

175 FERC ¶ 61,084  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Richard Glick, Chairman;  
Neil Chatterjee, James P. Danly,  
Allison Clements, and Mark C. Christie.

PJM Interconnection, L.L.C.

Docket Nos. ER21-278-001  
ER20-584-000  
EL19-100-000  
(consolidated)

ORDER REJECTING PROPOSED TARIFF REVISIONS, LIFTING PAPER  
HEARING ABEYANCE, AND ESTABLISHING BRIEFING SCHEDULE

(Issued April 30, 2021)

1. On April 10, 2020, the Commission established paper hearing procedures to examine PJM's rules pertaining to the determination of capacity values for all resources.<sup>1</sup> The Commission also held the paper hearing in abeyance through October 30, 2020 to allow PJM and the PJM stakeholders to consider a capacity valuation methodology or methodologies to apply to all resource types.<sup>2</sup> On October 30, 2020, pursuant to Federal Power Act (FPA) section 205,<sup>3</sup> PJM submitted proposed revisions to its Open Access Transmission Tariff (Tariff) and Reliability Assurance Agreement (RAA) to implement an Effective Load Carrying Capability (ELCC) construct for determining the accredited capacity capability of certain resource types that are unable to maintain output at a stated capability continuously on a daily basis without interruption. As discussed below, we reject PJM's ELCC proposal, lift the abeyance of the paper hearing in Docket Nos. EL19-100-000 and ER20-584-000, and establish a briefing schedule.<sup>4</sup>

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<sup>1</sup> *PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,015, at P 33 (2020) (April 10 Order).

<sup>2</sup> *Id.* P 34.

<sup>3</sup> 16 U.S.C. § 824d.

<sup>4</sup> If PJM wishes to file a revised ELCC proposal pursuant to FPA section 205 on or before June 1, 2021 (the deadline for PJM to submit its initial brief), then PJM may move

## I. Background

2. On October 17, 2019, the Commission accepted, subject to a further compliance filing, PJM's proposed revisions to its Tariff and Amended and Restated Operating Agreement (Operating Agreement) in compliance with the requirements of Order No. 841.<sup>5</sup> The Commission also instituted a proceeding in Docket No. EL19-100-000, pursuant to FPA section 206,<sup>6</sup> to (1) direct PJM to submit Tariff provisions reflecting the minimum run-time rules and procedures for every resource, which were then specified only in its Manual, and (2) to investigate whether PJM's minimum run-time rules and procedures are unjust, unreasonable, or unduly discriminatory or preferential as applied to Capacity Storage Resources.<sup>7</sup> The Commission noted concerns that PJM applied a 10-hour minimum run-time requirement to Capacity Storage Resources, while applying a 4-hour minimum run-time requirement to intermittent resources; that the 10-hour minimum run-time requirement does not reflect the physical and operational characteristics of Capacity Storage Resources; and that multiple PJM Tariff provisions differ in the treatment of Capacity Storage Resources and Generation Capacity Resources, even though PJM stated that Capacity Storage Resources are Generation Capacity Resources.<sup>8</sup>

3. On December 12, 2019, in Docket No. ER20-584-000, PJM proposed revisions to its RAA to incorporate rules for determining the capacity capability of all resources in compliance with the Commission's directive in the October 2019 Order (December 2019 Filing). On February 27, 2020, in Docket Nos. ER20-584-000 and EL19-100-000, PJM filed a motion to hold the proceedings in abeyance until January 29, 2021 in order to pursue an ELCC construct with PJM stakeholders for calculating the capability of resources in the PJM Reliability Pricing Model (RPM). PJM maintained that an ELCC

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to hold the paper hearing in abeyance, and must, in that event, file such motion on or before May 14, 2021.

<sup>5</sup> *PJM Interconnection, L.L.C.*, 169 FERC ¶ 61,049, at P 2 (2019) (October 2019 Order); see *Elec. Storage Participation in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 841, 162 FERC ¶ 61,127 (2018), *order on reh'g*, Order No. 841-A, 167 FERC ¶ 61,154 (2019), *aff'd sub nom. Nat'l Ass'n of Regul. Util. Comm'rs v. FERC*, 964 F.3d 1177 (D.C. Cir. 2020).

<sup>6</sup> 16 U.S.C. § 824e (2018).

<sup>7</sup> October 2019 Order, 169 FERC ¶ 61,049 at P 142. Capitalized terms that are not defined in this order have the meaning specified in the current or proposed Tariff and RAA.

<sup>8</sup> *Id.* P 141.

construct could potentially address the issues the Commission identified in the October 2019 Order regarding PJM's existing rules for Capacity Storage Resources and eliminate the need for these ongoing proceedings.<sup>9</sup>

4. On April 10, 2020, the Commission issued an order to establish paper hearing procedures to examine the rules pertaining to the determination of capacity values for all resources, consolidate Docket No. ER20-584-000 with the paper hearing proceeding previously established in Docket No. EL19-100-000, require that future filings in the consolidated proceedings be made solely in Docket No. EL19-100-000, and grant PJM's motion in part to hold the proceedings in abeyance through October 30, 2020.<sup>10</sup> The Commission stated that, if PJM makes an FPA section 205 filing on or before October 30, 2020 with a proposed methodology or methodologies to determine the capability of all resource types for Capacity Resource qualification purposes, the instant consolidated proceedings will be held in further abeyance until Commission action on that filing.<sup>11</sup> The Commission explained that, if PJM does not make such a filing pursuant to FPA section 205 on or before October 30, 2020, then the paper hearing will resume and PJM must instead submit its initial brief in the instant consolidated proceedings on or before October 30, 2020. On October 30, 2020, PJM submitted an FPA section 205 filing in Docket No. ER21-278-000.

## **II. FPA Section 205 Filing**

5. PJM proposes to use an ELCC analysis to assign the maximum quantity of Unforced Capacity (UCAP) that can be offered or provided by Generation Capacity Resources that are unable to maintain output at a stated capability continuously on a daily basis without interruption, or, "ELCC Resources."<sup>12</sup> PJM explains that three types of resources qualify as ELCC Resources: (1) Variable Resources,<sup>13</sup> (2) Limited

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<sup>9</sup> PJM Motion at 1, 6.

<sup>10</sup> April 10 Order, 171 FERC ¶ 61,015 at PP 33-34.

<sup>11</sup> *Id.* P 35.

<sup>12</sup> Transmittal at 8.

<sup>13</sup> PJM defines a Variable Resource as a Generation Capacity Resource with output that can vary as a function of its energy source, such as wind, solar, run of river hydroelectric power without storage, and landfill gas units without an alternate fuel source. *Id.* at 15.

Duration Resources;<sup>14</sup> and (3) Combination Resources.<sup>15</sup> PJM proposes to designate Generation Capacity Resources that are not ELCC Resources as “Unlimited Resources,” and explains that these resources can maintain energy output throughout an operating day and include typical fossil fuel-based resources and nuclear resources.<sup>16</sup> PJM proposes RAA revisions that reflect its current methodology for determining the capacity capability of Unlimited Resources and asserts that the existing rules for such resources adequately account for their periodic unavailability in a way that is comparable to the proposed ELCC analysis.<sup>17</sup> PJM states that it also does not propose to alter the current approach to determining the capacity capability of Demand Resources or Energy Efficiency Resources, which is specified in RAA, Schedule 6.<sup>18</sup>

6. PJM explains that the ELCC analysis uses probabilistic modeling to evaluate a generator’s contribution to system reliability, or capacity value, and distinguishes among generators with differing levels of reliability, size, and hourly output profiles to determine an ELCC rating for a given resource or a class of resources (an ELCC Class Rating).<sup>19</sup>

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<sup>14</sup> PJM defines a Limited Duration Resource as a Generation Capacity Resource, such as an Energy Storage Resource, that is not capable of running continuously at Maximum Facility Output for 24 hours or longer, and that is neither a Variable Resource nor a Combination Resource. *Id.*

<sup>15</sup> PJM defines a Combination Resource as a Generation Capacity Resource that has a component with the characteristics of a Limited Duration Resource combined with either a component that has the characteristics of an Unlimited Resource or a component that has the characteristics of a Variable Resource. Combination Resources, for example, might be solar-battery hybrids or Hydropower With Non-Pumped Storage. *Id.*

<sup>16</sup> *Id.* at 8.

<sup>17</sup> *Id.* at 9; proposed RAA, Schedule 9, § C. PJM states that the current approach for determining the capacity capability of Unlimited Resources is memorialized by the RAA revisions submitted in Docket No. ER20-584. PJM explains that this existing method for Unlimited Resources involves testing the maximum output capability and adjusting those test results to match conditions expected during peak load conditions. PJM explains that it applies an Equivalent Demand Forced Outage Rate (EFORD)-based performance adjustment based on historical unavailability over several years, which provides a reliability result that is comparable to the ELCC value at quantifying the expected amount of output that can serve load during conditions of extremely tight supply. Transmittal at 10.

<sup>18</sup> *Id.* at 9-10; *see* RAA, Schedule 6.B, I-J, L.2.

<sup>19</sup> Transmittal at 9.

According to PJM, under ELCC, resources that are able to consistently produce energy during hours with a high risk that load exceeds supply have a higher ELCC rating than resources less able to do so.

7. PJM states that, unlike Unlimited Resources, an ELCC Resource's Accredited UCAP is not solely a function of the resource's installed capacity and EFORd (i.e., installed capacity MW \* [1 – EFORd]).<sup>20</sup> Instead, PJM proposes to determine an ELCC Resource's Accredited UCAP based on the output of the ELCC analysis (by way of the ELCC Class Rating), the resource's performance relative to other members of its ELCC Class, and the maximum physical output capability of the resource. Specifically, PJM proposes to calculate the Accredited UCAP of Variable Resources and Limited Duration Resources as the product of: (1) the resource's Effective Nameplate Capacity; (2) the applicable ELCC Class Rating; and (3) the resource's ELCC Resource Performance Adjustment.<sup>21</sup> Similarly, PJM proposes to determine Accredited UCAP for Combination Resources based on the sum of the component accreditations, adjusting the accreditation of the Limited Duration Resource component to reflect the actual reliability value of the fully-fledged Combination Resource class.<sup>22</sup>

8. PJM proposes to update the applicable capacity value analysis and accreditation annually because the results of the ELCC analysis are sensitive to resource deployment levels and load shapes.<sup>23</sup> To account for changes in accredited capacity values from one year to the next, PJM proposes a “transition mechanism” that establishes ELCC Class Rating floors for ELCC Resources on a rolling annual basis for 13 subsequent Delivery Years after they enter the PJM market.<sup>24</sup> According to PJM, the floor values limit the effective uncertainty in future ELCC values by setting a conservative lower limit on the ELCC Class Rating used to calculate the Accredited UCAP of subject resources.<sup>25</sup> PJM explains that the floor values would apply only to the ELCC Class Rating, but do not set

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<sup>20</sup> *Id.*

<sup>21</sup> *Id.* at 40.

<sup>22</sup> *Id.* at 40-41. PJM proposes to use a resource-specific ELCC analysis in place of an ELCC Class Rating for Hydropower With Non-Pumped Storage resources based on the resource's unique parameters. *Id.* at 40 n.99.

<sup>23</sup> *Id.* at 9.

<sup>24</sup> *Id.* at 50-56. PJM proposes to include existing ELCC Resources as of year-end 2021 in the “2021 cohort” that will receive the first set of 13-year ELCC Class Rating floors. *Id.* at 56 n.119.

<sup>25</sup> *Id.* at 10.

a lower limit on a given resource's Accredited UCAP, which could vary based on individual resource performance.<sup>26</sup>

9. PJM explains that the instant filing includes revisions to amend RAA, Schedule 9 to introduce a new Schedule 9.1 that will set forth the rules for how PJM will “determine the capability of ELCC Resources to meet a Load Serving Entity’s obligations under the [RAA] using an effective load carrying capability analysis.”<sup>27</sup> According to PJM, the new Schedule 9.1 will embody the rules for performing the ELCC analysis and determining the Accredited UCAP values for ELCC Resources, and a number of important new defined terms. PJM states that it is also making conforming changes to RAA, Schedule 9 (as submitted in Docket No. ER20-584-000) and the RPM rules in the Tariff.

10. Finally, PJM requests that, if the Commission finds any aspect of the ELCC proposal unjust and unreasonable, necessitating rejection of the entire filing, the Commission provide specific findings and guidance so PJM may quickly update its approach and submit a revised ELCC construct on a timeline that will allow ELCC to be implemented for the 2023/2024 Delivery Year.<sup>28</sup>

### **III. Notice of Filing and Responsive Pleadings**

11. Notice of the filing was published in the *Federal Register*, 85 Fed. Reg. 70,610 (Nov. 5, 2020), with interventions and protests due on or before November 20, 2020. Appendix A identifies entities that submitted notices of intervention, motions to intervene, protests, comments, and/or answers.

12. On December 22, 2020, Commission staff issued a deficiency letter seeking additional information related to various technical and implementation details of PJM’s ELCC proposal, with responses due on or before January 21, 2021. On January 12, 2021, PJM filed a motion requesting an extension of the deficiency letter response deadline to March 1, 2021. The Commission issued a notice granting the requested extension on January 19, 2021.

13. PJM filed its response to the deficiency letter (Deficiency Letter Response) on March 1, 2021. Notice of PJM’s Deficiency Letter Response was published in the *Federal Register*, 86 Fed. Reg. 13,364 (Mar. 8, 2021), with interventions and protests

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<sup>26</sup> *Id.*

<sup>27</sup> *Id.* at 11.

<sup>28</sup> PJM April 2021 Answer at 8-9.

due on or before March 22, 2021. The IMM, LS Power, and P3 filed protests. Public Interest Organizations filed comments. ESA, PJM, and the IMM filed answers.

#### **IV. Discussion**

##### **A. Procedural Matters**

14. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2020), the timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding.

15. Pursuant to Rule 214(d) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214(d) (2020), the Commission will grant Lightsource'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.

16. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2020), prohibits an answer to a protest and/or answer unless otherwise ordered by the decisional authority. We are not persuaded to accept the IMM's April 30, 2021 Answer and will, therefore, reject it. We accept all other answers because they have provided information that assisted us in our decision-making process.

##### **B. Substantive Matters**

17. As discussed further below, we reject PJM's ELCC proposal because we find the proposed transition mechanism to be unjust, unreasonable, and unduly discriminatory or preferential. We find that the transition mechanism is unjust and unreasonable because it would discount the accredited capacity value of some ELCC Resources below their actual capacity value in order to value other ELCC Resources above their actual capacity value. Specifically, we find that, if the floors established by the transition mechanism bind for existing ELCC Resources, PJM would unjustly and unreasonably discount the capacity value of ELCC Resources that enter the market at a later date, despite the fact that these resources are likely to provide similar capacity value to existing ELCC Resources. We further find that the transition mechanism is unduly discriminatory because it would discount the capacity value of newer ELCC Resources within a given class for which the floor did not bind (i.e., are unfloored) below their actual capacity value, despite the fact that existing ELCC Resources and newer, unfloored ELCC Resources within the class are similarly situated. While we reject the ELCC proposal because we find the proposed transition mechanism to be unjust and unreasonable and unduly discriminatory, we note that PJM's ELCC framework, without the transition mechanism, appears to be a just and reasonable approach to determining the accredited capacity value of Variable Resources, Limited Duration Resources, and Combination Resources.

18. Because we are rejecting PJM's filing, we also lift the abeyance of the paper hearing in Docket Nos. EL19-100-000 and ER20-584-000 and establish a briefing schedule, as discussed more fully below. If PJM wishes to file a revised ELCC proposal pursuant to FPA section 205 on or before June 1, 2021, then PJM may move to hold the paper hearing in abeyance, and must, in that event, file such motion on or before May 14, 2021.

**1. ELCC Modeling Approach and Assumptions**

19. PJM states that the ELCC construct is consistent with the Commission's longstanding objective to remove barriers to entry for all resource types. PJM states that, by developing a methodology to measure and assign the maximum reliability contribution for resources composed of new technologies, like battery storage, wind, solar, and hybrid resources, PJM can further integrate these resource types into PJM markets and enhance competition while maintaining fair capacity accreditation values and system reliability.<sup>29</sup>

20. PJM contends that the ELCC methodology considers the simultaneous reliability contribution of all resources and recognizes the complementary and antagonistic interactions among resources expected to be able to provide capacity in a given Delivery Year. PJM argues that the ELCC construct: (1) recognizes the diminishing returns associated with greater levels of deployment for most ELCC Resource types to ensure the region does not become overdependent on a single resource type with inherent limitations; (2) recognizes the synergistic relationship among distinct resource types, potentially facilitating greater provision of reliability from the various resource classes pooled together across the PJM Region than what those same classes could provide in isolation; and (3) evolves with a changing load shape to account for changes in the future grid such as greater electrification of heating and transportation.<sup>30</sup>

21. PJM explains that the ELCC approach to resource adequacy helps capture the reliability contributions of distinct "classes" of resources and how different resource classes within a portfolio interact to meet the system's resource adequacy needs.<sup>31</sup> PJM explains that PJM and its stakeholders carefully considered the benefits and costs of a marginal versus average ELCC approach and ultimately selected an adjusted class average approach. PJM explains that, under an "adjusted class average" ELCC approach, the administrator first calculates a portfolio ELCC reliability value in MW (the ELCC Portfolio UCAP), then allocates that ELCC portfolio value to each class (the ELCC Class

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<sup>29</sup> Transmittal at 12.

<sup>30</sup> *Id.* at 13.

<sup>31</sup> *Id.* at 15.



UCAP), so that the sum of all classes equates to the total portfolio ELCC value. PJM contends that this method ensures (1) a correct total ELCC and an accurate measure of total reliability contribution; and (2) that each resource is responsible for and compensated for its share of the total reliability contribution of the class, without changing the basic tenets of the capacity market, such as performance obligations, offer structures, and auction clearing.<sup>32</sup>

22. PJM proposes a resource taxonomy within its adjusted class average ELCC construct that includes three broad categories: (1) Variable Resources; (2) Limited Duration Resources; and (3) Combination Resources, which are defined based on their practical operational characteristics.<sup>33</sup> PJM proposes to further group ELCC Resources into distinct ELCC Classes within the framework of the three overarching ELCC Resource categories.<sup>34</sup> According to PJM, each ELCC Class would be defined such that resources in that particular class share a common set of operational characteristics and will be reasonably homogenous in character and with respect to their impact on system resource adequacy. PJM explains that it will employ a common method of calculating the ELCC Resource Performance Adjustments for ELCC Resources within an ELCC Class.

23. PJM explains that it will define the specific ELCC Classes in its Manuals, except for an express stipulation that ELCC Classes be defined for Limited Duration Resources with 4-hour, 6-hour, 8-hour, and 10-hour durations (with matching durations for Combination Resources that are composed in part of one or more such ELCC Classes).<sup>35</sup> PJM avers that defining ELCC Classes in its Manuals allows for future flexibility to recognize that innovation and technological change may considerably alter the kinds of resources participating in PJM's ELCC construct in the coming years. PJM contends that recitation of all current and future possible ELCC Class permutations in the RAA would be impracticable, as they are not "realistically susceptible of specification."<sup>36</sup>

24. PJM proposes to use a hierarchical approach to derive an individual resource's Accredited UCAP based on the ELCC value of the entire resource portfolio and the

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<sup>32</sup> *Id.* at 22-23.

<sup>33</sup> *Id.* at 15.

<sup>34</sup> *Id.* at 16.

<sup>35</sup> *Id.* at 17.

<sup>36</sup> *Id.* (citing *City of Cleveland v. FERC*, 773 F.2d 1368, 1376 (D.C. Cir. 1985)).

resource's particular class.<sup>37</sup> At the top of the hierarchy is the ELCC Portfolio UCAP, which establishes the Effective UCAP of the entire set of ELCC Resources. At the mid-level are the ELCC Class UCAP values, which establish the Effective UCAP value for the entire set of resources in each ELCC Class (e.g., all solar resources). At the bottom are the ELCC Class Rating factors, which in turn are used with resource-specific performance adjustments to determine the Accredited UCAP values for individual resources, i.e., the amount of capacity (in MW) they are eligible to offer into the PJM capacity market.

25. PJM explains that its ELCC analysis will directly yield an ELCC Portfolio UCAP for the subject Delivery Year, and that this figure represents the sum of the capacity capability of all ELCC Resources modeled in the ELCC analysis.<sup>38</sup> More specifically, PJM explains that the ELCC Portfolio UCAP represents “the aggregate installed capacity ‘X’ of a group of Unlimited Resources with no outages [which] yields the same [0.1 Loss of Load Expectation] as the one produced by the scenario with all ELCC Resources that are expected to offer in a given RPM Auction, or otherwise provide capacity.”<sup>39</sup> PJM explains that it will use further ELCC analysis to allocate the ELCC Portfolio UCAP among ELCC Classes such that the aggregate of all ELCC Class UCAP values is equal to the ELCC Portfolio UCAP.<sup>40</sup> Then, PJM will calculate the ELCC Class Rating, which is a percentage equal to the ELCC Class UCAP divided by the sum of the Effective Nameplate Capacity of the ELCC Class.<sup>41</sup>

26. PJM states that it will determine the Accredited UCAP of a Variable Resource or a Limited Duration Resource as the product of the ELCC Resource's Effective Nameplate Capacity, its ELCC Class Rating, and its resource-specific ELCC Resource Performance

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<sup>37</sup> *Id.* at 31.

<sup>38</sup> *Id.*

<sup>39</sup> *Id.* at 31-32 (quoting Proposed RAA, Schedule 9.1, section B).

<sup>40</sup> *Id.* at 32. PJM witness Dr. Rocha Garrido explains that allocating the ELCC Portfolio UCAP to ELCC Classes requires multiple additional ELCC runs, and generally includes the following steps: (1) determining the ELCC of the ELCC Class in the absence of all other ELCC Classes (“First-In” runs); (2) determining the ELCC of the ELCC Class in the presence of all other ELCC Classes (“Last-In” runs); and (3) using the First-In and Last-In runs to allocate the ELCC Portfolio UCAP value among ELCC Classes. Garrido Aff. ¶ 25.

<sup>41</sup> Transmittal at 32-33.

Adjustment.<sup>42</sup> PJM explains that the resource-specific adjustment is necessary because the ELCC Class Rating is determined on an aggregate basis, and thus does not account for how a resource actually performs in comparison to other members of its ELCC Class.

27. PJM proposes to determine the Accredited UCAP of Combination Resources with a Variable Resource component as the sum of the component accreditations, while accounting for the reliability value of the fully-fledged Combination Resource.<sup>43</sup> For instance, the Accredited UCAP of a Variable Resource paired with a Limited Duration Resource (e.g., wind with battery storage) would be equal to the sum of the Accredited UCAP for the Variable Resource and an adjusted Accredited UCAP for the Limited Duration Resource. Specifically, PJM explains that the Accredited UCAP of the Limited Duration Resource will be the product of (1) the equivalent effective nameplate capacity of the Limited Duration Resource component, and (one minus the applicable EFORD) for the Limited Duration Resource component; and (2) the quotient (a)/(b), where (a) is the Combination Resource ELCC Class UCAP minus the product of the Variable Resource ELCC Class Rating and the aggregate Effective Nameplate Capacity of all the Variable Resource components within the subject Combination Resource class; and (b) is the aggregate equivalent Effective Nameplate Capacity of all the Limited Duration Resource components within the subject Combination Resource class. PJM explains that, while this formula includes the ELCC Class Rating for the corresponding standalone Variable Resource class, it applies the actual reliability value of the fully-fledged Combination Resource class as identified in the ELCC model, rather than inappropriately applying the separately-derived reliability values for the standalone Variable Resource class and the standalone Limited Duration Resource class to the uniquely situated Combination Resources.<sup>44</sup>

28. PJM states that Hydropower With Non-Pumped Storage has unique physical characteristics and requires a unique ELCC treatment. PJM explains that these resources generally consist of a dam on a river system that has either pondage or a reservoir in which the owner can store and control the release of water across the hours of an operating day, making their generation output discretionary and dispatchable, unlike hydro plants without such water storage.<sup>45</sup> PJM asserts that the characteristics of each such resource are different and it is not feasible to treat each of them as part of a single ELCC Class. Thus, PJM proposes to assign each Hydropower With Non-Pumped

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<sup>42</sup> *Id.* at 34.

<sup>43</sup> *Id.* at 40.

<sup>44</sup> *Id.* at 40-41.

<sup>45</sup> *Id.* at 42.

Storage resource a specific UCAP value as an output of the ELCC model, which is then multiplied by (1 minus EFORD) to determine its Accredited UCAP.

29. PJM states that the final amount of capacity an ELCC Resource is eligible to offer into the capacity market is the lesser of its capacity capability (i.e., Accredited UCAP) and transmission constraints (i.e., Capacity Interconnection Rights or CIRs).<sup>46</sup> PJM notes that this provides that a resource cannot offer more capacity than it is capable of providing nor more capacity than it is capable of delivering.<sup>47</sup>

30. PJM proposes to report final ELCC Class UCAP and ELCC Class Rating values once a year, no later than five months prior to the start of the target Delivery Year; PJM states that this report will be posted and relayed to all Generation Capacity Resource Providers.<sup>48</sup> PJM states that proposed RAA, Schedule 9.1, section I further outlines that starting in the 2023/2024 Delivery Year, Accredited UCAP values for the applicable Delivery Year will determine each ELCC Resource's maximum UCAP.

31. PJM states that proposed RAA, Schedule 9, section I also requires PJM to post non-binding, preliminary ELCC Class Rating values for nine subsequent Delivery Years, which PJM will finalize in advance of each Delivery Year.<sup>49</sup> For any year for which a final value has not been posted, PJM indicates that it will base the Accredited UCAP of each resource on the most recent preliminary value and the most recently posted ELCC Performance Adjustment value. In order to avoid scenarios in which a resource may unjustly offer more than it expects to be able to provide in the applicable Delivery Year, PJM explains that it proposes to limit capacity offers by preliminary ELCC Class Ratings. PJM clarifies that in those instances where an ELCC Resource's final ELCC Class Rating exceeds the preliminary ELCC Class Rating, Capacity Market Sellers may be permitted an opportunity to sell additional UCAP in the Third Incremental Auction for the applicable Delivery Year. In the reverse scenario, however, PJM states that affected Capacity Market Sellers may be required to buy back any shortfalls or face Deficiency Charges. PJM asserts that this process is identical to that currently in place for the EFORD value of an Unlimited Resource (the final value of which is not known until the December prior to the Delivery Year).<sup>50</sup>

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<sup>46</sup> *Id.* at 39-40.

<sup>47</sup> *Id.* at 40.

<sup>48</sup> *Id.* at 45.

<sup>49</sup> *Id.* at 46.

<sup>50</sup> *Id.* at 45-47.

32. PJM indicates that, similar to existing processes for the Reserve Requirement Study, it intends to review and manage the ELCC construct's methodology, assumptions, inputs, and procedures on an annual cycle, and post an annual report reviewed by a corresponding stakeholder body.<sup>51</sup> PJM states that it intends to provide sufficient transparency about data and methodology in these reports to allow market participants to anticipate future ELCC values and reproduce ELCC results, especially for the purposes of investment decisions.<sup>52</sup>

a. **Accuracy of the ELCC Construct, Dispatch Assumptions, and Modeling**

i. **Pleadings**

33. Multiple parties contend that PJM's proposal is an improvement over the current capacity accreditation construct and urge the Commission to approve it as just and reasonable. Joint Stakeholders, Duke, and Joint Consumer Advocates argue that the ELCC construct improves on the existing construct by providing a consistent approach to evaluate the benefits and limitations of diverse resource types.<sup>53</sup> Clean Energy Associations and Joint Consumer Advocates also argue that the ELCC proposal will remove barriers for storage, as was required by Order No. 841.<sup>54</sup> Several parties argue that PJM's proposed ELCC construct also provides a better methodology for integrating Variable Resources such as wind and solar, and/or Combination Resources such as paired solar and storage resources.<sup>55</sup> Multiple parties also emphasize their support for PJM's proposal to calculate a resource-specific ELCC for Hydropower With Non-Pumped Storage resources rather than treating each of these resources as a single class.<sup>56</sup>

34. Several parties allege that the ELCC construct will not produce accurate UCAP values because it relies on unsupported assumptions or erroneous modeling. They request that the Commission direct PJM to provide additional information with regard to certain issues, including: (1) whether the historical weather and load data PJM will use in

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<sup>51</sup> *Id.* at 47-48.

<sup>52</sup> *Id.* at 48.

<sup>53</sup> Joint Stakeholder Comments at 1-2; Duke Comments at 1-2; Joint Consumer Advocates Comments at 2.

<sup>54</sup> *E.g.*, Joint Consumer Advocates Comments at 3-4.

<sup>55</sup> *E.g.*, Clean Energy Associations Comments at 5.

<sup>56</sup> *E.g.*, Brookfield Comments at 1, 4-5.

its ELCC analysis properly account for certain factors such as persistent weather conditions that impact the availability of a resource over a period longer than 24 hours; (2) whether the ELCC analysis will take into account the specific characteristics of resources in each Locational Deliverability Area (LDA), particularly any LDA that has a high penetration of ELCC Resources or is utilizing the Fixed Resource Requirement (FRR) alternative; and (3) PJM's reliance on certain dispatch assumptions with respect to sequencing of specific resource types, and operation and availability of battery storage resources.<sup>57</sup>

35. In its protest, the IMM contests PJM's proposed use of the "adjusted class average" approach rather than the "marginal" approach to the ELCC framework. The IMM states that the theory behind the ELCC methodology requires the use of the "marginal" approach because the "adjusted class average" approach will cause the market to overvalue, over-compensate, and over procure certain ELCC resource types.<sup>58</sup>

36. In reply, PJM states that the IMM's proposal to substitute a different ELCC methodological approach is unreasonable and cannot be a basis to reject PJM's proposal.<sup>59</sup> PJM adds that a shift to the "marginal" approach would require corresponding modifications to the clearing of capacity in PJM's capacity market design.

37. In their answers, Public Interest Organizations and Joint Stakeholders assert that PJM's adjusted class average ELCC approach is just and reasonable.<sup>60</sup> Joint Stakeholders note that, during the PJM stakeholder process, other stakeholders argued that a "marginal" approach, which would lock-in values for the life of a resource, would not appropriately balance the interests of new and existing resources because the use of marginal ELCC will further depress the future ELCC value for many resource classes.<sup>61</sup>

38. In response, the IMM argues that PJM fails to address the fact that its proposed "adjusted class average" approach will not result in optimal quantities and prices for renewable resources. In response to PJM's statements regarding the need for

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<sup>57</sup> LS Power Protest at 11; P3 Comments at 6-7; IMM Protest at 13-14.

<sup>58</sup> IMM Protest at 18-20.

<sup>59</sup> PJM December 2020 Answer at 11 (citing *PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,210, at P 29 (2020)).

<sup>60</sup> *E.g.*, Public Interest Organizations Answer at 7.

<sup>61</sup> Joint Stakeholders Answer at 6-7.

reconfigurations of the capacity market if the “marginal” approach is adopted, the IMM states that any implementation of an ELCC methodology will require changes.<sup>62</sup>

39. The IMM also argues that PJM has not explained how it will determine the capacity resource mix that is an input to the ELCC analysis and asserts that PJM should make the exact basis for its capacity resource mix assumptions explicit.<sup>63</sup> The IMM asserts that PJM’s proposed *ex ante* determination of the capacity resource mix cannot be correct for the next auction or subsequent auctions because the capacity resource mix is a function of the market clearing process. The IMM further contends that the ELCC analysis includes MW of Unlimited Resources that did not clear in the capacity market and therefore should not have been included in the ELCC analysis because they were not part of the market solution to which the ELCC Resources are being added.<sup>64</sup>

40. The IMM avers that PJM’s use of putative output data for certain newer resource types such as limited use storage or hybrid resources with little operational history means that the ELCC analysis and results are heavily dependent on hypothetical data rather than actual data.<sup>65</sup> Specifically, the IMM argues that there is no basis for PJM’s assumption that Limited Duration Resources will reserve their output for those hours when output from Unlimited Resources and available output from Variable Resources is insufficient to meet load, rather than assuming standard profit maximizing behavior.<sup>66</sup>

41. In contrast, Clean Energy Associations, Joint Stakeholders, and Public Interest Organizations contend that PJM’s proposal contains sufficient detail regarding its modeling approach to demonstrate that it is just and reasonable.<sup>67</sup> Specifically, Clean Energy Associations argue that the ELCC model correctly values the reliability contribution of energy storage resources with various durations through reasonable dispatch estimates based on the rational assumption that higher energy prices will occur during times with the greatest reliability need, and that market participants will seek to

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<sup>62</sup> IMM December 15, 2020 Answer at 8-9.

<sup>63</sup> IMM Protest at 12.

<sup>64</sup> *Id.* at 12-13.

<sup>65</sup> *Id.* at 14; IMM December 21, 2020 Answer at 5-6.

<sup>66</sup> IMM Protest at 21; IMM December 15, 2020 Answer at 11-12.

<sup>67</sup> Clean Energy Associations Answer at 4-10; Joint Stakeholders Answer at 7-10; Public Interest Organizations Answer at 4-11.

capture these prices.<sup>68</sup> Similarly, Public Interest Organizations point out that the capacity values the IMM calls implausible align with capacity values for limited duration demand response and energy storage that the Commission has recently found just and reasonable, and are consistent with more than 50 years of Commission precedent that cost causation for capacity charges best relies on demand during peak periods.<sup>69</sup>

42. Joint Stakeholders argue that PJM's methodology should be evaluated as deployment of Limited Duration Resources increases and PJM gains more operational experience under its ELCC construct.<sup>70</sup> Accordingly, Joint Stakeholders request that the Commission direct PJM to file subsequent updates that evaluate and refine the methodology used to calculate the ELCC values for Limited Duration Resources and potentially other aspects of its methodology.<sup>71</sup>

43. The IMM disputes Public Interest Organizations' assertions that PJM's Limited Duration Resource dispatch assumptions are reasonable and asserts that Public Interest Organizations confuse a resource's flexibility with its reliability contribution. The IMM contends that Public Interest Organizations ignore that rational battery owners will make charge and discharge decisions on a short-term basis based on prices and expected prices.<sup>72</sup>

44. NHA contends that PJM's filing may not properly account for hydro plants that have added other resource types to their facility, such as a hydro plant with non-pumped storage that added a battery storage or solar component.<sup>73</sup>

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<sup>68</sup> Clean Energy Associations Answer at 4-9.

<sup>69</sup> Public Interest Organizations Answer at 10-11 (citing *Wis. Mich. Power Co.*, 31 FPC 1445, 1454 (1964); *PJM Interconnection, L.L.C.*, 146 FERC ¶ 61,052, at PP 5-6 (2014); *N.Y. Indep. Sys. Operator*, 170 FERC ¶ 61,033, at P 113 (2020) (NYISO ELCC Order)).

<sup>70</sup> Joint Stakeholders Answer at 7-8.

<sup>71</sup> *Id.* at 7-10.

<sup>72</sup> IMM December 21, 2020 Answer at 7-8 (citing Public Interest Organizations Answer at 9).

<sup>73</sup> NHA Comments at 4.



45. In its answer, PJM explains that, because it is evaluating ELCC for Hydropower With Non-Pumped Storage on a resource-specific basis, it would work with stakeholders to develop an approach for any unique hydropower Combination Resources.<sup>74</sup>

**ii. Deficiency Letter Response and Pleadings**

46. In its Deficiency Letter Response, PJM explains that it will use the “Delta Method” to allocate the ELCC Portfolio UCAP among the ELCC Classes to establish the ELCC Class UCAP values and ELCC Class Ratings.<sup>75</sup> PJM states that it has included revised tariff language in RAA, Schedule 9.1, section C to concisely state the overall Delta Method calculations,<sup>76</sup> while implementation details will be set forth in the PJM Manuals. To address transparency, PJM states that it includes in its Deficiency Letter Response its planned implementation details for the Delta Method in new Manual 21a, including details of how the First-In and Last-In runs are measured, and how they will be used in the ELCC analysis. PJM avers that this approach appropriately considers synergistic, antagonistic, and neutral interactions between the ELCC Classes.<sup>77</sup>

47. PJM provides a table with preliminary ELCC Class Rating values for a variety of classes in 2023 and 2028, and PJM provides another table to illustrate the difference between preliminary ELCC Class Ratings in 2023 and the current deration factors PJM applies to those resources under its current rules.<sup>78</sup>

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<sup>74</sup> PJM December 2020 Answer at 14.

<sup>75</sup> Deficiency Letter Response, Attach. 1 at 1.

<sup>76</sup> *Id.* attach. 1 at 1-2. The revised RAA, Schedule 9.1, section C specifies that the ELCC Portfolio UCAP shall be allocated to each ELCC Class UCAP according to: (1) the reliability value of the subject ELCC Class evaluated in the absence of other ELCC Classes, minus, (2) a quantity that is proportional to the product of: (a) the difference between the reliability value of the subject ELCC Class when evaluated in the presence of the entire portfolio of ELCC Classes and the reliability value of the subject ELCC Class when evaluated in the absence of the other ELCC Classes, and (b) the difference between the total reliability value of all the ELCC Classes in the model when evaluated jointly and the sum of the reliability values determined individually for each ELCC Class by evaluating the subject ELCC Class in the absence of other ELCC Classes. *Id.* attach. 1 at 2.

<sup>77</sup> *Id.* attach. 1 at 2-3.

<sup>78</sup> *Id.* attach. 1 at 27-29.

48. The IMM avers that PJM's class allocation method narrowly focuses only on Variable Resources and Limited Duration Resources and ignores the dynamic interactions among all resource types.<sup>79</sup> The IMM avers that the Delta Method understates the total contribution of each technology and fails to address the portfolio diversity interactions in an analytical way or based on economics. The IMM argues that PJM does not actually use Energy+Environmental Economics' (E3) Delta Method, but rather inexplicably switches the use of first-in and last-in ELCC values in each step of E3's Delta Method.<sup>80</sup>

49. LS Power reiterates that PJM's ELCC analysis fails to consider transmission constraints and asserts that, as a result, the ELCC analysis does not work with the Capacity Emergency Transfer Objective (CETO) and Capacity Emergency Transfer Limit (CETL) (collectively, CETO/CETL) analysis that PJM uses to determine the amount of energy that can be transferred to an LDA.<sup>81</sup> Specifically, LS Power states that, because the CETO/CETL analysis treats all resources internal to and external to an LDA as Unlimited Resources, it does not consider the possibility that the resources remaining in the LDA are limited and unable to perform in the way that Unlimited Resources would be expected to perform. Thus, LS Power argues that it is impossible to assess the real impact of PJM's ELCC proposal on reliability.

50. In response, PJM asserts that its ELCC model is not unjust and unreasonable for omitting transmission limitations.<sup>82</sup> PJM reiterates that it chose to neglect transmission constraints in order to be as consistent as possible with the assumptions of its Reserve Requirement Study, the main resource adequacy study PJM uses to determine the PJM Region's Reliability Requirement. Furthermore, PJM explains that the ELCC modeling of Variable Resources implicitly accounts for transmission limitations by "including historical performance in the determination of the capacity level and reliability contribution of an ELCC Resource."<sup>83</sup> PJM states that the status quo, on the other hand, neglects any consideration of actual operating transmission constraints that have impacted historical performance. PJM asserts that any potential future changes to its CETO/CETL methodology are beyond the scope of the instant FPA section 205 proposal. More broadly, PJM argues that, while the need to closely reevaluate many aspects of its markets in light of the evolving resource mix is apparent, neither PJM nor its

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<sup>79</sup> IMM Deficiency Letter Response Comments at 4.

<sup>80</sup> *Id.* at 4-7.

<sup>81</sup> LS Power Deficiency Letter Response Protest at 10.

<sup>82</sup> PJM April 2021 Answer at 6.

<sup>83</sup> *Id.* at 5.

stakeholders ever intended to effectuate all requisite reforms through a single FPA section 205 filing.<sup>84</sup>

### iii. Determination

51. Although we are rejecting PJM's ELCC proposal on the basis of the proposed transition mechanism, as discussed in greater detail below, we also provide guidance on the other aspects of PJM's proposal. Based on the record before us, PJM's ELCC methodology appears to be a just and reasonable approach to determining the capacity value of Variable Resources, Limited Duration Resources, and Combination Resources and an improvement over PJM's current approach. Overall, PJM's proposed ELCC construct appears to allocate capacity values to resources using a logical and methodical process that reasonably estimates each resource type's reliability contribution based on the alignment of each resource's expected output profile with PJM's expected load profile.

52. Contrary to the assertions of P3, the IMM, and LS Power, we concur with PJM that the ELCC analysis to determine the UCAP of the entire set of ELCC Resources does not need to account for the locational nature of resources and transmission constraints within the PJM footprint. PJM's existing resource adequacy study, the Reserve Requirement Study, does not consider transmission constraints within the PJM region because the transmission planning process ensures that specific areas of the PJM footprint have the necessary transmission infrastructure to receive the required level of energy imports.<sup>85</sup> We agree with PJM that it is similarly appropriate to exclude transmission constraints for the purposes of determining the UCAP of the entire set of ELCC Resources and therefore find that PJM's proposed approach would be appropriate.<sup>86</sup>

53. We find LS Power's concern about PJM's CETO/CETL analysis outside the scope of the instant filing. LS Power fails to demonstrate how the treatment of Variable Resources, Limited Duration Resources, and Combination Resources within the CETO/CETL framework would be made worse by the ELCC framework in contrast to the status quo treatment of these resources.

54. We find that the IMM's arguments regarding the potential benefits of a marginal ELCC approach are not relevant to an evaluation of PJM's proposal under FPA section 205. While the IMM critiques PJM for failing to achieve the "optimal" outcome and

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<sup>84</sup> *Id.* at 3-8.

<sup>85</sup> *See* Garrido Aff. ¶ 28.

<sup>86</sup> As noted above, PJM implicitly accounts for transmission limitations by considering each Variable Resource's historical performance. *See supra* P 50.

asserts various disadvantages of PJM's proposal in contrast to a marginal approach, the FPA does not require PJM to demonstrate that its proposal is optimal or the best alternative.<sup>87</sup> Rather, it requires that PJM demonstrate that its proposed approach is just and reasonable. While we are rejecting PJM's proposal in light of the transition mechanism, which we find is unjust, unreasonable, and unduly discriminatory, we agree with PJM that an adjusted class average approach is appropriate because it: (1) applies uniform capacity obligations on similarly situated resources based on their class average contribution to system resource adequacy; and (2) ensures that the sum of resource class's accredited capacity values is equal to the aggregate reliability value of the ELCC Resource portfolio. We also note that the Commission has previously found an average ELCC approach just and reasonable. Specifically, the Commission accepted NYISO's proposal to establish Duration Adjustment Factors for different classes of limited duration resources (akin to PJM's ELCC Class Ratings) and apply them to all limited-duration capacity resources in each class.<sup>88</sup>

55. The IMM claims that *ex ante* calculation of the ELCC values before knowing the precise quantity of ELCC Resources that will clear the market will lead to incorrect capacity valuation. However, we find that this approach appears to be appropriate because we find that PJM generally can predict the resource quantities by class prior to making a final ELCC Class Rating determination such that its *ex ante* ELCC analysis is sufficiently accurate.<sup>89</sup> Additionally, PJM's *ex ante* approach has the benefit of informing ELCC Resources of their capacity accreditation prior to the capacity auction, which reduces uncertainty for such resources and gives them better information to construct their capacity supply offers.

56. We disagree with the IMM's assertion that PJM's assumptions regarding Limited Duration Resource behavior have no basis. Although we agree with the IMM that

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<sup>87</sup> *PJM Interconnection*, 171 FERC ¶ 61,210 at P 29 n.77 ("To be just and reasonable, proposed revisions do not have to be the most just and reasonable among all possible alternatives.") (citations omitted).

<sup>88</sup> NYISO ELCC Order, 170 FERC ¶ 61,033 at P 113.

<sup>89</sup> We note that ELCC Resources currently comprise less than five percent of installed capacity in the PJM region and have not, to date, experienced significant year-to-year change. See Monitoring Analytics, LLC, *2020 State of the Market Report for PJM*, at 272, fig. 5-1. Even in regions where ELCC Resources have experienced relatively rapid growth, the growth rate has not been so fast as to defy a reasonably accurate prediction five months prior to the Delivery Year, when PJM would establish final ELCC Class Ratings. See California Independent System Operator, *2019 Annual Report on Market Issues & Performance*, at 18, fig. E.11.

resources are expected to engage in profit-maximizing behavior, it is also reasonable to expect that capacity resources will consider the risk of incurring capacity market non-performance charges and preserve storage capability accordingly for periods where performance assessment intervals are likely to occur. We agree with PJM that its ELCC approach appropriately plays a reliability backstop role, while maintaining the obligations associated with the Capacity Performance construct to ensure that resources perform in real time.<sup>90</sup> We disagree with the IMM's claim that PJM's preliminary ELCC results are "implausible" because they find that a 4-hour Limited Duration Resource has an ELCC Class Rating that is "the approximate equivalent of a new, efficient gas fired combined cycle plant."<sup>91</sup> The preliminary ELCC Class Rating for 4-hour electric storage resources provided in PJM's Deficiency Letter Response (79%) is reasonable and roughly aligns with the Commission-accepted ELCC values that NYISO determined for 4-hour electric storage resources.<sup>92</sup>

57. The IMM raises a number of concerns with PJM's proposed Delta Method to allocate the portfolio-level ELCC amongst ELCC Classes. We disagree with the IMM's claims that PJM's method is "arbitrary" and does not actually use E3's Delta Method. Contrary to the IMM's assertions, PJM's proposed formula is the same as E3's formula, albeit expressed differently.<sup>93</sup>

58. We also find that PJM has addressed NHA's concerns regarding treatment of hydro plants that have added other resource types to their facilities because PJM states that it will work with stakeholders to develop a resource-specific approach for any unique hydropower Combination Resources.<sup>94</sup>

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<sup>90</sup> Transmittal at 23-24.

<sup>91</sup> IMM Protest at 11-12.

<sup>92</sup> Specifically, NYISO found that 4-hour electric storage resources have a duration adjustment factor of 90% at incremental penetrations below 1,000 MW, and 75% at incremental penetrations of 1,000 MW and above. *Compare* Deficiency Letter Response, Attach. 1 at 29, *with* NYISO ELCC Order, 170 FERC ¶ 61,033 at PP 82-84 (summarizing the proposed duration adjustment factors).

<sup>93</sup> This can be verified by setting the two mathematical expressions equal to each other and solving.

<sup>94</sup> *See* PJM December 2020 Answer at 14.

**b. Transparency, Reproducibility, and Process**

**i. Pleadings**

59. Several commenters highlight concerns regarding the transparency and reproducibility of PJM's proposed ELCC construct. LS Power and P3 argue that PJM's filing is deficient because it does not provide market participants with sufficient information to gauge the impact of the proposed ELCC construct. LS Power posits that it has been unable to anticipate the Accredited UCAP values that will be assigned to its existing resources, or to those that are under consideration that would be classified as ELCC Resources under PJM's proposal.<sup>95</sup> LS Power asserts that this challenge has been exacerbated by the fact that PJM states that various implementation details will be set forth in PJM's manuals, which market participants have not yet been provided.<sup>96</sup> P3 contends that PJM's plan to implement the ELCC to accommodate the 2023/2024 BRA is premature because many of the technical details of the ELCC remain a work in progress. P3 posits that it is also conceivable that issues will surface during PJM's model development that require additional changes to PJM's proposed governing agreement revisions.<sup>97</sup>

60. AEP urges the Commission to underscore the need for transparency in PJM's implementation of the ELCC, particularly given PJM's selection of the "class average" approach.<sup>98</sup> Dominion recognizes that the ELCC Methodology results will be difficult to identically reproduce, but avers that PJM's proposed tariff language is neither transparent nor detailed to a sufficient level that would allow a Market Seller to reproduce PJM's determination of ELCC Class Ratings and Accredited UCAP values within a reasonable estimation.<sup>99</sup> Dominion requests that the Commission direct PJM to provide greater detail in its Tariff or manuals that more accurately describe the algorithms and probabilistic modeling used in the ELCC analysis.<sup>100</sup>

61. Calpine states that the Commission should accept PJM's filing, but also require PJM to provide a compliance filing within a year after ELCC implementation to assess

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<sup>95</sup> LS Power Protest at 10.

<sup>96</sup> *Id.* at 9-10 (quoting Transmittal at 15).

<sup>97</sup> P3 Comments at 5-6.

<sup>98</sup> AEP Comments at 2.

<sup>99</sup> Dominion Protest at 4.

<sup>100</sup> *Id.* at 4.

the efficacy of PJM's ELCC modeling.<sup>101</sup> Calpine suggests that the Commission should also require PJM to make detailed compliance filings analyzing the ELCC every three years thereafter.<sup>102</sup>

62. In response to protestors, PJM asserts that its proposal is a complete, well-formulated approach for using ELCC to determine resources' capacity value.<sup>103</sup> PJM contends that the time lag between submission of its proposal and its requested June 1, 2021 effective date does not suggest that the proposal is incomplete, but rather reasonably reflects the need to collect and validate data provided by sellers and develop the software changes necessary to implement the proposal. Furthermore, PJM states that its proposal properly defines the formulaic ELCC methodology in the RAA and leaves implementation details to be set forth in the PJM Manuals, and thus the specific items raised by LS Power and Dominion such as ELCC dispatch assumptions can be addressed through the PJM stakeholder process.<sup>104</sup>

63. Regarding LS Power's concern that it is not clear what standards PJM will use to define ELCC Classes, PJM asserts that it properly followed the Commission's rule of reason and outlined the guiding principles for defining ELCC Classes in the RAA, and left the implementation details for the PJM Manuals.<sup>105</sup> PJM clarifies that it did not choose to codify ELCC Classes in the RAA, except for various durations of Limited Duration Resources and Combination Resources, because there are many variations of

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<sup>101</sup> Calpine Comments at 5. Calpine suggests this compliance filing should address the following issues: (1) a methodology to ensure ELCC Resources are not being over-counted in any LDA or Fixed Resource Requirement Service Area; (2) whether the dispatch methodology reasonably matches resource dispatch in actuality and expected emergency conditions; (3) a review of its methodology for determining Accredited UCAP of Combination Resources including the use of the resource's EFORD to determine the ELCC Resource Performance Adjustment for Combination Resources with an Unlimited Resource component; and (4) how PJM plans to treat previously allocated CIRs, whether CIRs will be modified by the ELCC analysis, and whether the ELCC analysis will affect the allotment of CIRs in the future. *Id.* at 6-7.

<sup>102</sup> *Id.* at 5. Calpine posits that the triennial review should focus on (1) deliverability of ELCC Resources, (2) commitment and dispatch used with ELCC, (3) ELCC methodology and modeling, and (4) allocation of Accredited UCAP by ELCC Class. *Id.* at 7-8.

<sup>103</sup> PJM December 2020 Answer at 5.

<sup>104</sup> *Id.* at 6-8 (citing LS Power Protest at 11-12; Dominion Protest at 4).

<sup>105</sup> *Id.* at 8 (citing Proposed RAA, Article 1 – Definitions).

technologies even within classes of renewables such as wind and solar. PJM argues that attempting to “hard wire” ELCC Classes into the tariff would provide a false sense of finality and potentially embroil the Commission in an up-front review of each classification before ELCC is even implemented.<sup>106</sup>

64. P3 avers that, despite PJM’s answers and clarifications provided in response to the deficiency letter, important details of the ELCC implementation remain a work in progress and the Commission should require PJM to file updated information on the ELCC construct at the completion of the stakeholder process.<sup>107</sup> P3 recommends that the Commission require PJM to provide a compliance filing within one year of the ELCC’s implementation in order to more fully assess the sufficiency of the ELCC construct.<sup>108</sup> P3 echoes Calpine’s suggestion that the Commission require periodic review of the ELCC construct to ensure its methodology remains fair and nondiscriminatory.<sup>109</sup>

## ii. Determination

65. We find that PJM’s proposed formulaic ELCC methodology 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. The Commission has previously determined that “study assumptions and parameters are likely to change over time as planners gain experience . . . [t]hus, rigid specifications or formulas set out in the Tariff would likely lead to less reliable assessments due to the inability of planners to adapt to changing circumstances.”<sup>110</sup>

66. However, we note that the Commission’s rule of reason policy would likely require PJM to include the definitions of the ELCC Classes in the RAA. In contrast to modeling assumptions such as weather patterns, load shapes, and resource output profiles that PJM should have the flexibility to adjust in consultation with stakeholders, we find that the ELCC Classes should be specified in the RAA. The Commission’s rule of reason dictates that any rules that significantly affect rates, terms, and conditions of service and

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<sup>106</sup> *Id.* at 8-10.

<sup>107</sup> P3 Deficiency Letter Response Comments at 2-3.

<sup>108</sup> *Id.*

<sup>109</sup> *Id.* at 11-12.

<sup>110</sup> *Sw. Power Pool, Inc.*, 136 FERC ¶ 61,050, at P 37 (2011).



are readily susceptible to specification be on file with the Commission.<sup>111</sup> It appears that the ELCC Classes would significantly affect rates because a resource's ELCC Class would directly affect its Accredited UCAP in the RPM auction and its capacity payments. Further, PJM has already specified several ELCC Classes in its Deficiency Letter Response and states that it would do so in its manuals,<sup>112</sup> which undermines PJM's claim that ELCC Classes are not readily susceptible to specification due to fast-paced technological change.

67. We are not persuaded by commenters' claims that the inability to precisely reproduce PJM's determination of ELCC Class Ratings and Accredited UCAP values would necessarily render the proposal unjust and unreasonable or insufficiently transparent. Rather, we believe that PJM has provided a clear explanation of the process for determining these values, which only PJM as the market operator would be able to produce using the proprietary market and resource-specific data available to PJM. PJM states in its filing that it will "strive[] to provide sufficient transparency that interested parties have the opportunity to reproduce ELCC results to a sufficient degree of accuracy that they can anticipate future ELCC values, especially for the purposes of investment decisions."<sup>113</sup> We also note PJM's commitment to review and post the ELCC methodology, assumptions, inputs, and procedures on an annual basis to allow for the prediction of future ELCC values.

## **2. Interactions Between the ELCC Construct and CIRs**

### **a. Filing**

68. PJM states that the final amount of capacity an ELCC Resource is eligible to offer into the capacity market pursuant to the ELCC methodology is the lesser of its capacity capability (i.e., Accredited UCAP) and transmission constraints (i.e., CIRs). PJM notes

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<sup>111</sup> See, e.g., *Energy Storage Ass'n v. PJM Interconnection, L.L.C.*, 162 FERC ¶ 61,296, at P 103 (2018) (citing *Midcontinent Indep. Sys. Operator, Inc.*, 158 FERC ¶ 61,003, at P 69 (2017) (citing *PacifiCorp*, 127 FERC ¶ 61,144, at P 11 (2009); *City of Cleveland*, 773 F.2d at 1376 (finding that utilities must file "only those practices that affect rates and service *significantly*, that are reasonably *susceptible* of specification, and that are not so generally understood in any contractual arrangement as to render recitation superfluous") (emphasis in original); *Public Serv. Comm'n of N.Y. v. FERC*, 813 F.2d 448, 454 (D.C. Cir. 1987) (holding that the Commission properly excused utilities from filing policies or practices that dealt with only matters of "practical insignificance" to serving customers))).

<sup>112</sup> See PJM Deficiency Letter Response, Attachment 1 at 28.

<sup>113</sup> Transmittal at 48.

that this provides that a resource cannot offer more capacity into the market than it is capable of providing nor more capacity than it is capable of delivering.<sup>114</sup>

**b. Pleadings**

69. Commenters state that, while the proposed ELCC construct would not directly affect CIRs, it will have an impact on the quantity of CIRs a capacity resource could need in the future. For example, AEP contends that a resource owner may need to invest in transmission upgrades to receive sufficient CIRs to fully utilize its Accredited UCAP, only to have its UCAP later reduced as additional similar resources enter the market and lower the Accredited UCAP for all such resources. P3 questions how CIRs would be treated when they are above the Accredited UCAP level and therefore unused, and alternatively how the resource can obtain additional CIRs above the summer peak level requested if needed to fully support offering its Accredited UCAP into the capacity auction. LS Power questions whether the ELCC model accounts for CIRs, and whether a resource that fails to meet its capacity obligation in terms of actual MW delivered to the system would still retain all of its CIRs under the ELCC methodology. Calpine also questions how PJM plans to treat CIRs that have already been allocated, whether CIRs will be modified by the ELCC analysis, and whether the ELCC analysis will affect the allotment of CIRs in the future.<sup>115</sup>

70. Public Interest Organizations state that there is a potential inconsistency in the way CIRs are allocated to the ELCC Accredited UCAP. Public Interest Organizations aver that, according to PJM Manual 21, the maximum CIRs allocated for wind and solar resources is constrained by the resource's performance on the top eight summer days. In the case of solar resources, they state that CIRs allocated to solar resources range from 38% to 60% of nameplate capacity, while the preliminary estimate of ELCC Accredited UCAP for solar resources is 65% of nameplate capacity. Thus, Public Interest Organizations assert that a portion of resources' ELCC Accredited UCAP may be stranded and undeliverable due to manual provisions limiting eligibility for transmission service. This result, Public Interest Organizations contend, would be inconsistent with PJM's Tariff, which specifies that "[w]hen a Generation Interconnection Customer's generation is accredited as deliverable through the applicable procedures in Part VI and Part VI of the Tariff, the Generation Interconnection Customer also shall receive Capacity Interconnection Rights commensurate with the size in megawatts of the

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<sup>114</sup> *Id.* at 39-40.

<sup>115</sup> AEP Comments at 2; P3 Comments at 7; LS Power Protest at 11; Calpine Comments at 6-7.

generation as identified in the Interconnection Service Agreement.”<sup>116</sup> Public Interest Organizations maintain that the manual rules act as a de facto limit on UCAP capacity valuation, and they request that the Commission clarify that PJM, consistent with its Tariff, allow ELCC Resources to apply for sufficient CIRs to support their full ELCC capacity value.

71. In its December 2020 answer, PJM states that the October 30 filing does not directly address or otherwise propose changes to the CIR framework, and that CIRs will continue to represent the upper limit on offers into the capacity auction. However, PJM contends that it has initiated a stakeholder process to address concerns about CIRs expressed by the parties in this proceeding.<sup>117</sup>

**c. Deficiency Letter Response and Pleadings**

72. PJM summarizes how it determines the quantity of CIRs that Variable Resources, Limited Duration Resources, and Combination Resources secure upon interconnection and how each quantity compares to nameplate capacity, the current UCAP valuation, and the Accredited UCAP valuation under the proposed ELCC construct.<sup>118</sup>

73. PJM clarifies that, even if a Variable Resource or Combination Resource has CIRs equal to its Accredited UCAP, it is possible that this level of CIRs would not demonstrate sufficient deliverability to meet the Loss of Load Expectation standard. PJM explains that the ELCC analysis evaluates the contribution to reliability of the output of the Variable Resource or Combination Resource without regard to whether it is limited by the resource’s (expected) UCAP or CIR levels.<sup>119</sup>

74. LS Power, the IMM, and P3 assert that PJM’s clarification that the ELCC analysis does not consider transfer limitations at the point of interconnection associated with CIRs undermines the accuracy of its results.<sup>120</sup> They argue that the disconnect between the existing CIR rules and the ELCC framework, along with the prospective nature of PJM’s

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<sup>116</sup> Public Interest Organizations Comments at 20-21 (quoting PJM Tariff, § 230.2).

<sup>117</sup> PJM December 2020 Answer at 13-14.

<sup>118</sup> Deficiency Letter Response, Attach. 1 at 13-21.

<sup>119</sup> *Id.* attach. 1 at 24.

<sup>120</sup> LS Power Deficiency Letter Response Protest at 9-14; IMM Deficiency Letter Response Comments at 12-13; P3 Deficiency Letter Response Comments at 4-6.

promise to conduct a stakeholder process demonstrate that it would be premature to accept the ELCC framework at this time.

75. In contrast, Public Interest Organizations contend that PJM's proposed treatment of injection beyond a resource's CIRs is a reasonable simplification. They state that, during the interconnection process, PJM affirms that a facility may generally inject up to its maximum facility output. Further, they explain that CIRs are currently determined based on deliverability during studied peak conditions, in contrast to the ELCC method's more holistic hourly approach. In the absence of a settled method to reconcile peak-period transmission rights with hourly resource output analyses such as ELCC, Public Interest Organizations posit that PJM's proposal to model resources at their maximum facility output but limit their accredited capacity to their CIRs is a reasonable compromise. They also argue that the historic output data that PJM will use to inform its ELCC analysis will reflect the current resource injection limits, further demonstrating that PJM's approach is reasonable.<sup>121</sup>

76. Public Interest Organizations assert that PJM's Deficiency Letter Response demonstrates that PJM does not plan to update CIR eligibility for Variable Resources, and contend that, if left uncorrected, this would result in a situation where PJM manual provisions effectively override the Tariff. Public Interest Organizations argue that the rules for CIR eligibility act as a *de facto* cap on the quantity of capacity a resource may offer into the capacity market, and thus must be filed in the Tariff pursuant to the Commission's rule of reason. Public Interest Organizations request that the Commission direct PJM to conform its interconnection procedures in its Manuals to be consistent with the ELCC proposal and its Tariff, so that ELCC Resources may apply for sufficient CIRs to support their full ELCC-accredited capacity value.<sup>122</sup>

77. In its April 2021 Answer, PJM argues that commenters' concerns regarding coordination between ELCC and CIRs do not demonstrate that the ELCC proposal is not a just and reasonable improvement over the current approach with respect to measuring the reliability contribution of ELCC Resources.<sup>123</sup> PJM asserts that the ELCC proposal, in contrast to the current approach, recognizes actual operating transmission constraints that impacted historical performance. Thus, PJM contends that the ELCC proposal improves upon the status quo rules for wind and solar.<sup>124</sup> In response to protesters'

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<sup>121</sup> Public Interest Organizations Deficiency Letter Response Comments at 2-5.

<sup>122</sup> *Id.* at 7-9.

<sup>123</sup> PJM April 2021 Answer at 2-4 (citing LS Power Deficiency Letter Response Protest at 12).

<sup>124</sup> *Id.* at 5.

assertions that the proposal risks overstating the reliability contributions of ELCC Resources, PJM counters that the ELCC proposal will help safeguard against such a possibility because an ELCC Resource cannot offer above its CIR level, and preliminary ELCC Class Ratings indicate a decrease in rating factors for most ELCC Resources in comparison to the status quo.<sup>125</sup>

**d. Determination**

78. We find that commenters' concerns regarding coordination between the allocation of CIRs and the evaluation of Accredited UCAP are largely outside the scope of this proceeding. We acknowledge, as Public Interest Organizations point out, that there is no settled method to reconcile peak-period transmission rights (i.e., CIRs) with hourly resource output analyses such as ELCC. We agree with PJM and supportive commenters that its proposed approach would ensure that reliability is not at risk by appropriately limiting the total capacity in a resource's capacity market offer to be no greater than its CIR, which reflects the resource's deliverable capacity to the PJM market during peak conditions.

**3. Transition Mechanism**

**a. Filing**

79. PJM proposes to include a transition mechanism in its ELCC filing that establishes ELCC Class Rating floors for 13 subsequent Delivery Years after an ELCC Resource enters the PJM market in order to reduce the risk of downside ELCC volatility on ELCC Resources. PJM explains that its ELCC Class Rating floors are based on projections of expected load, resource portfolio mix, and expected contributions from each of the resource classes. PJM states that, as a result of these projections, the ELCC method introduces a new source of volatility for market participants because resources' ELCC Accredited UCAP may vary over the course of any multi-year period and may be affected by assumptions and policy changes. PJM asserts that the transition mechanism addresses the increased variability in resource adequacy values introduced by the ELCC method and provides ELCC Resources some limited protection to individual resources against major downward variations in Accredited UCAP. PJM states that, as the ELCC method is adopted in the PJM region, project developers will gain experience with the factors that influence ELCC Accredited UCAP. Thus, PJM views the proposed mechanism as strictly transitional and commits to an informed, rigorous review of the mechanism by no later than the 2026 quadrennial review. However, PJM states that the proposed RAA

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<sup>125</sup> *Id.* at 6.

revisions do not establish a sunset date for the Accredited UCAP floor rules established by the proposed transition mechanism.<sup>126</sup>

80. PJM proposes to calculate prospective ELCC Class Rating floors for each class of ELCC Resources by modeling a situation in which expected antagonistic changes<sup>127</sup> to the resource mix occur twice as quickly as forecasted and expected synergistic changes<sup>128</sup> to the resource mix occur half as quickly as forecasted. According to PJM, the ELCC Class Rating floors represent a conservative scenario for a particular resource class.<sup>129</sup> For example, PJM explains that solar resources and 4-hour storage resources are synergistic, because a higher storage penetration increases the ELCC of solar resources and vice versa. Thus, PJM states that it would calculate the ELCC Class Rating floors for 4-hour storage resources by *doubling* the expected growth of 4-hour storage and *halving* the expected growth of solar, reflecting a situation where a lopsided amount of storage is developed in a way that decreases its capacity value relative to a more balanced scenario. Accordingly, PJM states, the floor calculation could be seen as a rough proxy for the uncertainty of significant future policy changes. In short, PJM states, the floor-value adjustment is thus best viewed as protecting individual ELCC Resources against unexpected changes in the conditions and assumptions that govern the ELCC calculations.<sup>130</sup>

81. PJM explains that under the proposed transition mechanism, it will calculate and post during each calendar year ELCC Class Rating floor values for 10 subsequent Delivery Years that will apply to the “cohort” of ELCC Resources that entered the PJM capacity market in that calendar year. PJM states that it will supplement those floor values with additional floor values for years 11, 12, and 13 by December 31 of each of the immediately following three calendar years, respectively, so that it is forecasting no

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<sup>126</sup> Transmittal at 48-51.

<sup>127</sup> When increased penetration by one resource class reduces the resource adequacy value of a second class, the two classes are said to be antagonistic. *Id.* at 52.

<sup>128</sup> By contrast, when increased penetration by one resource class increases the resource adequacy value of a second class, the two classes are said to be synergistic. *Id.*

<sup>129</sup> *Id.* Specifically, proposed RAA, Schedule 9.1, section J(3)(d)(i) states “[a]ny expected increase in deployment of ELCC Resources in the given subject class in each year shall be accelerated in an exponential fashion such that the increase in deployment after 10 years shall be twice the value in the expected forecast.”

<sup>130</sup> *Id.* at 52-54.

more than 10 years in the future.<sup>131</sup> PJM states that setting floor values for 13 years will ensure that all resources receive floor values for at least 10 delivery years of expected service. According to PJM, this approach is also consistent with National Renewable Energy Laboratory data showing debt financing periods of 12 to 20 years for new large-scale solar resources.<sup>132</sup>

82. PJM explains that, for any given Delivery Year, ELCC Resources will be assigned an Accredited UCAP based on the higher of the ELCC Class Rating floor value or the ELCC Class Rating calculated under the standard ELCC methodology, multiplied by the applicable ELCC Resource Performance Adjustment.<sup>133</sup> PJM explains that, when a floor binds in this way, the entire ELCC Portfolio UCAP would be assigned an aggregate UCAP above the limit PJM's ELCC analysis found appropriate absent a corrective measure. Thus, PJM proposes to make offsetting adjustments to the ELCC Class Rating of ELCC Resources for which the floor did not bind (unfloored resources) in order to avoid relying on ELCC Resources to provide more reliability value than they can physically provide.<sup>134</sup> PJM explains that to allocate these offsetting adjustments among ELCC Resources, it proposes to work with stakeholders to group ELCC Classes that have similar relevant physical characteristics (e.g., 4-hour and 6-hour storage) to produce groups that are broad enough to include a significant fraction of the ELCC Portfolio

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<sup>131</sup> PJM notes that each cohort shares an associated table of floor values on the ELCC Class Ratings spanning the duration as described in proposed RAA, Schedule 9.1, § J(2). For example, for the 2021 cohort, a table of floor values for delivery years 2021/22 through 2033/34 shall apply to ELCC Resources that on or before December 31, 2021 are Existing Generation Capacity Resources or satisfy the requirements of RAA, Schedule 9.1, §§ J(1)(a) and (b). The 2022 cohort will begin with the 2022/2023 Delivery Year and will be posted in 2022. *Id.* at 56 & n.119; proposed RAA, Sched. 9.1, § J(2).

<sup>132</sup> Transmittal at 56 n.120 (citing David Feldman and Paul Schwabe, *Terms, Trends, & Insights on PV Project Fin. in the U.S., 2018*, National Renewable Energy Laboratory, <https://www.nrel.gov/docs/fy19osti/72037.pdf>).

<sup>133</sup> *Id.* at 54.

<sup>134</sup> *See id.* at 54-55; proposed RAA, Sched. 9.1, §§ J(3)(e)(i), J(3)(e)(ii).

UCAP.<sup>135</sup> PJM further states that if there are insufficient offsets available from other unfloored resources in the group (i.e., without pushing those resources below their floor), it would perform an offsetting adjustment across the total ELCC portfolio.<sup>136</sup>

83. PJM states that the proposed transition mechanism can be evaluated at any time and shall be evaluated in conjunction with the RPM quadrennial periodic review no later than the end of 2026, in accordance with the proposed requirements of RAA Schedule 9.1, section J(1).<sup>137</sup> PJM specifies that, as part of this evaluation, it will assess the efficacy and appropriateness of the transition mechanism and will recommend whether to reconsider some or all aspects of the transition mechanism through a stakeholder process.<sup>138</sup>

**b. Pleadings**

84. Clean Energy Associations, Duke, and Joint Stakeholders filed comments supporting PJM's transition mechanism. Clean Energy Associations believe that the proposed transition mechanism is appropriate and crucial to PJM's ELCC proposal because it protects against the risk of extreme downside volatility during the transition to the ELCC construct and ensures that ELCC Resources are not artificially and unjustly disadvantaged to resources that will continue to have their capacity capability measured under the EFORD method, which is not as volatile as the ELCC method. Clean Energy Associations asserts that the transition mechanism serves to treat ELCC Resources and non-ELCC Resources comparably to one another, and the proposed resource-specific performance adjustment provides parity with a similar adjustment in the EFORD method designed to compensate all capacity resources for services rendered. Clean Energy Associations also assert that the capacity floor values are crucial because they will provide certainty to project developers, financiers, and asset managers when projecting the minimum amount of capacity capability that a given ELCC Resource will be credited for in PJM's capacity market. Clean Energy Associations also state that PJM and

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<sup>135</sup> To obtain a lower UCAP assignment for ELCC Resources in the group where the floor did not bind, PJM proposes to sum the aggregate ELCC Class UCAP assigned to those classes of the group under the standard ELCC analysis, and subtract from that sum the floor-determined ELCC Class Rating. PJM adds that it will also allocate the residual UCAP quantity on a pro rata basis based on Effective Nameplate Capacity and Performance Adjustment. Transmittal at 55; proposed RAA, Sched. 9.1, § J(3)(e)(ii)(1), (2).

<sup>136</sup> Transmittal at 55-56; proposed RAA, Sched. 9.1, § J(3)(e)(ii)(3), (4).

<sup>137</sup> Transmittal at 58, 61; proposed RAA, Sched. 9.1, § J(1).

<sup>138</sup> Transmittal at 59; proposed RAA, Sched. 9.1, § J(1).



stakeholders will assess, on an ongoing basis, the efficacy of the transition mechanism and can make adjustments as necessary.<sup>139</sup>

85. Duke asserts that establishing ELCC Class Rating floor values to limit the uncertainty in future ELCC values will provide certainty and the ability to rely on intermittent and limited duration resources in its Fixed Resource Requirement capacity plans in the future. Duke further states that it supports PJM's proposed review of the transition mechanism no later than the 2026 quadrennial review to provide an opportunity to evaluate the efficacy of the floor value transition mechanism and ELCC methodology.<sup>140</sup>

86. Joint Stakeholders argue that the proposed transition mechanism provides appropriate safeguards against unknown or unexpected risks to market participants. Joint Stakeholders argue a safeguard (such as a narrowly crafted transition mechanism for the first ten delivery years after a resource exits the interconnection queue) is not new to the Commission. Joint Stakeholders assert that the Commission previously approved a similar mechanism in ISO New England Inc. (ISO-NE) that "locks in" the capacity price that new resources receive for up to seven years.<sup>141</sup> Joint Stakeholders state that, given the risk of extreme changes in the ELCC Rating of intermittent and limited duration resources and unforeseen variations in future ELCC values, which could affect existing resources, the same reasoning should apply in this matter.<sup>142</sup>

87. Dominion, IMM, LS Power, and P3 filed protests against the transition mechanism. Dominion argues that, while it supports PJM's ELCC proposal, it believes that the Commission should reject the transition mechanism because: (1) the proposal contains no sunset date for the transition mechanism; and (2) reducing the ELCC Class Rating of one or more assets to compensate for a binding floor value of other asset(s), whether in the same or a different ELCC Class, raises equity concerns. According to Dominion, the adjustment of the ELCC Class Rating in other classes to maintain the floor value in another class arguably will cause the classes without a binding floor to receive less capacity value despite potentially having a greater contribution to reliability.<sup>143</sup> Dominion contends that PJM's argument that the floor values are unlikely to bind is

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<sup>139</sup> Clean Energy Associations Comments at 7-9.

<sup>140</sup> Duke Comments at 3-4.

<sup>141</sup> Joint Stakeholders Comments at 6 (citing *Devon Power LLC*, 115 FERC 61,340, at P 16 (2006)).

<sup>142</sup> *Id.*

<sup>143</sup> Dominion Comments at 5.

suspect since PJM's analysis suggests these values are highly sensitive to modeling assumptions. Dominion requests that the Commission reject the proposed transition mechanism or require PJM to establish a specific sunset date for the mechanism.<sup>144</sup>

88. The IMM argues that the floor values, which serve as a lower bound on the ELCC Class Ratings, are inconsistent with competitive market principles because the floors shift market risk away from developers and owners of existing ELCC Resources that should bear the risk of a potentially decreasing capacity value and react to changing market conditions accordingly. The IMM argues that the ELCC Class Rating floors will cause resources using new technology to be at a disadvantage relative to older resources. Therefore, the IMM asserts that customers will pay more for inefficient, old technology and be denied the benefits of innovation.<sup>145</sup> The IMM contends that, because the ELCC Class Rating floors will bind when a current year ELCC Class Rating is below the corresponding ELCC Class Rating floor, the floor values are not sustainable and will make the PJM system less reliable.<sup>146</sup> The IMM further adds that, if there are not enough ELCC Resources with nonbinding ELCC Class Rating floors to make up the difference, a workable solution would be to require the procurement of additional capacity from Unlimited Resources that customers will pay for. The IMM states that, given the uncertainty regarding the ELCC Class Rating floor calculations, the Commission should find the transition mechanism unjust and unreasonable.<sup>147</sup>

89. LS Power argues that the proposed transition mechanism will reduce the effectiveness of the ELCC construct, overstate the reliability value of "grandfathered" ELCC Classes, and impede competition between existing resource classes and new entrants for over a decade. LS Power states that the transition mechanism sets up artificial, predetermined floor values for each ELCC Class that do not reflect their actual reliability contribution. LS Power asserts that, if the floor values bind, the transition mechanism will have inequitable adverse effects on other resources and affect system reliability in PJM. LS Power further argues that the transition mechanism interferes with competition in the RPM market and creates an uneven playing field where resources are

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<sup>144</sup> *Id.* at 4-6.

<sup>145</sup> IMM Protest at 16.

<sup>146</sup> To illustrate, the IMM uses an example that shows a group of solar resources being credited with a capacity level that exceeds the true capability of the resources. According to the IMM, this illustration shows that solar capacity cannot cover the capacity guaranteed by the ELCC floors and under the PJM proposed ELCC rules, another class of resources must cover the missing solar capacity by having their ELCC reduced. *Id.* at 16-17.

<sup>147</sup> *Id.* at 17-18.

judged not on their actual contribution to reliability, but instead on pre-determined floor values set as much as 13 years in advance, which could cause PJM customers to receive a lower amount of reliability than they would otherwise have obtained for the same price. LS Power adds that, because PJM proposes to reduce the Accredited UCAP of unfloored resources to accommodate the ELCC Class Rating floors for other resources, the transition mechanism is unduly preferential and discriminatory and violates section 205(b) of the FPA.<sup>148</sup> Furthermore, LS Power contends that the transition mechanism could deter the entry of efficient new resources that will be unable to compete with floored resources with artificially inflated Accredited UCAP values. LS Power states that this would be an unjust and unreasonable result that directly contradicts the Commission's recognition that, under a competitive market regime, "commodity markets [should] clear at prices based on location and timing of delivery, not the vintage of the production plants used to produce the commodity."<sup>149</sup>

90. P3 argues that PJM has provided limited record evidence to support a 10-year ELCC Class Rating guarantee and questions whether this guarantee is necessary to address the risk associated with the ELCC proposal. P3 contends that, when the floor values bind, PJM's proposal would allow the capacity value of one set of resources to transfer to another set of resources.<sup>150</sup> Thus, P3 asserts that the beneficiaries of the floors are not providing comparable value as traditional resources for their capacity payments because unfloored ELCC Resources, which provide the capacity value "uplift" (i.e., the difference between the actual calculated accredited ELCC value and the floor ELCC value), subsidize their participation.<sup>151</sup> P3 contends that for these reasons, the transition mechanism raises important legal, practical and fairness issues that should be further explored, explained, and perhaps changed before the Commission approves the ELCC construct.<sup>152</sup>

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<sup>148</sup> LS Power Protest at 3-5.

<sup>149</sup> *Id.* at 5-6 (citing *PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,331, at P 141 (2006)).

<sup>150</sup> P3 maintains that this is so because, under the ELCC construct, PJM will take capacity value from resources with an actual capacity value above their floor, or from resources for which a floor value has not been established, and transfer that capacity value to the resources with actual individual accredited capacity values below their floor. P3 Protest at 8.

<sup>151</sup> *Id.*

<sup>152</sup> *Id.*

c. Answers

91. PJM states that the IMM's claims that the proposed approach will shift market risk from generation sellers to customers, and LS Power's assertion that the proposed transition mechanism will adversely affect reliability in PJM, are both without merit. PJM explains that, when an ELCC Class Rating floor value binds, PJM will distribute the ELCC Portfolio UCAP among ELCC Resources by "reduc[ing] the ELCC Class Rating of other ELCC Resources, to offset the increase in the ELCC Class Rating for ELCC Resources for which the floor bound."<sup>153</sup> PJM therefore asserts that, contrary to the assertions of IMM and LS Power, the transition mechanism does not shift reliability risk to load and does not adversely affect reliability.<sup>154</sup>

92. Regarding the length of the transition mechanism (i.e., the 13-year period), Clean Energy Associations state that the transition mechanism must remain in effect for a sufficient period of time in order to provide market participants and financing parties with sufficient foresight into the minimum future capacity capabilities of ELCC Resources, so that financing parties do not over-price volatility risk associated with the ELCC method.<sup>155</sup>

93. Joint Stakeholders state that PJM's proposed transition mechanism is necessary to maintain efficient market price signals for both new and existing intermittent and limited duration resources. Joint Stakeholders argue that the transition mechanism is not a "lock-in" or guarantee to the capacity accreditation of certain resources, but a flexible tool that provides market participants with some degree of future confidence in the amount of Accredited UCAP they will be eligible to offer into RPM auctions. Joint Stakeholders assert that the ELCC proposal also equips PJM with tools to manage reliability through updated analysis of the bulk electric system needs and evolution while also providing

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<sup>153</sup> PJM December 2020 Answer at 11.

<sup>154</sup> *Id.*

<sup>155</sup> Clean Energy Associations Answer at 10-11. Clean Energy Associations argue that a disparate treatment in favor of ELCC Resources is not unduly discriminatory, but rather is necessary to account for the inherent differences in the ELCC and the EFORD methodologies. *Id.* at 11 n.36 (citing *N.Y. Indep. Sys. Operator, Inc.*, 172 FERC ¶ 61,206, at P 12 (2020) (finding disparate treatment for different resources was not unduly discriminatory because there was a "highly relevant and distinguishing feature that would support differential treatment"); *ISO New England Inc.*, 150 FERC ¶ 61,065, at P 26 (2015) ("[T]he [Federal Power Act] does not forbid preferences, advantages, and prejudices per se. Rather, [it] prohibits 'undue' preferences, advantages and prejudices.") (citation omitted); *id.* (explaining that discrimination is not undue where the relevant entities are not "similarly situated"))).

certainty to investors and removing barriers to entry into the market. In reply to suggestions that PJM's proposal benefits resources that come online in the near-term, and may result in capacity accreditation that does not reflect the capacity capability of the resource, Joint Stakeholders argue that several features (e.g., the performance adjustment and the accreditation floor for ELCC Resources) in PJM's proposed methodology minimize this risk and entirely obviate the concern that PJM will face a reliability shortage. Joint Stakeholders assert that, for a less efficient resource to have a higher capacity accreditation than a more efficient resource, an ELCC Class Rating floor value must bind. Joint Stakeholders also note that PJM's methodology minimizes the likelihood that a floor will bind because of the conservative approach it uses, which doubles the expected resource deployment after 10 years.<sup>156</sup>

94. The IMM responds that PJM ignored the actual dynamics that result from the long-term lock-in throughout the stakeholder process and continues to ignore them in its filing. The IMM states that, when old resources have locked-in ELCC Class Rating floors and their actual ELCC Class Ratings fall, the old resources will be credited with reliability value that exceeds their actual reliability value. The IMM asserts that this difference creates a shortfall in reliability that must be made up by other resources (i.e., a reallocation), requiring PJM to reduce the ELCC Class Rating values for new renewable resources below their actual reliability contribution. The IMM states that PJM incorrectly states that reliability risk is not shifted to load, because customers will be forced to pay more for capacity than they otherwise would have without the floor mechanism. The IMM contends that renewable resources that are assigned a capacity value that is less than their actual reliability contribution will have to offer their capacity at a higher price, causing an increase in capacity prices.<sup>157</sup>

95. Furthermore, the IMM contends the transition mechanism exacerbates the deficiencies of PJM's ELCC modeling assumptions. The IMM avers that it is inappropriate for PJM to use putative output data to establish ELCC floor values for existing resources that will have a significant impact on markets for at least 13 years. The IMM asserts that the stated purpose of the transition mechanism is to shift risk from owners of existing technology to new entrants with innovative technology, and, although not explicitly stated, to customers.<sup>158</sup>

96. In response to Joint Stakeholders' arguments, the IMM states that locking in unsupported ELCC Class Rating values for 13 years for the cohort of new resources each year is not a transition mechanism, and it is not a phased implementation strategy. The

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<sup>156</sup> Joint Stakeholders Answer at 2-4.

<sup>157</sup> IMM December 15, 2020 Answer at 5-7.

<sup>158</sup> IMM December 21, 2020 Answer at 4-5.

IMM further argues that the floors do not eliminate risks or provide safeguards against risks, rather they simply shift risks from the preferred group of investors to other market participants.<sup>159</sup>

**d. Deficiency Letter Response and Pleadings**

97. In its Deficiency Letter Response, PJM clarifies several aspects of the transition mechanism. First, PJM explains that if it redefines the ELCC Classes, including splitting previously combined categories and joining previously split ones, the ELCC Class Rating and the Performance Adjustment for the old class could differ significantly from the ELCC Class Rating for the new class, which would render the old floor values inappropriate in the new context.<sup>160</sup> PJM states that, to provide greater certainty about the consequences of such a future class re-definition, PJM proposes to revise proposed RAA, Schedule 9.1, section J(3)(f)(iii) to state that if an ELCC Class is redefined, “the floors for a given resource whose class has been redefined will be adjusted based on a ratio of the aggregate performance of the newly defined class of which it is a member relative to the aggregate performance of the previously defined class of which it had been a member.”<sup>161</sup>

98. Second, PJM explains that, if the ELCC Class Rating floors bind to such an extent across the ELCC Portfolio that PJM is unable to make offsetting adjustments to ensure that the total UCAP assigned across ELCC Classes is equal to the total ELCC Portfolio UCAP, PJM will reduce all ELCC Class Rating floors by the same proportion until the aggregate Accredited UCAP and the identified reliability value of the resources in the model is equal. PJM proposes revisions to RAA, Schedule 9.1, section J(3)(f) to effectuate this change to the ELCC Class Rating floor methodology.<sup>162</sup>

99. Third, PJM explains that it is currently discussing with its stakeholders the boundaries of ELCC Class groupings for the purposes of sharing offsetting adjustments to unfloored resources’ ELCC Class Rating that may be necessary to accommodate any binding ELCC Class Rating floors. PJM states that, as part of this collaborative process, it discussed with stakeholders the classes of resources that it believes have similar relevant physical characteristics, including: fixed solar and tracking solar; onshore wind and offshore wind; and tracking solar and 4-hour hybrids, and fixed solar and 6-hour

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<sup>159</sup> IMM December 15, 2020 Answer at 8-9.

<sup>160</sup> Deficiency Letter Response, Attach. 1 at 6.

<sup>161</sup> *Id.* attach. 1 at 7.

<sup>162</sup> *Id.* attach. 1 at 12.

hybrids.<sup>163</sup> PJM states that it will memorialize all groupings in PJM Manual 21a and stakeholders can raise any concerns with such groupings and propose changes through the stakeholder process. PJM further states that, if members wish to contest an ELCC Class designation, before taking their concerns to the Commission, they may use PJM's dispute resolution procedures in Schedule 5 of the Operating Agreement.<sup>164</sup>

100. LS Power, the IMM, and P3 assert that PJM's clarifications do not alleviate the actual concerns that the transition mechanism is unjust and unreasonable.<sup>165</sup> Specifically, they assert that PJM's proposed ELCC Class Rating floor values will take capacity value from one group of resources and award it to another group and create an equity and reliability issue in the PJM capacity market.<sup>166</sup> LS Power argues that, because the ELCC Class Rating floors will persist for 13 delivery years and may cause certain resources to receive an accredited capacity value greater than the value calculated by the ELCC method, the floors will prevent the ELCC construct from accurately reflecting the reliability contribution of certain ELCC Resources and will impede competition by shifting commercial risk among market participants.<sup>167</sup> LS Power states that the transition mechanism could have long-term detrimental impacts on the PJM market and consumers because the class floors: (1) favor incumbents and first movers (i.e., existing facilities advanced in the development process will be at the "top of the heap" in terms of risk preference) and will discourage future development and innovation by continually moving the risk exposure up as new entrants occur;<sup>168</sup> (2) allow existing state programs to deter other states' decarbonization efforts; and (3) allow a risk shift between ELCC

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<sup>163</sup> *Id.* attach. 1 at 10 (citing PJM Interconnection, L.L.C., *Effective Load Carrying Capability Floor Groupings* (Feb. 1, 2021), <https://www.pjm.com/-/media/committees-groups/task-forces/ccstf/2021/20210204/20210204-item-06-elcc-floor-groupings-01192021-updates.ashx>).

<sup>164</sup> *Id.* attach. 1 at 11.

<sup>165</sup> LS Power Deficiency Letter Response Protest at 3-9; IMM Deficiency Letter Response Comments at 8-12; P3 Deficiency Letter Response Comments at 8-11.

<sup>166</sup> IMM Deficiency Letter Response Comments at 9-10; P3 Deficiency Letter Response Protest at 9.

<sup>167</sup> LS Power Deficiency Letter Response Protest at 3-5.

<sup>168</sup> *Id.* at 8; Shanker Aff. ¶ 27.

Classes, i.e., the classes that penetrate the market the fastest could discourage other “antagonist” technologies (e.g., solar penetration may handicap wind).<sup>169</sup>

101. The IMM argues that PJM’s proposed transition mechanism is flawed because an efficient ELCC policy that relies on market mechanisms would not require PJM and its stakeholders, or the Commission, to choose winners and losers.<sup>170</sup> Specifically, the IMM asserts that PJM’s proposal defines, in the abstract, the need to reduce capacity values for one group of resources to cover the guaranteed floors established for another group of resources. According to the IMM, new resources with superior technology will lose out to older less efficient resources.<sup>171</sup> The IMM further states that, if aggrieved resource owners lose some ELCC value, they could seek compensation from PJM.<sup>172</sup> Finally, the IMM argues that PJM is incorrect to state that a large volume of expected ELCC Resources would provide the amount of capacity needed to support previously established floors because those expected volumes will reduce the incremental capacity values of ELCC Resources and PJM has not provided the floor values.<sup>173</sup>

102. The IMM also argues that PJM’s Deficiency Letter Response highlights the unnecessary complications that arise from a guarantee of floors in the ELCC design. Specifically, the IMM argues that PJM’s proposal to adjust floors for a redefined class does not account for the marginal interactions among the subclasses that are either being split or combined. The IMM avers that using estimated hypothetical historical output as a basis for these calculations is not appropriate for any market design. The IMM contends that PJM’s proposed method introduces further uncertainty for investors, which stands in contrast to the stated intent of the transition mechanism.<sup>174</sup>

103. P3 argues that the transition mechanism guarantees an ELCC Class Rating floor regardless of any changes in the ELCC Class Rating value. P3 states that the floors create a mismatch between cleared capacity commitments and delivery capability because deficient ELCC Resources cannot deliver a cleared capacity commitment that

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<sup>169</sup> LS Power Deficiency Letter Response Protest at 8; Shanker Aff. ¶ 27.

<sup>170</sup> IMM Deficiency Letter Response Comments at 11.

<sup>171</sup> *Id.* at 10.

<sup>172</sup> *Id.* at 11 (citing *PJM Interconnection, L.L.C.*, 170 FERC ¶ 61,258 (2020)).

<sup>173</sup> *Id.*

<sup>174</sup> *Id.* at 7-8.



has been transferred to them via the transition mechanism.<sup>175</sup> P3 asserts that the proposed floors will penalize second movers, such as states, that adopt new policies that encourage lower emissions resources or more economically efficient comparable facilities, and will also undermine any incentives needed to transition the grid to clean resources.<sup>176</sup>

**e. Determination**

104. We find that the transition mechanism is not just and reasonable because it would discount the accredited capacity value of some ELCC Resources below their actual capacity value in order to value other ELCC Resources above their actual capacity value. Specifically, we find that, if the floors established by the transition mechanism bind for existing ELCC Resources, the offsetting adjustments that preserve the floor values would unjustly and unreasonably discount the capacity value of ELCC Resources that enter the market at a later date. While all ELCC Resources contribute to the reduction in the value of ELCC capacity, as discussed below, PJM has failed to provide a sufficient explanation for favoring existing ELCC Resources and ELCC Resources that invest in the near future, over those making investments in later years.<sup>177</sup>

105. While PJM and supporting commenters argue that the ELCC Class Rating floors established by the transition mechanism are necessary to provide resources with stable investment signals and prevent ELCC Resources from overestimating future ELCC downside volatility, they fail to justify why the benefits of reducing ELCC volatility for certain resources outweigh the significant risks of establishing potentially inaccurate

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<sup>175</sup> P3 Deficiency Letter Response Comments at 10.

<sup>176</sup> *Id.* at 10-11.

<sup>177</sup> See *BNP Paribas Energy Trading GP v. FERC*, 743 F.3d 264, 268 (D.C. Cir. 2014) (explaining that cost causation “generally calls for giving the same treatment to new and continuing customers, based on a straightforward economic rationale. Where ‘all customers cause the incurrence of the costs . . ., whether by adding or merely continuing their usage,’ assignment of the costs to all customers (both continuing and new) forces each set ‘to weigh the marginal benefits of the capacity to them against the marginal costs they impose on society by continuing to make demands’”); *PJM Interconnection, L.L.C.*, Opinion No. 494, 119 FERC ¶ 61,063, at P 53 (2007) (“allocation of the sunk costs of existing transmission facilities has no significant impact on investment decisions associated with new transmission facilities.”), *reh’g denied*, 122 FERC ¶ 61,082 (2008), *aff’d in part, rev’d in part sub nom. Ill. Com. Comm’n v. FERC*, 576 F.3d 470, 473-74 (7th Cir. 2009) (upholding the Commission’s determination not to reallocate sunk costs that do not affect future investment decisions).

ELCC Class Rating floors for 13 subsequent Delivery Years and discounting the ELCC Class Rating of unfloored resources in order to accommodate any binding floors.

106. Given the uncertainty about the evolving resource mix, particularly over the following 13 years, the floors established according to PJM's forecasts could bind for a significant amount of existing resource capacity over several Delivery Years. If this were to occur, future ELCC Resources could be forced to shoulder potentially significant reductions in their capacity accreditation, in a manner divorced from their actual capacity value. Artificially low capacity accreditation for future ELCC Resources would send inaccurate signals to market participants about the actual capacity contribution of new ELCC Resources in a given delivery year, which could undermine the underlying objective of PJM's capacity market, i.e., to send efficient investment signals, promote competition, and minimize the cost of electricity to PJM customers while maintaining electric reliability.<sup>178</sup>

107. Further, PJM has not shown that the risks imposed by the transition mechanism are outweighed by the mechanism's potential benefits. Separate from the transition mechanism, PJM proposes to publish preliminary ELCC Class Rating values for nine subsequent Delivery Years as part of its annual ELCC reporting requirements. We believe that, by providing resource owners or financing parties with projections of future ELCC Class Rating values, these annual postings would help facilitate efficient investment decisions without imposing detrimental impacts on other ELCC Resources.

108. We further find that the transition mechanism is unduly discriminatory because it treats similarly situated resources differently by discounting the capacity value of newer, unfloored ELCC Resources within a given class despite the fact that existing, floored ELCC Resources and newer, unfloored ELCC Resources within the class are similarly situated. As PJM explains, resources within a class share a common set of operational characteristics and are reasonably homogenous with respect to their impact on system resource adequacy.<sup>179</sup> The transition mechanism would discriminate between resources in a class based on vintage despite the fact that all resources within a class bear equal responsibility for the decrease in the capacity contribution of their ELCC Class. For

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<sup>178</sup> See *Reg'l Transmission Orgs.*, Order No. 2000, FERC Stats. & Regs. ¶ 31,089, at 30,993 (1999) (cross-referenced at 89 FERC ¶ 61,285), *order on reh'g*, Order No. 2000-A, FERC Stats. & Regs. ¶ 31,092 (2000) (cross-referenced at 90 FERC ¶ 61,201), *aff'd sub nom. Pub. Util. Dist. No. 1 v. FERC*, 272 F.3d 607 (D.C. Cir. 2001) ("Competition in wholesale electricity markets is the best way to protect the public interest and ensure that electricity consumers pay the lowest price possible for reliable service.").

<sup>179</sup> Transmittal at 16.

example, if the PJM region experiences significant growth in solar resources that causes the ELCC Class Rating for those resources to decline much faster than expected, the ELCC Class Rating floors would bind for vintage solar resources. If this were to occur, PJM would be required to value vintage solar resources higher than their actual reliability contribution while, in the same delivery year, discounting the ELCC Class Rating of newer solar resources without binding floors. Because both new and vintage solar resources contribute to the decline in ELCC Class Rating, it would be unduly discriminatory to discount only the ELCC Class Rating of the newer solar resources as PJM proposes. Where the growth in a particular ELCC Class causes the measured ELCC Class Rating for that class to decline, it is reasonable to allocate the reduction in capacity value to all ELCC Resources of that class, and not only to vintages of ELCC Resources in that class for which the ELCC Class Rating does not bind. PJM has not demonstrated that resources entering the capacity market in different years are differently situated in a manner that warrants granting more favorable treatment to resources the earlier they enter into the capacity market.

109. We disagree with Clean Energy Associations' claim that the transition mechanism is crucial in order to ensure comparable treatment of ELCC Resources and Unlimited Resources, which have UCAP determined as a function of their EFORd and installed capacity and are thus subject to less year-to-year UCAP volatility. Clean Energy Associations rely on the false premise that PJM's markets must ensure "comparable" outcomes for ELCC Resources and Unlimited Resources, despite the fact that these resources have different physical characteristics. The proper objective therefore is not comparability, but rather is to ensure that each resource's capacity supply obligation does not exceed its expected contribution to system reliability. The proposed transition mechanism is not necessary for and could undermine the ability to meet that objective.

110. We also disagree with Joint Stakeholders' claim that the transition mechanism should be accepted because it is comparable to new entrant capacity market price-lock rules. As an initial matter, we note that the Commission recently found ISO-NE's 7-year new-entrant price lock, which Joint Stakeholders cite, unjust and unreasonable.<sup>180</sup> Furthermore, the Commission rejected similar new entrant pricing rules in PJM, finding that "[a] market should be designed correctly so that the contribution to reliability from both new entrants and existing suppliers is compensated comparably."<sup>181</sup>

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<sup>180</sup> *ISO New England Inc.*, 173 FERC ¶ 61,198, at P 68 (2020).

<sup>181</sup> *PJM Interconnection, L.L.C.*, 128 FERC ¶ 61,157, at P 103 (2009).

#### **4. Status of Paper Hearing in Docket No. EL19-100-000**

##### **a. Pleadings**

111. Joint PJM Members argue that the instant filing fulfills the Commission's directives to investigate whether PJM's minimum run-time rules and procedures were unjust, unreasonable, unduly discriminatory or preferential as applied to Capacity Storage Resources as well as for PJM to submit tariff provisions reflecting the minimum run-time rules and procedures for all resources.<sup>182</sup> Clean Energy Associations similarly argue that accepting the filing would alleviate the need for the Commission, PJM, and stakeholders to continue the paper hearing proceeding in Docket No. EL19-100-000.<sup>183</sup>

112. P3 argues that, of all potential methodologies to properly assess the capacity value of non-traditional resources, the ELCC construct is by far the best. However, because of the problems P3 identifies with PJM's filing,<sup>184</sup> P3 requests that the Commission hold the paper hearing in abeyance for as long as necessary for PJM to develop a complete and fully understood ELCC construct. P3 maintains that PJM can resolve the issues associated with its filing by providing more information and perhaps an amended filing. But, P3 urges, if the Commission rejects the filing, the Commission should allow ELCC discussions to continue and not resume the paper hearing.<sup>185</sup>

113. The IMM argues that PJM's ELCC methodology is an unacceptable alternative to the compliance filings PJM made following Order No. 841.<sup>186</sup> The IMM argues that the Commission should reject PJM's proposal, require PJM to implement its compliance filing in Docket No. ER20-584-000, and proceed with its investigation in Docket No. EL19-100-000. The IMM requests that, if the Commission does not reject PJM's filing, the Commission consolidate this proceeding with the paper hearing in Docket No. EL19-100-000. The IMM asserts that, by consolidating the proceedings, the

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<sup>182</sup> Joint PJM Members Comments at 3.

<sup>183</sup> Clean Energy Associations Comments at 2-3; *see* PJM December 2020 Answer at 3-5 (maintaining that approval of its filing may moot the Commission's investigation in Docket No. EL19-100).

<sup>184</sup> *See supra* P 59, 64 (Part IV.B.1.b).

<sup>185</sup> P3 Comments at 9.

<sup>186</sup> IMM Protest at 22-23.

Commission could evaluate the merits of the ELCC approach, order any necessary revisions, and consider the merits of other approaches.<sup>187</sup>

**b. Deficiency Letter Response and Pleadings**

114. ESA argues that the Commission should approve the filing in order to allow electric storage resources to fully participate in PJM's capacity market without further delay. ESA argues that, if the Commission fails to approve the filing, the investigation in Docket No. EL19-100-000 to address electric storage resource participation will remain unresolved after one and a half years.<sup>188</sup>

**c. Determination**

115. Because we reject PJM's filing on the basis that the transition mechanism is unjust, unreasonable, and unduly discriminatory, we lift the abeyance in Docket No. EL19-100-000 and restart the consolidated paper hearing procedures to evaluate the justness and reasonableness of PJM's capacity valuation rules, as filed in Docket No. ER20-584-000. Parties in Docket No. EL19-100-000 should address the following questions with specificity.

(1) PJM's compliance filing in Docket No. ER20-584-000 provides that:

Generating units with limited energy capability include, but are not limited to, Energy Storage Resources that receive energy from the grid and store the energy for later injection to the grid (e.g., pumped storage hydro units, compressed air energy storage units, flywheel energy storage units and battery storage units) and hydroelectric generating units with reservoir storage capability. The capability of generating units with limited energy capability is based on the sustained level of output that the unit can provide and maintain over a continuous ten-hour period with consideration given to conditions expected to exist at the time of PJM system peak load to the extent that such conditions impact such capability.<sup>189</sup>

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<sup>187</sup> IMM December 15, 2020 Answer at 2-4.

<sup>188</sup> ESA Answer at 2-5.

<sup>189</sup> December 2019 Filing, Proposed RAA, Sched. 9.C.ii.

Does this method of capacity valuation reflect PJM's current practices for these generating units? Explain whether and how this method of capacity valuation is just, reasonable, and not unduly discriminatory or preferential. To what extent does it align with the actual resource adequacy value of these generating units?

- (2) PJM's compliance filing in Docket No. ER20-584-000 also provides that:

Generating units with output that varies as a function of an energy source that is non-continuous and that cannot be directly controlled are unable to provide a stated level of output on demand and are unable to maintain a stated level of output for any specified period of time include, but are not limited to, wind units, solar units, run-of-river hydroelectric units (without reservoir storage capability) and landfill gas units (without alternate fuel capability). The capability of such generating units is based on the level of output that the unit is expected to be reliably producing as a function of its energy source at the time of system peak loads. Specifically, the capability of a wind or a solar generating unit is determined by the unit's average hourly MW output during 368 summer-period hours defined by hours ending 15, 16, 17 and 18 of each day of the months of June, July and August.<sup>190</sup>

Does this method of capacity valuation reflect PJM's current practices for these generating units? Explain whether and how this method of capacity valuation is just, reasonable, and not unduly discriminatory or preferential. To what extent does it align with the actual resource adequacy value of these generating units?

- (3) PJM's compliance filing in Docket No. ER20-584-000 also provides that:

For generating units having the ability to maintain output at stated capability continuously on a daily basis without interruption, the capability of the generating unit is based on the level of output that the unit can provide under the site conditions expected to exist at the time of PJM system peak load where such conditions include, but are not limited to, ambient air

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<sup>190</sup> *Id.*, Sched. 9.C.iii.

temperature, humidity, barometric pressure, intake water temperature, and cooling system performance. Generating units with the ability to operate continuously across all hours of an operating day without interruption if needed include, but are not limited to, nuclear and fossil-fired steam units, combined cycle units, combustion turbine units, reciprocating engine units, and fuel cell units.<sup>191</sup>

Does this method of capacity valuation reflect PJM's current practices for these generating units? Explain whether and how this method of capacity valuation is just, reasonable, and not unduly discriminatory or preferential. To what extent does it align with the actual resource adequacy value of these generating units?

- (4) Would PJM's ELCC proposal, absent the transition mechanism, be a just, reasonable, and not unduly discriminatory or preferential method to determine the capacity capability of Variable Resources, Limited Duration Resources, and Combination Resources? Please comment on modeling assumptions, reporting requirements, or any other aspects of the ELCC proposal.
- (5) Would an ELCC construct similar to PJM's proposal, absent the transition mechanism, that is limited to only a subset of resources, such as Limited Duration Resources, be just, reasonable, and not unduly discriminatory or preferential?

116. PJM must submit its initial brief in Docket No. EL19-100-000 on or before June 1, 2021. The deadline to file responses to PJM's initial brief will be June 22, 2021, and the deadline to file replies to those responses will be July 9, 2021.

117. If PJM seeks to file a revised ELCC proposal pursuant to FPA section 205 on or before June 1, 2021, then PJM may move to hold the paper hearing in abeyance, and must, in that event, file such motion on or before May 14, 2021.

118. Any future filings in the consolidated paper hearing procedures must be made in Docket Nos. EL19-100-000 and ER20-584-000.

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<sup>191</sup> *Id.*, Sched. 9.C.i.

## 5. Implementation Date

### a. Filing

119. In its October 30 Filing, PJM requests an effective date of June 1, 2021 for its substantive tariff revisions and proposes RAA language specifying that it will implement the ELCC construct beginning with the 2023/2024 Delivery Year. PJM states that, under an accelerated schedule, PJM requires five to six months from Commission approval to complete the review and validation of the ELCC model. PJM explains that, if the 2022/2023 BRA were scheduled in order to ensure the ELCC construct is in place, it would conflict with the Commission's stated desire to avoid further delay in holding the long-delayed 2022/2023 BRA, and subsequent delayed auctions. Thus, PJM states, prudence dictates applying the ELCC construct in the 2023/2024 BRA.<sup>192</sup>

### b. Pleadings

120. GlidePath supports the ELCC proposal as a replacement for the 10-hour rule but contends that PJM's proposed effective date and implementation timeline conflict with the Commission's "directive" in the April 2020 Order. Specifically, GlidePath asserts that PJM's proposal to implement the ELCC proposal beginning with the 2023/2024 BRA does not align with the Commission's directive to apply the new methodology to the "next capacity auction."<sup>193</sup> GlidePath states that not having the new methodology in place for the 2022/2023 BRA could have devastating effects for itself and similarly situated developers who have invested in projects in PJM's interconnection queue targeting the upcoming BRA. Glidepath emphasizes that two years have passed since stakeholders began to take issue with the 10-hour rule, which it alleges does not reflect the will of the PJM stakeholders and was never approved by the Commission. For this reason, GlidePath requests that the Commission direct PJM to apply the ELCC construct to the BRA for the 2022/2023 Delivery Year. Alternatively, GlidePath requests that the Commission direct PJM to apply the ELCC methodology to only Capacity Storage Resources in the upcoming auction; or clarify that the applicable capacity valuation construct for the upcoming auction is the "currently available Tariff construct" predicated on "average expected output during peak-hour periods."<sup>194</sup>

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<sup>192</sup> Transmittal at 61-63. PJM also assigned an effective date of January 1, 2021 to a title tariff record with no substantive changes. *Id.* at 61 n.138.

<sup>193</sup> GlidePath Comments at 1 n.2 (quoting April 10 Order, 171 FERC ¶ 61,015 at P 34).

<sup>194</sup> *Id.* at 12-15 (quoting Tariff, Attachment DD, § 5.6.1(h)).



121. In its December 2020 Answer, PJM argues that, contrary to GlidePath's claim, the Commission did not direct PJM to make its ELCC filing or issue any other directives requiring implementation of the ELCC proposal prior to the next BRA. PJM asserts that, as of the date of its answer, pre-auction activities have already begun for the 2022/2023 Delivery Year, and that, if made to comply with GlidePath's request, PJM would need to reset these activities.<sup>195</sup>

**c. Deficiency Letter Response**

122. In its Deficiency Letter Response, PJM requests an amended July 1, 2021 effective date for its substantive tariff revisions. PJM states that, at the time of submitting its October 30 Filing, the exact timeline for holding the 2023/2024 BRA was not known, but it is now known that the auction will be held in December 2021. Thus, PJM states an amended July 1, 2021 effective date is appropriate.<sup>196</sup>

**d. Determination**

123. We clarify that the April 10 Order did not direct PJM to implement its planned FPA section 205 proposal or any other rate change prior to the 2022/2023 BRA. Rather, the April 10 Order specified a shorter abeyance period than PJM initially proposed to increase the possibility that the Commission could approve new rules to take effect in advance of the next auction. Thus, PJM is under no obligation to implement a revised method for determining the capacity capability of Capacity Storage Resources, or any other resource type, prior to the next BRA. However, as discussed above, we have specified an expedient paper hearing schedule to investigate the justness and reasonableness of PJM's existing capacity valuation methods as soon as possible.

124. We also decline GlidePath's request to find that the applicable capacity valuation construct for Capacity Storage Resources for the upcoming auction is their "average expected output during peak-hour periods."<sup>197</sup> As PJM explained in the context of its Order No. 841 compliance filing, the Tariff specifies how Capacity Storage Resources' Sell Offers are determined, while the RAA specifies that the rules for determining resources' Installed Capacity shall be specified in the PJM Manuals.<sup>198</sup> In the April 10

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<sup>195</sup> PJM December 2020 Answer at 17.

<sup>196</sup> Deficiency Letter Response, Transmittal at 2. PJM also assigned an effective date of May 1, 2021 to a tariff record with no substantive changes. *Id.*

<sup>197</sup> Tariff, Attachment DD, § 5.6.1(h).

<sup>198</sup> See PJM, Answer, Docket No. ER19-469-000, at 14-18 (filed March 5, 2019) ("The cited Tariff section, therefore, permits those resources to base Capacity Performance offers on their average expected output during peak-hour periods, so long as

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Order, the Commission stated that it will not require PJM to alter its current practice before the resolution of this proceeding.<sup>199</sup>

The Commission orders:

(A) PJM's filing is hereby rejected, as discussed in the body of this order.

(B) The consolidated paper hearing procedures are hereby restarted in Docket Nos. EL19-100-000 and ER20-584-000 to evaluate the justness and reasonableness of PJM's capacity valuation rules, as filed in Docket No. ER20-584-000.

(C) PJM is hereby directed to submit its initial brief in Docket No. EL19-100-000 on or before June 1, 2021. The deadline to file responses to PJM's initial brief will be June 22, 2021, and the deadline to file replies to those responses will be July 9, 2021. If PJM wishes to file a revised ELCC proposal pursuant to FPA section 205 on or before June 1, 2021, then PJM may move to hold the paper hearing in abeyance, and must, in that event, file such motion on or before May 14, 2021.

(D) Any future filings in the consolidated paper hearing procedures must be submitted in Docket Nos. EL19-100-000 and ER20-584-000.

By the Commission. Commissioner Christie is concurring with a separate statement attached.

( S E A L )

Kimberly D. Bose,  
Secretary.

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the offer—per the other cited Tariff provisions on sell offers—does not exceed the [Installed Capacity] determined for that resource in accordance with the RAA.”).

<sup>199</sup> April 10 Order, 171 FERC ¶ 61,015 at P 34.

**Appendix A**

**Entities filing interventions, protests and/or comments, and answers are as follows:**

<b>Entity</b>	<b>Short Name or Acronym</b>
Advanced Energy Economy**±	
AES Solutions Management, LLC**±	
American Electric Power Service Corporation <sup>200</sup>	AEP
American Municipal Power, Inc.**	
American Clean Power Association**± <sup>201</sup>	
Avangrid Renewables, LLC*	
Boston Energy Trading and Marketing LLC*	
Brookfield Renewable Trading and Marketing LP	Brookfield
Calpine Corporation	Calpine
Citizens Utility Board**†	
The Dayton Power and Light Company**	
Delaware Division of the Public Advocate/Public Advocate for the State of Delaware**	
Dominion Energy Services, Inc.	Dominion
Duke Energy Corporation	Duke
Electric Power Supply Association*	
ENEL NORTH AMERICA, INC.**	
Energy Storage Association**±	ESA
Exelon Corporation**	
Geenex Solar LLC**†±	
GlidePath Development LLC	GlidePath
Illinois Commerce Commission*	

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<sup>200</sup> AEP moves to intervene on behalf of its affiliates Appalachian Power Company, Indiana Michigan Power Company, Kentucky Power Company, Kingsport Power Company, Ohio Power Company, Wheeling Power Company, and AEP Energy Partners, Inc.

<sup>201</sup> The American Clean Power Association originally intervened under the name American Wind Energy Association, and then filed notice that it merged into the newly created American Clean Power Association, effective January 1, 2021.

Monitoring Analytics, LLC, acting in its capacity as the Independent Market Monitor for PJM±	IMM
Invenergy L.L.C.**†±	
J-POWER USA Development Co., Ltd.*	
Leeward Renewable Energy, LLC*	
Lightsource Renewable Energy Operations, LLC*	Lightsource
LS Power Associates, L.P.	LS Power
Maryland Office of People's Counsel*	
Maryland Public Service Commission*	
Modern Energy Resources, LLC**±	
National Hydropower Association	NHA
Natural Resources Defense Council**±	
New York Transmission Owners, et. al.* <sup>202</sup>	
NextEra Energy Resources, LLC**	
North Carolina Electric Membership Corporation*	
NRG Power Marketing LLC and Midwest Generation, LLC*	
Office of the People's Counsel for the District of Columbia**	
Ohio Federal Energy Advocate*	
Old Dominion Electric Cooperative*	
Organization of PJM States, Inc.*	
PJM Industrial Customer Coalition**	
PJM Power Providers Group	P3
Public Power Association of New Jersey**†	
Rockland Electric Company*	
Savion, LLC**†±	
Shell Energy North America (US) L.P.**	
Sierra Club**±	
The Solar Council**†±	
Solar Energy Industries Association**±	
Southern Maryland Electric Cooperative, Inc.*	
Sustainable FERC Project**±	
Tangent Energy Solutions, Inc.**±	

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<sup>202</sup> New York Transmission Owners include Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New York, Inc., Long Island Power Authority, New York Power Authority, New York State Electric & Gas Corporation, Niagara Mohawk Power Corporation d/b/a National Grid, Orange and Rockland Utilities, Inc., and Rochester Gas and Electric Corporation.

Tangibl Group Inc.**†±	
Tesla, Inc.**†±	
Union of Concerned Scientists**±	
Vistra Corp. and Dynegy Marketing and Trade, LLC*	

\* Entities submitting interventions only

\*\* Entities submitting comments or answers as part of a coalition

± Entities submitting answers

† Entities submitting comments and no motion to intervene

### **List of Coalitions' Individual Members:**

Clean Energy Associations: American Clean Power Association, Solar Energy Industries Association, Energy Storage Association, Advanced Energy Economy, and the Solar Council.

Joint Consumer Advocates: Office of the People's Counsel for the District of Columbia, Citizens Utility Board, and Delaware Division of the Public Advocate.

Joint PJM Members: American Municipal Power, Inc., The Dayton Power and Light Company, ENEL NORTH AMERICA, INC., Exelon Corporation, Invenergy L.L.C., Modern Energy Resources, NextEra Energy Resources, LLC, Office of the People's Counsel for the District of Columbia, PJM Industrial Customer Coalition, Public Advocate for the State of Delaware, Public Power Association of New Jersey, and Shell Energy North America (US), L.P.

Joint Stakeholders: Enel North America, Geenex Solar LLC, Invenergy L.L.C., Modern Energy Resources, Savion, LLC, Tangibl Group Inc., Tangent Energy Solutions, Inc., Tesla, Inc., and AES Solutions Management, LLC.

Public Interest Organizations: Sustainable FERC Project, Natural Resources Defense Council, Union of Concerned Scientists, and Sierra Club.

UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C

Docket No. ER21-278-001  
ER20-584-000  
EL19-100-000  
(consolidated)

(Issued April 30, 2021)

CHRISTIE, Commissioner, *concurring*:

1. I agree that what is termed the ELCC “transition mechanism” is unjust, unreasonable and unduly discriminatory or preferential. While today’s order makes clear that the Commission rejects the entirety of PJM’s ELCC proposal, it also suggests that the rest of PJM’s proposal “appears” to be a just and reasonable approach to determining the accredited capacity value.<sup>1</sup> While the current ELCC proposal without the “transition mechanism” may have met the standard for approval under FPA section 205,<sup>2</sup> since the Commission rejects the entire proposal here any future decision will be made when and if a revised ELCC proposal is again before the Commission. Given that there will now be an opportunity for further comment and possible refinement of the ELCC construct, I offer the following.

2. It is absolutely essential that RTO/ISO capacity markets value and compensate capacity resources as accurately as practicable, for two primary reasons: First, reliability depends on it, and second, consumers should only pay for capacity that actually performs when needed. That was an oft-heard theme of the Commission’s recent technical conference on resource adequacy in RTOs/ISOs with capacity markets.<sup>3</sup>

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<sup>1</sup> *PJM Interconnection, L.L.C.*, 175 FERC ¶ 61,084, at P 17 (2021).

<sup>2</sup> *PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,210, at 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.”).

<sup>3</sup> *See, e.g., Technical Conference regarding Resource Adequacy in the Evolving Electricity Sector*, Docket No. AD21-10-000 (Mar. 23, 2021) (Technical Conference), Tr. 263:15-19 (“Keep the lights on, while at the same time not undermining individual state

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3. Further, this issue is closely related to the current discussion over the Minimum Offer Price Rule (MOPR) in capacity markets; for another common theme at the aforementioned Technical Conference was that, whatever your opinion on MOPR, the rationale for the MOPR construct may be significantly diminished if — *a big “if”* — capacity resources are accurately valued and compensated in capacity markets based on their actual performance.<sup>4</sup>

4. With that in mind, I believe that PJM’s current ELCC proposal, while an improvement over the *status quo*, can and will be improved. I hope that parties will use the opportunities provided by today’s order to offer additional comment on how the ELCC construct can be made more accurate, including particularly addressing any necessary *post hoc* reporting requirements that detail actual performance versus the *ex ante* ELCC values, how such data can and will be used to adjust values, and the

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preferences. The key to it is appropriately evaluating resources based on their capacity contributions and capabilities.”) (Conway); Tr. 108:25-109:1 (“Efficient capacity accreditation is something that would really facilitate the policy objectives.”) (LeeVanSchaick); ISO-New England Mar. 19, 2021 Pre-Technical Conference Statement at 3 (“The next step in the evolution includes a project to revise the capacity accreditation of various resource types, which may require modifications to capacity clearing and qualification procedures *to ensure we are not crediting resources for more than their actual reliability benefit to consumers.*”) (emphasis added); Tr. 242:1-7 (“The type of generation or resource technology that a state wants to deploy or retain demonstrates its ability to meet demand consistently and when most needed. And that type of resource should be able to participate and compete for capacity revenue in the PJM capacity market, but *only to the extent that it actually provides capacity performance and no more.*”) (emphasis added) (Conway).

<sup>4</sup> See, e.g., Technical Conference Tr. 146:21-147:10 (“it’s not as simple as eliminating the MOPR or keeping the MOPR. . . . [F]irst off you need to define what your requirements [for] reliability are, and you need to revisit that on a regular basis. . . . [A]nd then it’s putting the right value on those different elements to make sure that the consumers are protected, and those resources are compensated appropriately.”) (Dewey); Tr. 264:21-265:1 (“I don’t think that removing the current expanded MOPR in PJM and replacing it with a targeted MOPR like the prior MOPR, would result in improper cost shifting as long as the state policy preferred resources are *appropriately valued, based on their capacity contributions and capabilities.*”) (Conway) (emphasis added).

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functioning of performance penalties to ensure consumers are not forced to pay for capacity that turned out to be over-valued by the ELCC formula in actual performance.<sup>5</sup>

5. PJM also now has the opportunity to address these issues in any future ELCC proposal.

For these reasons, I respectfully concur.

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Mark C. Christie  
Commissioner

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<sup>5</sup> Moreover, 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. Independent Market Monitor for PJM 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.”); *see also, 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.”).



Document Content(s)

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