actually committed in the auction, which is also the case today. Therefore, we find that calculating the CETO value using planned generation

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[354] PJM Deficiency Letter Response at 35-36.

[355] PJM Interconnection, L,L.C., *PJM Generation Adequacy Analysis: Technical Methods* at 17 (Oct. 2003), https://www.pjm.com/-/media/planning/res-adeq/20040621-white-paper-sections12.ashx.

[356] Transmittal at 71.

resources in the queue that have completed the Interconnection Service Agreement at the time auction parameters are calculated to be a reasonable approach.

185. Although Public Interest Organizations claim that PJM has failed to explain how its peak-demand-based allocation of capacity costs is just and reasonable "when marginal ELCC accreditation means that capacity needs are no longer caused by peak demand,"[357] the "effects on other [rate] provisions are not dispositive."[358] Based upon the record here, "the total effect of rate [changes] cannot be said to be unjust and unreasonable."[359] PJM's existing, unchanged, tariff allocates costs in the delivery year to LSEs based on their peak load, which is a longstanding method of allocating capacity costs to load based on their maximum coincident usage.[360] We see no basis to find that PJM's just and reasonable revisions to its capacity accreditation and resource adequacy risk modeling must be rejected because PJM has determined to continue its current longstanding capacity market cost allocation.

186. We also reject Public Interest Organizations' claim that the FPR and resulting cost allocation under PJM's marginal ELCC framework will "improperly socialize investments in electricity supply," because state-sponsored resources with declining marginal ELCC values may provide benefits to the entire PJM pool. One of the primary benefits of a regional resource adequacy construct such as PJM's capacity market is that all LSEs collectively contribute to a single resource adequacy planning requirement, and

[357] Public Interest Organizations Jan. 19 Answer at 9.

[358] *See Advanced Energy Management Alliance v. FERC*, 860 F.3d 656, 664 (D.C. Cir. 2017).

[359] *Id. Cf.*, *American Municipal Power, Inc. v. FERC*, 86 F.4th 922, 936 (D.C. Cir. 2023) (affirming the Commission's finding that a tariff provision used for planning was not unjust and unreasonable due to unchanged cost allocation provisions).

[360] *Town of Norwood, Mass. v. FERC*, 962 F.2d 20, 24 n.1 (D.C. Cir. 1992) ("Each customer's contribution to the coincident peak load 'causes' the costs associated with the peak, regardless of whether that contribution comes from the customer's increasing, or its failing to diminish, its historic consumption.") (citing Alfred E. Kahn, 1 *The Economics of Regulation: Principles and Institutions* 140 (1970)); *Black Oak Energy, LLC v. FERC*, 725 F.3d 230, 238 (D.C. Cir. 2013) ("as we explained in a similar context, 'for purposes of marginal cost pricing, all customers cause the incurrence of the costs associated with coincident peak load, whether by adding or merely continuing their usage.'") (quoting *Nat'l Ass'n of Regulatory Util. Comm'rs v. FERC,* 475 F.3d 1277, 1285 (D.C.Cir.2007)).

therefore benefit from the diversity of loads and resources across the PJM footprint.[361] Therefore, we find that it is reasonable for PJM to calculate its FPR in proportion to the *pool-wide* Average Accredited UCAP Factor. As PJM explains, such cost allocation is not only consistent with core marginal cost and marginal value principles, but also consistent with the "nearly incontrovertible" allocation of costs in the energy market.[362]

187. We disagree with ODEC's claim that PJM's proposal to revise its Reliability Principles and Standards will result in PJM not having to comply with the 1-day-in-10-years reliability standard.[363] As PJM explains, the proposed addition of the EUE metric is keyed to the LOLE metric, thus maintaining the 1-day-in-10-year reliability standard. As PJM explains, the proposed modeling with rely on the LOLE reliability standard and that adding the EUE metric provides more granular insight into the hours at risk on the system. We find ODEC's claim, that the proposed substitution of the Office of Interconnection for NERC is overbroad and could have unintended adverse consequences, to be speculative and unsupported because PJM remains obligated to follow all NERC and other reliability requirements.[364]

3. Resource Testing Requirements

a. Filing

188. PJM proposes to enhance its resource testing requirements to ensure capacity resources are physically capable of responding during a PAI.[365] PJM explains that improvements to these testing requirements are warranted because of PJM's experience with Winter Storm Elliot, which demonstrated that resources that operated within a month of the event experienced a lower forced outage rate than those units that had not run as recently.[366] PJM argues that its enhanced testing requirements will increase

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[361] *See, e.g.*, *Pennsylvania-New Jersey-Maryland Interconnection*, 81 FERC ¶ 61,257, at 62,775 (1997) ("The ability of PJM members to pool their resources for purposes of reserve sharing has generated significant reliability and cost savings benefits for the PJM members over the years.").

[362] Bruno and Graf Reply Aff. ¶ 39.

[363] ODEC Comments at 8-9.

[364] *Id.* at 8-9.

[365] Transmittal at 80.

[366] *Id.* at 81 (citing Keech Aff. ¶ 27).

reliability by better testing the physical capabilities of committed resources and incentivizing resources to maintain their operational status.[367]

189. PJM first proposes changes to the generator capacity capability test.[368] Specifically, PJM proposes to require that the generator capacity capability test be conducted in both the summer and winter seasons during the delivery year for any Generation Capacity Resource, excluding Variable Resources, that is committed through the RPM Auctions or in an FRR Plan.[369] PJM states that, compared to the current rules—which require only a single test to be conducted in the summer, which is then adjusted to demonstrate winter capability—physical testing in both the summer and winter will give PJM greater confidence that a resource is physically capable of performing during an emergency.[370]

190. PJM also proposes to change the manner in which it assesses charges for failure to satisfy seasonal generator capability testing requirements.[371] PJM states that, currently, the Generation Resource Rating Test Failure Charge is calculated at the end of each delivery year by multiplying the Daily Deficiency Rate by the MW shortfall calculation—the annual average of the installed capacity committed on each resource minus the highest installed capacity rating determined for the resource during the relevant summer or winter testing period. PJM proposes that, effective with the 2025/2026 Delivery Year, PJM will assess the resource's MW shortfall on the daily installed capacity commitment of the resource rather than annual average of the installed capacity committed on the resource. PJM argues that this will allow for a more precise determination of whether the resource's installed capacity commitment for each day aligns with its demonstrated capability.

[367] *Id.* at 82.

[368] *Id.* at 81. PJM explains that the purpose of the capacity capability test is to verify that committed Generation Capacity Resources are capable of generating up to their committed megawatt amount of installed capacity. *Id.* at 83 (citing Keech Aff. ¶ 25).

[369] *Id.* at 83.

[370] *Id.* at 82.

[371] *Id.* at 84.

191. PJM also proposes to conduct a new test, referred to as the Generator Operation Test.[372] PJM explains that the purpose of this operational test is to measure a resource's capability and operating parameter accuracy prior to periods of the year where PJM may experience extreme weather conditions.[373] Under the proposed test, PJM states that a unit will be considered to have passed if it is synchronized to the grid within the start-up times specified in the schedule that PJM tests the unit on and operates for its minimum run time.[374] PJM states that the resources selected for operational testing and the timing of such tests will be subject to PJM's dispatch discretion, and based on a number of factors.[375] PJM states that units will receive make-whole payments for costs associated with initial tests,[376] but PJM may issue re-tests (at the unit owner's cost) following any failed test.[377]

192. PJM proposes that any Generation Capacity Resource that fails a retest of the Generator Operator Test will be subject to a Generation Capacity Resource operational test failure charge equal to the Daily Deficiency Rate multiplied by the applicable daily committed unforced capacity MW of that Generation Capacity Resource.[378] PJM argues

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[372] *Id.* at 81.

[373] *Id.* at 81. PJM also states that this test will mean resources are required to run more often, so that when there is an emergency, the likelihood of a forced outage should be significantly reduced. *Id.* at 85 (citing Keech Aff. ¶ 27).

[374] *Id.* at 86.

[375] *Id.* at 86. PJM states that these factors include the period of time since a unit last operated, the system conditions under which the unit has recently operated, the expected system conditions during the operational test, and the recent performance of units with respect to successfully starting and operating within the specified parameters. PJM further states that PJM intends to conduct operational tests with an element of surprise because such "real world" testing helps verify the resource's stated operational capabilities and identify operational issues. *Id.* at 86.

[376] PJM states that units will be dispatched and settled the same as any other resource operating in the PJM energy market and any uplift required to ensure the resource has recovered its operating cost will be covered by PJM's existing uplift provisions detailed in tariff, Attachment K-Appendix, section 3.2.3 and the parallel provisions of Operating Agreement, Schedule 1, section 3.2.3.236. *Id.* at 87.

[377] *Id.* at 87.

[378] *Id.* at 88.

that, to avoid being overly punitive, the operational test failure charge is only assessed when resources fail to come online after a retest. However, PJM states that, once such operational test failure charge is assessed, it will continue to be assessed on a daily basis until such time the resource is able to successfully demonstrate that it is operational again and synchronizes back to the grid.

193. PJM also proposes conforming revisions to the testing and failure charge requirements for Demand Resources.[379] PJM explains that, under the currently effective tariff, Demand Resources are not capability tested in the same manner as other capacity resources. Instead, PJM explains that Demand Resources are "tested" based on their performance during a PAI.[380] PJM states that it is proposing a conforming revision to its tariff given the recent change to the definition of Emergency Action—which has been amended such that a Load Management action does not automatically result in a PAI where Demand Resource performance would be assessed.[381] Specifically, PJM proposes that, if a Demand Resource is not dispatched for a Load Management event in a delivery year and assessed for performance during PAIs, then the resource will be tested, at a date and time to be determined by PJM, for a two-hour period during the relevant delivery year.[382] PJM states that, because deployment of Demand Resources no longer automatically produces a PAI, annual testing is necessary to increase the likelihood that Demand Resources will actually perform as expected during a PAI. PJM explains that, consistent with the existing rules, Committed Demand Resources that do not satisfy these testing requirements will be assessed a Demand Resources Test Failure Charge. PJM states that the test failure charge will be based on the net capability testing shortfall, converted to an Unforced Capacity basis using the applicable FPR prior to 2025/2026 Delivery Year, and the applicable ELCC Class Rating beginning with the 2025/2026 Delivery Year.

b. Responsive Pleadings

194. Many parties support PJM's proposed resource testing requirements.[383] Commenters argue that these testing requirements will allow for a more accurate

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[379] *Id.* at 89.

[380] *Id.* at 89 (citing to PJM, Intra-PJM Tariffs, OATT, attach. DD, § 11A (10.0.0)).

[381] *PJM Interconnection, L.L.C.*, 184 FERC ¶ 61,058, at P 34 (2023) (accepting PJM's revision to the definition of Emergency Action).

[382] Transmittal at 89-90.

[383] OPSI Comments at 4; P3 Comments at 11-12; AMP Protest at 25-26; Ohio FEA Comments at 10; AES Comments at 5-6; Constellation Comments at 12; PSEG

assessment of generators' ability to meet capacity obligations and provide greater certainty that capacity resources will be able to perform, reducing the risk of capacity shortages in critical times.

195. While they do not oppose PJM's proposed capacity testing requirements, several parties request certain clarifications and accommodations regarding the timing and application of PJM's proposed operational test. OCC states that the Commission should clarify that tests must be random and conducted during hours with high loss of load probabilities.[384] NOVEC argues that, while it understands the rationale behind a surprise operational test, such timing could complicate NOVEC's compliance with regulatory emissions requirements for its biomass-burning generator.[385] NOVEC states that a surprise test could require NOVEC to choose between whether to comply with PJM's testing requirements or maintain its emissions compliance. NOVEC therefore requests that the Commission condition approval of PJM's proposal on PJM allowing generators to demonstrate to PJM that an operational test at the time proposed by PJM could present legitimate regulatory compliance issues and to forgo testing at that time, subject to PJM retaining the ability to schedule a surprise test on another occasion. With respect to gas generators, P3 argues that the Commission should direct PJM to consider the natural gas nomination cycle and similar factors in its operational testing regime in order to give resources that would not normally purchase gas under market circumstances during which a test is scheduled the opportunity to do so prior to testing.[386] Similarly, LSP Development argues that PJM should adopt manual provisions specifying that it will not conduct operational tests during periods of gas pipeline stress because a generator's failure to perform under those circumstances would be due solely to pipeline conditions.[387] Invenergy requests that PJM clarify that Variable Resources will be excluded from the generator operational testing requirements, consistent with PJM's

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Companies Comments at 12-13; LSP Development Comments at 16; Public Interest Organizations Protest at 47-49; OCC Protest at 19; 23-24; Republican Members of the Pennsylvania Senate Environmental Resources and Energy Committee Comments at 3; Ohio House Public Utilities Committee and Ohio Senate Energy and Utility Committee Comments at 2.

[384] OCC Protest at 19, 24.

[385] NOVEC Comments at 8-9.

[386] P3 Comments at 12.

[387] LSP Development Comments at 17.

exclusion of such resources from the generator testing and associated test failure charges, given the varying nature of the resources' capability as a function of its energy source.[388]

196. Several parties also raise concerns about the cost and market impacts of PJM's proposed testing requirements. P3 argues that the costs of generator testing should be allowed to be reflected in capacity and/or energy market offers.[389] Constellation further states that the Commission should direct PJM to file an informational report examining the effects of its testing requirements on energy market prices.[390]

197. With respect to penalties, OCC argues that the Commission should ensure that Generator Operation Testing penalties should extend back to the last successful test and remain in place until the next successful test, as proposed by the IMM.[391]

c. Deficiency Letter Response and Responsive Pleadings

198. In its Deficiency Letter, Commission staff asked PJM to identify the tariff revisions that effectuate the requirement that the generator capacity capability test be conducted in both the summer and winter seasons. The Deficiency Letter also asked PJM to clarify whether PJM is proposing to apply the Generation Capacity Operational Test to Variable Resources.

199. In its response to the Deficiency Letter, PJM states that it is not proposing tariff revisions to require that an actual, physical test be conducted in each season.[392] Rather, PJM states that, contingent on acceptance of its filing, PJM will remove current provisions in the PJM Manuals that allow a winter test to be satisfied by adjusting the most recent summer capability test to winter conditions, which would effectively require the capability test to be conducted in both summer and winter conditions.[393] PJM further states that it is not proposing to apply the operational test to Variable Resources because performance of those resources is already demonstrated on an on-going basis through

[388] Invenergy Comments at 8.

[389] P3 Comments at 12.

[390] Constellation Comments at 12.

[391] OCC Protest at 19-20.

[392] Deficiency Letter Response at 14.

[393] PJM also states that it consents to a compliance directive that would more explicitly require a physical testing requirement in both the summer and winter seasons.

normal operations.[394] PJM states that it intends to exempt Variable Resources from the operational test in the PJM Manuals, consistent with the placement of the current provisions in the PJM Manuals that provide an exemption for Variable Resources for seasonal capability testing.[395]

200. In response to the Deficiency Letter Response, the IMM contends that all the capacity testing requirements should be included in the tariff rather than the manuals.[396] The IMM argues that it is essential to have defined criteria in the tariff for testing to avoid uncertainty about the nature, extent, and subjects of such testing and to ensure that testing requirements are enforceable.[397] AMP similarly argues that capacity testing requirements significantly affect rates, terms, and conditions of service, and are readily susceptible of specification, and, thus they ought to be included in the tariff.[398] The IMM further states that PJM failed to explain why it should not test, or evaluate based on actual operations, the maximum output of Variable Resources.[399]

d. Answers

201. In response to protestors, PJM asserts that its proposed generator operation testing requirements are just and reasonable.[400] PJM states that the goal of the proposed testing framework is to promote increased accuracy and accountability in the capacity market. Further, PJM states that the proposed testing requirements are intended to mimic dispatch of committed capacity resources during an actual capacity shortage event. PJM disagrees with comments suggesting PJM should not conduct operational tests during periods of gas pipeline stress, or that PJM should not test units that are at or near their emission

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[394] *Id.* at 16.

[395] *Id.* (citing to PJM Manual 18, section 8.5). PJM also states that it would be amenable to specifying this exemption as part of the proposed tariff language in Attachment DD, section 7A. *Id.* at 17.

[396] IMM Protest of Deficiency Letter Response at 11 (citing *Energy Storage Ass'n v. PJM Interconnection, L.L.C.*, 162 FERC ¶ 61,296, at P 105 (2018)).

[397] *Id.* at 12.

[398] AMP Answer at 8.

[399] IMM Protest of Deficiency Letter Response at 12.

[400] PJM Dec. 21 Answer at 32-33.

limits.[401] PJM contends that capacity sellers should be accurately reporting the availability of their resource and updating the associated parameters to PJM. PJM states that if a resource cannot provide energy due to gas pipeline stress during a test, the limitation should be marked as an outage. Otherwise, PJM asserts, if a resource has not indicated curtailments or limitations affecting its ability to provide energy by continuing to be marked as available to PJM, then there is no reason the resource should not be available for testing. Similarly, PJM states that, when a resource has a limit on its run hours imposed by a federal, state, or other governmental entity, the seller may select their Maximum Emergency offer, and PJM would not test such resource outside of a Maximum Emergency condition.[402] In this way, PJM states that it can consider whether operational testing would hamper a resource's ability to perform during an actual capacity shortage event.

202. In response to OCC's suggestion that generator operation testing failure charges should extend back to the last successful test passed by the resource and remain in place until the next successful test, PJM cautions that overly punitive charges can have chilling effects on investment and could contribute to premature retirements that may harm the market.[403] PJM states that OCC's suggested framework may have an overly punitive and inequitable impact. PJM contends that its proposal properly balances these considerations and is just and reasonably without being overly punitive.

203. PJM responds to the comments that Variable Resources should not be exempt from the proposed Generation Capacity Operational Test[404] explaining that because Variable Resources tend to operate at full available capacity, they are already demonstrating their performance on an on-going basis. Thus, PJM argues that it is not necessary to apply the Generation Capacity Operational Test to Variable Resources.

204. The IMM asserts that PJM's notion that test conditions can mimic a PAI is false because, by design, PJM faces actual capacity shortages infrequently.[405] The IMM claims that the unusual combination of ambient conditions (e.g., extreme heat or cold)

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[401] *Id.* at 33-34.

[402] *Id.* at 34.

[403] *Id.* at 37.

[404] *Id.* at 35-36 (citing Invenergy Comments at 8; Deficiency Letter Response at 16-17) and PJM Jan. 12 Answer at 23 (citing IMM Comments on Deficiency Letter Response at 12).

[405] IMM Oct. 25 Answer at 16-17.

and other system stresses lead to unique operational issues that cannot be replicated by test conditions.

e. Determination

205. We find that PJM's proposed generation capacity operational testing requirements are just and reasonable. We agree with PJM and supporting commenters that the proposed additional testing requirements should enable PJM to more accurately assess a resource's physical capabilities and expected availability during periods of system stress, help PJM and generation owners identify and correct mechanical issues,[406] and incentivize generators to keep PJM apprised of their operational status. We also find that PJM's proposed generation capacity operational test failure charges are just and reasonable because they incentivize resources to be available without being overly punitive. Further, PJM's proposal allows PJM to re-test failed units, without subjecting load to further uplift payments.

206. We disagree with protests suggesting that PJM's proposal is unjust and unreasonable because it could result in an operational test being conducted during a period of gas pipeline stress, outside of the gas nomination cycles, or when a unit is at or near its emission limit. As PJM states, the goal of this test is to gauge the operating capability of resources during system conditions that are similar to those faced during a reliability event.[407] We agree with PJM that "real world" testing with limited notice is reasonable because it will give resources a strong incentive to make their resource ready and available to support system needs, help PJM verify the resource's stated operational capabilities, and identify potential problems before an actual emergency.[408] PJM's proposed tariff language also states that the operational tests will respect a resource's operating parameter limits.[409] As PJM states in its answer, resources should accurately reflect their availability and all limitations and parameters to PJM so that PJM can take those factors into consideration when scheduling operational tests. We agree with PJM

[406] PJM cites to data indicating that over 80% of outages experienced during Winter Storm Elliott were mechanical in nature, rather than caused by fuel-supply issues. Transmittal at 82 (citing Keech Aff. ¶ 29).

[407] *Id.* at 85.

[408] *Id.* at 86.

[409] PJM, Intra-PJM Tariffs, OATT, attach. DD, § 7A ("[s]uch tests will respect operating parameter limits of the available schedule that the Office of the Interconnection selects for purposes of testing the resource.").

that, if a resource has not indicated a limitation to PJM and is marked as available to PJM, it should be available for generator operational testing.

207. We reject the IMM's argument that PJM has not demonstrated the value of its winter testing program. As PJM states, during Winter Storm Elliott, resources that operated within a month prior to the event experienced a lower forced outage rate than those units that had not run as recently. By testing in the winter, PJM can be more confident that the resource can start in cold weather, even if the conditions for the test are not as extreme as those likely to trigger a PAI event.

208. The IMM objects to PJM's clarification that Variable Resources need not be subject to testing up to their maximum output because their performance will be demonstrated through their regular operation and state that all resources should be subject to testing.[410] We disagree. We find that PJM has provided a reasonable explanation as to why it will require testing for certain resources and not others. Specifically, PJM explained that Variable Resources already demonstrate operational readiness on an on-going basis through normal operations; by contrast, some other generators, due to high marginal costs or long start-up times, are not even started in cold or hot weather inside an individual delivery year. PJM's tests will help demonstrate that a resource will be able to perform up to its full available capacity on a hot or cold day. Moreover, because Variable Resources' day-to-day performance is based on upon environmental factors outside the resource's control, testing up to the resource's maximum output on a given day may be impracticable.

209. Additionally, PJM states in its Deficiency Letter Response that, although OATT, Attachment DD, section 7.1(a) specifies that Variable Resources are exempt from completing a generation resource capacity test, PJM is amenable to also specifying this exemption in OATT, Attachment DD, section 7A.[411] PJM also states that it consents to a compliance directive to explicitly require physical testing in both the summer and winter seasons in section 7.1(a).[412] Consistent with PJM's clarification and consent to make those changes, we direct PJM to submit a compliance filing within 30 days of the date of this order revising section 7A to further specify that Variable Resources are exempt from

[410] PJM Dec. 21 Answer at 35-36 (citing Invenergy Comments at 8; Deficiency Letter Response at 16-17) and PJM Jan.12 Answer at 23 (citing IMM Comments on Deficiency Letter Response at 12).

[411] Deficiency Letter Response at 17.

[412] *Id.* at 15.

the generation resource capacity test and to specify the physical testing requirement in 7.1(a).

4. Non-Performance Charge Limit

a. Filing

210. PJM's current tariff sets a Non-Performance Charge limit, or "stop loss," at 1.5 times Net CONE multiplied by the committed MW of Unforced Capacity times the number of days in the delivery year.[413] In approving this change, the Commission stated that the stop loss "protects resources against exceedingly large penalties resulting from an unforeseen event."[414] And, the Commission further found that "[t]he stop loss provision is designed to provide some protection to capacity resources while not unduly limiting the performance incentive underlying the Non-Performance Charge provisions," while still retaining the appropriate incentive for each resource to respond during an emergency—"[s]ince each unit's performance may be crucial and all units need to have sufficient incentive to make investments and perform when needed."[415]

211. PJM proposes to re-index the stop loss, replacing Net CONE in the formula with the Base Residual Auction's price for the delivery year. PJM states that this provides a total net charge liability that is in better proportion to a resource's capacity revenues and the risks with taking on a capacity commitment.[416] PJM asserts that periods of relatively low capacity prices combined with a high stop loss may make it uneconomic for otherwise willing market sellers to accept a capacity obligation and its associated risks. PJM argues that lowering the stop loss will help maintain robust competition in the capacity market by safeguarding against the potential for resources to lose multiple years of capacity revenues, which could in turn deter or chill future investments in PJM's capacity market.[417]

212. In support, PJM points to Winter Storm Elliott where Net CONE for the RTO in the 2022/2023 Delivery Year was roughly $90,000/MW-year, providing for an annual stop loss of $135,000/MW-year. PJM explains that, during Winter Strom Elliot, the stop

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[413] PJM, Intra-PJM Tariffs, OATT, attach. DD, § 10A (0.0.0), § 10A(e).

[414] Capacity Performance Rehearing Order, 155 FERC ¶ 61,157 at P 78.

[415] *Id.* at 80.

[416] Transmittal at 93.

[417] *Id.* at 95 (citing Graf Aff. ¶ 49).

loss was about 7.5 times higher than the RTO Base Residual Auction clearing price for that year ($50/MW-day, or $18,250/MW-year).[418] PJM therefore argues that Elliott demonstrates that a resource could lose about 7.5 years of capacity revenues from a single event and that the risk only increases as capacity market prices fall.

213. PJM argues that reducing the stop loss will not affect resource performance during emergency conditions because: (1) this change does not affect the Non-Performance Charge Rate; (2) improvements to accreditation and risk modeling provide increased confidence that PJM will procure resources capable of providing capacity during emergencies; (3) the proposal retains the ability for a resource's capacity revenues net Non-Performance Charges to go negative in a given delivery year; (4) previously approved changes to the trigger for a PAI reduces the probability of any Capacity Resource being assessed total Non-Performance Charges that exceed the stop loss; and (5) in the event of a resource hitting its stop loss, scarcity pricing will continue to provide some incentive to perform during a system emergency.[419]

b. Responsive Pleadings

214. Several parties support PJM's proposal to index the stop loss to the BRA clearing price.[420] Those parties argue that the current approach of indexing the stop loss to Net CONE exposes resources to disproportionately high penalties that may exceed multiple years of capacity market revenues, which may disincentivize participation. They generally argue that indexing the stop loss to the clearing price achieves a more appropriate balance between incentives and penalties.

215. Other parties object to PJM's proposal on grounds that it may not properly incentivize performance. AMP, Vistra, Constellation, and Public Interest Organizations argue that PJM's proposal would create a situation in which the overall penalty cap could be exhausted within just a few hours of non-performance, leaving those resources with no

[418] *Id.* at 94.

[419] *Id.* at 95-97.

[420] OPSI Comments at 3; Invenergy Comments at 2-3; P3 Comments at 13; Buckeye and EKPC Comments at 3-4; ODEC Comments at 7; Ohio FEA Comments at 10-11; AES Comments at 4-5. Some parties argue that, in addition to indexing the stop loss on the BRA clearing price, PJM should also index the Non-Performance Charge on the BRA clearing price. OPSI Comments at 3; Buckeye and EKPC Comments at 3-5; ODEC Comments at 7; AMP Protest at 17-21.

further incentive to operate reliably during the remainder of the delivery year.[421] Constellation contends that, since PJM's delivery year starts on June 1, there is a risk that a resource may hit the stop loss before the start of the winter season.[422] Constellation presents an internal analysis showing that for the 2024/25 Delivery Year, PJM's proposal would have resulted in a stop loss of 4.4 Performance Assessment Hours, and in three of the last seven years, the stop loss would have been below 10 Performance Assessment Hours. Constellation contrasts this with the current rules where the stop loss would not be hit until 45 Performance Assessment Hours. Constellation also argues that under certain market conditions, PJM's proposed stop loss may be higher than its current stop loss. Constellation argues that reliability shortfalls are connected to these tight market conditions, meaning that PJM's proposal results in the highest stop loss when the risk reduction provided by the stop loss is most critical.[423]

216. Vistra also disputes PJM's assertion that Winter Storm Elliott demonstrates that the existing framework provides penalties disproportionate to revenues.[424] Vistra points to PJM's Winter Storm Elliott Report, which states that when considering "only the resources with shortfalls, the $1.80 billion in Non-Performance Charges represents 83% of the $2.17 billion in RPM auction" revenues that these resources received for the 2022/2023 Delivery Year.[425] Vistra asserts that the total "clawback" was only 83% of revenues received by non-performing resources, and that many resources were not exclusively winners or losers because they both paid penalties and received bonuses across their fleet and among individual units.[426]

217. Vistra and Constellation also object to PJM's proposal on the grounds that indexing the stop loss to the auction clearing price introduces uncertainty into the market because resources will not know the stop loss until after submitting offers into the BRA. These parties argue that, when the Commission accepted PJM's proposal to index the stop loss to Net CONE, it emphasized that by relying on Net CONE, market participants

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[421] AMP Comments at 19-21; Vistra Protest at 12; Public Interest Organizations Protest at 50; Constellation Protest at 3-4.

[422] Constellation Protest at 17.

[423] *Id.* at 18-19.

[424] Vistra Dec. 1 Answer at 5.

[425] *Id.* (citing PJM, Winter Storm Elliott Report at 110).

[426] *Id.*

have predictability and certainty when they submit their offers.[427] Vistra further states that the level of uncertainty is compounded by the fact that there are greater differences in BRA clearing prices across LDAs in the PJM footprint than Net CONE, creating even more uncertainty in bids as a resource may not know if the LDA it is offering into will separate.[428] Moreover, Vistra and Constellation argue that indexing the stop loss on the BRA clearing price further complicates the process of determining offer caps because the IMM would need to approve a resource's clearing price forecast when considering the proposed offer cap.[429] Constellation argues that the need to account for such uncertainty in making capacity market offers will tend to increase the offers and thus capacity prices.[430]

218. Protesters argue that changes to the stop loss create an asymmetric risk transfer for consumers by hedging Capacity Resources against Non-Performance Charge risk, while not providing consumers a hedge against upside risk such as windfall prices to Capacity Resources if market prices are too high. OCC asserts that the change will reduce the incentive for resources to undertake actions to increase performance and decrease potential Non-Performance Charges, as well as reduce additional payments to resources that perform above their expected level.[431]

219. PSEG Companies share Vistra's and Constellation's concerns on the stop loss provision, requesting that, should the Commission accept PJM's proposal, PJM be directed to take concrete steps to improve generator reliability and performance during future cold weather events. PSEG Companies propose the adoption of specific fuel reliability enhancements such as backup firm fuel for gas generators.[432]

220. Public Interest Organizations express similar arguments.[433] It also argues that changes in accreditation reflecting fossil resources' poor performance should lower their expectation for performance, which in Public Interest Organizations' view is not a strong

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[427] *Id.* at 9 (citing Capacity Performance Order, 151 FERC ¶ 61,208 at P 164).

[428] Vistra Protest at 10.

[429] *Id.* at 10.

[430] Constellation Protest at 20-21.

[431] OCC Protest at 20-23.

[432] PSEG Companies Comments at 14-15.

[433] Public Interest Organizations Protest at 50-51.

argument to reduce the maximum penalties that these resources might pay if they fail to perform at the lower level their accreditation reflects. They argue that the reduction in the stop loss will reduce performance incentives more than a testing regime will improve them. Public Interest Organizations state that increased testing will not address the problem of thermal resources not procuring fuel – a significant driver of outages during Winter Storm Elliott. Public Interest Organizations argue that changing the penalty trigger already reduces the risks faced by resources and again reducing maximum penalty exposure again reduces performance incentives.

221. Public Interest Organizations disagree with PJM's argument that the current penalty cap may deter or chill future investments in PJM's capacity market.[434] Public Interest Organizations assert that non-performing resources still earned hundreds of millions of dollars in net revenues from a single year's sales after the historic penalties. Public Interest Organizations state that these revenues are in addition to many years of these resources earning capacity revenues during which no PAIs occurred. Public Interest Organizations thus argue that the prospect that penalties should exceed annual revenues is a beneficial deterrent to resources being chronically unreliable, and it is a sufficiently remote contingency that it cannot serve as a reasonable basis for reducing the stop loss. Public Interest Organizations point to 31 GW of gas plants coming online since Capacity Performance went into effect in 2015, and the 230 GW of new resources in PJM's interconnection queue, all under the current stop loss rules, stating that there is no proof that the Capacity Performance construct stifles investment in the capacity market.[435]

222. Constellation requests that the Commission sever PJM's stop-loss proposal and reject it.[436] Constellation argues that the Commission can do so without violating *NRG*. Constellation contends that the stop loss is more germane to the reforms submitted in Docket No. ER24-98-000—which address Capacity Performance—than the instant filing, so severing and rejecting it would not result in an "entirely different rate design." Constellation further states that the PJM members did not elect or agree to structure the filings in this manner. Constellation asserts that section 205 does not authorize "poison pills," and that NRG does not tie the Commission's hands to force it to accept a poorly conceived reform (the stop loss) just to avoid rejecting an unrelated reform of utmost importance. Moreover, Constellation argues that the Commission has an obligation

[434] *Id.* at 52.

[435] *Id.* at 49-52.

[436] Constellation Protest at 5.

under the FPA to evaluate the unrelated components individually to prevent gamesmanship and circumvention of meaningful Commission review.[437]

c. PJM's Answer

223. PJM responds to intervenors' arguments by asserting that the stop loss seeks to strike a balance, and that there may be more than one just and reasonable way to find that balance.[438] PJM states that, when the Commission approved the Capacity Performance reforms, the Commission observed that "it is the possibility of zero or negative net capacity revenues that provides the proper incentive," and PJM asserts that its proposed stop loss set a reasonable bound around the possibility of zero or negative revenues.[439]

224. PJM disagrees with objections that the stop loss proposal is unjust and unreasonable simply because a seller could reach its limit after a relatively few number of hours.[440] PJM states that its proposal would cut off penalty risk only after the resource has to return all of its capacity market revenue for the delivery year and pay an amount equal to half that annual revenue amount, which provides a very strong incentive to perform.[441] In response to arguments that, under PJM's proposal, poor performance over a relative handful of hours insulates a resource from Non-Performance Charges for the rest of the delivery year, PJM argues that protesters' arguments assume that a resource was 100% deficient during those hours, which is a worst case scenario of performance.[442] PJM states that Constellation's observation that the stop loss might apply after only 4.4 hours of non-performance reflects the lowest number from the seven delivery years for which they calculate this metric and assumes zero performance during all PAIs.[443] PJM asserts that, if a resource's Actual Performance was equal to some but not all of its

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[437] *Id.* at 28.

[438] PJM Dec. 21 Answer at 39 (citing *Cities of Bethany v. FERC*, 727 F.2d 1131).

[439] *Id.* (citing Capacity Performance Rehearing Order, 155 FERC ¶ 61,157 at P 62).

[440] *Id.* at 40.

[441] *Id.* at 41. Moreover, PJM asserts that, after reaching the stop loss, a resource will be incentivized to perform because energy market prices will be high during PAIs. *Id.*

[442] *Id.* at 42.

[443] *Id.* at 43.

Expected Performance, it would take many more hours of non-performance before hitting the stop loss.[444]

225. PJM also responds to protesters' references to the Capacity Performance proceeding, where the Commission found that PJM's proposed monthly stop loss was unjust and unreasonable because the potential likelihood of having a high concentration of performance assessment hours in a few peak months could allow under-performance without consequence.[445] PJM states that the Commission in the Capacity Performance proceeding expressed concern about a *monthly* stop loss, which PJM is not proposing. Moreover, PJM states that other key facts are far different now compared to when the Capacity Performance orders were issued, including that capacity clearing prices have tended to be well below Net CONE for a number of years, and that PJM is tying the instant stop loss change to new resource testing requirements that provide strong performance incentives and revised accreditation rules that should reduce and mitigate instances of individual resource performance failure, and that under the current tariff there are likely to be fewer and shorter PAI trigger events.[446] PJM argues that the Non-Performance Charge and its incentive do not stand alone. Rather, PJM argues the stop loss change is part and parcel of a set of coordinated tariff changes to resource accreditation and testing requirements.[447]

226. PJM also responds to Constellation's argument that the stop loss may also be too punitive under tighter supply conditions.[448] PJM asserts that in all cases PJM's stop loss proposal will mean that a seller is at risk of paying penalties up to 150% of the revenues it will receive for committing its resource for the relevant delivery year. PJM states that there is nothing unreasonable about this; rather, the proposed stop loss appropriately scales with the BRA clearing price while providing a reasonable level of tail-risk in all potential capacity market clearing outcomes.[449]

227. In response to Constellation's objection that PJM's stop loss proposal will complicate sellers' pre-auction estimates of CPQR, PJM states that many factors must be

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[444] *Id.* at 42.

[445] *Id.* at 44.

[446] *Id.* at 44-45.

[447] *Id.* at 42-43.

[448] *Id.* at 45.

[449] *Id.* at 46.

estimated, including energy prices, shortage prices, ancillary service prices, and a range of possible clearing prices, all of which have a greater impact on the CPQR calculation than the stop loss, which is a tail-probability event.[450] As such, PJM argues that the stop loss will not render sellers incapable of developing offers that serve their interests.[451]

228. PJM also responds to Constellation's argument that the Commission should sever and reject the stop loss revision while accepting the remainder of PJM's filing.[452] PJM contends that the Commission does not have that option. PJM asserts that the Commission is constrained to act on the section 205 filing before it and cannot substitute its own proposal in place of the proposal the public utility filed.[453] While PJM states that the Commission may, under certain circumstances, accept a 205 proposal with modifications where the public utility consents to those modifications, PJM does not consent to severing the stop loss revisions. PJM further states that the stop loss revisions are an integral component of PJM's package of tariff changes.[454]

d. Additional Answers

229. Vistra, in its answer, responds to parties' arguments that Winter Storm Elliot demonstrates the existing framework can result in penalties that far exceed capacity revenues in a given year.[455] Vistra asserts that, even with widespread outages, the total charges assessed amounted to a "clawback" of approximately 83% of the capacity revenues received by non-performing resources.[456] Moreover, Vistra contends that many asset owners were both paid penalties and earned bonuses, not just across their fleet but among individual units who performed well one day and poorly the next. Vistra states

[450] *Id.* at 47.

[451] *Id.* at 48.

[452] *Id.* at 48.

[453] *Id.* at 48 (citing *NRG Power Mktg LLC v FERC*, 862 F.3d 108 (D.C. Cir. 2017) (*NRG*)).

[454] *Id.* at 48-49.

[455] Vistra Dec. 1 Answer at 5.

[456] *Id.* at 5.

that Winter Storm Elliot demonstrates that the capacity performance framework operated precisely as intended.[457]

e. Deficiency Letter and Responsive Pleadings

230. The Deficiency Letter asked PJM to explain how PJM will evaluate sellers' requests for a CPQR component in their unit-specific Market Seller Offer Caps given that the BRA clearing price would not be known until after the auction is completed. In its answer, PJM states that PJM's assessment of CPQR would be very similar to its existing process.[458] PJM states that assumptions are inherent in a forward market and it does not anticipate that an unknown stop loss would materially affect a seller or PJM's ability to conduct this assessment. PJM states that sellers face many costs and uncertainties that are not resolved at the time of their offer, such as EAS market revenue, costs of investments, and fixed operation and maintenance costs, and potential bonus or penalty payments, which are in turn dependent on other unknown factors including the number of PAIs, performance during PAIs, and the Balancing Ratio. Moreover, PJM asserts that, in the context of these other unknowns, the exact stop loss should have substantially less impact on a resources' competitive offer level because reaching the stop loss is a tail-probability event and should thus the impact of uncertainties in the stop loss must be discounted.[459]

231. AMP agrees with PJM's observation that the uncertainty facing sellers regarding the stop loss level would be just one of many costs and uncertainties that are not resolved at the time of their offer.[460] But AMP emphasizes that PJM's assertion that reaching the stop loss is improbable does not mitigate the reliability concerns discussed in AMP's protest.

232. Constellation states that PJM did not answer the Deficiency Letter question; rather, Constellation states that PJM simply asserted that it does not anticipate that an unknown stop loss would materially affect offers.[461] Constellation asserts that this non-response is reason enough to reject PJM's proposal. Vistra similarly contends that PJM's answer that the CPQR assessment would be "very similar to the process today" misses

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[457] *Id.* at 6.

[458] Deficiency Letter Response at 40.

[459] *Id.* at 40-41.

[460] AMP Answer at 5.

[461] Constellation Answer at 21.

the point and does not address how PJM will accurately assess such information in light of the fact that a key determinant of the risk of non-performance will be unknowable at the time that PJM's evaluation will occur.[462]

233. Constellation also notes that PJM has agreed to make numerous changes to various elements of its proposals on compliance, which Constellation argues confirms PJM's view that these various elements are not part of an integrated filing.[463] Accordingly, Constellation asserts that the Commission can sever and reject the stop loss proposal independently from the remainder of PJM's filing.

f. Determination

234. We find that PJM's proposed stop loss is just and reasonable. Under PJM's proposed construct, the stop loss would be benchmarked to the BRA clearing price, providing sellers with a consistent level of risk exposure—150% of capacity market revenues—across a range of market conditions.

235. The purpose of the stop loss provision is to "provide some protection to capacity resources while not unduly limiting the performance incentive underlying the Non-Performance Charge provisions."[464] By its nature, the stop loss is a market design feature that must balance various competing objectives. One key objective of the stop loss limit is to give resources a strong incentive to perform during times of system stress. Another objective of the stop loss is to ensure that providing capacity in PJM's capacity construct, which risks exposure to non-performance penalties, is an economically viable option for capacity resources.[465] We agree with PJM that, considering the totality of PJM's proposed capacity market reforms included in this proceeding, PJM's proposed stop loss strikes a reasonable balance between incentivizing performance during emergency events and ensuring the economic viability of providing capacity in PJM.[466] Importantly, PJM's

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[462] Vistra Protest of Deficiency Letter Response at 4.

[463] Constellation Answer at 22 (citing to Deficiency Letter Response at 15, 17).

[464] Capacity Performance Rehearing Order, 155 FERC ¶ 61,157 at P 80.

[465] As the winter storm Elliott demonstrated, assessing significant non-performance penalties to resources can result in bankruptcy. *See PJM Interconnection, L.L.C.* 185 FERC ¶ 61,204 (2023).

[466] *Cities of Bethany v. FERC*, 727 F.2d at 1136 (finding that the correct legal standard under 205 is whether a proposal is just and reasonable, not whether a proposal is more or less reasonable than alternative rate designs); *Louisville Gas & Elec. Co.*, 114 FERC ¶ 61,282, at P 29 (the just and reasonable standard under the FPA is not so rigid as

proposal maintains a key element of PJM's existing stop loss—"put[ting] at risk full capacity auction revenues if a resource completely fails to perform during Performance Assessment Hours."[467] Under PJM's proposed stop loss rules, there is a potential for a non-performing resource to lose its entire capacity market revenue plus an additional 50 percent of that revenue, and as such the proposed stop loss gives resources strong performance incentives. That risk exposure would scale with the clearing price such that the stop loss would remain in proportion to the payment a resource would expect to receive in any given delivery year.

236. In addition to the incentive of retaining expected capacity market revenue and avoiding penalties, capacity resources will also have an incentive—even after hitting the stop loss—to perform during an emergency event when scarcity pricing is in effect to obtain the higher energy prices associated with scarcity pricing. On balance, we find that PJM's proposal provides sufficient incentives for resources to perform while ensuring that it is economically viable to provide capacity in PJM.

237. Moreover, as PJM explains in its answer, we recognize that other changes to PJM's capacity market construct, including elements of the instant proposal, may contribute to a reduction in the amount and duration of emergency events in future delivery years and strengthen the likelihood of resource performance during such events.[468] One factor is the Commission's recent approval of PJM's proposal to narrow the definition of Emergency Action. This change should reduce how often, and for how long, PAIs are triggered, resulting in fewer hours for which Non-Performance Charges will be assessed. In addition, PJM's proposed improvements to resource accreditation, testing requirements, and penalties for test failures will strengthen the likelihood that PJM is procuring resources capable of providing capacity during emergencies. Given these modifications, which together should reduce the amount and duration of emergency events while increasing the likelihood of performance, we are not persuaded by arguments that PJM's stop loss proposal would allow for a seller to reach its limit after a relatively few number of hours.

238. We also agree with PJM that the BRA clearing price reasonably reflects the replacement cost of capacity. We disagree with Vistra's and Constellation's argument that indexing the stop loss to the auction clearing price introduces an unreasonable level of uncertainty into the market because resources will not know the stop loss until after

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to limit rates to a "best rate" or "most efficient rate" standard; rather, a range of alternative approaches often may be just and reasonable), *reh'g denied, E. ON U.S. LLC*, 116 FERC ¶ 61,020 (2006)).

[467] Capacity Performance Order, 151 FERC ¶ 61,208 at P 164 (emphasis added).

[468] PJM Dec. 21 Answer at 44-45.

submitting offers into the BRA. As PJM explains, the exact value of the stop loss is only one of many factors that sellers must estimate when considering a capacity supply offer, including but not limited to the resource's expected energy and ancillary service revenues, expected resource performance, the likelihood of PAI intervals, and a range of potential capacity clearing prices. None of these factors are certain and, as such, the stop loss is only one of many uncertainties that sellers must consider.

239. We are not persuaded the OCC's argument that PJM's proposal creates an asymmetric risk. As noted above, we find PJM's proposal reasonably balances resource performance incentive and economic viability considerations. Importantly, a reduction in stop loss generally lowers the financial risk capacity resources face, all else equal. As such, PJM's proposal to lower the stop loss may result in lower capacity supply offers because lowering the stop loss limit lowers a resource's total risk exposure.[469] As such, PJM's proposal may result in lower capacity prices and reduced capacity costs to ratepayers.

240. Several intervenors argue that PJM should also have revised the Non-Performance Charge Rate or suggest that PJM should make further changes to the definition of Emergency Action. In submitting proposed tariff changes pursuant to a FPA section 205 filing, PJM need only demonstrate that its proposed revisions are just and reasonable, not that its proposal is the most just and reasonable among all possible alternatives. Therefore, having found PJM's proposed stop loss to be just and reasonable we decline to address proposed alternatives in the context of this section 205 proceeding.[470]

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[469] The risk of exposure to non-performance penalties is an explicit component of PJM capacity supply offer mitigation and is referred to as Capacity Performance Quantitative Risk. We note that this finding is independent of PJM's proposal to revise the capacity market seller offer cap in Docket No. ER24-98-000.

[470] *Cities of Bethany v. FERC*, 727 F.2d 1131, 1136 (D.C. Cir. 1984) (the Commission's authority to review rates under the FPA is limited to an inquiry into whether the rates proposed by a utility are reasonable, not whether a proposed rate schedule is more or less reasonable than alternative rate designs); *Louisville Gas and Elec. Co.*, 114 FERC ¶ 61,282, at P 29 (2006) (the just and reasonable standard under the FPA is not so rigid as to limit rates to a "best rate" or "most efficient rate" standard; rather, a range of alternative approaches often may be just and reasonable), *reh'g denied, E. ON U.S. LLC*, 116 FERC ¶ 61,020 (2006).

5. Fixed Resource Requirement

a. Filing

241. PJM explains that FRR Entities are required to have all required capacity under commitment at least 30 days before the Base Residual Auction for the relevant delivery year, and to submit an FRR Plan detailing such capacity commitments.[471] PJM states that if the FRR Plan is short, then after a five-day notice and cure period, PJM assesses the FRR Entity an FRR Commitment Insufficiency Charge equal to two times the CONE (in $/MW-day) for the relevant location times the megawatt shortfall below applicable capacity obligation.[472] PJM states that once the delivery year starts, any capacity shortfall is subject to an FRR Capacity Deficiency Charge equal to 120% of the applicable BRA clearing price,[473] which PJM proposes to revise to be equal to the RPM clearing price if RPM was facing a capacity shortfall.[474] PJM states that beginning with the 2025/2026 Delivery Year, PJM proposes to set the deficiency and insufficiency charge rates for FRR Entities at the price-level corresponding to Point 1 on the LDA VRR curve where the FRR obligation exists.

242. PJM claims that such revisions will be less punitive and that RPM and FRR rules would send similar incentives with regard to the willingness to pay to alleviate a capacity shortfall.[475] PJM explains that it selected the price-level corresponding to Point 1 on the LDA VRR curve because the obligation of an FRR Entity is set based on the FPR, which represents the amount of UCAP required to maintain the one-day-in-ten-years LOLE standard, and because that point also generally corresponds to the maximum price level

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[471] Transmittal at 98-100.

[472] *Id.* at 98 (citing PJM, Intra-PJM Tariffs, RAA, Schedule 8.1.D (12.0.0), Schedule 8.1.D(7)).

[473] *Id.* at 98 (*see* PJM, Intra-PJM Tariffs, RAA, Schedule 8.1F (5.1.0), Schedule 8.1.F(2) ("FRR Capacity Deficiency Charge shall be in an amount equal to the deficiency below such FRR Entity's Daily Unforced Capacity Obligation for such Zone times (1.20 times the Capacity Resource Clearing Price resulting from all RPM Auctions for such Delivery Year for the LDA encompassing such Zone, weight-averaged for the Delivery Year based on the prices established and quantities cleared in such auctions).")).

[474] *Id.* at 98-99 (*see* Keech Aff. ¶ 40 ("Two times gross CONE for the insufficiency charge is higher than any point on the VRR Curve used in the RPM Auctions and is inappropriately high and punitive.")).

[475] *Id.* at 99-100 (*see* Keech Aff. ¶ 41).

loads participating in the BRA would pay if the RPM auction cleared short of the reliability target. PJM argues that failure to meet target reliability levels should correspond to a high penalty rate to incentivize curing the shortfall expeditiously. PJM further justifies the revisions by noting that recent low BRA clearing prices have made it economical for FRR Entities to fail to procure enough capacity to meet reliability needs and instead pay the lesser deficiency charge.

243. PJM states that it proposes to implement the changes to determining the Deficiency Charge starting with the 2025/2026 Delivery Year and to determine the Insufficiency Charge for FRR Plans beginning with the 2029/2030 Delivery Year.[476] PJM explains that the delay in application of the Insufficiency Charge accommodates the four-delivery year transition period for FRR Entities to adjust to the other new rules.

244. PJM also proposes a transition period to allow FRR Entities time to align with new capacity accreditation rules in recognition of: (1) the proposed marginal ELCC accreditation approach and its broad application to almost all Capacity Resources, which PJM expects will result in many existing Capacity Resources having less Unforced Capacity available to meet reliability requirements; (2) the longer lead time capacity planning in FRR regions, (3) the relatively short timeframe in which such changes will be implemented, and (4) the unique circumstances facing FRR Entities due to their inability to purchase capacity through RPM Auctions.[477]

245. PJM proposes two options to smooth the synchronization with RPM for FRR Entities.[478] PJM explains that one option, available to FRR Entities in the midst of a minimum five-year commitment of the FRR election, is the opportunity to re-join the RPM beginning with the 2025/2026 Delivery Year so that they may sell their resources in RPM Auctions and purchase capacity from the pool.[479] PJM states that this option would require a five year minimum commitment period to stay in RPM and that FRR Entities electing this option must provide written notice of the termination of its election of the FRR Alternative at least two months prior to the BRA through the 2028/2029 Delivery Year.[480] PJM explains that for FRR Entities that elect to remain in the FRR option, PJM

[476] *Id.* at 100-101.

[477] *Id.* at 101.

[478] *Id.* at 101-103 (citing Keech Aff. ¶ 43).

[479] *Id.* at 101 (citing Keech Aff. ¶ 44).

[480] *Id.* at 101 (citing PJM, Intra-PJM Tariffs, Proposed RAA, Schedule 8.1.C (6.0.0), Schedule 8.1.C(5)).

proposes to suspend any potential insufficiency charges, which would ordinarily apply when an FRR Entity is unable to demonstrate in its preliminary FRR Plan that they have contracted for sufficient megawatts of UCAP to meet their capacity obligation, through the end of the 2028/2029 Delivery Year. PJM notes that because the insufficiency charge is assessed based only on an FRR Plan that is submitted before the BRA and before the relevant delivery year. PJM states that only the insufficiency charge would be waived between the 2025/2026 Delivery Year and 2028/2029 Delivery Year and that once a delivery year starts, an FRR Entity will continue to be assessed a deficiency charge if an FRR Entity still has not secured sufficient capacity during the actual delivery year.[481] PJM argues that an FRR Entity will still be incentivized to secure sufficient capacity to meet its load requirements before the actual start of the delivery year and that it will provide FRR Entities with additional time to procure or build additional Capacity Resources before the delivery year begins and incentivize them to do so given the potential for deficiency charges if an FRR Entity is still short capacity once the delivery year begins.

b. Responsive Pleadings

246. Several commenters[482] offer broad support for PJM's proposal, with P3[483] reasoning that PJM's proposal is responsive to the PJM's Board's direction to synchronize the rules between FRR and RPM resources, and AES[484] noting that PJM's proposal encourages market participants to invest in capacity needed for grid reliability. In addition to generally supporting PJM's proposal, AMP states that it also supports PJM's proposed transition period as a reasonable approach to implementing the reforms while affording FRR Entities sufficient time to address the revised obligations.[485] Additionally, AMP argues that PJM's proposed reforms will better align the FRR Alternative approach with the Capacity Performance model.

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[481] *Id.* at 103 (*compare* PJM, Intra-PJM Tariffs, RAA, Schedule 8.1.D (12.0.0), Schedule 8.1.D(7), *with* PJM, Intra-PJM Tariffs, RAA, Schedule 8.1.F (5.1.0), Schedule 8.1.F(2)).

[482] *See, e.g.*, P3 Comments at 14; AMP Protest at 26; AES Comments at 10; Clean Energy Associations Comments at 6.

[483] P3 Comments at 14.

[484] AES Comments at 10.

[485] AMP Protest at 26.

247. Although it generally supports PJM's proposal, and agrees that PJM's proposed changes balance the incentive for FRR Entities to meet their FRR obligations, FRR Coalition claims that the transition period proposed for FRR Entities is incomplete and that the Commission should require PJM to adjust the transition period to account for the currently compressed schedule of the capacity market.[486] FRR Coalition states that PJM's proposal includes two transition mechanisms, both of which are essential. FRR Coalition explains that it supports the first transition mechanism, for FRR Entities to elect to return to RPM beginning with the 2025/2026 Delivery Year. However, FRR Coalition states that PJM's proposed transition mechanism for FRR Entities that instead elect to remain in the FRR Alternative is lacking because, while it proposes to suspend Insufficiency Charges for preliminary FRR Capacity Plans that do not have sufficient megawatts of Unforced Capacity, the proposed transition mechanism does not address the other penalty faced by FRR Entities, the FRR Capacity Deficiency Charge. FRR Coalition states that it agrees that this penalty provides a necessary incentive and does not object to the substantial increase in the Capacity Deficiency Charge rate, but argues that PJM's failure to propose a transition for the new Capacity Deficiency Charge rate is unjust and unreasonable.

248. FRR Coalition argues that the compressed timeline of the current RPM and FRR schedules provides FRR Entities only one year to procure enough capacity to meet their capacity requirements calculated under the new methodology.[487] FRR Coalition claims that such a timeline leaves FRR Entities unable to build new resources, which leaves procuring additional capacity through bilateral contracts as the only option to cover a short capacity position for the 2025/2026 Delivery Year because FRR Entities are precluded from buying capacity in the RPM Auction. FRR Coalition argues that FRR Entities may be faced with the decision to contract prior to the auction at a price above the projected auction clearing price or to wait until after the BRA to contract, in which case the pool of available capacity may be small if the auction clears excess capacity.

249. Instead, FRR Coalition proposes to provide FRR Entities three years to adjust their integrated resource plans in preparation for implementation of the new penalty rate, which would then become effective for the 2027/2028 Delivery Year.[488] FRR Coalition argues that the three-year lead time matches the forward procurement period used in RPM because this is typically viewed as a reasonable amount of time to plan and develop new capacity resources, which also allow FRR Entities time to address changes that may be required for existing bilateral contracts due to the change in capacity accreditation for

[486] FRR Coalition Comments at 1, 4-8.

[487] *Id.* at 8-9.

[488] *Id.* at 10-11.

all resources. FRR Coalition claims that FRR Entities would still have strong incentives to meet their capacity requirements because of the existing Capacity Deficiency Charge and Daily Deficiency Charge. FRR Coalition states that requiring this transition period is within the Commission's authority under FPA section 205[489] and that the Commission has previously found the "use of limited transition periods to be just and reasonable when they allow significant market design changes to be phased in gradually" and to allow market participants "to gain experience with the new market design at reduced risk exposure."[490]

250. In its answer,[491] Michigan Commission states that it supports the transition plan as proposed by PJM.[492] Michigan Commission argues that the ability to rejoin RPM beginning in the 2025/2026 Delivery Year, coupled with the suspension of insufficiency charges through the 2028/29 Delivery Year, should allow FRR Entities sufficient time to adjust to the new rules and accreditation changes and make every effort to procure any additional capacity needed to avoid any insufficiency/deficiency charges.

c. Determination

251. We find that PJM's proposed revisions to the FRR are just and reasonable, including the proposed transition mechanism. We agree with PJM that the proposed transition mechanism will incentivize FRR Entities to build or contract with resources in a timely manner to meet their capacity obligations. As PJM explains, under the current rules, FRR Entities may not have an incentive to procure enough capacity to meet reliability needs because the penalty for not procuring the required amount of capacity may be lower than the cost of obtaining that additional capacity (e.g., due to low Base

[489] *Id.* (citing *NRG* F.3d 108 ("…Section 205 does not allow FERC to suggest modifications that result in an "entirely different rate design" than the utility's original proposal or the utility's prior rate scheme" at 115, citing *W. Res., Inc. v. FERC*, 9 F.3d 1568, 1578 (D.C. Cir. 1993))).

[490] *Id.* at 11 (citing *ISO New England Inc.*, 179 FERC ¶ 61,139, at P 51 (2022) (citing *ISO New Eng. Inc. and NEPOOL Participants Committee*, 162 FERC ¶ 61,205, at P 100 (2018); *ISO New Eng. Inc.*, 155 FERC ¶ 61,319, at P 62 (2016); *ISO New England. Inc.*, 147 FERC ¶ 61,172, at P 73 (2014).

[491] We note that Michigan Commission filed its answer in Docket No. ER24-98-000 instead of ER24-99-000. We accept their answer given that this appears to be inadvertent, and given that there appears to be an absence of any undue prejudice or delay.

[492] Michigan Commission Comments at 4.

Residual Auction clearing prices, which serve as the basis for the penalty amount). PJM's proposed revisions address this incentive misalignment without introducing the potential for overly punitive penalties by setting the FRR Commitment Insufficiency Charge and FRR Capacity Deficiency Charge both equal to point 1 on the LDA VRR curve where the FRR obligation exists, which corresponds to the maximum price level loads participating in the Base Residual Auction would pay if the RPM auction cleared short of the reliability target.[493]

252. We are not persuaded by FRR Coalition's argument that PJM's proposal is unjust and unreasonable because PJM failed to provide a transition mechanism for the Capacity Deficiency Charge. PJM provides data to support its argument that the current Capacity Deficiency Charge rate may negatively affect reliability and resource adequacy because it may be less expensive for an FRR Entity to pay the Capacity Deficiency Charge than to procure sufficient capacity. It is reasonable for PJM to correct this incentive misalignment expeditiously. Although PJM's proposal may require FRR Entities to procure additional capacity before the 2025/2026 Delivery Year in order to avoid Capacity Deficiency Charges, we find speculative and unsupported FRR Entities argument that they will be at a bargaining disadvantage or otherwise unable to procure capacity in that time period. We find that PJM's proposed transition mechanism strikes a reasonable balance between promptly correcting an identified incentive misalignment that may negatively affect reliability and resource adequacy, and providing flexibility to FRR Entities to align their resource plans with PJM's proposed capacity market reforms by temporarily suspending potential insufficiency charges and allowing FRR Entities the option of rejoining the RPM.

6. Binding Notice of Intent to Offer

a. Filing

253. PJM notes that it determines a Locational Deliverability Area Reliability Requirement for certain LDAs, which is the amount of capacity that must be deliverable to an LDA to maintain the desired level of reliability, determined based in part on the LDA's CETO and its projected internal capacity.[494] PJM states that Planned Generation Capacity Resources are included in the preliminary Locational Deliverability Area Reliability Requirement as projected internal capacity and offset by decreases in the CETO. PJM states that it currently includes all resources with an executed ISA that specifies a commercial operation date that falls on or before the first day of the delivery year in the Locational Deliverability Area Reliability Requirement prior to the auction,

[493] Transmittal at 99-100 (citing Keech Aff. ¶ 41).

[494] *Id.* at 72.

but thereafter, excludes resources that do not participate in the auction from the Locational Deliverability Area Reliability Requirement when employing the optimization algorithm during the conduct of the RPM Auction.[495] PJM asserts this allows it to more closely align the Locational Deliverability Area Reliability Requirement with actual reliability needs of an LDA.

254. PJM now proposes to require all Capacity Market Sellers of any Planned Generation Capacity Resource to provide a binding notice of intent if such resource will be offered in the relevant RPM Auction before the auction parameters are posted.[496] PJM states that Existing Generation Capacity Resources that are not subject to the capacity must-offer requirement would not be subject to this requirement because, as the Commission recently explained, "these resources are likely to be producing energy in the delivery year and should therefore be included in the [Locational Deliverability Area] Reliability Requirement as internal capacity that may be available during a local capacity emergency."[497] PJM states Planned Generation Capacity Resources will be required to submit this notice of intent by December 1 prior to an auction so that PJM has sufficient time to model such resources.[498] PJM states that it will not need to complete new analyses for Incremental auctions, so Planned Generation Resources will only need to provide a binding notice of intent 90 days prior to the conduct of an Incremental Auction.[499] PJM states that Planned Generation Capacity Resources that are the subject of such binding notice of intent would then be required to be offered into the applicable RPM Auction, and such resources that do not submit a binding notice of intent would not be allowed to offer capacity into the RPM.[500] PJM states that any Planned Generation Capacity Resource that is associated with a notice of intent to offer, but is not offered into

[495] *Id.* at 73 (citing PJM, Intra-PJM Tariffs, OATT, attach. DD, § 5.12 (22.0.0), §§ 5.12(a) and (b)).

[496] *Id.* at 74.

[497] *Id.* at 74 (quoting *PJM Interconnection, L.L.C.*, 184 FERC ¶ 61,055, at P 115 (2023)).

[498] *Id.* at 74-75.

[499] *Id.* at 75 (citing PJM, Intra-PJM Tariffs, Proposed OATT, attach. DD, § 5.5 (5.0.0)).

[500] *Id.* at 75-76.

the auction, will not be allowed to be offered in each of the subsequent Incremental Auctions associated with that delivery year.[501]

255. PJM argues that this approach is an improvement over the existing rules as it will not require PJM to recalculate the Locational Deliverability Area Reliability Requirement during the conduct of the RPM Auction.[502] PJM contends that this approach provides greater transparency to market participants and reduces the administrative burden on PJM.

b. Responsive Pleadings

256. Several parties express support for PJM's proposed binding notice of intent.[503] P3 states that the binding notice of intent will allow PJM to appropriately set the reliability requirement ahead of the auction and remove some of the uncertainty associated with the current process.[504] AMP states that the notice requirement provides additional assurance that LDA Reliability Requirements are calculated consistent with the LDA's actual reliability needs.[505]

257. While not opposing PJM's proposal, several parties raise concerns regarding the submission of a binding notice of intent prior to when a resource's ELCC accreditation is finalized. Renewable Energy Coalition states that this creates a "cart-before-the-horse" problem, but argues that this problem can be solved if PJM provides Planned Generation Capacity Resources with indicative estimates of their accreditation levels and a mechanism to release a resource from its binding intent if the final accreditation changes in such a way that materially alters the financial assumptions underlying the decision to submit a notice of intent.[506] Similarly, Clean Energy Associations, Pine Gate, and LSP Development state that PJM should commit to providing indicative ELCC values to

[501] *Id.* at 76.

[502] *Id.*

[503] *E.g.*, P3 Comments at 7-9; AMP Protest at 22-25; Ohio FEA Comments at 9-10; Constellation Comments at 11-12; Pine Gate Comments at 13.

[504] P3 Comments at 8-9.

[505] AMP Protest at 23-24.

[506] Renewable Energy Coalition at 13-14. Renewable Energy Coalition states that, as a condition to accepting PJM's proposal, the Commission should require PJM to indicate how it proposes to resolve this concern. *Id.*

Market Participants prior to the deadline for submitting a binding notice of intent.[507] Pine Gate further argues that PJM should clarify what denomination of capacity a resource must commit—accredited capacity, nameplate, or installed capacity—and notes that it would be difficult to provide precise information regarding these capacity values in the notice of intent because ELCC values would be unknown at the time the notice is submitted.[508] Similarly, Clean Energy Associations request that PJM clarify how it intends to work with market participants who may not intend to offer their full resource as a Capacity Resource in a given auction, but rather only a portion of it.[509]

258. Several parties also seek clarification on other aspects of PJM's proposal. Specifically, several parties contend that PJM's proposal does not adequately account for a situation where a seller of a Planned Generation Capacity Resource might expect that resource to be deliverable during a delivery year at the time it submits its binding notice of intent, but ultimately the resource is unable to participate in the capacity auction due to factors outside of the seller's control.[510] Moreover, Ørsted seeks clarification as to whether a Planned Generation Capacity Resource that does not submit a binding notice of intent to offer into the BRA can nonetheless participate in the Incremental Auction if it provides the requisite ninety day notice, and what ramifications would occur if a resource submits the ninety-day notice for participation in an Incremental Auction but is unable to participate in that auction.[511] Ørsted also argues that it is unclear from PJM's transmittal whether planned renewable resources would be exempt from the must-offer requirement or if PJM is creating a must-offer requirement for a subset of renewable resources.[512]

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[507] Clean Energy Associations at 7-8; Pine Gate Comments at 14; LSP Development Comments at 4.

[508] Pine Gate at 13.

[509] Clean Energy Associations Comments at 8.

[510] Pine Gate Comments at 13 (citing to potential interconnection delays from the interconnecting utility, delays in commissioning a project, procurement or supply chain issues, and labor shortages); Clean Energy Association Comments at 7; Ørsted Comments at 6).

[511] Ørsted Comments at 5.

[512] *Id.* at 6.

c. PJM Dec. 21 Answer

259. PJM, in its Dec. 21 answer, clarifies that for the 2024/2025 Delivery Year, the deadline for resource owners to provide the binding notice of intent to offer is not December 1, 2023, as indicated in its October 13, 2023 Filings; rather, PJM states the deadline is the effective date of this filing, which PJM has requested to be December 12, 2023.[513] PJM states that, as of the date of its answer, PJM has begun the process of calculating the accreditation values for each resource based, in part, on the notices of intent that were submitted by December 12, 2023. PJM explains that it expects to have final ELCC values calculated by January 2024 and those final accreditation values will be used to inform the development of the FPR, which the PJM Board would need to approve at its February meeting before the planning parameters for the 2025/2026 Base Residual Auction may be posted. PJM states that, given that the deadline to post planning parameters is March 4, 2024, there would simply not be enough time for PJM to accept notices of intent to participate after December 12, 2023, and complete the necessary analysis without further delaying the 2025/2026 Base Residual Auction and the associated pre-auction deadlines.[514]

d. Deficiency Letter and Responsive Pleadings

260. The Deficiency Letter asked PJM to clarify several aspects of its proposed binding notice of intent, including how PJM would apply the binding notice of intent to a seller that only intends to offer a portion of its resource into the corresponding capacity auction, the extent to which a seller would be required to specify the quantity of capacity it intends to offer into the corresponding capacity auction, whether a seller would have its preliminary ELCC Class Rating resource-specific performance adjustment prior to submitting a binding notice of intent to offer, and how the binding notice of intent would apply to a seller that learns its resource will not be available due to factors beyond its control during the corresponding delivery year.

261. In its answer, PJM clarifies that a notice of intent would not need to specify the number of megawatts that will be offered into a specific auction because sellers will not know the final ELCC values until after the notices of intent are submitted.[515] PJM further explains that the binding notice of intent would continue to apply to a seller that learns its resource will not be available due to factors beyond its control after it submits the binding notice of intent. PJM states that, should the seller of such resource decide not to offer

[513] PJM Dec. 21 Answer at 55.

[514] *Id.* at 56.

[515] Deficiency Letter Response at 43.

into the relevant auction, that resource would not be allowed to participate in any remaining auction associated with that delivery year. PJM argues that this is appropriate to discourage resource owners from speculating that a resource will be available to serve as capacity when the development of the resource is still in its infancy. PJM also reiterates that its proposal applies only to Planned Generation Capacity Resources, and that nothing about its proposal revises the must-offer requirement and the associated exceptions.[516] PJM explains that the binding notice of intent is a granular implementation detail appropriately belongs in the PJM Manuals and is not required to be specified in the tariff and that the tariff language does not need to be amended to reflect this implementation detail given that it is simply worded to require a resource that is subject to a notice of intent to offer into the relevant RPM Auction and does not specify the quantity of megawatts that must be offered to meet this requirement.[517]

262. The IMM states that, under the rule of reason, the notice of intent requirement should be included in the tariff rather than the manuals because it places a significant obligation on the seller and the seller's compliance with such obligation can significantly impact market prices and may need to be enforced.[518] AMP similarly argues that the binding notice of intent rules significantly affect rates, terms, and conditions of service, and are readily susceptible of specification, and, thus they ought to be included in the tariff.[519] The IMM also reiterates its position that, while it supports the concept of a binding notice of intent for planned resources, that support is linked to the IMM's support for a binding must-offer requirement for all existing intermittent and storage resources.[520] Further, the IMM states that, since a resource owner will not know its UCAP at the time it submits a notice of intent, PJM should instead require that the notice of intent include a statement of the resource's ICAP.[521]

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[516] *Id.* at 44.

[517] *Id.* at 43, n.57.

[518] IMM Protest of Deficiency Letter Response at 37-38 (citing *Energy Storage Ass'n v. PJM Interconnection, L.L.C.*, 162 FERC ¶ 61,296 (2018)).

[519] AMP Answer at 8.

[520] IMM Protest of Deficiency Letter Response at 37; IMM Oct. 25 Answer at 1.

[521] IMM Protest of Deficiency Letter Response at 37.

e. Determination

263. We find that PJM's proposed notice of intent requirements are just and reasonable. Under PJM's proposal, the LDA Reliability Requirement can be determined without requiring PJM to recalculate the Reliability Requirement during the conduct of the auction. We agree with PJM that this approach will provide greater transparency to market participants and reduce the administrative tasks needed for PJM to run the optimization algorithm during the conduct of the auction. It also provides some assurance that the mix of resources in PJM's ELCC model will reflect what is cleared in any individual capacity auction.

264. We disagree with protesters' arguments that PJM's proposal is unreasonable because it would require submission of the binding notice of intent prior to when a resource's ELCC accreditation is finalized. As PJM clarified in its Deficiency Letter Response, the notice of intent would not need to specify a number of megawatts that the resource would offer; rather, the offer requirement will be satisfied as long as any megawatt quantity for the resource is offered into the relevant auction.[522] Therefore, resources would not need their final ELCC accreditation values in order to comply with PJM's notice of intent requirements.

265. We also disagree with the IMM that additional detail regarding the notice of intent should be included in the tariff. We find that PJM's proposed tariff language provides sufficient specificity regarding the administration of the notice of intent because it describes when such notice is due and the consequences if a resource fails to submit such notice or fails to comply with a notice it has submitted.[523] Additionally specific details regarding what must be included with a notice of intent are an implementation detail, which need not be included in the tariff,[524] and which instead may be included only in the business practices manual.[525]

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[522] Deficiency Letter Response at 43. Moreover, as PJM notes in its Deficiency Letter Response, PJM has posted preliminary ELCC class ratings for the 2025/2026 Delivery Year to provide Market Participants with an indication of the preliminary ratings. *Id.*

[523] *See* PJM, Intra-PJM Tariffs, Proposed OATT, attach. DD, §§ 5.5, 6.6(a), 6.6(h) (5.0.0).

[524] *Id.*

[525] *See, e.g., NYISO*, 179 FERC ¶ 61,102 at P 108 (finding NYISO's marginal capacity accreditation approach to be consistent with the rule of reason because it "provides sufficient detail to define 'marginal reliability contribution,' and in

266. PJM also explains that resources that fail to fulfill their offer obligation under a notice of intent may not offer into any other capacity auctions associated with that delivery year. PJM's proposal reasonably balances the interests of market participants while aligning the LDA Reliability Requirement with actual reliability needs in an administratively efficient manner that discourages speculation. We thus find this aspect of PJM's proposal just and reasonable.

267. We also direct a compliance filing regarding the deadline for submission of the binding notice of intent for the 2025/2026 BRA. Although PJM's tariff states that the deadline to submit the binding notice of intent is "the preceding December 1 for a [BRA],"[526] PJM clarifies in its Deficiency Letter Response that the deadline for sellers to submit the binding notice of intent for the 2025/2026 BRA should be December 12, 2023, the same day PJM requests that this filing become effective, because PJM states that the Commission has previously found that deadlines before the effective date are not effective or enforceable.[527] Consistent with PJM's clarification, we direct PJM to submit a compliance filing within 30 days of the date of this order revising its tariff to specify that the deadline for the binding notice of intent for the 2025/2026 BRA is December 12, 2023.

7. Consumer Impact Analysis of the Enhanced Risk Modeling and Accreditation Proposal

a. Filing

268. PJM argues that its enhanced risk modeling and accreditation proposal will improve PJM's ability to maintain resource adequacy at a reasonable cost.[528] In support of its argument, PJM provides the results of a simulation analysis performed by Dr. Graf to compare potential clearing results under the status quo design compared to a capacity market with PJM's proposed risk modeling and accreditation changes. PJM states that simulations of re-running the 2024/2025 BRA with its proposed risk modeling and marginal ELCC accreditation in place demonstrate lower total supply costs and greater

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addition *sets forth the process* for calculating the marginal capacity accreditation" (emphasis added)).

[526] PJM, Intra-PJM Tariffs, Proposed OATT, attach. DD, § 5.5 (5.0.0).

[527] Deficiency Letter Response at 3 n.5 (citing *PJM Interconnection, L.L.C.*, 183 FERC ¶ 61,009, at P 38 (2023)).

[528] Transmittal at 65.

reliability compared to the status quo.[529] Specifically, PJM found that: (1) total costs to consumers increased modestly from $2.2 billion in the status quo case to $2.4 billion in the enhanced design case; (2) total supply costs (i.e., total offered cost of cleared resources) fell from $330 million to $310 million; and (3) reliability increased, with a 25% decrease in EUE in the enhanced design case versus the status quo case. PJM argues that these findings demonstrate that PJM's proposed accreditation and risk modeling enhancements are expected to provide reliability and efficiency benefits.

269. Furthermore, PJM explains that simulations of its proposed risk modeling enhancements identified distribution of risk throughout the delivery year that is more consistent with PJM's recent experience during extreme weather events such as Winter Storm Elliott.[530] Specifically, PJM states that it found that approximately 64% of EUE was observed in the winter period, with 36% of EUE in the summer period, and, conversely, around 65% of LOLE was observed during the summer period while the remaining 35% of LOLE was observed during the winter period. PJM argues that these results demonstrate that its proposed risk modeling enhancements provide a more accurate quantification of seasonal and hourly risk.

b. Responsive Pleadings

270. OCC states that PJM provides the results of an analysis of the cost impact of the marginal ELCC approach and hourly resource adequacy risk model on consumers, but does not provide clarification and specifics as to how the new techniques will be used.[531] OCC asserts that PJM should provide a detailed description of its proposed data-generation and simulation processes and calculation of loss of load probabilities, as well as a sensitivity case example of how it will implement these factors to derive the level of resource adequacy needed for the region.[532] OCC argues that the impact on consumers has been shown not to be de minimis, and the Commission should not approve PJM's proposal without a better understanding of the impact of these proposed changes for Ohio consumers, especially those serviced in smaller LDAs.[533]

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[529] *Id.* at 65-66. (PJM notes that it removed constraints related to LDAs and Capacity Emergency Transfer Limits to yield an "unconstrained" RTO price.)

[530] *Id.* at 67-69.

[531] OCC Protest at 27.

[532] *Id.* at 27.

[533] *Id.* at 28-29.

271. Several parties argue that PJM has failed to demonstrate that its filing is just and reasonable because PJM did not provide a thorough consumer impact analysis. The IMM and AMP argue that PJM's simulation analysis is oversimplified and based on several unrealistic assumptions.[534] Specifically, the IMM and AMP contend that the simulation analysis underestimates cost by ignoring local constraints and omits other, more expensive scenarios that may demonstrate a more significant increase in cost to PJM customers.[535] New Jersey Rate Counsel and Maryland OPC similarly contend that PJM provided insufficient analysis of the resource adequacy, cost, and benefits to specific LDAs.[536] AMP also states that PJM's analysis notably does not include assumptions about implementation of PJM's proposed changes to the CPQR component of sell offers.[537] Maryland OPC further states that PJM has not described how CETL and CETO will be calculated, nor has PJM provided information to determine how the demand curves will be drawn.[538] OCC argues that PJM failed to provide a sensitivity analysis or technical report for its proposal to use an hourly load model and inclusion of an EUE metric, which OCC argues could increase costs to consumers.[539] The IMM contends that a more accurate representation of the cost impacts of PJM's proposed reforms is to divide the increase in costs by the energy that will be served, which results in $1.8 million per MWh ($200 million divided by 110 MWh).[540] Moreover, the IMM and AMP assert that PJM's simulation analysis does not indicate consumers would receive reliability benefits that justify these additional costs.[541] For example, the IMM and AMP contend that PJM's simulation analysis demonstrates an improvement to reliability from a 1 in 40

[534] IMM Protest at 25; AMP Protest at 11-12.

[535] IMM Protest at 25-27; AMP Protest at 11-12.

[536] New Jersey Rate Counsel Protest at 4-5; Maryland OPC Protest at 1-2.

[537] AMP Protest at 10.

[538] Maryland OPC Protest at 5.

[539] OCC Protest at 27-28.

[540] IMM Protest at 27. *See*, *also*, AMP Protest at 11 (AMP similarly states that consumers would be paying $2.2 million for each MWh reduction in EUE.).

[541] IMM Protest at 27; AMP Protest at 11.

LOLE to a 1 in 50 LOLE—both of which are well in excess of the 1 in 10 LOLE requirement.[542]

272. In contrast to the IMM and AMP, Renewable Energy Coalition states that PJM's simulation analysis may have underestimated the potential benefits of PJM's proposal.[543] Specifically, Renewable Energy Coalition states that PJM's analysis did not incorporate the benefits of more granular clearing in a case where PJM's forecast of the supply mix is inaccurate, and therefore the actual benefits of more granular clearing are even greater than PJM's analysis concludes.

c. Answers

273. PJM states that it conducted additional simulations to incorporate LDA-specific effects arising from proposed changes in this filing and in Docket No. ER24-98.[544] These simulations use actual data on resource offers, load forecasts, and assumed resource mix from the 2024/2025 Base Residual Auction and used updated resource accreditation consistent with the proposed changes, and translated offers to maintain the same total cost in dollars that were actually observed for each 2024/2025 offer or offer segments. PJM states that the proposed changes do not appear to result in significantly large increases in costs. In fact, many LDAs showed potential decreases in auction clearing prices compared with the actual 2024/2025 BRA results as certain LDAs are no longer binding. PJM further states that the same analysis shows that the proposed enhancements to risk modeling and accreditation produce a 25% improvement in EUE when compared with the results of the 2024/2025 Delivery Year under the status quo rules.

274. The IMM asserts that the simulations PJM reports do not provide any useful information because those simulations do not accurately assess the impact of PJM's proposals on either customers or generators.[545]

d. Determination

275. The Commission does not generally require a utility to provide a cost-benefit analysis, nor does the Commission require a utility to affirmatively demonstrate that the

[542] IMM Protest at 25; AMP Protest at 11.

[543] Renewable Energy Coalition Comments at 17.

[544] PJM Dec. 21 Answer at 31-32 (citing Bruno and Graf Reply Aff. ¶ 45).

[545] IMM Jan. 12 Answer at 18 (citing PJM Dec. 21 Answer at 31).

benefits of a proposed rate change outweigh its costs.[546] Rather, in determining whether rates are just and reasonable, "the Commission considers the proposal in light of the currently effective tariff and comments in support and opposition to reach its determination."[547] Although costs are an important consideration, the Commission has "broad authority to consider non-cost factors as well as cost factors."[548] The Commission "does not have to find net savings"[549] and may "act based upon reasonable predictions rooted in basic economic principles."[550] Here, on balance, we find that PJM provided sufficient support to demonstrate that the proposed changes are just and reasonable for the reasons discussed above.

276. We also reject the IMM and AMP's protest that PJM's scenario analysis shows that the cleared EUE will be consistent with a 1-day-in-50 year reliability scenario, which exceeds the 1-day-in-10 year standard. PJM's capacity market demand curve is sloped, meaning it procures capacity in excess of what is needed to meet the minimum standard under certain circumstances, by design. As PJM's use of EUE will develop a reliability requirement reflective of the 1-day-in-10 year standard used to set its approved demand curve, any over procurement of capacity is a product of PJM's existing tariff and capacity market design.

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[546] Capacity Performance Order, 151 FERC ¶ 61,208 at PP 9, 49 ("PJM is not required by the FPA or Commission precedent to provide the mathematical specificity of a cost-benefit analysis to support a market rule change"); *see also Sw. Power Pool, Inc.*, 141 FERC ¶ 61,048, at P 57 (2012) ("A cost-benefit analysis is largely a tool for stakeholders to evaluate different market designs and to determine their interest in moving forward with a market proposal."); *Process Gas Consumers Grp. v. FERC*, 866 F.2d 470, 477 (D.C. Cir. 1989) ("FERC, in making these judgments, need not engage in painstaking cost-benefit analysis of the merits of research proposals on a project-by-project basis. Rather, the Commission is required to make only a candid, common-sense assessment as to the consistency of a project's objectives with the interests of the ratepayers providing the financing. FERC's mandate to determine "just and reasonable" rates requires no less.").

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

[548] Capacity Performance Rehearing Order, 155 FERC ¶ 61,157 at P 30 (citations omitted).

[549] *AEMA*, 860 F.3d at 662 ("The Commission explained the important non-cost reasons for approving PJM's proposal. It does not have to find net savings.").

[550] *S.C. Pub. Serv. Auth. v. FERC*, 762 F.3d 41, 77 (D.C. Cir. 2014).

8. Other Issues

a. VRR Curve

277. PJM notes that, in the last quadrennial review of the VRR curve, the Commission accepted PJM's proposed changes to the metric inputs used to determine the VRR Curve starting with the 2026/2027 Delivery Year.[551] PJM states that it proposes to bring forward by a year the use of set percentages that are applied directly against the Reliability Requirement rather than against the Installed Reserve Margin so that it is effective for the 2025/2026 Delivery Year. PJM additionally states that, for the determination of the point on the y-axis, PJM proposes to discontinue using a percentage based on "one minus the pool-wide EFORd" as the factor to convert the net Cost of New Entry (CONE) price from a $/MW-day on an installed capacity basis to be on an Unforced Capacity basis and instead proposes to use the Reference Resource's ELCC Class Rating.[552]

278. AMP opposes PJM's VRR curve changes because they are premised on the use of a marginal ELCC approach, which AMP also opposes.[553] AMP argues that PJM's proposed changes to the VRR curve inputs may increase costs to consumers without any commensurate improvement in reliability. P3 notes that, during the quadrennial review referenced above, it opposed PJM's revisions to the VRR curve, but was ultimately rebuffed by PJM and the Commission.[554] P3 states that it continues to have concerns related to those approved changes to the VRR curve accepted in the last quadrennial review filing.

279. We accept PJM's proposal to bring forward by one year—from the 2026/2027 to 2025/2026 Delivery Year—the changes to the metric inputs used to determine the VRR Curve that have been previously accepted by the Commission[555] and PJM's proposal to use the Reference Resource's ELCC Class Rating in place of EFORd-based formula for determining Net CONE. We find that these changes are consistent with PJM's proposed marginal ELCC approach, which we find to be just and reasonable, as discussed above. As we have stated above, PJM's proposal will more accurately reflect reliability needs

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[551] Transmittal at 77.

[552] *Id.* at 78-79.

[553] AMP Protest at 16-17.

[554] P3 Protest at 9-10.

[555] *PJM Interconnection, L.L.C.*, 182 FERC ¶ 61,073, at P 157 (2023).

going forward, and any price increases reflect these needs. As P3 states, its concerns were disposed of in the quadrennial review proceeding and raising them here is a collateral attack on those findings.

b. Sell Offer Requirements

280. PJM states that, consistent with its proposal to discontinue use of EFORd in favor of PJM's proposed marginal ELCC approach to determine each Generation Capacity Resource's capacity accreditation, PJM proposes to modify its Sell Offer requirements to require Generation Capacity Resources to specify their Accredited UCAP Factor rather than their EFORd.[556] Similarly, to calculate the Nominated Demand Resource Value included in a Demand Resource's Sell Offer, PJM proposes to convert the nominated Demand Resource value to a UCAP basis by multiplying such value by the applicable ELCC Class Rating.[557]

281. PJM also proposes to revise OATT, Attachment M – Appendix to make certain provisions regarding the IMM's review of EFORd values included in Sell Offers only applicable through the 2024/2025 Delivery Year.[558]

282. P3 supports PJM's proposed revisions to the sell offer requirements, noting that the revisions more properly align with PJM's ELCC and modeling changes.[559] The IMM states that, while PJM is proposing to replace its EFORd concept with an analogous Accredited UCAP Factor concept, PJM also proposes revisions to Attachment M-Appendix that would remove tariff provisions that specifically authorize steps the IMM can take when it is concerned that incorrect determinations about EFORd could permit the exercise of market power.[560] The IMM states that removal of those tariff provisions contradicts the IMM's exclusive responsibility to make determinations concerning

[556] Transmittal at 79.

[557] *Id.* at 80.

[558] PJM, Intra-PJM Tariffs, Proposed OATT, attach. M-Appendix, §§ II.C.3, II.C.5 (26.0.0).

[559] P3 Comments at 11.

[560] IMM Protest at 28 (citing to PJM, Intra-PJM Tariffs, Proposed OATT, attach. M-Appendix, § II.C.3 (26.0.0))

market power.[561] The IMM argues that the proposed conceptual change from EFORd to Accredited UCAP Factor does not change the fundamental need for the IMM to review an adjustment to the quantity that sellers must offer. The IMM argues that PJM failed to demonstrate the proposed revisions to Attachment M-Appendix, Section II.C are just and reasonable.

283. The Deficiency Letter asked PJM to support its proposed revision to Attachment M – Appendix, which PJM did not explain in PJM's transmittal letter. In its answer, PJM states that its proposed revision makes the IMM's review of a resource's EFORd only applicable through the 2024/2025 Delivery Year because under PJM's proposal, offers will be converted to Accredited UCAP effective with the 2025/2026 Delivery Year, thus the rules regarding the review of a resource's EFORd would no longer be applicable or necessary.[562]

284. In response to PJM's Deficiency Letter Response, the IMM reiterates its arguments that PJM's proposal would reduce the ability of the IMM to fulfill its tariff defined responsibilities to make determinations concerning market power.[563] The IMM contends that PJM should have instead modified the review of the EFORd to a review of the derating factor, and retained the rules regarding the must-offer requirement and determinations about the level of any adjustment to the quantity that must be offered, whether based on EFORd or Accredited UCAP Factor.[564]

285. PJM asserts the Market Monitor's concerns are misplaced. PJM states that under PJM's proposal, the seller is no longer involved in determining its derating factor.[565] Rather, PJM explains that PJM runs the ELCC model, determines ELCC class ratings, and the ELCC RPA, and finally, each resource's Accredited UCAP value. Because there is no seller-submitted derating factor, PJM contends that this conceptual change obviates the need for the IMM to screen potential exercises of market power in the derating factor determination.[566]

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[561] *Id.* at 28 (citing to PJM, Intra-PJM Tariffs, OATT, attach. M-Appendix § IV.2; OATT § 12A).

[562] Deficiency Letter Response at 45.

[563] IMM Protest of Deficiency Letter Response at 39.

[564] *Id.* at 40.

[565] PJM January 12 Answer at 22.

[566] *Id.* at 23.

286. We agree with PJM that under its proposed marginal ELCC approach, resource offers will be converted into Accredited UCAP by PJM. Thus, there is no need for either the IMM or PJM to review requests to change a resource's EFORd. Marginal ELCC accreditation is the result of a complex set of interrelated factors, and a resource cannot simply contest its ELCC rating in the same way that it could seek to change its EFORd rating. PJM will be the party responsible for calculating the Marginal ELCC rating, and therefore will also calculate the Accredited UCAP for resources seeking to participate in the capacity market. PJM's changes here are limited strictly to the review of the EFORd which will now be an irrelevant factor in a resource's offer, and do not prevent the IMM from informing the Commission about concerns with a Generation Sell Offer.[567] For these reasons, we reject the Market Monitor's protest.

c. Ministerial Revisions

287. PJM additionally states that it is proposing limited clerical, ministerial, and non-substantive revisions to the sections of the tariff that are affected by this filing, including removing capacity market rules that have been sunset and are no longer applicable.[568]

288. We accept PJM's clerical, ministerial, and non-substantive tariff revisions because they remove references to capacity market rules that are no longer applicable and serve to clarify the tariff requirements.

d. Alternative Proposals

289. Several parties submitted comments addressing potential changes or alternative proposals to PJM's capacity market design. For example, some parties expressed support for PJM's commitment to continuing to evaluate the design of the capacity market construct and how a more granular or seasonal approach could support reliability and efficiency.[569] Other parties request that the Commission go further by affirmatively directing PJM to evaluate the merits of a more granular, seasonal market.[570] Others contend that they have not yet formed an opinion on the practicality of more granular

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[567] *See* PJM, Intra-PJM Tariffs, OATT, attach. M-Appendix § II.C.5 (23.0.0).

[568] Transmittal at 103-104.

[569] OPSI Comments at 4-5; Pennsylvania Commission Comments at 2-4; Renewable Energy Coalition Comments at 15-20; Pine Gate Renewables Comments at 14-17; Public Interest Organizations Protest at 59-62.

[570] Clean Energy Associations at 14-15; AES Comments at 9; NOVEC Comments at 4; FirstEnergy Service Company Comments at 8-9.

modeling,[571] or that PJM should maintain the annual market construct until stakeholders have additional time to meaningfully review alternative structures.[572] For example, ODEC states that under the proposed accreditation methodology, a solar resource is assigned a single accreditation value for the entire delivery year, yet it has no ability to provide capacity during the night. ODEC asserts that using a seasonal construct approach would address this limitation.[573]

290. Similarly, some parties argue that PJM should propose additional changes. Specifically, several parties contend that PJM should extend the must-offer requirement to intermittent and limited duration resources and harmonize performance obligations with availability.[574] Other parties argue that PJM should provide indicative planning parameters prior to the deadline to request a must-offer exemption,[575] or that the Commission should hold a technical conference on capacity accreditation.[576]

291. Some parties compare PJM's filing to the alternative proposal recommended by the IMM in Docket No. EL24-12-000. OCC argues that the Commission should grant the IMM's complaint and permit the next to BRAs to proceed as currently scheduled while allowing additional time for stakeholder and regulatory review of PJM's proposed reforms.[577] Although OCC acknowledges that the Commission need not consider whether better alternatives exist for resolving a particular problem, OCC argues that such alternatives shed light on the justness and reasonableness of PJM's proposals.[578] AMP states that the Commission should encourage PJM to renew its stakeholder process and

[571] ODEC Comments at 4-5.

[572] PJM ICC Comments at 2-4.

[573] ODEC Comments at 4-5.

[574] Pennsylvania Commission Comments at 4-6; OPSI Comments at 6; IMM Protest at 24; Clean Energy Associations Comments at 6 (supports maintaining the must-offer exemption for intermittent resources).

[575] *E.g.*, LSP Development Comments at 4-5.

[576] Clean Energy Associations Comments at 2.

[577] OCC Protest at 29-30.

[578] *Id.* at 31.

resubmit a package of reforms to the Commission.[579] AMP further states that, in the absence of further meaningful PJM stakeholder process, the Commission should initiate a section 206 proceeding to determine whether the existing rules are unjust and unreasonable, and if so, direct a replacement rate.[580] FirstEnergy Service Company states that the Commission should reject any proposal that would result in additional delays to the auction schedule.[581]

292. Several parties encourage the Commission to remain focused on evaluating PJM's proposal, rather than evaluating alternative proposals.[582] Calpine states that the fact that there may be alternative solutions preferred by certain stakeholders does not render PJM's proposal unjust and unreasonable.

293. The issue before us is whether PJM's proposal, as filed, is just and reasonable. Although we recognize PJM's commitment to continue to evaluate more granular market design elements, we do not find that the absence of those design elements renders PJM's proposal unjust and unreasonable.[583] We encourage PJM to continue evaluating market enhancements consistent with its statement that "PJM has the responsibility to

[579] AMP Protest at 26-27.

[580] *Id.* at 27.

[581] FirstEnergy Service Company Comments at 6-8.

[582] Calpine Comments at 13-14.

[583] *PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,210, at P 29 n.77 (2020) ("To be just and reasonable, proposed revisions do not have to be the most just and reasonable among all possible alternatives.") (citations omitted); *see also Louisville Gas & Elec. Co.*, 174 FERC ¶ 61,188, at P 48 (2021) ("In submitting an FPA section 205 filing, the public utility need only demonstrate that its proposal is just and reasonable . . . not that its proposal is the most just and reasonable among all possible alternatives."); *Cal. Indep. Sys. Operator Corp.*, 116 FERC ¶ 61,274, at P 1402 (2006) ("Although additional features could enhance [the new market mechanism], we find that these potential enhancements do not outweigh the need to implement without further delay the numerous benefits. . . ."); *Sw. Power Pool, Inc.*, 114 FERC ¶ 61,289, at P 2 (2006) (recognizing that "the implementation of organized markets is to some extent an iterative process that requires some modifications after the transmission provider and market participants gain actual market experience.").

continually refine its markets to align with the evolving realities of the power system and maintain a coherent and relevant market structure."[584]

e. Inadvertent Tariff Revisions

294. The Deficiency Letter asked PJM to support its proposed revisions to RAA, Schedule 6, section K and the parallel OATT, Attachment DD-1, section K which were not explained in PJM's transmittal letter. In its answer, PJM explains that the revisions to RAA, Schedule 6, section K and the parallel OATT, Attachment DD-1, section K pertain to Demand Resources' eligibility for Bonus Performance and were inadvertently included in Docket No. ER24-99-000 rather than ER24-98-000. PJM states that the Commission should accept the revisions as filed and direct PJM to remove the referenced proposed revision in a subsequent compliance filing in the event the Commission rejects PJM's filing in Docket No. ER24-98-000.[585]

295. PJM states that these tariff revisions were inadvertently included in this filing. We therefore reject these provisions and direct PJM to file, within 30 days of the date of issuance of this order, a compliance filing removing the inadvertently included revisions to RAA, Schedule 6, section K and the parallel OATT, Attachment DD-1, section K pertaining to Demand Resources' eligibility for Bonus Performance.

f. Effective Date

296. PJM in its initial filing requests an effective date of December 12, 2023,[586] and in its deficiency letter response, PJM requests waiver of the 60-days' notice requirement,[587] stating that good cause exists to grant waiver to allow the proposed revisions to become effective December 12, 2023.[588] PJM argues that acceptance of this requested effective date is necessary to provide for an orderly conduct of the 2025/2026 BRA, which is scheduled to commence on June 1, 2024, with pre-auction deadlines occurring in January 2024. PJM explains that its requested effective date is necessary to allow adequate time to model planned resources in the ELCC model and reserve requirement study. PJM further explains that the deadline to submit a binding notice of intent to offer for the

[584] Graff Aff. ¶ 159.

[585] Deficiency Letter Response at 46.

[586] Transmittal at 104-105.

[587] 18 C.F.R. § 35.3 (2023).

[588] Deficiency Letter Response at 2, 30, n.48.

2025/2026 Base Residual Auction was December 12, 2023, the requested effective date, and there would be insufficient time for PJM to accept notices of intent to participate after December 12, 2023, and complete the necessary analysis without further delaying the 2025/2026 Base Residual Auction and the associated pre-auction deadlines.[589]

297. LSP Development and AMP argue that the Commission should reject the requested December 12, 2023 effective date because they contend there is substantial uncertainty regarding PJM's proposal that cannot be resolved prior to the December 12, 2023 effective date, such as the application of PJM's revised accreditation approach, the potential for further compliance filings, or the inclusion of more specific detail in the PJM Manuals.[590] Instead, LSP Development argues the Commission should "accept the filing with the latest possible effective date, and direct PJM to refine and finalize its new accreditation approach before implementing it in the BRA for the 2026/2027 Delivery Year."[591] AMP similarly argues that the Commission should decline PJM's request for waiver and direct PJM to run the BRA for the 2025/2026 Delivery Year, as currently scheduled, under the existing rules.[592]

298. In response to LSP Development and AMP, PJM argues that the Commission should not delay acceptance of the proposal or delay PJM's requested effective date. PJM highlights that even some protesters recognize that the proposal makes critical improvements to the accreditation of Unlimited Resources.[593] In response to LS Power Development's assertion that, upon acceptance, the Commission should not allow PJM to apply the proposed tariff and RAA enhancements until after manual provisions detailing implementation are developed, PJM states that it would be inefficient to fully develop manual language before the Commission accepts the proposal and offers guidance.[594]

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[589] PJM Dec. 21 Answer at 56.

[590] LSP Development Protest of Deficiency Letter Response at 11; AMP Comments on Deficiency Letter Response at 8-9.

[591] LSP Development Protest of Deficiency Letter at 11 (citing 16 U.S.C. § 824d(e) (providing that the Commission "may suspend the operation of [a rate] schedule and defer the use of such rate, charge, classification, or service, but not for a longer period than five months beyond the time when it would otherwise go into effect").

[592] AMP Protest of Deficiency Letter Response at 2.

[593] PJM Jan. 12 Answer at 2-3.

[594] *Id.* at 3.

299. On January 19, 2024, LSP Development submitted a motion to lodge in the record of this proceeding a notice issued by PJM to stakeholders.[595] The notice, issued January 17, 2024, states that PJM's electric vehicle forecast vendor informed PJM of a calculation error. The notice further states that, while the error may impact 2025/2026 ELCC Class Ratings and the Forecast Pool Requirement, the error is "not anticipated to be large" and PJM is working with the vendor to update and re-post the load forecast and associated analysis.[596] LS Power argues that this notice demonstrates that market participants cannot rely on previously-released ELCC Class Ratings to estimate the Accredited UCAP of their individual resources, and therefore, it is unreasonable for PJM to apply the new ELCC methodology in the 2025/2026 BRA.[597]

300. PJM argues that the Commission should reject LSP Development's motion to lodge.[598] PJM asserts that the inputs to PJM's load forecast are not the subject of the underlying proposal and are entirely outside the scope of this proceeding.[599] Moreover, PJM states that the fact that one input into the load forecast needs to be updated does not render the pending proposal to adopt a marginal ELCC methodology unjust and unreasonable. Moreover, PJM states that load forecasts are also an input into the capacity auction parameters under the existing rules, so the load forecast would need to be updated irrespective of whether the Commission accepts or rejects PJM's proposed reforms. PJM states that, in any event, PM expects to have updated electric vehicle forecasts in the coming days and the impact to the load forecast should be minimal.[600]

301. We find good cause to grant PJM's request for waiver of the Commission's 60-day prior notice requirement to allow an effective date of December 12, 2023.[601] Granting

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[595] LSP Development Motion to Lodge at 1.

[596] *Id.* at attach. A.

[597] *Id.* at 3.

[598] PJM Answer to Motion to Lodge at 1.

[599] *Id.* at 2 (citing *High Prairie Pipeline, LLC* v. *Enbridge Energy Limited P'ship*, 149 FERC ¶ 61,004, at P 34 (2014) ("The Commission will not accept motions to lodge or similar filings when these filings contain information that is repetitive, outside the scope of the proceeding, or of no assistance in the decision-making process.").

[600] *Id.* at 4.

[601] 18 C.F.R. § 35.11 (2023); *Cent. Hudson Gas & Elec. Corp.*, 60 FERC ¶ 61,106, *reh'g denied*, 61 FERC ¶ 61,089 (1992).

PJM's requested effective date will allow adequate time for PJM to model planned resources in the ELCC model and reserve requirement study and to provide an orderly conduct of the 2025/2026 BRA. We disagree with LSP Development and AMP's contention that it is unjust and unreasonable for PJM to implement its proposed tariff changes starting with the 2025/2026 Delivery Year because of alleged uncertainty regarding the application of PJM's revised accreditation approach, or because PJM intends to include implementation details in the PJM Manuals and provide further specification in its tariff language on compliance. As we addressed *supra*, we find that PJM's proposal provides sufficient detail in the tariff and that further implementation details are appropriately included in the PJM Manuals.[602] Moreover, PJM has committed to providing data sufficient for participants to replicate PJM's results and anticipate future ELCC values with reasonable accuracy.

302. We also deny LSP Development's motion to lodge. The arguments raised in the motion are substantively similar to the arguments raised by LSP Development and AMP above—that some uncertainties as to PJM's accreditation model render PJM's proposal to implement its proposed changes in the 2025/2026 BRA unreasonable. We are not persuaded that an Electric Vehicle forecast error, which is "not anticipated to be large" and is being promptly corrected by PJM renders PJM's proposal to implement its accreditation model in the 2025/2026 BRA unreasonable.

[602] *Supra* at PP 53-58.

The Commission orders:

(A) PJM's proposed tariff revisions are hereby accepted, to become effective December 12, 2023, subject to PJM submitting a compliance filing within 30 days of the date of this order, as discussed in the body of this order.

(B) PJM is hereby directed to submit a compliance filing within 30 days of the date of this order, as discussed in the body of this order.

By the Commission. Commissioner Clements is concurring in part and dissenting in part with a separate statement attached.
Commissioner Christie is concurring with a separate statement attached.

(S E A L)

Debbie-Anne A. Reese,
Acting Secretary.

Appendix A

List of Intervenors

*Filed Comments

Advanced Energy Management Alliance (AEMA)*
AES Clean Energy Development, LLC (AES, collectively with Dayton Power and Light Company)*
American Clean Power Association*
American Electric Power Service Corporation (FRR Coalition, collectively with Duke Energy Kentucky, Inc. and Dominion Energy Services, Inc.)*
American Municipal Power, Inc. (AMP)*
Avangrid Renewables, LLC
Big Sandy Peaker Plant, LLC and Wolf Hills Energy, LLC
BP Energy Company
Buckeye Power, Inc. (Buckeye)*
Calpine Corporation (Calpine)*
Chief Conemaugh Power, LLC and Chief Keystone Power, LLC
Constellation Energy Generation, LLC (Constellation)*
CPower, Inc.
CPV Power Holdings, LP
Crete Energy Venture, LLC and Lincoln Generating Facility, LLC
Cypress Creek Renewables, LLC (Renewable Energy Coalition, collectively with Leeward Renewable Energy, LLC, MN8 Energy LLC, and VC Renewables LLC)*
Delaware Division of the Public Advocate
Delaware Municipal Electric Corporation, Inc.
Dominion Energy Services, Inc.*
Duke Energy Business Services LLC[603]
Duquesne Light Company
East Kentucky Power Cooperative, Inc.*
EDF Renewables, Inc.
EDP Renewables North America LLC
Electric Power Supply Association (EPSA)*
Elevate Renewables F7, LLC
Enel North America, Inc.

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[603] Duke Energy Business Services LLC submitted a motion to intervene on behalf of its franchised public utility affiliates, Duke Energy Carolinas, LLC; Duke Energy Progress, LLC; Duke Energy Florida, LLC; Duke Energy Ohio, Inc.; and Duke Energy Kentucky, Inc.

Exelon Corporation
FirstEnergy Service Company[604] (FirstEnergy)*
H-P Energy Resources LLC
Illinois Commerce Commission
Illinois Municipal Electric Agency
Invenergy Nelson LLC and Lackawanna Energy Center LLC*
Invenergy Wind Development North America LLC; Invenergy Storage Development LLC; Invenergy Solar Development North America LLC; and Invenergy Thermal Development LLC (Invenergy, collectively with Invenergy Nelson LLC and Lackawanna Energy Center LLC)*
J-POWER USA Development Co., Ltd.
Kentucky Public Service Commission
Keystone Power Pass-Through Holders LLC and Conemaugh Power Pass-Through Holders LLC
Leeward Renewable Energy, LLC*
LS Power Development, LLC (LSP Development)*
Maryland Office of People's Counsel (Maryland People's Counsel)*
Maryland Public Service Commission (Maryland Commission)
Michigan Public Service Commission (Michigan Commission)*
MN8 Energy LLC*
Modern Energy Resources, LLC
Monitoring Analytics, acting in its capacity as Independent Market Monitor for PJM (Market Monitor)*
National Hydropower Association
New Jersey Board of Public Utilities (New Jersey Commission)
New Jersey Division of Rate Counsel (New Jersey Rate Counsel)*
North Carolina Electric Membership Corporation
Northern Virginia Electric Cooperative, Inc. (NOVEC)*
NRG Business Marketing LLC and Midwest Generation, LLC
Office of the Ohio Consumers' Counsel (OCC)*
Public Utilities Commission of Ohio's Office of the Federal Energy Advocate (Ohio FEA)*
Old Dominion Electric Cooperative (ODEC)*

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[604] FirstEnergy Service Company submitted a motion to intervene as agent for its franchised public utility affiliates Ohio Edison Company, Cleveland Electric Illuminating Company, Toledo Edison Company, Pennsylvania Power Company, Pennsylvania Electric Company, Metropolitan Edison Company, West Penn Power Company, Jersey Central Power & Light Company, Monongahela Power Company, and Potomac Edison Company.

Olympus Power, LLC
Organization of PJM States, Inc. (OPSI)*
Ørsted Wind Power North America LLC (Ørsted)*
Pennsylvania Office of Consumer Advocate
Pennsylvania Public Utility Commission (Pennsylvania Commission)*
Pine Gate Renewables, LLC (Pine Gate)*
PJM Industrial Customer Coalition (PJM ICC)*
PJM Power Providers Group (P3)*
Public Service Electric and Gas Company, PSEG Power LLC, and PSEG Energy Resources & Trade LLC (PSEG Companies)*
Public Citizen, Inc.
REV Renewables, LLC
Rockland Electric Company
Shell Energy North America (US), L.P.
Sierra Club*
Solar Energy Industries Association*
Southern Maryland Electric Cooperative, Inc. (SMECO)*
Steel Producers[605]*
Sustainable FERC Project and National Resources Defense Council (Public Interest Organizations, collectively with Sierra Club)*
Talen Energy Marketing, LLC (Talen)
Tenaska, Inc.
The Dayton Power and Light Company
VC Renewables LLC*
Vistra Corp. and Dynegy Marketing and Trade, LLC (Vistra)*
Vitol Inc., Vitol Solar I LLC, and Vitol Wind I LLC

[605] Steel Producers consists of the steel mills owned by Steel Dynamics, Inc. and Nucor Corporation that are located in the PJM footprint.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C. Docket Nos. ER24-99-000
ER24-99-001

(Issued January 30, 2024)

CLEMENTS, Commissioner, *concurring in part and dissenting in part*:

1. The risk modeling enhancements at the core of PJM's proposal are an important step forward in modernizing its capacity market. Over a decade's worth of extreme weather experience, along with other historical operational data, have made plain that the traditional model of procuring capacity solely based on summer peak demand is outmoded. Instead, grid operators' risk modeling must become more sophisticated to ensure capacity markets send accurate demand signals today and into the future. PJM's development of a new framework that seeks to assess the patterns, drivers, and probabilities of reliability risk across all hours of the year is an important advancement in this effort. PJM's new approach to capacity accreditation will enhance system reliability because it more accurately addresses system risk than PJM's current method. While I would not have made all of the same specific market design choices as PJM, in my view PJM cleared the bar in demonstrating its filing to be just and reasonable.

2. I write separately for two reasons. First, regrettably, despite my view that PJM has demonstrated its proposal to be just and reasonable, I dissent in part from the Order because its response to arguments regarding PJM's choice not to modify its Demand Resource availability window is overbroad and unsupported. I agree with the Order that any potential changes to the Demand Resource availability window are outside the scope of PJM's proposal, and I would have signed onto an order that simply stated and justified this conclusion. Yet the Order gratuitously adds a conclusory statement declaring that the Advanced Energy Management Alliance (AEMA) and Clean Energy Associations "have not demonstrated that PJM's proposed changes in the accreditation methodology and the Reserve Requirement Study render the Demand Resource 'performance' window unjust and unreasonable."[1]

[1] Order at P 107. The Commission's discussion of cost allocation is similarly perplexing, though less demonstrably incorrect. The Order concludes that there is "no basis to find that PJM's just and reasonable revisions to its capacity accreditation and

3. The Order provides no support for this conclusion. And the record leads to a contrary result. AEMA argues that the Demand Resource availability windows currently enshrined in PJM's rules "reflect PJM's historical understanding of reliability risk."[2] PJM's proposal reflects an evolved understanding of system risk, such that "the current DR performance window in the winter period does not cover hours that show loss of load risk in the model."[3] Further, "AEMA members include the vast majority of Curtailment Service Providers and support expanding the winter availability window to include the hours from 6 a.m. to 12 a.m. consistent with PJM's evolving understanding of reliability risk."[4] Yet, rather than including an expansion to the availability window within the scope of its filing to match its new understanding of system risk, PJM has chosen to apply a haircut to the capacity accreditation of demand response resources.[5] To the extent that this denies demand response resources an opportunity to deliver a service that they stand ready, willing, and able to provide, this *does* appear to render the existing tariff unjust and unreasonable and unduly discriminatory. Not only does the Order fail to rebut any of these arguments, it fails to even provide any indication as to what step of this logical chain, if any, the majority takes issue with.

4. While I would have found the Demand Resource availability window to be out of scope to PJM's filing because it has not proposed any changes thereto, the Commission should have initiated an order to show cause pursuant to section 206 of the Federal Power Act to address the clear mismatch between PJM's existing Demand Resource availability window and its new understanding of system risk. PJM should be required to either adjust the availability window to reflect its new understanding of risk, or else demonstrate why its proposed changes have not rendered the current availability window unjust and unreasonable or unduly discriminatory.

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resource adequacy risk modeling must be rejected because PJM has determined to continue its current longstanding capacity market cost allocation." Order at P 185. So far as I can tell, this conclusion follows because revisions to PJM's peak-demand-based allocation of capacity costs are outside the scope of PJM's filing, a defensible conclusion. But the Order does not clearly state this, leaving its logic ambiguous and muddled.

[2] AEMA Comments/Protest at 3.

[3] Deficiency Response at 28.

[4] *Id.* at 4.

[5] *See* Order at P 95.

5. Beyond dissenting from the Commission's arbitrary and capricious[6] response to demand response providers, I also write separately to explain my support for the Commission's rejection of Public Interest Organizations' concern that "cost allocation under PJM's marginal ELCC framework will 'improperly socialize investments in electricity supply.'"[7]

6. As PJM explains, it allocates costs according to the commonly accepted principles under the Federal Power Act, where collateral benefits that accrue to the whole PJM region due to each given resource investment are shared across the region rather than disaggregated and assigned to the host state or load serving entity in which the investment is located.[8] In my view, this approach makes sense. State and local policies of all stripes naturally affect the supply of capacity resources, thereby influencing the costs and benefits that others receive by participating in the capacity market.[9] In this case, as with some other regional investments, benefits accrue broadly to customers across the region when ELCC resources enter the capacity market such that a resource's marginal cost is lower than its average capacity value. But while the Federal Power Act requires rates to be just and reasonable and not unduly discriminatory, that does not require isolating state policies, attributing the development of certain resources to specific policies (where they may be developed due to many different factors), and charging wholesale customer different capacity rates based on the policy of the state(s) in which they are located. Rather, the just and reasonable standard is met where the relevant public utility engages in the more straightforward exercise of determining a cost of the relevant product (here, capacity), and charging each customer for the share of that capacity which they need to purchase.[10] Attempting to disaggregate the effects of state

[6] FERC's fails to "engage in the reasoned decisionmaking required by the Administrative Procedure Act" where its arguments "amount[] to conclusory statements that dismiss . . . concerns without providing reasoned analysis." *New England Power Generators Ass'n, Inc. v. FERC*, 881 F.3d 202, 211 (D.C. Cir. 2018).

[7] Order at P 186 (quoting Public Interest Organizations' Protest at 44).

[8] Bruno and Graf Reply Aff. at ¶ 39; Order at P 174 n. 340.

[9] *See* Joint Statement of Chairman Glick and Commissioner Regarding the Fair Rates Act on PJM MOPR, Docket No. ER21-2582 (October 19, 2021) ("[P]ublic policy and electricity markets are inextricably intertwined. Nearly every aspect of the electricity market is affected by at least one—and more often many—federal, state, or local policies.").

[10] The Commission adheres to the same basic principles in allocating transmission costs, where the costs charged to each customer must be "roughly commensurate" with

policy, as Public Interest Organizations suggest the Commission do, opens the door to a contentious exercise that will ultimately prove impracticable given the "inextricable link[]"[11] between matters of state and federal jurisdiction over electricity markets.

7. As markets continue to develop, evidence continues to demonstrate that utilities stand stronger together, delivering greater reliability and lower costs by pooling resources across broad geographical areas.[12] Reserving specific cost savings for only those load serving entities or market participants in which a particular investment is located is not only practically unworkable and legally unnecessary in a shared pool, it overlooks the reliability and cost benefits that pooled markets impart.

For these reasons, I respectfully concur in part and dissent in part.

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Allison Clements
Commissioner

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the benefits they receive. *See Coalition of MISO Transmission Customers v. FERC*, 45 F.4th 1004, 1009 (D.C. Cir. 2022).

[11] *FERC v. EPSA*, 577 U.S. 260, 265 (2016)

[12] *See, e.g.*, Chang et al., *Potential Benefits of a Regional Wholesale Power Market to North Carolina's Electricity Customers*, at 4-6 (April 2019), available at https://www.brattle.com/wp-content/uploads/2021/05/16092_nc_wholesale_power_market_whitepaper_april_2019_final.pdf (listing many different studies, including both prospective and retrospective estimates of benefits).

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C. Docket Nos. ER24-99-000
ER24-99-001

(Issued January 30, 2024)

CHRISTIE, Commissioner, *concurring*:

1. Despite my serious concerns about PJM's failure to propose a transition period for the application of the new Capacity Deficiency Charge for utilities that have chosen Fixed Resource Requirement (FRR) status, about which more below,[1] I nevertheless concur in the approval of PJM's filings in this matter.

2. While I am sympathetic to the Independent Market Monitor's (IMM) claim that these reforms are ultimately inadequate to "fix" once and for all the PJM capacity

[1] *See infra* PP 8-13.

market,[2] they do represent some significant improvements and do meet the standard for approval under section 205 of the Federal Power Act (FPA).[3]

3. In particular, PJM finally moves from an average ELCC methodology to a marginal one, which I and the IMM both strongly advocated in a recent major PJM capacity reform filing.[4] So better late than never.

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[2] *See, e.g.*, IMM Dec. 21, 2023 Answer to PJM Deficiency Letter Response, Docket No. ER24-99, at 1-2 (citation omitted) ("PJM . . . has failed to make the case that the proposal in Docket ER24-99 'will help to strengthen the capacity market's ability to send market signals that incentivize resource adequacy in PJM.' Ensuring that market signals reflect the underlying supply and demand conditions in the markets is essential. But PJM's proposal is an effort to change the signals rather than to allow the market to send signals. PJM continues to assert its unique ability to administratively define the value of assets three years prior to a delivery year, based on a black box method that is not founded on market principles and does not allow market forces, including actual resource performance, to define asset values. (The black box method is PJM's ELCC approach, also known as capacity accreditation in PJM terminology). That initial definition of asset values would be updated by PJM prior to the delivery year using the same black box method, putting resource owners at risk of unpredictable capacity shortfalls just prior to the delivery year. PJM's ELCC approach is based on incorrect input data that significantly affects the value of market assets including both thermal and renewable resources. PJM's ELCC approach fails to determine the reliability of the actual portfolio of resources that clear in the auction, meaning that PJM's approach would not and cannot correctly define either the asset value of resources or the expected reliability for the delivery year. All of these issues mean that PJM has not demonstrated that its filing is just and reasonable.").

[3] I limit my comments in this statement to my views related to the IMM's comments concerning Docket No. ER24-99 only, which is the subject of today's order. The IMM has also offered views in Docket No. ER24-98 (sometimes in the same filing as comments he made related to ER24-99) and has filed a complaint concerning PJM's penalty rates for Performance Assessment Intervals (PAI) in the Reliability Pricing Model in Docket No. EL24-12. However, as noted, I comment only on Docket No. ER24-99.

[4] *See, e.g.*, *PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,056 (2021) (Christie, Comm'r, dissenting at P 3) (available at https://www.ferc.gov/news-events/news/commissioner-christies-dissent-order-concerning-pjms-proposed-elcc) (quoting *PJM Interconnection, L.L.C*, 175 FERC ¶ 61,084 (2021) (Christie, Comm'r, concurring at P 4 n.5), (available at https://www.ferc.gov/news-events/news/commissioner-mark-c-christie-concurrence-order-pjms-proposal-effective-

4. I found particularly persuasive the thoughtful comments – and I make this observation only with respect to the issues before us today in Docket No. ER24-99[5] – filed by the Organization of PJM States, Inc. (OPSI), the Public Utility Commission of Ohio's Federal Energy Advocate (Ohio FEA), and the Pennsylvania Public Utility Commission (PAPUC). None of these state entities are cheering vociferously for PJM's reforms in today's docket – OPSI in particular expresses concerns about the rushed process in which the reforms were developed,[6] which curtailed time for thorough analysis and consideration – but all three ultimately express their qualified support for the filings as a step forward.

5. I would add that these filings certainly do not render the PJM Capacity Market any less opaque and complex than it has been historically. PJM's filing is replete with a blizzard of acronyms, old and new, understandable only to pure insiders, and not to all of them. (Just to cite a few: LOLE, FPR, UCAP, VRR, PRISM, LDA, CIR, ELCC, RAA,

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load) (". . . I hope the parties continue to address the distinctions between a marginal versus average ELCC value. The Independent Market Monitor has expressed his view that the marginal approach is superior to the average approach and, indeed, has expressed concerns that use of average values will cause increased inefficiencies.") (citing Independent Market Monitor for PJM, Docket Nos. ER21-278 and EL19-100, Nov. 23, 2020 Comments at 19 ("The use of average rather than marginal ELCC values will cause PJM's capacity market results to be incorrect and inefficient, at the expense of the PJM customers and non-ELCC resources competing with ELCC resources."); *id.* at 19-20 ("Using the marginal rather than average ELCC value in market clearing results in every resource receiving the same price per MW of provided equivalent load carrying capacity, the correct assignment of capacity obligations per MW of cleared of a ELCC adjusted resource and the correct allocation of any penalties for non performance.")); *reh'g denied by operation of law*, 176 FERC ¶ 62,159 (2021).

[5] I make this distinction with great care. For example, the Ohio FEA's comments were filed in both Docket No. ER24-99, which is before us today, and Docket No. ER24-98, which is pending before this Commission and is not the subject of this order. And, portions of the PAPUC's comments may also arise in the ER24-98 docket, although they appear to have been filed solely in today's docket, ER24-99. My remarks as to each of these filings today are made only with regard to the portion of OPSI, Ohio FEA and PAPUC's comments that concern today's docket and I reserve my views on any comments related to Docket No. ER24-98 until that matter is decided by this Commission.

[6] OPSI Nov. 9, 2023 Comments at 2.

RPA, PAI, CONE NetCONE/360, etc.) Consider this passage from the order itself, attempting to explain PJM's methodology:

> . . . PJM calculates the Accredited UCAP of ELCC Resources using a four-step process. First, PJM uses an ELCC analysis to calculate the ELCC Portfolio UCAP, which reflects the installed capacity of a group of Unlimited Resources with no outages that yields the same annual LOLE as the group of ELCC Resources that are expected to offer into a given capacity auction. Second, PJM allocates the ELCC Portfolio UCAP among individual ELCC Resource Classes (e.g., 4-hour storage, 10-hour storage, wind, tracking solar, etc.) by conducting additional ELCC analyses that consider the reliability value of ELCC Classes in the presence and absence of other ELCC Classes. The result of this allocation process is an ELCC Class UCAP for each ELCC Resource Class. Third, PJM converts the ELCC Class UCAP for each class to an ELCC Class Rating, using procedures described in its RAA. Finally, PJM calculates an Accredited UCAP value for each individual ELCC Resource based on the resource's ELCC Class Rating, its nameplate capacity, and a resource-specific ELCC Resource Performance Adjustment (RPA).[7]

6. There will be a pop quiz on this passage soon.

7. Every "fix" – and there have been many since the RPM[8] went into operation about 15 years ago – renders the capacity market construct more incomprehensible (and as I have said many times, it's an administrative construct, not a market). One could even make a credible argument that its sheer complexity renders it unjust and unreasonable. I have described it before as "Rube Goldberg-esque" and as replete with "hopeless complexity."[9] Perhaps PJM should be required to post a warning to every reader who

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[7] Order at P 7 (footnote omitted).

[8] PJM's capacity market is technically named the Reliability Pricing Model (RPM). *See, e.g.*, *id.* P 1.

[9] *See, e.g.*, *PJM Interconnection, L.L.C.*, 182 FERC ¶ 61,073 (2023) (Christie, Comm'r, concurring at P 2) (footnote omitted) (available at https://www.ferc.gov/news-events/news/commissioner-christies-concurrence-pjms-quadrennial-review-er22-2984) ("That issue is whether the PJM capacity market itself needs to be reconsidered on a comprehensive basis to determine whether it is still fit for purpose, which is to make certain a sufficient amount of power supply is available to ensure reliability, at a cost that is just and reasonable to consumers. This proposal is only the latest example — and one of the worst in its hopeless complexity — of the endless Rube Goldberg tinkering with the minute details of the capacity market construct. Such tinkering with the rules has

tries to read and comprehend a detailed explanation of how the capacity market construct works (borrowing from Dante): "*Abandon all hope, ye who enter here!*"[10]

8. While I vote to approve this filing overall as meeting the FPA section 205 standard, I want to join the serious concerns expressed by the FRR Coalition.[11] While the FRR Coalition "generally supports the overall set of reforms" on the filing, it protests the "incomplete" transition period that "[does] not address the impact of RPM's currently compressed schedule on the Capacity Deficiency Charge" related to the applicable to FRR utilities.[12]

9. As a former regulator in a state in which the two largest load-serving utilities have chosen FRR status,[13] I am particularly sensitive to the impacts of capacity market rules on FRR utilities and, more importantly, on their customers. The heart of the FRR Coalition's Limited Protest is the time frame allowed for FRR utilities to transition to the new Capacity Deficiency Charge:

> Failure to provide a transition for the Capacity Deficiency Charge substantially increases the financial risks and potential capacity costs for FRR Entities and *could close off the FRR Alternative as a viable option for vertically integrated utilities*. This result is clearly unjust and unreasonable.[14]

10. The FRR Coalition asks for a slightly longer transition period to comply, which I find an entirely reasonable "ask." Yet PJM has not agreed to this.

11. It should be noted that PJM, as the operator of its own capacity market, has an incentive to discourage load-serving utilities from choosing FRR status. FRR utilities

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gone on for years and never reaches a point of stability, yet stability of market design is essential to attract the necessary capital investment in capacity resources.").

[10] Dante Alighieri, *The Divine Comedy*.

[11] Dominion Energy Services, Inc., American Electric Power Service Corp., and Duke Energy Kentucky, Inc. Nov. 9, 2023 Comments and Limited Protest (FRR Coalition Limited Protest).

[12] *Id*. at 6.

[13] Dominion Energy Services, Inc.'s and American Electric Power Service Corp.'s Appalachian Power Company unit are Virginia's two largest load-serving utilities.

[14] FRR Comments at 9-10 (emphasis added).

self supply, usually through a combination of constructing generation units, purchasing through bilateral power purchase agreements (PPAs), or open-market purchases in PJM's markets. FRR utilities have chosen not to subject their customers to the vagaries and risks of complete dependence on the PJM capacity market to meet their load-serving obligations.

12. So my ideal outcome would have been that the Commission approve the filing but impose a condition that PJM grant the FRR utilities their requested transition time related to the Capacity Deficiency Charge. However, under *NRG*, the Commission's ability to direct revisions to a section 205 filing is limited, and such an outcome could raise serious legal risks.[15] Since I believe the filing overall meets the section 205 standard, as I described above, I will concur with the order accepting it.

13. I would urge the FRR utilities, however, to monitor the impacts on their customers in terms of costs and reliability as implementation of PJM's reforms take place, and if evidence materializes that their customers are being subjected to unjust and unreasonable rates as a result, the FRR Coalition has the option to file a section 206 complaint.

For these reasons, I respectfully concur.

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Mark C. Christie
Commissioner

[15] *NRG Power Mktg., LLC v. FERC*, 862 F.3d 108 (D.C. Cir. 2017) (*NRG*).