



June 22, 2021

Via Electronic Filing

The Honorable Kimberly D. Bose  
Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E. Room 1A  
Washington, D.C. 20426

Re: *PJM Interconnection L.L.C., Docket No. ER21-2043-000*  
*Updated Effective Load Carrying Capability Construct*

Dear Secretary Bose,

Enclosed for filing in the above-referenced proceeding, please find the Comments of the Public Interest Organizations. As indicated by the attached certificate of service, all parties to the proceeding are being served with a copy of this document. Should you have any questions, please do not hesitate to contact me. Thank you.

Sincerely,

*/s/ Devin McDougall* \_\_\_\_\_

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

**PJM Interconnection, L.L.C.**

)  
)

**Docket No.**

**ER21-2043-000**

**COMMENTS OF THE PUBLIC INTEREST ORGANIZATIONS**

## **I. INTRODUCTION**

Pursuant to Rule 211 of the Federal Energy Regulatory Commission’s (the “Commission” or “FERC”) Rules of Practice and Procedure,<sup>1</sup> the Sustainable FERC Project, Natural Resources Defense Council, Union of Concerned Scientists, and Sierra Club (collectively, the “Public Interest Organizations” or “PIOs”) respectfully submit these comments (“Comments”) in support of the June 1, 2021 proposed revisions to the Reliability Assurance Agreement Among Load-Serving Entities in the PJM Region (“RAA”) and PJM’s Open Access Transmission Tariff (“Tariff”) filed by PJM Interconnection, L.L.C. (“PJM”) in the above-captioned docket (the “ELCC Filing”).<sup>2</sup>

The purpose of PJM’s ELCC Filing is to make changes necessary to create and implement an Effective Load Carrying Capacity (“ELCC”) construct for determining the amount of capacity that variable resources (such as wind and solar), limited duration resources (such as energy storage, or “ESRs”), and hybrid resources (such as combined solar and energy storage) (collectively, the “ELCC Resources”) can offer in PJM’s Reliability Pricing Model (“RPM”) capacity market. As explained in greater depth herein, the PIOs strongly support PJM’s ELCC Filing and urge the Commission to approve it. The PIOs support the PJM effort to clarify expectations and incentives for investments in ELCC Resources by establishing how their capacity value that may be offered in PJM’s capacity market will be calculated.

## **II. BACKGROUND**

On October 30, 2020, PJM Interconnection, LLC (“PJM”) filed in Docket No. ER21-278-000 a set of revisions to the PJM Open Access Transmission Tariff and the Reliability Assurance Agreement among Load Serving Entities in the PJM Region (the “Initial ELCC Filing”). These

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<sup>1</sup> 18 C.F.R. § 385.211.

<sup>2</sup> PJM ELCC Filing, Accession No. 20210601-5065 (Jun. 1, 2021) (“Revised ELCC Filing”).

revisions were designed to implement an ELCC construct to determine the relative amount of capacity that variable, limited duration, and hybrid resources may offer to provide in PJM's capacity market.<sup>3</sup> On November 11, 2020, the PIOs filed comments on the Initial ELCC Filing (the "November ELCC Comments").<sup>4</sup> In these comments, the PIOs stated that: (1) the ELCC approach to capacity valuation is just and reasonable as a methodology; (2) PJM's proposed implementation of ELCC is just and reasonable; and (3) PJM should conform its interconnection procedures to be consistent with its ELCC proposal and its tariff.<sup>5</sup>

On December 11, 2020, the PIOs filed a motion for leave to answer and answer in reply to some of the comments and protests filed in response to Initial ELCC Filing (the "December ELCC Answer").<sup>6</sup> In the December ELCC Answer, the PIOs stated that: (1) PJM's ELCC proposal is, taken as a whole, just and reasonable; (2) PJM's proposed implementation of ELCC modeling is just and reasonable; (3) PJM's approach to ELCC auction mechanics is reasonable and consistent with existing practice; and (4) PJM's ELCC proposal reasonably models energy storage.<sup>7</sup>

On December 22, 2020, the Commission filed a letter informing PJM that the Initial ELCC Filing is deficient and requested additional information.<sup>8</sup> On March 1, 2021, PJM filed a response to the Deficiency Letter (the "PJM Response").<sup>9</sup> The PJM Response contained both additional information and amendments to the tariff revisions proposed in the Initial ELCC Filing.<sup>10</sup> On March 22, 2021, the PIOs filed comments in support of the Initial ELCC Filing and

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<sup>3</sup> ELCC 205 Filing, Accession No. 20201030-5238 (Oct. 30, 2020) ("Initial ELCC Filing").

<sup>4</sup> Comments of the PIOs, Accession No. 20201120-5261 (Nov. 20, 2020) ("November ELCC Comments").

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

<sup>6</sup> Mot. for Leave to Answer and Answer of the PIOs, Accession No. 20201211-5175 (Dec. 11, 2020) ("December ELCC Answer").

<sup>7</sup> *Id.*

<sup>8</sup> Deficiency Letter, Docket No. ER21-278 (Dec. 22, 2020) ("Deficiency Letter").

<sup>9</sup> PJM Resp. to Comm'n Deficiency Letter, Accession No. 20201222-3043 (Mar. 1, 2021) ("PJM Response").

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

the PJM Response, reiterating and amplifying their prior comments in support of the Initial ELCC Filing.<sup>11</sup> On April 30, 2021, the Commission issued an order rejecting the Initial ELCC Filing and providing for PJM to submit a revised ELCC filing by June 1, 2021.<sup>12</sup> On June 1, 2021, PJM submitted a revised ELCC filing (the “Revised ELCC Filing”) in the above-captioned docket, Docket No. ER21-2043-000.

### **III. COMMENTS**

#### **A. PJM’s Revised ELCC Filing Remains a Just and Reasonable Approach to Determining the Capacity Contributions of the ELCC Resources**

The core of the Revised ELCC Filing is a methodology that determines the reliability value of various technologies, and thus the amount of capacity they may offer into PJM’s capacity market. These aspects of the Revised ELCC Filing are identical<sup>13</sup> to the Initial ELCC Filing<sup>14</sup> filed by PJM on October 30, 2020. The Commission rejected the Initial ELCC Filing due to flaws in a transition mechanism.<sup>15</sup> However, in the Rejection Order, the Commission noted that “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.”<sup>16</sup>

The PIOs have previously filed three sets of extensive comments supporting the ELCC methodology,<sup>17</sup> which are attached hereto as Exhibits and are fully incorporated into these comments as they directly address relevant questions of ELCC methodology. These prior

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<sup>11</sup> Comments of the PIOs, Accession No. 20210322-5266 (Mar. 22, 2021) (“March ELCC Comments”).

<sup>12</sup> *Order Rejecting Proposed Tariff Revisions, Lifting Paper Hearing Abeyance, and Establishing Briefing Schedule*, Docket ER21-278-000 (April 30, 2021) (“Rejection Order”) at 17.

<sup>13</sup> Revised ELCC Filing at 2.

<sup>14</sup> Initial ELCC Filing.

<sup>15</sup> Rejection Order at 17.

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

<sup>17</sup> See November ELCC Comments (Exhibit A); December ELCC Comments (Exhibit B); and March ELCC Comments (Exhibit C).

comments were silent on the transition mechanism, but they provided detailed evidence supporting the conclusion that an ELCC approach in general is a just and reasonable method of determining capacity valuation, that PJM's specific implementation of ELCC was faithful and reasonably accurate, and that the proposed approach would correct an unjust and unreasonable status quo.<sup>18</sup> We reiterate and amplify those arguments in the remainder of this section.

PJM's proposed implementation of ELCC in the Revised ELCC Filing makes use of data inputs that will contribute to ensuring accurate modeling in three key ways. First, PJM will develop a probabilistic projection of summer and winter load profiles using a range of potential future hourly loads derived from actual weather patterns of previous years; it will simulate the hourly output of each resource category using the same range of weather and other variables, to derive a series of resource-specific availability/unavailability patterns; and then it will simulate economic dispatch following conservative principles that simulate how resources will be used in practice.<sup>19</sup> Because both load patterns and generator output derive from a common set of weather data, PJM's approach captures the correlations between weather, load, and generator performance.

Second, PJM's Revised ELCC Filing will reasonably implement the modeling of interactivity and synergistic effects between resources that is core to the ELCC methodology. The proposed process does not treat different generation or generation categories units in isolation, but models and values the ability of the entire projected generation fleet when determining their potential capacity values. This interactivity is important to modeling reliability as the resource mix changes to include more wind, solar, energy storage, and hybrid facilities.

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<sup>18</sup> See November ELCC Comments at 6-18.

<sup>19</sup> Revised ELCC Filing at 25-26

Third, the Revised ELCC Filing corrects flawed treatment of storage and hybrid resources. The status quo values storage resources using a “minimum run-time” rule and has no provisions for hybrid resources. Those rules established a practice of using a 10-hr requirement for storage and the storage component of hybrid plants, while treating the non-storage component (generally wind or solar) of hybrid plants as a separate resource. PIOs and others have argued that the 10-hour requirement unreasonably undervalued storage resources.<sup>20</sup> This approach also unduly discriminatory to hybrids: PJM long-ago decided that it would treat of natural gas combined cycle plants with a combination of generating units that have different abilities as a single unit for evaluation and participation in the capacity market.

The Commission Staff, in recent a White Paper on hybrid resources,<sup>21</sup> commented on this failing of that system:

[W]hile each RTO/ISO that submitted post-conference comments notes that co-located hybrid and integrated hybrid resources could currently participate in its markets in some form, current market rules may not always recognize the full value of co-located and integrated hybrid resources.<sup>22</sup>

And following a discussion of the status of ELCC efforts in several RTOs, the White Paper continued:

There is no current consensus about the best way to model capacity accreditation for co-located hybrid or integrated hybrid resources, other than the fact that the current methods are unlikely to reflect these resources’ full value, and it will take further operational experience to determine the best methods.<sup>23</sup>

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<sup>20</sup> See, e.g., November ELCC Comments at 3.

<sup>21</sup> *Hybrid Resources White Paper*, Docket No. AD20-9-000, available at <https://www.ferc.gov/media/hybrid-resources-white-paper> (“Hybrid Resources White Paper”).

<sup>22</sup> *Hybrid Resources White Paper* at 30.

<sup>23</sup> *Hybrid Resources White Paper* at 35.

The Revised ELCC Filing addresses both of these issues. It reasonably accurately models the reliability value of storage resources,<sup>24</sup> and contains provisions for specific modeling of a new Complex Hybrid Class.<sup>25</sup>

#### B. The Revised ELCC Filing Corrects the Deficiencies that Caused FERC to Reject the Initial ELCC Filing

The Commission rejected the Initial ELCC Filing largely due to a transition mechanism that would have protected some ELCC Resources from future lower ELCC values.<sup>26</sup> The Commission also noted that “the Commission’s rule of reason policy would likely require PJM to include the definitions of the ELCC Classes in the RAA”<sup>27</sup> The current filing address both of these flaws.

First, the transition mechanism is simply removed.<sup>28</sup> The Initial ELCC Filing included a transition mechanism would have discounted future new entrant’s capacity value in order to value incumbent resources above their actual capacity value. The Commission found this treatment unduly discriminatory.<sup>29</sup> PJM’s Revised ELCC Filing corrects this by simply removing the transition mechanism entirely.<sup>30</sup> With the transition mechanism gone similarly situated resources now receive equal treatment, completely remedying the undue discrimination flaw that led to the Initial ELCC Filing’s rejection.

In response to the Commissions note that the rule of reason likely requires the ELCC definitions to be incorporated in the RAA, PJM has submitted tariff language<sup>31</sup> defining a number of ELCC Classes. These classes are based on technology and operational resources, and

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<sup>24</sup> See November ELCC Comments at 13-15.

<sup>25</sup> Revised ELCC Filing at 48-51.

<sup>26</sup> Rejection Order at 104.

<sup>27</sup> *Id.* at 66.

<sup>29</sup> Rejection Order at 108.

<sup>29</sup> Rejection Order at 108.

<sup>30</sup> Revised ELCC Filing at 2.

<sup>31</sup> Proposed RAA, Article 1 and Schedule 9.1, Section B.



so place the practice of categorizing most resources for purposes of ELCC analysis on file with the Commission. The Revised ELCC Filing also includes detailed provisions for creating new Combination Resource ELCC Classes.<sup>32</sup> Given the rapid pace of technological development and large number of permutations of possible resource combinations, the universe of possible combination resources is not “reasonably *susceptible* of specification,”<sup>33</sup> making it appropriate for PJM to not place these provisions on file with the Commission.

Finally, even though the Commission was not persuaded by arguments that “the inability [of third parties] to precisely reproduce PJM’s determination of ELCC Class Ratings and Accredited UCAP values would necessarily render the proposal unjust and unreasonable,”<sup>34</sup> the Revised ELCC Filing contains additional measures to provide transparency. PJM states that it “plans to post a model and sufficient data by which parties may replicate PJM’s results with reasonable accuracy.”<sup>35</sup> While participating in the development of PJM’s ELCC rules, PIOs have found data provided by PJM sufficient for and other stakeholders to engage in meaningful and productive technical discussion. Based on this experience, we believe the data PJM proposes to provide is sufficient to allow a just and reasonable level of independent review and stakeholder participation.

### C. Regarding Concerns Raised by Commissioner Christie in his Concurrence

In his Concurrence to the Rejection Order, Commissioner Christie raises several issues regarding ELCC for further consideration: capacity valuations and compensation must be accurate; and compensation should consider *post hoc* performance. The PIOs believe PJM’s

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<sup>32</sup> Revised ELCC Filing at 32.

<sup>33</sup> Rejection Order at n111, citing *City of Cleveland, Ohio v. F.E.R.C.*, 773 F.2d 1368, 1376 (D.C. Cir. 1985).

<sup>34</sup> *Id.* at 67

<sup>35</sup> Revised ELCC Filing at 57-61.

Revised ELCC Filing just and reasonably addresses each of these concerns, as discussed briefly here.

The PIOs entirely agree with Commissioner Christie that “it is absolutely essential”<sup>36</sup> to accurately value all resources in a capacity market. Considering this point requires grappling with an uncomfortable truth: reliability is a statistical exercise, always has been, and always will be. For many decades, the industry’s basic paradigm for resource adequacy has been to match a large fleet of individually unreliable resources to only partially predictable load so that the expected frequency (and sometimes extent or duration) of outages meets policy makers requirements.

ELCC is firmly embedded in this paradigm. As explained at length in PJM’s Revised ELCC Filing<sup>37</sup> and Dr. Rocha Garrido’s Affidavit,<sup>38</sup> the purpose of ELCC is to calculate the amounts of various technologies that bring equivalent reliability benefits. PJM’s proposed ELCC implementation represents a best-faith expert implementation of a model widely regarded as standard practice for determining the equivalent resource adequacy value of various technologies. Thus, absent specific flaws in PJM’s approach (such as the now-removed floor mechanism), PIOs do not see any risk of PJM’s Revised ELCC Filing creating a situation where resources are credited for more than their actual reliability benefit. On the contrary, PJM’s proposal in the Revised ELCC Filing fulfills the need for efficient and accurate capacity accreditation that is needed to cost-effectively maintain reliability with a rapidly changing resource mix.

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<sup>36</sup> Rejection Order at 54.

<sup>37</sup> See, e.g., Revised ELCC Filing at 9-11.

<sup>38</sup> *Affidavit of Dr. Patricio Rocha Garrido on Behalf of PJM Interconnection, L.L.C.*, Attachment C to Revised ELCC Filing.

In response to comments that have been submitted connecting this ELCC evaluation to the ongoing proceeding around PJM’s Minimum Offer Price Rule (“MOPR”), we respectfully suggest the Commissioner may have been led astray by inaccurate testimony. To be absolutely clear, the purpose of the MOPR was never to ‘protect reliability against renewables’—such arguments appear nowhere in either of the Commission’s MOPR orders. Identifying and implementing an accurate ELCC is the first step to getting an accurate valuation of what capacity is available, and should be considered a fundamental building block for PJM to design an accurate market. This makes it all the more important for the Commission to approve PJM’s filing that fairly credits the capacity offerings of ELCC Resources.

Commissioner Christie’s concerns highlight another important point: ELCC is already a stricter capacity valuation than the forced outage-based method used for thermal resources, as ELCC considers the effects of RTO-wide phenomena such as correlated outages, or outages correlated with times of high load. As recent events in ERCOT have shown, multiple simultaneous outages within the gas fleet are arguably the greatest current threat to resource adequacy, especially when those outages correspond to times of high demand.

This suggests that the ELCC approach should be applied to additional resource types, especially gas-fired units with common fuel supply vulnerabilities. Failing to do so risks exactly the type of “customers paying for reliability they aren’t getting” outcomes noted in Comm. Christie’s concurrence. The PIOs understand that PJM will consider this issue as part of its upcoming Phase 2 Capacity Market review, and support an outcome that results in accurate capacity valuation for all resource types.

Additionally, Commissioner Christie also raises concerns that capacity payments must be based on actual performance. We agree, while noting that this goal must be implemented without

undue discrimination and in a manner that respects the statistical nature of capacity markets. PJM's capacity is rife with indulgences for traditional generation. This is dramatically apparent in the results of the one large Capacity Performance event under current rules, where an average of 10,457MW of resources failed to deliver, but 8,347MW were excused from penalty for various reasons.<sup>39</sup> We submit that reform of capacity performance requirements must be systematic; any attempt to 'crack down' on performance concerns specific to ELCC resources while maintaining a system that excuses 80% of the failures of traditional generation would be unduly discriminatory.

Finally, PJM's Revised ELCC Filing incorporates several *post hoc* adjustments. First, ELCC resources are still subject to Capacity Performance penalties, an arrangement that if anything overpenalizes the ELCC resources.<sup>40</sup> Additionally, Portfolio, Class, and individual ELCCs are recalculated every year,<sup>41</sup> meaning that a resource that fails to perform will quickly see its capacity value diminish. In combination, these two features provide assurance that consumers will not be 'paying for capacity they do not receive.'

#### **IV. CONCLUSION**

For the reasons explained in these Comments and the attached Exhibits, the PIOs respectfully request that the Commission approve PJM's Revised ELCC Filing.

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<sup>39</sup> *A Review of the October 2019 Performance Assessment Event* (April 7, 2020) at 31-35, available at <https://www.pjm.com/-/media/markets-ops/rpm/review-of-october-2019-performance-assessment-event.ashx>.

<sup>40</sup> For example, the ELCC of a solar resource is calculated in full awareness that the sun goes down at night. Solar resource owners also take on the risk of their ELCC dropping as daytime reliability concerns ease. Given that solar is essentially providing "daytime capacity", it is unclear to us what purpose is served by penalizing them during times when they were known not to be able to perform, and for which their UCAP was already discounted.

<sup>41</sup> Revised ELCC Filing at 42-48.

June 22, 2021

Respectfully submitted,

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## CERTIFICATE OF SERVICE

I hereby certify that the foregoing has been served in accordance with 18 C.F.R. § 385.2010 upon each party designated on the official service list in this proceeding, by email.

Dated: June 22, 2021

*/s/ Devin McDougall*

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The Honorable Kimberly D. Bose  
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*Effective Load Carrying Capability Construct*

Dear Secretary Bose,

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Sincerely,

/s/ Devin McDougall

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## I. INTRODUCTION

Pursuant to Rule 211 of the Federal Energy Regulatory Commission's (the "Commission" or "FERC") Rules of Practice and Procedure,<sup>1</sup> the Sustainable FERC Project, Natural Resources Defense Council, Union of Concerned Scientists, and Sierra Club (collectively, the "Public Interest Organizations" or "PIOs") respectfully submit these comments ("Comments") in support of the proposed revisions to the Reliability Assurance Agreement Among Load-Serving Entities in the PJM Region ("RAA") and PJM's Open Access Transmission Tariff ("Tariff") filed by PJM Interconnection, L.L.C. ("PJM") in the above-captioned docket (the "ELCC Filing").<sup>2</sup>

The purpose of PJM's ELCC Filing is to make changes necessary to create and implement an Effective Load Carrying Capacity ("ELCC") construct (the "ELCC Proposal") for determining the amount of capacity that variable resources (such as wind and solar), limited duration resources (such as energy storage, or "ESRs"), and hybrid resources (such as combined solar and energy storage) (collectively, the "ELCC Resources") can offer in PJM's Reliability Pricing Model ("RPM") capacity market.

As explained in greater depth herein, the PIOs strongly support PJM's ELCC Filing and urge the Commission to approve it. First, the ELCC methodology for capacity valuation is just and reasonable, and represents an industry standard for modeling the interactive nature of resources on an evolving grid. Second, PJM's ELCC Proposal is just and reasonable because it accurately models the capacity contributions of the ELCC Resources and corrects important

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<sup>1</sup> 18 C.F.R. § 385.211.

<sup>2</sup> The RAA and the Tariff can be found in PJM's "Intra-PJM Tariffs" eTariff title. *See* PJM, *Intra-PJM Tariffs*, <https://etariff.ferc.gov/TariffBrowser.aspx?tid=1731>. Terms not otherwise defined herein shall have the same meaning as set forth in the RAA, Tariff, and the Amended and Restated Operating Agreement of PJM ("Operating Agreement").

flaws in PJM's current capacity valuation system, including the dramatic undervaluation of ESRs.

## II. PROCEDURAL BACKGROUND

### A. PJM's Order 841 Compliance Process

The impetus for PJM's ELCC Filing originates from PJM's compliance process pursuant to Order No. 841,<sup>3</sup> which requires the removal of barriers to the participation of electric storage resources in FERC-jurisdictional markets.<sup>4</sup> Order No. 841 directs Regional Transmission Organizations ("RTOs") and Independent System Operators ("ISOs") to create a participation model for electric storage resources that will "remove barriers to the participation of [ESRs] in the capacity, energy, and ancillary service markets."<sup>5</sup> In March 2018, numerous parties filed requests for rehearing and motions for clarification.<sup>6</sup> On May 16, 2019, the Commission issued Order No. 841-A, which clarified the requirements of Order No. 841.<sup>7</sup>

On December 3, 2018, PJM filed two Order No. 841 compliance filings containing proposed revisions to its tariffs. First, PJM submitted a proposed set of changes to its resource

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<sup>3</sup> *Elec. Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 162 FERC ¶ 61,127 (Feb. 15, 2018) ("Order No. 841"), *order on reh'g*, 167 FERC ¶ 61,154 (May 16, 2019) ("Order No. 841-A"), *aff'd sub nom Nat'l Ass'n of Regul. Util. Comm'rs v. FERC*, 964 F.3d 1177 (D.C. Cir. 2020).

<sup>4</sup> Order No. 841 defines an electric storage resource as "a resource capable of receiving electric energy from the grid and storing it for later injection of electric energy back to the grid." Order No. 841 at P 29. PJM has adopted essentially identical language as its definition of "energy storage resource." *Order No. 841 Compliance Filing – ESR Accounting Proposal*, at 7, Docket No. ER19-462-000 (Dec. 3, 2018) (defining "Energy Storage Resource" as "a resource capable of receiving electric energy from the grid and storing it for later injection to the grid that participates in the PJM Energy, Capacity and/or Ancillary Services markets as a Market Participant.") ("ESR Accounting Model Filing"). Where these Comments refer to ESRs, the intended reference is to Energy Storage Resources as defined by PJM in its tariff.

<sup>5</sup> Order No. 841-A.

<sup>6</sup> *See e.g., Mot. for Clarification of PJM*, Docket Nos. RM16-23 and AD16-20 (Mar. 16, 2018); *Req. for Clarification and Reh'g of the Nat'l Ass'n of Regulatory Utility Comm'rs*, Docket Nos. RM16-23 and AD16-20 (Mar. 19, 2018); *Mot. for Clarification and Req. for Reh'g of the AES Companies*, Docket Nos. RM16-23 and AD16-20 (Mar. 16, 2018).

<sup>7</sup> Order No. 841-A.

definitions and accounting procedures, in order to facilitate accounting for energy sold to ESRs, docketed at ER19-462.<sup>8</sup> Second, PJM submitted a proposed set of changes to its market rules to create a participation model for ESRs in all of its markets (the “ESR Participation Model Filing”), docketed at Docket No. ER19-469.<sup>9</sup>

On February 1, 2019, the Commission approved PJM’s ESR Accounting Model Filing.<sup>10</sup> On February 7, 2019, numerous parties, including the PIOs, filed comments on PJM’s ESR Participation Model Filing.<sup>11</sup> The PIOs’ comments raised numerous issues, including the assertion by PJM in its transmittal letter for its ESR Participation Model Filing that ESRs would be subject to a ten-hour minimum run-time requirement (the “10 Hour Rule”) in order to participate in PJM’s capacity market, for which PJM relied upon a new interpretation of language from a business manual but not any filed tariff language.<sup>12</sup> The PIOs objected that such a 10 Hour Rule would be unjust and unreasonable, and that it would need in any event to be introduced via filed tariff language rather than the announcement of a new interpretation of a business manual.<sup>13</sup>

On April 1, 2019, the Commission submitted a request to PJM for more information in connection with its ESR Participation Model Filing.<sup>14</sup> On May 1, 2019, PJM submitted its response, which included an amended compliance filing.<sup>15</sup> On October 17, 2019, the

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<sup>8</sup> ESR Accounting Model Filing.

<sup>9</sup> *Order No. 841 Compliance Filing, ESR Markets and Operations Proposal*, Docket No. ER-19-469-000 (Dec. 3, 2018).

<sup>10</sup> *PJM*, 166 FERC ¶ 61,087 (Feb. 1, 2019).

<sup>11</sup> *Protest and Comments of PIOs*, Docket No. ER19-469 (Feb. 7, 2019) (“PIO Comments”); *Protest of the American Wind Energy Ass’n and the Solar Council*, Docket No. ER19-469 (Feb. 7, 2019); *Comments of Advanced Energy Economy*, Docket No. ER19-469 (Feb. 7, 2019); *Protest and Comments of the Energy Storage Ass’n*, Docket No. ER19-469 (Feb. 7, 2019) (“ESA Comments”).

<sup>12</sup> PIO Comments at 6–7.

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

<sup>14</sup> *Compliance Filing for Order No. 841*, Docket No. ER-19-469-000 (Apr. 1, 2019).

<sup>15</sup> *Response to April 1, 2019 Request for Additional Information*, Docket No. ER-19-469-000 (May 1, 2019).

Commission issued an order approving PJM's ESR Participation Model Filing as satisfying Order 841's requirements, subject to certain modifications.<sup>16</sup>

### **B. The Commission's Section 206 Investigation**

The Commission's October 2019 Order also addressed matters beyond the scope of Order 841. The October 2019 Order found that the question of whether or not the 10 Hour Rule would be just and reasonable was outside the scope of Order 841.<sup>17</sup> However, the Commission agreed with the PIOs and other commenters that PJM's minimum run-time requirement must be contained under filed tariff language, rather than business manuals, pursuant to the Commission's "rule of reason policy," under which provisions that "significantly affect rates, terms, and conditions' of service" must be included in a filed tariff.<sup>18</sup>

Consequently, the Commission directed PJM to file tariff language covering the minimum run-time rules for all resources.<sup>19</sup> The Commission also found that "the record in this proceeding raises concerns that PJM's application of its minimum run-time rules and procedures to [ESRs] may be unjust, unreasonable, unduly discriminatory or preferential."<sup>20</sup> Accordingly, the Commission initiated, pursuant to Section 206 of the Federal Power Act, a paper hearing in Docket No. EL19-100 to determine whether or not PJM's minimum run-time rules are unjust, unreasonable, unduly discriminatory or preferential as applied to ESRs.<sup>21</sup> The Commission set a deadline of December 12, 2019 for PJM to file the requested tariff language and for parties to submit briefing on the application of PJM's minimum run-time rules to ESRs.<sup>22</sup>

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<sup>16</sup> *PJM*, 169 FERC ¶ 61,049 (Oct. 17, 2019) ("October 2019 Order").

<sup>17</sup> *Id.* at P 139.

<sup>18</sup> *Id.* at P 140.

<sup>19</sup> *Id.*

<sup>20</sup> *Id.* at P 141.

<sup>21</sup> *Id.* at P 142.

<sup>22</sup> *Id.* at P 143. The Commission ordered that these actions be performed within 45 days of the publication of notice in the Federal Register, and the resultant deadline fell on December 12, 2019.

On November 26, 2019, PJM filed a motion for a 90-day extension for the briefing, until March 11, 2020, in order to allow for stakeholder discussions, including discussion of potential alternative approaches to capacity valuation.<sup>23</sup> On December 6, 2019, the Commission issued an order granting the requested extension.<sup>24</sup> On December 12, 2019, PJM filed tariff language addressing the minimum run time procedures for all resources in Docket No. ER20-584.<sup>25</sup>

On February 27, 2020, after a series of stakeholder discussions, PJM moved to hold the proceedings in Docket Nos. EL19-100 and ER20-584 in abeyance until January 29, 2021 in order to allow time for PJM and its stakeholders to develop an ELCC methodology for capacity valuation that would address the concerns identified in the Commission's October 2019 Order.<sup>26</sup>

On March 3, 2020, the Commission granted an extension on the deadline for briefs in Docket No. EL19-100 until April 27, 2020. On April 10, 2020, the Commission issued an order (the "April 2020 Order") that consolidated Docket Nos. EL19-100 and ER20-584 and granted an abeyance of those consolidated proceedings until October 30, 2020.<sup>27</sup> The April 2020 Order also provided that if PJM submits, pursuant to Section 205 of the Federal Power Act, proposed tariff amendments reflecting a new proposed methodology for capacity valuation prior to October 30, 2020, then the consolidated proceedings will be held in abeyance pending disposition of the Section 205 filing.

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<sup>23</sup> *Mot. for Extension of time of PJM*, Docket Nos. EL19-100 et al. (Nov. 26, 2019).

<sup>24</sup> *Notice Granting Extension of Comment Period*, Docket No. EL19-100 (Nov. 27, 2019).

<sup>25</sup> *Compliance Filing Regarding Minimum Run Duration Requirements*, Docket No. EL19-100 (Dec. 12, 2019). FERC's October 2019 Order instructed PJM to file this tariff language in a new "ER" denominated docket. October 2019 Order at 107. Accordingly, PJM filed the tariff language in a new docket, which was assigned Docket No. ER20-584.

<sup>26</sup> *Mot. of PJM to Hold Proceedings in Abeyance and for Shortened Comment Period and Expedited Action*, Docket Nos. EL19-100 and ER20-584 (Feb. 27, 2020).

<sup>27</sup> *PJM*, 171 FERC ¶ 61,015 (Apr. 10, 2020).

On March 29, 2020, PJM formed a new task force called the Capacity Capability Senior Task Force (“CCSTF”), which was tasked with developing an ELCC proposal.<sup>28</sup> After meetings throughout the summer, the CCSTF presented an ELCC proposal to PJM’s Markets and Reliability Committee on September 17, 2020, which approved it in a sector-weighted vote of 3.98/5.<sup>29</sup> On the same day, PJM’s Members Committee also reviewed the proposal, and approved it in a sector-weighted vote of 4.05/5, representing 81% approval.<sup>30</sup> On September 23, 2020, PJM’s Board of Directors conditionally accepted the substance of the proposal, pending development of final tariff amendment language by PJM staff.<sup>31</sup> PJM’s Board of Directors subsequently approved the final language prior to filing on October 30, 2020.<sup>32</sup>

### III. ARGUMENT

#### **A. The ELCC Approach to Capacity Valuation is Just and Reasonable**

The purpose of PJM’s capacity construct is to use market-based mechanisms to obtain commitments from sufficient resources to ensure a desired level of reliability.<sup>33</sup> To accommodate a market-based approach, PJM expresses the reliability value of all capacity resources in units of unforced capacity (“UCAP”), which is the installed capacity of a unit rated at summer conditions that is not on average experiencing a forced outage or forced derating.<sup>34</sup> Each megawatt (“MW”) of UCAP represents roughly the contribution a theoretical 1 MW generation station that is perfectly available at all times would make to PJM’s ability to serve load.

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<sup>28</sup> *ELCC 205 Filing*, at 7, Docket No. ER21-278-000 (Oct. 30, 2020) (“ELCC Filing”).

<sup>29</sup> *Id.*

<sup>30</sup> *Id.* at 7–8.

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

<sup>32</sup> *Id.*

<sup>33</sup> PJM, RAA (Rate Schedule FERC No. 44) (“RAA”), Article 2; *Compliance Filing Regarding Minimum Run Duration Requirements*, at 3, Docket No. EL19-100-000 (Dec. 12, 2019).

<sup>34</sup> RAA, Article 1 at 23 (definition for “Unforced Capacity”).

As PJM's system has historically been dominated by dispatchable resources (fossil-fuel or nuclear plants), PJM adopted the system of determining UCAP by using a simple rule of a resource's demonstrated output under summer conditions (referred to as that resource's installed capacity, or "ICAP"), discounted for that resource's historical outage rate.<sup>35</sup> This method is simple and was reasonably accurate when system resources consisted mostly of traditional baseload and dispatchable generation.<sup>36</sup>

However, this simple calculation does not apply well to resources with different characteristics than fossil fuel plants: many renewables produce an uncertain amount of power each hour, there is no obvious way to incorporate the duration limits of storage technology, demand response has time of day and duration limits, and so on. Over the years, the share of such total capacity provided by these technologies has grown. In response, PJM has devised a variety of heuristics to determine a UCAP for these resource types,<sup>37</sup> along with rules to compensate for the limits of those heuristics.<sup>38</sup> As discussed *supra*, the shortcomings of this ad hoc approach attracted Commission concern when PJM determined that the UCAP of ESRs should be based on the output they can sustain for 10 continuous hours.<sup>39</sup>

PJM now proposes to use the ELCC methodology to measure the UCAP of some resource types. ELCC analysis was introduced over 50 years ago,<sup>40</sup> and is well-established as an

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<sup>35</sup> RAA, Schedule 5. *See also* PJM, *PJM Manual 21: Rules and Procedures for Determination of Generating Capacity*, at 12 (Aug. 1, 2019) ("PJM Manual 21").

<sup>36</sup> Though it assumes generation outages are random and uncorrelated, an assumption that was put to the test when stress on the natural gas system caused multiple simultaneous plant outages during the winter of 2014–15.

<sup>37</sup> *See, e.g.*, PJM Manual 21, App. B (setting procedures to determine capacity value of wind and solar resources). *See also* PJM, 134 FERC ¶ 61,066 (Jan. 31, 2011) (approving PJM's proposal to establish various categories of demand response and defining their equivalency with traditional generation).

<sup>38</sup> *See, e.g.*, PJM, 146 FERC ¶ 61,052 (setting limits on various demand response categories based on their availability).

<sup>39</sup> October 2019 Order at PP 139–141.

<sup>40</sup> L.L. Garver, *Effective Load-Carrying Capability of Generating Units*, IEEE Transactions on Power Apparatus and Systems, Vol. PAS-85, Issue 8 (Aug. 1966).



industry best practice for measuring resource adequacy.<sup>41</sup> In recent decades, abundant work has established the applicability of ELCC to measuring resource adequacy in power systems containing significant solar, wind, and storage deployments.<sup>42</sup> The Midcontinent Independent System Operator (“MISO”) states that “ELCC is the preferred methodology for determining the capacity value of wind” and uses the method to determine wind units UCAP.<sup>43</sup> ELCC is also used by CAISO and the California Public Utilities Commission (“CPUC”) for wind, solar photovoltaic, and solar thermal resources.<sup>44</sup>

As described in the Garrido Affidavit, the ELCC methodology uses statistical techniques to compare a range of expected demands for power in each hour of a year with the probability that a grid operator’s generation fleet, taken as a whole, will be able to provide various amounts of power.<sup>45</sup> The probability that demand exceeds load, summed over all hours of the year, is the “loss of load expectation” (“LOLE”), which PJM aims to maintain at less than 10%, or once every ten years.<sup>46</sup> The marginal resource adequacy contribution of any individual resource or group of resources can be determined by evaluating the system with and without the resource(s) in question,<sup>47</sup> making the approach appropriate as a basis for determining the UCAP of market participants.

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<sup>41</sup> E. Ibanez & M. Milligan, *Comparing Resource Adequacy Metrics and their Influence on Capacity Value*, National Renewable Energy Laboratory (Apr. 2014), <https://www.nrel.gov/docs/fy14osti/61017.pdf>.

<sup>42</sup> See, e.g., Bethany A. Frew, *Assessing Capacity Value of Wind Power*, National Renewable Energy Laboratory (Nov. 17, 2016).

<sup>43</sup> MISO, *Planning Year 2019-2020 Wind & Solar Capacity Credit*, at 3–6 (Dec. 2018), <https://cdn.misoenergy.org/2019%20Wind%20and%20Solar%20Capacity%20Credit%20Report303063.pdf>.

<sup>44</sup> CPUC R.17-09-20, *Qualifying Capacity Methodology Manual Adopted 2017*, at 8, <https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442455533>.

<sup>45</sup> ELCC Filing, Attach. C, Affidavit of Dr. Patricio Rocha Garrido on Behalf of PJM Interconnection, L.L.C. (“Garrido Affidavit”).

<sup>46</sup> *Id.* at P 18.

<sup>47</sup> *Id.* at PP 20–22.

This approach directly models resource adequacy at a fine level of detail, and as such, is a significant improvement over the various rules-of-thumb PJM proposes to replace. A key virtue is that ELCC reasonably and fairly provides a common measure of the UCAP value for a variety of resource types. Rather than relying on arbitrary (or at least draconian) dictums such as ‘all capacity must be available at all times,’ an ELCC-based approach takes resources’ physical and operational capabilities as given, and incorporates those particulars in determining an appropriate UCAP value. This supports proper market functioning and price formation by accurately measuring the quantity of UCAP each seller may offer while avoiding arbitrary barriers to entry.

ELCC also captures several specific effects important to modeling contemporary power grids, particular as the resource mix changes to include greater penetrations of wind, solar, and energy storage resources:

- Correlations. PJM’s current rules treat each capacity resource as independently experiencing random outages. This approach fails, potentially dangerously, when a common event can cause multiple outages, such as when cloudy or windless weather, gas pipeline outages, or extreme temperatures impair multiple power plants. In a similar but beneficial effect, the output of solar and demand response often correlates with load, increasing their resource adequacy benefit. ELCC automatically incorporates such effects, so long as they are accounted for in determining the probable output of the generation fleet during each hour.
- Diminishing returns. Related to the above, many technologies initially have high marginal resource adequacy benefits that decrease as more of that technology is deployed. A prominent example is how the marginal value of

adding more solar power declines as net peak loads are shifted away from daylight hours. These effects are captured in ELCC, which will generally show that resources with limited availability or diurnal/seasonal cycles lose UCAP as more of those resources installed. This reasonably and fairly captures the risk associated with building variable or limited-duration resources compared to dispatchable unlimited ones, ensuring that ELCC produces capacity valuations that do not discriminate against or privilege any resource.

- Synergies. In contrast to a traditional approach to capacity valuation that simply examines resource units in isolation, ELCC captures the reality that a fleet made up of resources with complementary characteristics may have a UCAP that is greater than the sum of its individual components. Solar and wind may produce most reliably at different times of the day or year; storage may be particularly well-suited to the short residual afternoon peaks left by solar or the distinctive load shapes created by demand response deployments. Critically, ELCC captures both the benefits and limits of this approach, and measures both the UCAP of, for example, combined wind-solar-storage fleets *and* the amount of traditional dispatchable generation needed to ‘plug the gaps’ left behind by such a fleet.

Based on these features, the PIOs respectfully submit that the ELCC approach reflects current engineering best practices and is a reasonable method to determine the UCAP of a fleet of mixed resources. ELCC is non-discriminatory in that it provides a consistent and rigorous analytical basis for determining the UCAP of resources with differing capabilities. It is also non-discriminatory because it avoids the potentially arbitrary outcomes of applying estimates

developed for one technology to others and the barriers to entry that can arise from setting bright-line market participation criteria.

**B. PJM’s ELCC Proposal for Capacity Valuation is Just and Reasonable and Should Be Approved**

1. PJM’s ELCC Proposal is Just and Reasonable Because it Reasonably Accurately Models the Capacity Contributions of the ELCC Resources, Including Energy Storage

*a) Overview*

As explained above, the ELCC methodology, as a general matter, is a just and reasonable approach to capacity valuation. PJM’s specific proposed implementation of ELCC is also just and reasonable, because it will provide for accurate modeling of the capacity contributions of the ELCC Resources. In its ELCC Filing, PJM proposes to apply ELCC to determine UCAP values for three categories of ELCC Resources: ESRs (which PJM includes in a general “Limited Duration Resources” category), wind, solar, and other variable resources (“Variable Resources”), and hybrid facilities comprised of ESRs and Variable Resources (“Combination Resources”).<sup>48</sup>

The first reason why PJM’s ELCC Proposal will produce reasonably accurate results is that it will rely on a comprehensive range of data inputs, enabling it to generate accurate capacity values for resources based on best available information. PJM has indicated that its ELCC analysis will “include[] the following six primary data sources:

1. Historical weather and load data;
2. Historical output of existing Variable Resources;
3. Estimates of putative historical output for planned Variable Resources;
4. Forced outage patterns for Unlimited Resources;
5. Resource deployment forecast; and
6. Modeling parameters for Limited Duration Resources and Combination Resources.”<sup>49</sup>

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<sup>48</sup> ELCC Filing at 8.

<sup>49</sup> *Id.* at 24.

These inputs enable PJM to develop a model that simulates grid operations at a high level of detail, properly and accurately evaluating the contributions of the ELCC Resources to resource adequacy.<sup>50</sup>

PJM's proposed use of these data inputs shows how they will contribute to ensuring accurate modeling: First, PJM will develop a probabilistic projection of summer and winter load profiles using a range of potential future hourly loads derived from actual weather patterns of previous years; it will simulate the hourly output of each resource category using the same range of weather and other variables, to derive a series of resource-specific availability/unavailability patterns; and then it will simulate economic dispatch following conservative principles that simulate how resources will be used in practice.<sup>51</sup> Because both load patterns and generator output derive from a common set of weather data, PJM's approach captures the correlations between weather, load, and generator performance described above.<sup>52</sup>

Second, PJM's ELCC Proposal will reasonably implement the modeling of interactivity and synergistic effects between resources that is core to the ELCC methodology. The proposed process does not treat different generation or generation categories units in isolation, but models and values the ability of the entire projected generation fleet when determining their potential capacity values.<sup>53</sup> This interactivity is important to modeling reliability as the resource mix changes to include more wind, solar, energy storage, and hybrid facilities.

And this sophisticated calculation cuts both ways: the model will appropriately increase ELCC values for ESRs and variable resources as they are joined by higher levels of

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<sup>50</sup> *Id.* at 24–26.

<sup>51</sup> *Id.* at 26–30.

<sup>52</sup> Although PJM does not at this time propose to apply ELCC to traditional generation, the method is well suited for characterizing the risks arising from multiple gas-fired units relying on the same pipeline, or of extreme temperatures reducing overall fleet availability.

<sup>53</sup> ELCC Filing at 12–13.

complementary resources (e.g., ESR ELCC values will go up as variable resources are integrated at higher levels, and vice versa); but it will also appropriately decrease ELCC values for ESRs and variable resources as the integration rate of those resources increases (e.g., wind resources will see ELCC values drop as more wind resources are integrated).<sup>54</sup>

*b) The ELCC Proposal's Storage Modelling is Reasonably Accurate*

Given that the ELCC Filing originated from the Commission's Section 206 investigation into PJM's capacity valuation rules for ESRs,<sup>55</sup> it is important to note that the ELCC Proposal provides for reasonably accurate modeling of the capacity contributions of ESRs (and a marked improvement from the 10 Hour Rule). Notably, the ELCC Filing establishes a 4-hour duration class for ESRs along with three other duration classes ranging up to ten hours,<sup>56</sup> which help more accurately capture the variety of ways that ESRs can serve grid reliability, including through helping meet peak needs during short periods.

One distinctive feature of ESRs is that they offer a tradeoff between high power for short periods or lower power for longer periods; there may well be situations where reliability is better served, for example, by an additional 5 MW for 2 hours than by 1 MW for 10 hours.<sup>57</sup> These contributions are possible due to the highly controllable nature of ESRs.<sup>58</sup> Notably, ESRs can be called upon to provide energy to precisely fill gaps between load and energy produced by other resources.<sup>59</sup> Approaches that require ESRs to always derate to meet long duration runtime

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<sup>54</sup> ELCC Filing at 14.

<sup>55</sup> See *supra* Section II.A.

<sup>56</sup> ELCC Filing at 14.

<sup>57</sup> See, e.g., Sustainable FERC, *Capacity Value of Storage Resources*, at 4–6 (July 10, 2020) (“Sustainable FERC Report”), <https://www.pjm.com/-/media/committees-groups/task-forces/ccstf/2020/20200710/20200710-item-06c-capacity-value-of-storage-resources.ashx>.

<sup>58</sup> PIO Comments at 15; ESA Comments, Carden Aff. at P 11.

<sup>59</sup> PIO Comments at 15. See also Aramazd Muzhikyan et al., *Limited Energy Capability Resource Duration Requirement for Participation in PJM Capacity Market*, at 2–3, 2019 IEEE Power & Energy Society Innovative

requirements fail to capture this benefit. By including shorter duration classes, PJM's proposed approach reasonably accurately incorporates this feature of storage resources.<sup>60</sup>

PJM's preliminary model results show that, under current conditions, a 4-hour ESR has an ELCC of 92% of its nameplate rating, declining to 75% as the amount of ESRs increases to 1,500 MW.<sup>61</sup> This result is reasonably consistent with multiple analyses showing how such an approach enables a more accurate measure of the contribution to reliability by ESRs than that captured by an invariant 10 Hour Rule. One study, commissioned from Astrapé by the Energy Storage Association and NRDC, takes a 'bottom-up' approach: it models the PJM grid in detail, simulates how it would perform under many different conditions, and then determines how much generation could be replaced with storage while maintaining the same reliability level.<sup>62</sup> This approach found that in PJM's current market, ESRs with continuous operation capability of 4 to 6 hours can provide capacity equivalent to conventional resources until roughly 4,000 MW of 4-hour ESRs are incorporated into PJM's resource mix,<sup>63</sup> and that beyond this level, the value of 4-hour ESRs diminishes.<sup>64</sup> Since PJM's current planning peak is 152,647 MW,<sup>65</sup> this 4,000 MW represents about 3% of peak load.

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Smart Grid Technologies Conference (2019) ("IEEE Study"), <https://www.pjm.com/-/media/library/reports-notices/special-reports/2019/esr-duration.ashx?la=en>.

<sup>60</sup> PIOs believe that ESRs are most accurately measured without fixed duration classes but consider the four-hour class in PJM's ELCC Proposal to be an approximation within the zone of reasonableness under current conditions.

<sup>61</sup> Patricio Rocha-Garrido, *Public 2<sup>nd</sup> Draft ELCC Results*, at 5 (Aug. 12, 2020) ("Preliminary ELCC Results"), <https://www.pjm.com/-/media/committees-groups/task-forces/ccstf/2020/20200812/20200812-item-04-2nd-draft-prelim-ELCC-results.ashx>.

<sup>62</sup> Kevin Carden et al., *Capacity Value of Energy Storage in PJM*, at 2, Astrapé Consulting (July 2019) ("Astrapé Study").

<sup>63</sup> *Id.*

<sup>64</sup> *Id.* at 20.

<sup>65</sup> PJM, *2021–2022 RPM Base Residual Auction Parameters*, <https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2021-2022/2021-2022-bra-planning-period-parameters.ashx?la=en>.

A second study was jointly conducted by PJM staff and Dartmouth College reaches similar results.<sup>66</sup> It used a ‘top-down’ approach, examining PJM’s historical load shapes and determining how much storage capability would be required to meet any given portion of peak loads. It concluded that storage with a 4-hour duration would have similar reliability value to traditional generation up to “about 3% of the annual peak.”<sup>67</sup> The study also found that beyond this 3% level, the capacity value of 4-hour storage would begin to decrease.<sup>68</sup>

Thus, PJM’s proposal agrees with other studies that under current conditions, 4-hour ESRs bring roughly the same benefit as a traditional generator with the same maximum output. PJM’s proposed method has the value of 4-hour storage fall off more quickly as more is installed than the other studies. The PIOs attribute this difference partially to PJM’s use of conservative operational assumptions in their model. These assumptions are reasonable given the limited experience with this new resource type.

*c) The ELCC Proposal Allows For Operational Improvements*

The way PJM dispatches different resources in its ELCC model will necessarily impact how much those different resources provide, and thus their resulting ELCC value. Discussion during the CCSTF revealed that the resource adequacy value of ESRs depends closely on how they are optimized between reserves and energy markets, and how they are operationally coordinated with demand response.<sup>69</sup>

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<sup>66</sup> IEEE Study at 5.

<sup>67</sup> *Id.*

<sup>68</sup> *Id.* at 6.

<sup>69</sup> Sustainable FERC Report at 11–15. *See also* Astrapé Consulting, *Dispatch Effects on Storage ELCC in PJM*, at 5–10 (July 16, 2020), <https://www.pjm.com/-/media/committees-groups/task-forces/ccstf/2020/20200716-workshop/20200716-item-03-dispatch-effects-on-elcc.ashx>.



PJM's current approach, by its own admission, "conservatively simulates the behavior of" ESRs.<sup>70</sup> PJM indicated during the stakeholder process that changing its operational protocols is outside the scope of its rule, and fundamentally the ELCC calculation should accurately incorporate the existing protocols. The PIOs agree, but note that as PJM gains experience in how to most effectively use ESRs, the dispatch assumptions used in the ELCC modeling should be updated to reflect those improvements. Those dispatch assumptions are reflected in the "Resource Deployment Forecast" inputs used in the ELCC model. By leaving that deployment forecast to be specified outside of the filed Tariff, PJM provides a reasonable route to incorporate future operational refinements into ELCC calculations.

Second, the PIOs note that in future filings, PJM should consider adding another ESR duration class at two hours, to enable those yet-shorter-duration ESRs to participate at their full capacity potential. While PJM is correct to note that "a 2-hour storage resource can join the 4-hour class by using an Effective Nameplate Capacity of 50 percent of the maximum power rating, since such a resource could run for four hours at half power,"<sup>71</sup> this merely captures the lower bound for those resources. This observation does not justify a policy that effectively imposes on those 2-hour ESRs the same arbitrary restriction that was imposed on 4-, 6-, and 8-hour resources under PJM's previous 10 hour rule. The PIOs do not object to the 4-hour requirement as unduly discriminatory under current conditions, but note that this could change under different circumstances.<sup>72</sup>

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<sup>70</sup> ELCC Filing at 30 (also noting that the model simulates dispatch of demand-side resources after all other resources, likely reducing their modeled participation).

<sup>71</sup> *Id.* at 14.

<sup>72</sup> In particular, short duration/high power storage brings an outsized reliability benefit in systems with either high ramp requirements or very "peaky" net load.

Lastly, while the ELCC Filing represents an important step forward for ESRs and hybrid resources, particularly through its modeling of the synergistic effects of wind, solar, and energy storage, the PIOs look forward to further development of modeling for hybrid facilities. The ELCC Filing essentially treats hybrid facilities (Combination Resources, in PJM's parlance) as two separate facilities. While the overall inter-resource interactivity modeled by the ELCC Proposal reasonably captures much of the benefit of hybrid facilities, it does not capture the more fine-grained co-optimization possible for the operation of the components of a hybrid facility. The PIOs anticipate that PJM's understanding, treatment, and procedures for hybrid facilities to evolve, much as has been the case for the familiar combination of combustion turbines and steam turbines we know as combined cycle plants.

## 2. PJM's ELCC Proposal Corrects an Unjust and Unreasonable Status Quo for ESRs

An additional reason that the Commission should approve the ELCC Proposal is that it corrects an unjust and unreasonable status quo for ESRs. The 10 Hour Rule currently applied by PJM dramatically undervalues the capacity contributions of ESRs because it fails to allow ESRs to provide capacity according to their full technical capability.<sup>73</sup> While ESRs are energy-limited (they can store a limited quantity of energy) they are also precisely dispatchable (they can be dispatched nearly instantaneously with no minimum run time or downtime).<sup>74</sup> Notably, ESRs can be called upon to provide capacity at any point of the peak load curve to precisely fill gaps between load and energy produced by other resources.<sup>75</sup> In contrast, as the PIOs have previously

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<sup>73</sup> This result is not only unjust and unreasonable, it is also inconsistent with the policy objectives of Order No. 841. PIO Comments at 8.

<sup>74</sup> ESA Comments, Carden Aff. at P 11.

<sup>75</sup> PIO Comments at 15. *See also* IEEE Study at 2–3.

commented, the 10 Hour Rule “is equivalent to valuing storage as if it were a non-dispatchable, block-loaded resource similar to demand response.”<sup>76</sup>

As noted above, following consideration of comments on PJM’s Order No. 841 compliance filings (including the PIOs’ comments), the Commission took note of these problems. The Commission found that the record indicated that PJM’s capacity valuation rules for storage may be “unjust, unreasonable, unduly discriminatory or preferential” because the 10 Hour Rule may not be “based on a sound consideration of physical and operational characteristics” of ESRs.<sup>77</sup>

As discussed above, multiple studies have shown that the invariant imposition of a 10 hour runtime requirement prevents ESRs from making substantial capacity contributions possible at shorter runtimes.<sup>78</sup> This undervaluation of the capacity of ESRs has significant real world consequences. As the PJM Cities and Communities Coalition has pointed out, cities in the PJM Region are often host to highly polluting peaking power plants that could be replaced with ESRs if the technical capability of ESRs to help meet peak load was accurately valued.<sup>79</sup> The impacts of such peaking power plants tend to fall disproportionately on low-income communities and communities of color, raising serious environmental justice issues.<sup>80</sup>

In sum, PJM’s ELCC Proposal, which was the product of extensive stakeholder discussions over the summer,<sup>81</sup> should be approved because it provides a reasonable way forward

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<sup>76</sup> October 2019 Order at P 140.

<sup>77</sup> ELCC Filing at 5–6.

<sup>78</sup> See *supra* Section III.A.1.b. As noted above, two independent studies show that ESRs with a 4-hour runtime could contribute approximately 3% of PJM’s peak load under current conditions.

<sup>79</sup> PJM Cities and Communities Coalition, *PJM CCC Policy Statement on the Benefits of Reducing Barriers to Energy Storage in the PJM Region* (Nov. 18, 2020), <https://files.wri.org/s3fs-public/uploads/pjmccc-storage-policy-statement.pdf>.

<sup>80</sup> *Id.*

<sup>81</sup> As PJM’s ELCC Filing notes, the CCSTF met 13 times, and various stakeholders, including the PIOs, participated in additional meetings with PJM staff. ELCC Filing at 7.

to correct pressing problems with how ESRs are treated in the capacity market. While the ELCC Proposal has significant technical merits, most importantly its accurate modeling of ESRs and the other ELCC Resource, its correction of an unjust, unreasonable, and unsustainable status quo furnishes an independent reason for approval.

**C. PJM Should Conform its Interconnection Procedures to Be Consistent with its ELCC Proposal and its Tariff**

In order to ensure that PJM's ELCC Proposal is implemented in the manner described in PJM's ELCC Filing, it is essential that PJM conform the interconnection procedures in its business manuals to be consistent with the ELCC Proposal and its Tariff. As the Commission has instructed, "the filed and accepted tariff is the governing document and not the Business Practice Manuals - the former has precedence over the latter and not the other way around."<sup>82</sup>

As discussed above, the heart of PJM's ELCC Proposal is establishing an accurate, just and reasonable ELCC methodology for determining the UCAP capacity valuation assigned to the ELCC Resources.<sup>83</sup> Capacity resources may, in general, offer up to their UCAP in PJM's capacity market. However, this is constrained by each resource's Capacity Interconnection Rights ("CIRs"), which measure how much output the capacity resource has the right to inject into the grid.<sup>84</sup> As part of the interconnection process, resources apply for their CIRs, and may be required to pay for transmission upgrades to support those CIRs. PJM's Tariff provides that resources may receive CIRs "commensurate with the size in megawatts of the generation," but

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<sup>82</sup> *MISO*, 117 FERC ¶ 61,113, 61,597 (Oct. 26, 2006); *See also MISO*, 122 FERC ¶ 61,172, 61,965 (Feb. 25, 2008) ("To the extent the Business Practice Manuals contain greater detail than the tariff...the greater detail supplements the tariff and does not override the tariff."); *Midwest Indep. Transmission Sys. Operator, Inc. Pub. Utilities with Grandfathered Agreements in the Midwest ISO Region*, 108 FERC ¶ 61,163, 62,012 (Aug. 6, 2004) ("We share WEPCO's concern that the Business Practice Manuals should not take precedence over the TEMT.").

<sup>83</sup> *See supra* at Sections III.A–B.

<sup>84</sup> Tariff, Section 1 (definition of "Capacity Interconnection Rights").

leaves the specific determination of this value to PJM business manuals.<sup>85</sup> Thus, any limit set by PJM's business manuals on a resource's ability to apply for CIRs functions as a *de facto* limit on that resource's UCAP capacity valuation.<sup>86</sup>

Wind and solar resources, which fall within the Variable Resources category of the ELCC Resources, may find themselves in such a situation. Eligibility for CIRs is set in PJM's Manual 21,<sup>87</sup> which sets CIR eligibility for wind and solar resources based on their average summer peak hour output.<sup>88</sup> The summer average peak hour output of solar resources in PJM appears to support eligibility for CIRs ranging from 38% to 60% of nameplate capacity,<sup>89</sup> while preliminary results show solar resources in PJM assigned a UCAP of 65% of nameplate capacity under the ELCC methodology.<sup>90</sup>

Thus, a portion of resources' ELCC capacity value may be stranded and undeliverable due to business manual provisions limiting eligibility for transmission service, resulting in an inconsistency with the UCAP capacity valuation determined pursuant to the ELCC Proposal's methodology. This result would be inconsistent with language in PJM's Tariff specifying 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 generation as identified in the Interconnection Service Agreement.”<sup>91</sup>

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<sup>85</sup> Tariff, Section 230.2.

<sup>86</sup> We emphasize that we are concerned with limits of general applicability, not specific circumstances that make CIRs difficult or impossible to obtain at a particular location.

<sup>87</sup> PJM Manual 21, Section 1.

<sup>88</sup> *Id.* Section 1.1.7.

<sup>89</sup> PJM, *Class Average Capacity Factor—Wind and Solar Resources* (June 2017), <https://www.pjm.com/-/media/planning/res-adeq/class-average-wind-capacity-factors.ashx?la=en>.

<sup>90</sup> Preliminary ELCC Results at 5.

<sup>91</sup> Tariff, Section 230.2.

To avoid the problem of business manual language overriding tariff language, the PIOs respectfully request that the Commission clarify its expectation that PJM, consistent with its Tariff, allow ELCC Resources to apply for sufficient CIRs to support their full ELCC capacity value.<sup>92</sup> To the extent that amendments to PJM's manuals may be needed to ensure such consistency with the Tariff, the PIOs respectfully request that the Commission clarify its expectation that PJM will make such necessary conforming amendments to avoid a conflict between business manual language and filed Tariff language.

#### IV. CONCLUSION

In recent years, markets have been driving significant investment in wind, solar, energy storage, and hybrid facilities in the PJM Region. The ELCC Proposal contained in PJM's ELCC Filing represents a just and reasonable way of modeling the reliability contributions of these resources, and corrects an unjust and unreasonable status quo that dramatically undervalues the capacity contributions of energy storage. For the reasons explained in these Comments, the PIOs respectfully request that the Commission approve PJM's ELCC Filing.

November 20, 2020

Respectfully submitted,

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<sup>92</sup> *MISO*, 122 FERC ¶ 61,172, 61,965 (Feb. 25, 2008); *MISO*, 117 FERC ¶ 61,113, 61,597 (Oct. 26, 2006); *Midwest Indep. Transmission Sys. Operator, Inc. Pub. Utilities with Grandfathered Agreements in the Midwest ISO Region*, 108 FERC ¶ 61,163, 62,012 (Aug. 6, 2004).

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**CERTIFICATE OF SERVICE**

I hereby certify that the foregoing has been served in accordance with 18 C.F.R. § 385.2010 upon each party designated on the official service list in this proceeding, by email.

Dated: November 20, 2020

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December 11, 2020

Via Electronic Filing

The Honorable Kimberly D. Bose  
Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E. Room 1A  
Washington, D.C. 20426

Re: *PJM Interconnection L.L.C., Docket No. ER21-278-000*  
*Effective Load Carrying Capability Construct*

Dear Secretary Bose,

Enclosed for filing in the above-referenced proceeding, please find the Motion for Leave to Answer and Answer of the Public Interest Organizations. As indicated by the attached certificate of service, all parties to the proceeding are being served with a copy of this document. Should you have any questions, please do not hesitate to contact me. Thank you.

Sincerely,

/s/ Devin McDougall

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

**PJM Interconnection, L.L.C.**

**Docket No. ER21-278-000**

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**MOTION FOR LEAVE TO ANSWER AND ANSWER  
OF THE PUBLIC INTEREST ORGANIZATIONS**

Dated: December 11, 2020.

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## I. INTRODUCTION

Previously, pursuant to Rule 211 of the Federal Energy Regulatory Commission's (the "Commission" or "FERC") Rules of Practice and Procedure,<sup>1</sup> the Sustainable FERC Project, Natural Resources Defense Council, Union of Concerned Scientists, and Sierra Club (collectively, the "Public Interest Organizations" or "PIOs") submitted comments<sup>2</sup> in support of the proposed revisions to the Reliability Assurance Agreement Among Load-Serving Entities in the PJM Region ("RAA") and PJM's Open Access Transmission Tariff ("Tariff")<sup>3</sup> filed by PJM Interconnection, LLC ("PJM") in the above-captioned docket (the "ELCC Filing").<sup>4</sup>

Pursuant to Commission Rules 212 and 213,<sup>5</sup> the PIOs hereby submit this Motion for Leave to Answer and Answer in reply to certain of the comments and protests filed in response to PJM's ELCC Filing.<sup>6</sup>

Rule 213 provides that an answer may not be made to protests or comments without authorization by the Commission.<sup>7</sup> However, the Commission routinely authorizes such answers

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<sup>1</sup> 18 C.F.R. § 385.211.

<sup>2</sup> *Comments of the PIOs*, Docket No. ER21-278 (Nov. 20, 2020) ("PIO Comments").

<sup>3</sup> The RAA and the Tariff can be found in PJM's "Intra-PJM Tariffs" eTariff title. See PJM, *Intra-PJM Tariffs*, <https://etariff.ferc.gov/TariffBrowser.aspx?tid=1731>. Terms not otherwise defined herein shall have the same meaning as set forth in the RAA, Tariff, and the Amended and Restated Operating Agreement of PJM.

<sup>4</sup> *ELCC 205 Filing*, Docket No. ER21-278 (Oct. 30, 2020) ("ELCC Filing").

<sup>5</sup> 18 C.F.R. §§ 385.212, 385.213.

<sup>6</sup> *Comments and Mot. of the Indep. Mkt Monitor* ("Market Monitor" or "IMM") for PJM, Docket Nos. ER21-278 and EL19-100 (Nov. 23, 2020) ("IMM Comments"); *Limited Protest of LS Power Associates, L.P.*, Docket Nos. ER21-278 and EL19-100 (Nov. 20, 2020) ("Limited Protest of LS Power"); *Comments of the PJM Power Providers Group* ("P3"), Docket Nos. ER21-278 and EL19-100 (Nov. 20, 2020) ("P3 Comments"); *Protest of Dominion Energy Services, Inc.*, Docket No. ER21-78 (Nov. 20, 2020); *Mot. to Intervene and Comments of GlidePath Development LLC*, Docket No. ER21-278 (Nov. 20, 2020); *Am. Elec. Power Serv. Corp.'s Comments on PJM's Effective Load Carrying Capability Construct*, Docket No. ER21-278 (Nov. 20, 2020); *Mot. to Intervene and Comments of the Nat'l Hydropower Ass'n*, Docket No. ER21-278 (Nov. 20, 2020); *Supporting Comments of Calpine Corp.*, Docket No. ER21-278 (Nov. 20, 2020).

<sup>7</sup> 18 C.F.R. § 385.213(a)(2).

when they assist the Commission in its deliberative process by providing relevant information, correcting errors, and clarifying the issues.<sup>8</sup>

The PIOs' Answer presents relevant information that will aid in the Commission's decision-making process and will help ensure a complete and accurate record. Accordingly, there is good cause to grant the PIOs' Motion for Leave to Answer and accept this Answer.

## II. ARGUMENT

### **A. PJM's ELCC Proposal as a Whole Is Just and Reasonable**

PJM's ELCC Filing is designed to create and implement an Effective Load Carrying Capacity ("ELCC") construct (the "ELCC Proposal") for determining the amount of capacity that variable resources (such as wind and solar), limited duration resources (such as energy storage, or "ESRs"), and hybrid resources (such as combined solar and energy storage) (collectively, the "ELCC Resources") can offer in PJM's Reliability Pricing Model ("RPM") capacity market.

The ELCC Filing was made pursuant to Section 205 of the Federal Power Act, which provides a mechanism for grid operators to submit proposed revisions to their tariff for Commission review.<sup>9</sup> This is consistent with the Commission's order issued April 10, 2020, which directed PJM to submit proposed tariff revisions relating to capacity valuation under Section 205 prior to October 30, 2020 if PJM wished to continue an abeyance of the

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<sup>8</sup> See, e.g., *Pioneer Transmission, LLC v. N. Ind. Pub. Serv. Co.*, 140 FERC ¶ 61,057 at P 94 (July 19, 2012); *Sw. Power Pool, Inc.*, 131 FERC ¶ 61,252 at P 19 (June 17, 2010) (accepting and permitting answers that "provided information that assisted us in our decision-making process"); *Midwest Indep. Transmission Sys. Operator, Inc.*, 131 FERC ¶ 61,285 at P 6, n.10 (June 18, 2010); *Entergy Servs. Inc.*, 126 FERC ¶ 61,227 (Mar. 17, 2009); *Duke Energy Ky., Inc.*, 122 FERC ¶ 61,182 at P 25 (Feb. 29, 2008) (permitting answers that "provided information that assisted us in our decision-making process").

<sup>9</sup> ELCC Filing at 1; 16 U.S.C. § 824e; *Advanced Energy Mgmt. All. v. FERC*, 860 F.3d 656, 662 (D.C. Cir. 2017).

Commission's investigation of the justness and reasonableness of PJM's approach to capacity valuation.<sup>10</sup>

Certain parties have, in their comments or protests, raised concerns with specific aspects of the ELCC implementation proposed in PJM's ELCC Filing.<sup>11</sup> Such specific concerns are addressed in more detail *infra*.<sup>12</sup> However, as an overarching response, under Section 205, PJM needs only to show that its ELCC Proposal as a whole will result in just and reasonable rates, not that the Proposal cannot be improved in any way. As courts have explained, "FERC has interpreted its authority to review rates under [Section 205 of the Federal Power Act] as limited to an inquiry into whether the rates proposed by a utility are reasonable—and not to extend to determining whether a proposed rate schedule is more or less reasonable than alternative rate designs."<sup>13</sup> The appropriate standard for review of a Section 205 filing, courts have instructed, is "not whether [one] method is more appropriate than [another] method, but rather whether the [proposed] method is reasonable and adequate."<sup>14</sup>

Accordingly, the Commission should approve the ELCC Filing because, as a whole, it would meet the statutory requirement of resulting in just and reasonable rates. As the PIOs discuss in their comments, the ELCC Filing would provide a just and reasonable method for modelling the capacity contributions of the ELCC Resources, and would correct an unjust and

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<sup>10</sup> *PJM*, 171 FERC ¶ 61,015 at ordering paragraph (C) (Apr. 10, 2020) ("If PJM files, pursuant to FPA section 205, a proposed methodology or methodologies to determine the capability of all resource types for Capacity Resource qualification purposes on or before October 30, 2020, the instant consolidated proceedings will be held in abeyance pending Commission action on that FPA section 205 filing."); For discussion of the broader procedural history, see PIO Comments at Point II.

<sup>11</sup> See, e.g., IMM Comments; Limited Protest of LS Power; P3 Comments.

<sup>12</sup> See *infra* at II.B–D.

<sup>13</sup> *Nebraska Pub. Power Dist. v. FERC*, 957 F.3d 932, 943 (8th Cir. 2020) (quoting *Cities of Bethany v. FERC.*, 727 F.2d 1131, 1136 (D.C. Cir. 1984)).

<sup>14</sup> *Id.*

unreasonable status quo, particularly for ESRs.<sup>15</sup> More broadly, as the composition of the grid changes, PJM will need to develop increasingly sophisticated methods for evaluating and ensuring reliability.<sup>16</sup> The ELCC Filing represents an essential first step in this process, and will provide a foundation on which PJM can build to ensure that it is ready to meet future challenges. Implementation of the ELCC Proposal will enable PJM to learn and refine its approach and will help support further improvement of PJM's capacity valuation process.

More broadly, the Commission can and should also consider the strong stakeholder support that the ELCC Proposal received.<sup>17</sup> As the PIO Comments note, the ELCC Proposal received a sector-weighted vote of 4.05/5 in PJM's stakeholder process, representing 81% approval.<sup>18</sup> The ELCC Proposal must still meet the statutory standard of producing just and reasonable rates, which it does, as the PIOs argue in their Comments and in this Answer.<sup>19</sup> However, the stakeholder consensus supporting the ELCC Proposal provides further assurance to the Commission that the ELCC Proposal, as a whole, reflects a just and reasonable balance between a wide range of interests among PJM's stakeholders.

### **B. PJM's Proposed Implementation of ELCC Modelling is Just and Reasonable**

In its comments, the IMM contends that PJM's implementation of ELCC modelling is

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<sup>15</sup> PIO Comments.

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

<sup>17</sup> *See Pub. Serv. Comm'n of Wis. v. FERC*, 545 F.3d 1058, 1062–63 (D.C. Cir. 2008) (observing that the Commission often gives weight to RTO proposals that reflect the position of the majority of stakeholders); *Sw. Power Pool, Inc.*, 127 FERC ¶ 61,283 at P 33 (June 18, 2009) (noting that the Commission “accord[s] an appropriate degree of deference to RTO stakeholder processes”); *Am. Elec. Power Serv. Corp.*, 122 FERC ¶ 61,083, 61,509 (Jan. 31, 2008) (“[R]egional or stakeholder consensus is an important factor to be considered in reviewing the just and reasonableness of a rate design.”) (quoting *PJM Interconnection, L.L.C.*, 119 FERC ¶ 61,063 at P 56 (Apr. 19, 2007)); *Regional Transmission Organizations* (“RTOs”), 89 FERC ¶ 61,285 at 99 (Dec. 20, 1999) (FERC grants deference to RTOs “that have appropriate procedural mechanisms in place to ensure fair representation of viewpoints.”); Policy Statement Regarding Regional Transmission Groups; Policy Statement, 58 FR 41626-01 (1993) (“[T]he Commission has the authority and is willing to give appropriate deference to outcomes produced by agreement of the parties.”).

<sup>18</sup> PIO Comments at 6.

<sup>19</sup> *Id.* at Point III; *see also infra* at Point II.



unreasonable because it does not incorporate certain specific variables.<sup>20</sup> For instance, the IMM critiques PJM’s proposed modeling because it excludes details “like the effect of adding resources in specific locations . . . [and] potential interactions among resources based on network location.”<sup>21</sup> But the IMM does not point to real-life situations where PJM actually modeled those highly localized interactions in other market contexts—because doing so would require a level of modeling granularity that does not exist elsewhere at PJM or other RTOs. PJM’s ELCC Proposal will utilize multiple data inputs to generate capacity values;<sup>22</sup> these detailed inputs will help PJM model reasonable ELCC values. As P3 notes, inputs to the ELCC Proposal “are extraordinarily detailed in the level of technical specification they provide regarding the calculation of ELCC.”<sup>23</sup>

Like any model, the ELCC Proposal likely will not be perfect (particularly right away, before it is refined by information gained through experience applying it). However, modeling is by its nature an imprecise science, and it is unrealistic to expect any model to achieve the level of detail advocated by the IMM. The key issue is whether or not the model includes enough variable to produce a reasonable level of accuracy, and it does. Notably, the model includes “a 4-hour duration class for ESRs along with three other duration classes . . . which help more accurately capture the variety of ways that ESRs can serve grid reliability.”<sup>24</sup> The various specific critiques raised by the IMM ask for a level of granularity that far exceeds what is reasonably expected of PJM in any other market context, and perfection is not the standard—reasonability is.

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<sup>20</sup> IMM Comments at 13–14.

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

<sup>22</sup> As highlighted in PIOs’ previous set of comments, the principle six data inputs are: “(1) Historical weather and load data; 2) Historical output of existing Variable Resources; 3) Estimates of putative historical output for planned Variable Resources; 4) Forced outage patterns for Unlimited Resources; 5) Resource deployment forecast; and 6) Modeling parameters for Limited Duration Resources and Combination Resources.” ELCC Filing at 24.

<sup>23</sup> P3 Comments at 6.

<sup>24</sup> PIO Comments at 13.

### **C. PJM's Approach to ELCC Auction Mechanics is Reasonable and Consistent with Existing Practice**

The IMM raises two technical objections to the auction mechanics included in PJM's proposal. First, the IMM asserts various flaws in PJM's model, and further notes that PJM does not have sufficient, accurate data to properly execute its proposal.<sup>25</sup> Second, the IMM argues that PJM's proposal is "incorrect" because it relies on pre-calculated, average ELCC values, rather than marginal values calculated dynamically for each resource during the auction clearing process.<sup>26</sup> As detailed below, the IMM's comments neither demonstrate why these concerns make PJM's proposal unjust or unreasonable, nor address how the current situation is distinguishable from prior cases where the Commission has considered and rejected similar arguments.

First, to the IMM's complaints on the model and its data sources. The IMM indulges in wordplay<sup>27</sup> to claim that PJM aims to use "imaginary" values for resource performance. However, the ELCC Filing states that PJM will base ELCC on, among other inputs, historical weather and historical output of existing variable resources.<sup>28</sup> Thus, far from the IMM's insinuation that PJM will simply make up resource performance values, PJM proposes to use historical data when available, and conduct a reasonable engineering analysis of future output when historical data is not available. Simplifying, PJM proposes to forecast the output of wind and solar units based on the characteristics of the machines and weather patterns. The IMM's comments fail to engage the substance of this approach, and offers no reasoning for why such a method is unreasonable.

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<sup>25</sup> IMM Comments at 10–11, 13–14.

<sup>26</sup> *Id.* at 18–20.

<sup>27</sup> *Id.* at 10, n.24.

<sup>28</sup> ELCC Filing at Proposed RAA, Schedule 9.1(A).

Forecasts based on historical weather and engineering analysis are commonplace in the PJM capacity market. The load forecast that RPM relies on includes estimates of the weather sensitivity of various load segments and calculations of how those respond to future weather patterns.<sup>29</sup> The future outage rate of existing generation is estimated based on historical data of the particular unit when available, and of a technology class average when historical data is unavailable.<sup>30</sup> Under current rules, the capacity value of variable resources is estimated based on unit-specific historical output when available, and average historical output of similarly situated units when it is not.<sup>31</sup> The IMM makes no effort to explain why an approach that is reasonably used in at least three other situations within the same market suddenly becomes unjust or unreasonable in the context of the current proceeding.

Second, the IMM claims that the ELCC Proposal is inadequate because it uses an average approach to defining ELCC values for resources rather than a marginal value approach.<sup>32</sup> This contention is unavailing, because the average approach is just and reasonable. The average approach functions by assessing the ELCC value for a fleet of resources, allocating that value to the various classes of resources that make up the fleet, and then in turn allocating the value of each class to units within that class.<sup>33</sup> This differs from the marginal value approach in that it does not calculate a unique marginal ELCC value for each unit added to the system. The average approach is reasonable, because the primary purpose of the ELCC Proposal is to model

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<sup>29</sup> See *PJM Manual 19: Load Forecasting and Analysis*, at Section 3.1 (Dec. 5, 2019), <https://www.pjm.com/-/media/documents/manuals/m19.ashx>. See also Andrew Gledhill, *Load Forecast: Education on Model Drivers*, at 5, 12, 23 (Oct. 2020), <https://www.pjm.com/-/media/committees-groups/subcommittees/las/2020/20201022/20201022-item-03-load-forecast-model-education.ashx>.

<sup>30</sup> *PJM Manual 18: PJM Capacity Market* (November 2020), Section 4.2.5. Available at <https://www.pjm.com/-/media/documents/manuals/m18.ashx>.

<sup>31</sup> *PJM Manual 21: Rules and Procedures for Determination of Generating Capability*, at App. B, Section B.3 (Aug. 2019).

<sup>32</sup> IMM Comments at 18–20.

<sup>33</sup> ELCC Filing at Attach. C, *Aff. of Dr. Patricio Rocha Garrido on Behalf of PJM*, at PP 23–27.

reliability, and reliability can be reasonably modelled by examining the performance of PJM's entire fleet of resources.<sup>34</sup> Notably, the Commission recently approved a proposal by the New York Independent System Operator ("NYISO") that uses a similar approach, and provides for an equal capacity adjustment value for each unit of energy storage up to a certain level of penetration, based on a study performed using an ELCC methodology.<sup>35</sup>

Further, the IMM's claim that stakeholders had insufficient time to develop a marginal value approach is not supported by the record.<sup>36</sup> The IMM made several lengthy presentations to PJM stakeholders on the virtues of its proposed marginal value approach.<sup>37</sup> The IMM also developed and proposed a package based on this approach.<sup>38</sup> This package was resoundingly rejected by PJM stakeholders.<sup>39</sup>

Additionally, the IMM claims that the use of dynamic marginal values is essential to efficient market clearing.<sup>40</sup> However, the IMM has made these arguments in at least two other dockets.<sup>41</sup> In both prior cases, the IMM also argued that a market must clear based on a dynamically calculated marginal value, and in both cases, the Commission rejected the IMM's

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<sup>34</sup> See *id.* at PP 10, 20.

<sup>35</sup> NYISO, 170 FERC ¶ 61,033, 61176, at P 113 (Jan. 23, 2020); PJM, *Effective Load Carrying Capability Presentation to Stakeholders*, at 18 (Feb. 24, 2020), <https://www.pjm.com/-/media/committees-groups/committees/mic/2020/20200224-capacity-market/20200224-item-02-effective-load-carrying-capability-elcc.ashx>.

<sup>36</sup> IMM Comments at 2–3.

<sup>37</sup> See, e.g., *ELCC – IMM Proposal* (Aug. 7, 2020), <https://www.pjm.com/-/media/committees-groups/task-forces/ccstf/2020/20200807/20200807-item-06c-imm-package.ashx>; *ELCC - IMM Proposal* (Aug. 12, 2020), <https://www.pjm.com/-/media/committees-groups/task-forces/ccstf/2020/20200812/20200812-item-06a-elcc-mmu-package-and-follow-up-discussion.ashx>.

<sup>38</sup> *Options And Packages Matrix – Post Meeting – Corrected*, at excel sheet 3. Package Matrix, column "C-IMM" (Aug. 2020), <https://www.pjm.com/-/media/committees-groups/task-forces/ccstf/2020/20200812/20200812-options-packages-matrix-post-meeting-20200817-correction.ashx>.

<sup>39</sup> See PJM Markets and Reliability Committee, *Capacity Capability Senior Task Force*, at 4 (Aug. 2020) (showing 94-6 vote against the IMM package), <https://pjm.com/-/media/committees-groups/committees/mrc/2020/20200831-special/20200831-item-01-1-ccstf-voting-results-presentation.ashx>.

<sup>40</sup> IMM Comments at 19.

<sup>41</sup> See *Answer and Mot. for Leave to Answer of the IMM for PJM*, at 6–12, Docket No. ER18-87 (Dec. 2017). See also *Comments of the IMM for PJM*, Docket No. ER12-2391-001 (Oct. 2012).

argument, and approved market designs similar to the one proposed by PJM in the instant proceeding.<sup>42</sup>

#### **D. PJM's ELCC Proposal Reasonably Models Energy Storage**

The IMM also claims that ELCC analysis is “not applicable” to energy storage resources because it relies on assumptions about how the storage will be used in practice<sup>43</sup> and claims, without analysis, that PJM’s results are “simply implausible.”<sup>44</sup> The IMM claims that, unlike wind and solar, which function based on external drivers that can be accurately modelled, energy storage, as a dispatchable resource, could be operated in any number of ways that are not susceptible to predictive modelling.<sup>45</sup> Although the IMM does not say so, presumably it intends for the Commission to conclude that these make the ELCC Proposal unreasonable.

Yet the capacity values of *all* dispatchable resources are based on assumptions about how resources will operate in practice. Many traditional generators have lengthy, expensive startup sequences. The capacity value for those generators is determined with no regard to start-up time or ramp rate, and without consideration of whether a resource owner might make an economic decision to risk a capacity performance penalty rather than begin a potentially unneeded unit start-up. Relatively inflexible generation resources enjoy a capacity value that treats them as ideal, perfectly dispatchable resources that are always optimally used.

Modern energy storage, on the other hand, very closely approximates an ideal, perfectly dispatchable resource, but PJM’s Proposal determines their ELCC based on an algorithmic, possibly sub-optimal dispatch. In contrast to the IMM’s claims, energy storage is modeled more rigorously than other capacity resources. Thus, the IMM’s comments appear to be arguing in

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<sup>42</sup> See *PJM*, 141 FERC ¶ 61,134 at P 85; *PJM*, 162 FERC ¶ 61,295 at P 53 (Mar. 30, 2018).

<sup>43</sup> IMM Comments at 20.

<sup>44</sup> *Id.* at 11.

<sup>45</sup> *Id.* at 20–21.

favor of discriminatory treatment, where highly flexible storage is discounted based on some assumption of inefficient dispatch, while less flexible traditional generation is treated as perfectly used.

The IMM further claims that PJM's findings that four and eight hour batteries are the approximate equivalent of a traditional generator are "implausible."<sup>46</sup> This claim misses both the purpose of a capacity market and prior findings by the Commission. Capacity markets exist to ensure sufficient capacity to serve loads during peak periods. Load during off-peak periods is easily served by the capacity needed to serve the peak periods. Additional capacity during off-peak periods does not bring any additional benefit. An increase or decrease in availability during off-peak periods thus has no impact on the system's total capacity needs. This is the basis behind more than fifty years of FERC and Federal Power Commission precedent that cost causation for capacity charges best relies on demand during peak periods.<sup>47</sup> PJM's finding that storage capable of serving peak hours has nearly the same capacity value as a generator is merely reflecting this aspect of markets.

Further, in other proceedings, the Commission has found reasonable rules that provide that demand response with limited duration brings equivalent capacity value to traditional generation, up to a limited amount of demand response.<sup>48</sup> PJM's current proposal further refines this concept: small amounts of limited duration storage have capacity value close to generation, but the ELCC model will decrease this capacity value as more storage is deployed, or increase it as other changes create more need for short-duration energy. In contrast to being "implausible,"

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<sup>46</sup> *Id.* at 11.

<sup>47</sup> *See, e.g., Wisconsin Michigan Power Co.*, 31 FPC 1445, 1454 (1964).

<sup>48</sup> *PJM*, 146 FERC ¶ 61,052 at PP 5–6 (Jan. 30, 2014).

PJM's results reflect actual system needs and put short duration resources on more rigorous analytical footing than they have been in the past.

Finally, the Commission has recently approved NYISO's proposal to use an ELCC-based methodology to determine the capacity valuation for energy storage.<sup>49</sup> As noted by PJM in a stakeholder presentation regarding ELCC, NYISO's approach uses a relatively simple tiering structure in which capacity value factors for storage duration classes remain the same up to a 1,000 megawatts of penetration for limited duration resources, and then step down to lower capacity value factors after that threshold.<sup>50</sup> PJM's ELCC Proposal is much more sophisticated, and is based on dynamic system modelling rather than a simple binary stepdown, as explained in the PIOs' Comments.<sup>51</sup> As such, if the Commission-approved NYISO approach to modelling the capacity value of energy storage qualifies as just and reasonable, the ELCC Proposal's more detailed approach to modelling energy storage capacity should easily clear that bar.

### III. CONCLUSION

For the reasons explained herein, and in the PIO Comments, the PIOs respectfully request that the Commission approve PJM's ELCC Filing.

Dated: December 11, 2020

Respectfully submitted,

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<sup>49</sup> NYISO, 170 FERC ¶ 61,033, 61176, at P 113; PJM, *Effective Load Carrying Capability Presentation to Stakeholders*, at 18 (Feb. 24, 2020).

<sup>50</sup> PJM, *Effective Load Carrying Capability Presentation to Stakeholders*, at 18 (Feb. 24, 2020).

<sup>51</sup> PIO Comments at II.A.

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**CERTIFICATE OF SERVICE**

I hereby certify that the foregoing has been served in accordance with 18 C.F.R. § 385.2010 upon each party designated on the official service list in this proceeding, by email.

Dated: December 11, 2020

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March 22, 2021

VIA ELECTRONIC FILING

The Honorable Kimberly D. Bose  
Secretary  
Federal Energy Regulatory Commission  
888 First Street, NE Room 1A  
Washington, DC 20426

Re: *PJM Interconnection L.L.C., Docket No. ER21-278-000*  
*Effective Load Carrying Capability Construct*

Dear Secretary Bose,

Enclosed for filing in the above-referenced proceeding, please find the Comments of the Public Interest Organizations on PJM's March 1, 2021 filing. As indicated by the attached certificate of service, all parties to the proceeding are being served with a copy of this document. Should you have any questions, please do not hesitate to contact me. Thank you.

Sincerely,

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## I. INTRODUCTION

On October 30, 2020, PJM Interconnection, LLC (“PJM”) filed in the above-captioned docket a set of revisions to the PJM Open Access Transmission Tariff and the Reliability Assurance Agreement among Load Serving Entities in the PJM Region. These revisions were designed to implement an Effective Load Carrying Capacity (“ELCC”) construct to determine the relative amount of capacity that variable, limited duration, and hybrid resources may offer to provide in PJM’s capacity market.<sup>1</sup> On December 22, 2020, the Federal Energy Regulatory Commission (“Commission” or “FERC”) filed a letter informing PJM that the ELCC Filing is deficient and requested additional information.<sup>2</sup> On March 1, 2021, PJM filed a response to the Deficiency Letter.<sup>3</sup> The PJM Response contained both additional information and amendments to the tariff revisions proposed in the ELCC Filing.<sup>4</sup>

Pursuant to Rule 211 of the Commission’s Rules of Practice and Procedure,<sup>5</sup> the Sustainable FERC Project, Natural Resources Defense Council, Union of Concerned Scientists, and Sierra Club (collectively, the “Public Interest Organizations” or “PIOs”) respectfully submit these comments on the PJM Response (“Comments”). As discussed in further detail below, subject to certain caveats, the PIOs support PJM’s proposed tariff revisions to implement an ELCC construct for its capacity market.

## II. ARGUMENT

### A. The PIOs’ Previously-Filed Comments on the ELCC Filing Remain Applicable to the PJM Response

On November 11, 2020, the PIOs filed comments on the ELCC Filing.<sup>6</sup> In the ELCC

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<sup>1</sup> ELCC 205 Filing, Accession No. 20201030-5238 (Oct. 30, 2020) (“ELCC Filing”).

<sup>2</sup> Deficiency Letter, Docket No. ER21-278 (Dec. 22, 2020) (“Deficiency Letter”).

<sup>3</sup> PJM Resp. to Comm’n Deficiency Letter, Accession No. 20201222-3043 (Mar. 1, 2021) (“PJM Response”).

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

<sup>5</sup> 18 C.F.R. § 385.211.

<sup>6</sup> Comments of the PIOs, Accession No. 20201120-5261 (Nov. 20, 2020) (“ELCC Filing Comments”).

Filing Comments, the PIOs stated that: (1) the ELCC approach to capacity valuation is just and reasonable as a methodology; (2) PJM's proposed implementation of ELCC is just and reasonable; and (3) PJM should conform its interconnection procedures to be consistent with its ELCC proposal and its tariff.<sup>7</sup>

On December 11, 2020, the PIOs filed a motion for leave to answer and answer in reply to some of the comments and protests filed in response to ELCC Filing.<sup>8</sup> In the ELCC Filing Answer, the PIOs stated that: (1) PJM's ELCC proposal is, taken as a whole, just and reasonable; (2) PJM's proposed implementation of ELCC modeling is just and reasonable; (3) PJM's approach to ELCC auction mechanics is reasonable and consistent with existing practice; and (4) PJM's ELCC proposal reasonably models energy storage.<sup>9</sup>

The PIOs' ELCC Filing Comments and ELCC Filing Answer remain applicable to PJM's ELCC Filing as modified by the PJM Response. The PIOs find that PJM's ELCC proposal is, taken as a whole, just and reasonable, and should be approved, subject to the caveats discussed in the ELCC Filing Comments, ELCC Filing Answer, and herein.

**B. PJM's Proposed Treatment of Injection Beyond Capacity Interconnection Rights is a Reasonable Simplification**

Resource interconnections within PJM are characterized by two different megawatt ("MW") values: Maximum Facility Output ("MFO") and Capacity Interconnection Rights ("CIRs"). These roughly correspond to interruptible and non-interruptible transmission service. During the interconnection process, PJM affirms that the facility may generally inject up to its MFO, but may from time to time be restricted due to transmission constraints because loads are

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<sup>7</sup> *Id.*

<sup>8</sup> Mot. for Leave to Answer and Answer of the PIOs, Accession No. 20201211-5175 (Dec. 11, 2020) ("ELCC Filing Answer").

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

lower or other resources are operating. CIRs, on the other hand, represent deliverability during studied peak conditions, which is not the same as a demonstration that the facility can expect to be able to inject at all times.

For intermittent resources, these two values may be significantly different. For example, a wind farm with a 100 MW MFO might have an Accredited Unforced Capacity (“UCAP”) of only 13 MW, and so would only be required (and allowed) to hold 13 MW of CIRs. PJM’s proposed ELCC analysis is based on a facility’s MFO, raising a concern that an ELCC resource’s Accredited UCAP is based in part on the supply studied on the transmission system at the CIR level. Commission staff raise this concern in Question 4(e) of the Deficiency Letter, and PJM confirms that “the reliability value of output above a resource’s CIR level is included in the ELCC evaluation.”<sup>10</sup> As discussed below, this approach is reasonable.

1. *PJM’s proposed ELCC approach is a reasonable measure of the reliability value of variable resources*

Variable resources present a challenge for transmission planning. Since these resources only output at their full nameplate power level a small fraction of the time, it would be wasteful and uneconomic to require them to have demonstrated injection capability at all hours at their MFO. In fact, no generation is studied for injection at all hours. On the other hand, resource adequacy analysis must take deliverability into account; energy that is isolated due to transmission constraints is of no use during an emergency. To find the contribution to resource adequacy of a generator, PJM’s current CIR rules statically allocate ‘slices’ of the transmission system to capacity resources, while the proposed ELCC rules acknowledge that dynamic combinations of renewable, storage, and limited resources will be operating at various times.

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<sup>10</sup> PJM Response, Attach. 1, Resp. of PJM to FERC Staff’s December 22, 2020 Information Request, at 24.



In the absence of a settled method to reconcile these two approaches, PJM proposes a simple heuristic: study ELCC resources based on their MFO, and require them to hold firm CIRs based on the result of that study. This creates an obligation on ELCC resources to pay for, and hold rights to, some level of CIRs on the transmission system, while granting that ELCC resources' output beyond that studied CIR injection level may contribute to resource adequacy. A variety of factors make this a reasonable compromise.

Critically, the ELCC Accredited UCAP already accounts for historical curtailments. PJM proposes to calculate Accredited UCAP based on the historical metered output of ELCC resources. Instances where ELCC resources are curtailed due to transmission constraints will be reflected in this data, and will be reflected in the resulting Accredited UCAP values. Ultimately, the extent to which transmission constraints impact ELCC resources' resource adequacy value is an empirical question. By incorporating historical curtailments into the Accredited UCAP values, PJM accurately captures their impact. This results in more cost-effective utilization of the transmission system.

PJM's proposed empirical approach is, in itself, enough to make their treatment of ELCC resources' injection beyond their CIRs reasonable. However, there are a number of supporting arguments that help explain the empirical results, and further justify the reasonableness of PJM's proposed approach:

- CIRs are granted based on peak conditions, while ELCC considers year-round benefits. CIRs are generally constrained by deliverability under peak load conditions. ELCC, in contrast, considers benefits delivered during all 8,760 hours each year. At least a portion of the resource adequacy benefit of ELCC resources lies in hours when the system is not transmission constrained and the output of the ELCC resources is deliverable.
- By design, there is spare "firm" or deliverable capacity on PJM's transmission system. In PJM, traditional generation is granted a UCAP equal to their CIRs discounted by their forced outage rate. Additionally, PJM plans to hold sufficient UCAP to maintain a reserve margin. These two factors lead to the amount of CIRs being significantly higher than

peak load. For example, looking at PJM's 2022 planning parameters, PJM requires at least 163,269 MW UCAP to serve 150,229 MW of peak load. The pool-wide average forced outage rate is 5.08%, meaning that at about 170,007 MW of CIRs will be held to deliver the required amount of UCAP. At any given time, there will be transmission capacity unused due to the generators it is reserved for being out of service. As ELCC is based on the dynamic contribution of the entire pool of ELCC resources, it is reasonable to expect them, and PJM, to take advantage of this situation. In operations, that use of the transmission capacity will happen through the security-constrained dispatch.

- Resource adequacy risk is driven as much by generator outages as by peak load. Amplifying the previous point, recent events have demonstrated that system emergencies are often caused as much by supply issues as peak load. This means that conditions on the transmission system during emergencies will often be different from those studied in granting CIRs. In particular, during emergencies resulting from generator outages, the transmission reserved for non-performing generation risks being unused. The proposed ELCC approach models winter generation outages, reflecting the resource adequacy value during those periods.

In short, the current system of statically allocating CIRs based on peak load conditions has the virtue of simplicity, but creates inefficiencies in the use of the built transmission system and generator capability. As a more sophisticated planning tool than the "meet peak load" approach behind CIRs, ELCC reflects a more efficient use of the transmission system. PJM's proposal to consider the full output of ELCC resources is a reasonable reflection of this improved efficiency. The fact that curtailments stemming from historical transmission congestion are reflected in the inputs to the ELCC model gives additional, appropriate assurance that PJM's proposed approach adequately and accurately measures resource adequacy.

2. *The Commission's inquiry about transmission adequacy should be informed by PJM's manual rules that require studying all resources*

More broadly, the Commission's inquiry in Question 4(e)<sup>11</sup> regarding transmission adequacy should also take into consideration relevant language from PJM Manual 14B.<sup>12</sup> PJM's

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

<sup>12</sup> *PJM Manual 14B: PJM Region Transmission Planning Process*, at 75 (Oct. 1, 2020) ("PJM Manual 14B"), <https://pjm.com/planning/~media/documents/manuals/m14b.ashx>.

reply to Question 4(e) does not discuss this language, but this language is important to consider because it provides key context.

We encourage the Commission to recognize the full manner in which PJM assures sufficient deliverability. Deliverability discussions should reflect the actual loss of load expectation (“LOLE”) standards and practices used in PJM planning and resource adequacy analyses and operations.

The answer to Question 4(e) in the PJM Response emphasized the CIRs that can be obtained by a generating resource, which are not congruent with the PJM procedures for measuring and maintaining the deliverability needed to meet LOLE standard. PJM Manual 14B’s language describing PJM’s Deliverability Testing Methods does not use measures of UCAP, Installed Capacity (“ICAP”), or CIRs but instead is written to describe energy. Further, there is the matter of a higher standard (1 event in 25 years) used by PJM in testing the adequacy of the transmission system to maintain the LOLE standard of 1 event in 10 years. The following language from PJM Manual 14B is key:

The specific procedures utilized to test deliverability from the load perspective involve the calculation of Capacity Emergency Transfer Objectives (CETO) and Capacity Emergency Transfer Limits (CETL) for the various electrical areas of PJM. A CETO value represents the amount of energy that a given area must be able to import in order to remain within an LOLE of 1 event in 25 years (1/25) when that area is experiencing a localized capacity emergency. The LOLE calculation takes into account all generation within the study area including that which may not be a PJM capacity resource. The CETL represents the actual ability of the Transmission System to support deliveries of energy to an electrical area experiencing such a capacity emergency. Providing that the CETL for a given area exceeds the CETO for that area, the test is passed and, on a probabilistic level, the area will be able to import sufficient energy during emergencies. The Transmission System is tested at a LOLE of 1/25 so that the transmission risk does not appreciably diminish the overall target of a 1/10 LOLE for PJM.<sup>13</sup>

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

The Commission's consideration of the ELCC Filing and the PJM Response should include consideration of the relevant context provided by this language from PJM Manual 14B.

**C. The Treatment of Capacity Interconnection Rights for Wind and Solar in PJM's Manuals Should be Updated Consistent with the ELCC Values for Wind and Solar**

The PIOs' ELCC Filing Comments raised a concern that if resources' eligibility for CIRs as delineated in PJM's manuals is not updated to conform to ELCC values, inability to obtain CIRs will prevent those resources from participating in the capacity market at their full Accredited UCAP.<sup>14</sup> The Deficiency Letter's Question 4 asks PJM to clarify this issue. In response to Question 4(b), PJM confirms that CIR eligibility for wind and solar resources will not be updated to reflect Accredited UCAP.<sup>15</sup> In response to Question 4(c), PJM confirms that a resource with an Accredited UCAP greater than its CIR eligibility will not be able to offer its full Accredited UCAP into the capacity market.<sup>16</sup>

If left uncorrected, this would return us to a situation where provisions in PJM's manuals override its tariff. The Commission's concerns about a similar flaw was one of the motivations for the Section 206 investigation that led to this docket. Now, as then, the Commission's rule of reason policy applies: "provisions that [1] 'significantly affect rates, terms, and conditions' of service, [2] are readily susceptible of specification, and [3] are not generally understood in a contractual agreement must be included in the tariff."<sup>17</sup>

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<sup>14</sup> ELCC Filing Comments at 19.

<sup>15</sup> PJM Response, Attach. 1, Resp. of PJM to FERC Staff's December 22, 2020 Information Request, at 18–21.

<sup>16</sup> *Id.* at 22.

<sup>17</sup> See, e.g., *Energy Storage Ass'n v. PJM*, 162 FERC ¶ 61,296 at P 103 (2018) (citing *Midcontinent Indep. Sys. Operator, Inc.*, 158 FERC ¶ 61,003, at P 69 (2017)); *PacifiCorp*, 127 FERC ¶ 61,144, at P 11 (2009); *City of Cleveland, Ohio v. FERC*, 773 F.2d 1368, 1376 (D.C. Cir. 1985).

CIR eligibility meets all three of these prongs of the rule of reason, and so must be specified in a tariff. As PJM confirms,<sup>18</sup> business manual provisions on wind and solar resources' eligibility for CIRs act as a *de facto* cap on the quantity they may offer into the capacity market. This easily meets the standard of being a provision that significantly affects rates. Rules regarding CIR eligibility are currently specified in PJM manuals, and we propose updating them to conform to tariff language, demonstrating these provisions are readily susceptible to specification. Finally, we are aware of no arguments that CIR eligibility is considered a generally understood contractual arrangement and no party has so argued in this proceeding.

PJM suggests the question may be moot, as preliminary ELCC results give Accredited UCAP values less than current CIR limits.<sup>19</sup> This may be the case for PJM's most recent preliminary results, but PJM has published earlier preliminary ELCC results that yielded Accredited UCAP values higher than current CIR limits. This demonstrates that the question of whether CIRs will override Accredited UCAP is an empirical question, and so cannot be dismissed as moot. Even if we did have certainty on the current situation, that gives no guarantee that it might not change in the future. As PJM noted, "ELCC values for a resource can actually increase with time when there is greater buildout in other, complementary classes."<sup>20</sup> Increased deployment of energy storage technologies could well increase the Accredited UCAP value of wind and solar beyond current CIR eligibility.

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<sup>18</sup> PJM Response, Attach. 1, Resp. of PJM to FERC Staff's December 22, 2020 Information Request, at 16–17.

<sup>19</sup> *Id.* at 22.

<sup>20</sup> ELCC Filing at 20.

In order to ensure that PJM's ELCC proposal is implemented in the manner described in PJM's ELCC Filing, PJM must simply conform the interconnection procedures in its business manuals to be consistent with the ELCC proposal and its Tariff. As the Commission has instructed, "the filed and accepted tariff is the governing document and not the Business Practice Manuals - the former has precedence over the latter and not the other way around."<sup>21</sup>

The PIOs respectfully reiterate our request that the Commission clarify its expectation that PJM, consistent with its tariff, allow ELCC resources to apply for sufficient CIRs to support their full Accredited UCAP, and that the Commission direct PJM to make necessary conforming manual changes to avoid a conflict between business manuals and filed tariff language.

### III. CONCLUSION

In recent years, markets have been driving significant investment in wind, solar, energy storage, and hybrid facilities in the PJM Region. The ELCC proposal contained in the ELCC Filing and the PJM Response represents a just and reasonable way of modeling the reliability contributions of these resources, and corrects an unjust and unreasonable status quo that dramatically undervalues the capacity contributions of energy storage. Accordingly, the PIOs respectfully request that the Commission approve PJM's ELCC Filing as modified by the PJM Response.

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<sup>21</sup> *Midwest Indep. Sys. Operator, Inc.*, 117 FERC ¶ 61,113, 61,597 (2006); *See also Midwest Indep. Sys. Operator, Inc.*, 122 FERC ¶ 61,172, 61,965 (2008) ("To the extent the Business Practice Manuals contain greater detail than the tariff...the greater detail supplements the tariff and does not override the tariff."); *Midwest Indep. Transmission Sys. Operator, Inc. Pub. Utilities with Grandfathered Agreements in the Midwest ISO Region*, 108 FERC ¶ 61,163, 62,012 (2004) ("We share WEPCO's concern that the Business Practice Manuals should not take precedence over the TEMT.").

Dated: March 22, 2021.

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**CERTIFICATE OF SERVICE**

I hereby certify that the foregoing has been served in accordance with 18 C.F.R. § 385.2010 upon each party designated on the official service list in this proceeding, by email.

Dated: March 22, 2021

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