

180 FERC ¶ 61,135  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

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

PJM Interconnection, L.L.C.

Docket Nos. EL19-58-012  
EL19-58-014  
EL19-58-015

ORDER ON COMPLIANCE

(Issued September 1, 2022)

1. On February 22, 2022, August 16, 2022, and August 17, 2022, PJM Interconnection, L.L.C. (PJM) submitted revisions to the PJM Open Access Transmission Tariff (Tariff) and the Amended and Restated Operating Agreement of PJM (Operating Agreement) to implement the reserve market revisions the Commission accepted in the May 21, 2020 Order on Proposed Tariff and Operating Agreement Revisions<sup>1</sup> and affirmed in the December 22, 2021 Order on Voluntary Remand,<sup>2</sup> and to reflect the then currently effective Reserve Penalty Factors and Operating Reserve Demand Curves (ORDCs), in compliance with the Remand Order.<sup>3</sup>

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<sup>1</sup> *PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,153 (May 2020 Order), *order on reh'g*, 173 FERC ¶ 61,123 (2020) (November 2020 Rehearing Order); *PJM Interconnection, L.L.C.*, 173 FERC ¶ 61,134 (2020) (November 2020 Compliance Order), *order on reh'g*, 174 FERC ¶ 61,180 (2021) (March 2021 Compliance Rehearing Order).

<sup>2</sup> *PJM Interconnection, L.L.C.*, 177 FERC ¶ 61,209 (2021) (Remand Order), *order on clarification*, 178 FERC ¶ 61,085 (2022) (Clarification Order), *order on reh'g*, 180 FERC ¶ 61,051 (2022) (Remand Rehearing Order).

<sup>3</sup> To avoid confusion, references to the “currently effective” Reserve Penalty Factors and ORDCs refer to the Reserve Penalty Factors and ORDCs that were effective at the time of the Remand Order, which were the provisions effective prior to PJM’s filing of proposed reserve market changes in Docket No. EL19-58-000. Similarly, other references to “currently effective” provisions generally refer to the provisions in effect prior to the proposed changes in that filing.

2. PJM filed two sets of tariff records. One set with a requested effective date of May 1, 2022 establishes the tariff records that existed prior to the filing of the reserve market changes in Docket No. EL19-58-000 (and any tariff provisions accepted by the Commission in other proceedings effective prior to or including May 1, 2022). This first set of tariff records replaces tariff records that went into effect on May 1, 2022 (i.e., tariff records previously accepted by the Commission in this proceeding in compliance with directives that were later reversed in the Remand Order). The second set of tariff records implements the Remand Order's directives with a requested effective date of October 1, 2022, consistent with the Remand Order's finding that PJM may propose a new effective date for those tariff records if PJM determines that it cannot implement the changes by May 1, 2022.<sup>4</sup> As discussed below, we accept both sets of tariff records.<sup>5</sup> We also require PJM to submit a compliance filing by September 26, 2022 to implement the corrections and revisions described in Appendix B of this order, as discussed below.

### **I. Background**

3. On March 29, 2019, PJM submitted filings pursuant to FPA sections 205 and 206<sup>6</sup> asserting that the reserve market provisions of its Tariff and Operating Agreement are

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<sup>4</sup> Remand Order, 177 FERC ¶ 61,209 at P 47.

<sup>5</sup> On February 22, 2022, in Docket No. EL19-58-012, PJM filed tariff records with two effective dates, May 1, 2022 and an indeterminate effect date (12/31/9998) as PJM stated that it did not know when it would be able to implement the Remand Order's directives. On August 16, 2022, PJM made a filing in Docket No. EL19-58-014 because it determined that it could implement the directives on October 1, 2022. In so doing, however, PJM inadvertently eliminated from eTariff tariff records to be effective on May 1, 2022. PJM then made the filing in Docket No. EL19-58-015 on August 17, 2022 to reinstate the tariff records effective May 1, 2022 that it inadvertently deleted.

<sup>6</sup> 16 U.S.C. §§ 824d-824e. PJM filed the proposed revisions to the Operating Agreement pursuant to FPA section 206, in Docket No. EL19-58-000, and filed pursuant to FPA section 205 to include the same revisions to its Tariff, Attachment K-Appendix, which merely repeats certain provisions of the Operating Agreement, in Docket No. ER19-1486-000. PJM, Filings, Docket Nos. EL19-58-000 and ER19-1486-000, at 1 n.1 (filed March 29, 2019) (2019 Reserve Markets Complaint). As PJM recognized in its transmittal letter, because PJM does not have authority under its Operating Agreement to file these revisions unilaterally pursuant to section 205, its FPA section 205 filing remains subject to the requirements of FPA section 206. *Id.* All citations to the "2019 Reserve Markets Complaint" herein, unless otherwise noted, refer to the transmittal filed in Docket No. EL19-58-000, which, aside from the cover letter and Attachments A and B, is identical to the transmittal filed in Docket No. ER19-1486-000.

unjust and unreasonable and proposing revisions to the Tariff and Operating Agreement.<sup>7</sup> As part of its replacement rate, PJM proposed to: (1) revise the shape of the ORDCs to be based on a probabilistic calculation of the risk of a reserve shortage due to operational uncertainties; (2) increase its \$850/MWh Reserve Penalty Factors to \$2,000/MWh to align with the price-setting energy offer cap of \$2,000/MWh; (3) consolidate the Tier 1 and Tier 2 Synchronized Reserve products into one product with uniform commitment, compensation, and non-performance penalty structures; (4) align reserve procurement in the day-ahead and real-time markets by establishing two 10-minute reserve requirements (Synchronized Reserve Requirement and Primary Reserve Requirement) and one 30-minute reserve requirement (30-minute Reserve Requirement)<sup>8</sup> in each market; and (5) remove the reserve price caps.<sup>9</sup>

4. In the May 2020 Order, the Commission granted PJM's complaint and found that PJM's existing reserve market design is no longer just and reasonable. The Commission largely adopted PJM's proposed revisions as the just and reasonable replacement rate, subject to certain modifications in a compliance filing.<sup>10</sup> Among other things, the Commission: (1) adopted PJM's proposed Reserve Penalty Factors of \$2,000/MWh for all reserve products;<sup>11</sup> (2) adopted PJM's proposal to establish a downward-sloping portion of its ORDCs to the right of the applicable minimum reserve requirement to value reserves in excess of the minimum reserve requirements;<sup>12</sup> (3) adopted PJM's proposal to

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<sup>7</sup> May 2020 Order, 171 FERC ¶ 61,153 at P 1. For a comprehensive history, see Remand Order, 177 FERC ¶ 61,209; March 2021 Compliance Rehearing Order, 174 FERC ¶ 61,180; November 2020 Rehearing Order, 173 FERC ¶ 61,123; Remand Rehearing Order, 180 FERC ¶ 61,051 (2022).

<sup>8</sup> PJM's revisions defined a new regional-transmission-organization-wide (RTO-wide) 30-minute Reserve Requirement that can be met by the existing 10-minute reserve products and a new Secondary Reserve product representing a resource's ability to provide energy (or curtail load) within 10 minutes to 30 minutes after being called upon. PJM's proposal allowed PJM to define a 30-minute Reserve Requirement for the MAD sub-zone, but PJM stated that "as a default PJM intends to only model the 30-minute [R]eserve [R]equirement for the RTO-wide Reserve Zone." 2019 Reserve Markets Complaint at 12 n.12.

<sup>9</sup> May 2020 Order, 171 FERC ¶ 61,153 at P 9; November 2020 Rehearing Order, 173 FERC ¶ 61,123 at P 5.

<sup>10</sup> May 2020 Order, 171 FERC ¶ 61,153 at PP 2, 22, 24, 74.

<sup>11</sup> *Id.* PP 8, 153.

<sup>12</sup> *Id.* PP 219-225.

consolidate Tier 1 and Tier 2 Synchronized Reserve products;<sup>13</sup> (4) adopted PJM's proposal to align its day-ahead and real-time reserve markets;<sup>14</sup> (5) removed the reserve price caps; and (6) adopted various changes related to resources' eligibility for reserves, determining resources' reserve capability, and offer rules.<sup>15</sup> The Commission accepted PJM's proposal to lift the reserve price caps as part of its adoption of PJM's proposed \$2,000/MWh Reserve Penalty Factors.<sup>16</sup> The May 2020 Order did not specifically find the reserve price caps unjust and unreasonable.

5. The November 2020 Rehearing Order reached the same results. In the November 2020 Compliance Order, the Commission accepted PJM's Tariff and Operating Agreement revisions regarding the reserve market reforms, effective May 1, 2022.<sup>17</sup>

6. In the Remand Order, the Commission affirmed its finding that PJM satisfied its burden under FPA section 206<sup>18</sup> to show that the bifurcation of Tier 1 and Tier 2 Synchronized Reserve products, misalignment of the day-ahead and real-time reserve markets, and the provisions regarding resources' reserve capability and offer rules are unjust and unreasonable.<sup>19</sup> However, the Commission reversed its prior determination in part and found that PJM failed to meet its burden to show that the currently effective Reserve Penalty Factors and two-step ORDCs are unjust and unreasonable and denied PJM's complaint regarding these two aspects of its reserve market.<sup>20</sup> The Commission also directed PJM to submit a compliance filing within 60 days including revisions to the Tariff and Operating Agreement tariff records previously accepted in this proceeding (to become effective May 1, 2022) to reflect the then currently-effective Reserve Penalty

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<sup>13</sup> *Id.* PP 115-121.

<sup>14</sup> *Id.* PP 254-256.

<sup>15</sup> *Id.* P 157.

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

<sup>17</sup> November 2020 Compliance Order, 173 FERC ¶ 61,134 at P 3.

<sup>18</sup> 16 U.S.C. § 824e.

<sup>19</sup> Remand Order, 177 FERC ¶ 61,209 at PP 2, 24.

<sup>20</sup> *Id.* PP 2, 25. The Commission also reversed its determination that the prior backward-looking energy and ancillary services offset (E&AS Offset) is unjust and unreasonable, as that determination was based primarily on the findings regarding the Reserve Penalty Factors and ORDCs. *Id.*

Factors and ORDCs.<sup>21</sup> The Commission stated that it was unsure whether PJM would be able to implement the reserve market changes not revised by the order by May 1, 2022. The Commission directed that, if PJM determined that it could not implement those changes by May 1, 2022, it should include tariff records proposing a new effective date for those changes. The Commission explained that, if PJM determined that a later effective date was required for any tariff records, PJM needed to file two sets of tariff records: one set of records to become effective May 1, 2022 with the currently-effective tariff provisions (and any tariff provisions accepted by the Commission in other proceedings prior to the compliance filing that would be effective prior to or including May 1, 2022); and a second set of records with the provisions to be effective on a later proposed effective date.<sup>22</sup> On July 28, 2022, the Commission issued an order on rehearing affirming the Commission's findings in the Remand Order.<sup>23</sup>

7. On January 18, 2022, PJM filed a motion requesting clarification regarding how and if it should revise its reserve price caps to comply with the Remand Order.<sup>24</sup> PJM requested that the Commission clarify whether the Remand Order: (1) retains the May 2020 Order's acceptance of the removal of price caps in the reserve markets; or (2) directs maintaining such price caps.<sup>25</sup> PJM explained that, to the extent the Commission did not intend to reaffirm the removal of the reserve price caps, PJM would include capping provisions in its compliance filing that are consistent with its existing reserve capping provisions but reflect the addition of the new 30-minute Reserve Requirement.<sup>26</sup>

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<sup>21</sup> *Id.* PP 2, 26, 47. The Commission also directed PJM to restore its tariff provisions related to its prior backward-looking E&AS Offset, effective November 12, 2020. PJM submitted those changes in a separate compliance filing in Docket No. EL19-58-011, which the Commission accepted on May 13, 2022, subject to a compliance filing. *PJM Interconnection, L.L.C.*, 179 FERC ¶ 61,104 (2022). The Commission also directed PJM to submit a compliance filing proposing a new schedule for the base residual auctions, which the Commission accepted on February 22, 2022 in Docket No. EL19-58-010. *PJM Interconnection, L.L.C.*, 178 FERC ¶ 61,122 (2022).

<sup>22</sup> Remand Order, 177 FERC ¶ 61,209 at P 47 n.106.

<sup>23</sup> Remand Rehearing Order, 180 FERC ¶ 61,051.

<sup>24</sup> PJM, Motion for Clarification, Docket No. EL19-58-008 (filed Jan. 18, 2022) (Motion for Clarification).

<sup>25</sup> *Id.* at 4.

<sup>26</sup> *Id.* at 9-10.

8. On February 11, 2022, the Commission issued an order clarifying that the Remand Order did not remove the reserve price caps.<sup>27</sup> However, the Commission found that:

Because the Remand Order maintained the May 2020 Order's directive that PJM adopt a new 30-minute Reserve Requirement and Secondary Reserve product, PJM may propose revised reserve price caps to reflect the addition of this new product, but we note that the Commission will review PJM's proposal with the benefit of parties' comments submitted as part of the compliance proceeding.<sup>28</sup>

## II. Filing

9. On February 22, 2022, PJM filed two sets of tariff records, one set with a requested effective date of May 1, 2022, and the other set with an indeterminate requested effective date of 12/31/9998.<sup>29</sup> On August 16, 2022, PJM refiled the second set of tariff records, without changes to the proposed revisions, with a new requested effective date of October 1, 2022.<sup>30</sup>

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<sup>27</sup> Clarification Order, 178 FERC ¶ 61,085.

<sup>28</sup> *Id.* P 17.

<sup>29</sup> February 22 Transmittal at 1, 4. As discussed above, PJM filed two sets of tariff records. One set with a requested effective date of May 1, 2022 establishes the tariff records that existed prior to the filing of the reserve market changes in Docket No. EL19-58-000 (with additional tariff provisions accepted by the Commission in any other proceedings effective prior to or including May 1, 2022), replacing tariff records that went into effect on May 1, 2022 (i.e., tariff records previously accepted by the Commission in this proceeding in compliance with directives that were later reversed in the Remand Order). The second set of tariff records implements the Remand Order's directives with a requested effective date of October 1, 2022, consistent with the Remand Order's finding that PJM may propose a new effective date for those tariff records if PJM determines that it cannot implement the changes by May 1, 2022. All of the revisions discussed in PJM's filing are in this second set of tariff records with an October 1, 2022 effective date.

<sup>30</sup> In its August 16, 2022 filing, PJM states that the tariff records submitted in the August 16, 2022 filing are unchanged from those included in the February 22, 2022 filing except for the October 1, 2022 effective date metadata, and Tariff and Operating Agreement updates to the definitions that have been accepted by the Commission in

**A. Tariff Records Requested to Be Effective May 1, 2022**

10. PJM states that it submits one set of tariff records with a requested effective date of May 1, 2022 to replace the records previously accepted in this proceeding so that the Tariff and Operating Agreement provisions effective prior to and including May 1, 2022 will remain in effect.<sup>31</sup>

**B. Tariff Revisions Requested to Be Effective October 1, 2022**

11. PJM states that to comply with the directives in the Remand Order to implement the market rule revisions “previously accepted in this proceeding . . . [but] reflect[ing] the currently effective Reserve Penalty Factors and the ORDCs,”<sup>32</sup> PJM is generally carrying forward, without change, the revisions accepted in the May 2020 Order (as updated in the July 6, 2020 compliance filing) to Operating Agreement, Schedule 1, sections 1.5A, 1.7, 1.10, 1.11, and 3.2.<sup>33</sup> PJM states that it is also carrying forward the energy market revisions accepted in sections 2.2, 2.5, and 2.6, but that those revisions are not as straightforward because of intervening changes to those sections as part of PJM’s implementation of fast-start pricing. PJM explains that, because section 2.2 was overhauled as part of the fast-start proceeding, PJM is adding this revision as new subsection 2.6(b), with the text generally unchanged from what PJM initially proposed to add in Operating Agreement, Schedule 1, section 2.2(d)(i).<sup>34</sup> In addition, PJM is carrying

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Docket No. ER22-1420 since the submission of the February 22, 2022 filing. August 16 Transmittal at 4-6.

<sup>31</sup> February 22 Transmittal at 13 n.37 (citing Remand Order, 177 FERC ¶ 61,209 at P 47 & n.106). On August 17, 2022, PJM resubmitted, without changes, the tariff records previously submitted on February 22, 2022 with a requested effective date of May 1, 2022 that it had inadvertently deleted from eTariff. August 17 Transmittal at 1-2.

<sup>32</sup> February 22 Transmittal at 4 (citing Remand Order, 177 FERC ¶ 61,209 at P 4).

<sup>33</sup> *Id.* (citing PJM, Compliance Filing, Docket No. EL19-58-002 (filed July 6, 2020)). PJM explains that all references to the Operating Agreement, Schedule 1, herein shall also be meant to reference the identical provisions in Tariff, Attachment K-Appendix. *Id.* at 1 n.2.

<sup>34</sup> *Id.* at 4-5.

forward revised language that clarifies that real-time and day-ahead energy market prices will be determined in conjunction with clearing the reserve markets.<sup>35</sup>

12. PJM explains that it is not revising the Reserve Penalty Factors stated in its currently-effective market rules of \$850/MWh for the Synchronized Reserve Requirement and Primary Reserve Requirement and \$300/MWh for the Extended Synchronized Reserve Requirement and Extended Primary Reserve Requirement.<sup>36</sup> PJM states that to comply with the directives in the Remand Order to propose “Reserve Penalty Factors for 30-minute Reserve that are the same as the Reserve Penalty Factors for Synchronized Reserve and Primary Reserve,”<sup>37</sup> PJM is revising the Secondary Reserve market rules accepted in the May 2020 Order and affirmed in the Remand Order to provide for Reserve Penalty Factors of \$850/MWh for the 30-minute Reserve Requirement and \$300/MWh for the Extended 30-minute Reserve Requirement.<sup>38</sup> For the revisions to become effective in the future, PJM has also included a price cap for the Non-Synchronized Reserve Market Clearing Price equal to 1.5 times the Reserve Penalty Factor for the Primary Reserve Requirement, as discussed below.<sup>39</sup>

13. To comply with the directives in the Remand Order related to both the currently effective two-step ORDCs and the proposed two-step ORDC for the new 30-minute Reserve Requirement, PJM proposes the defined term “Operating Reserve Demand Curve” to describe the two-step curve.<sup>40</sup> PJM explains that although the two-step ORDC is not described in the currently effective market rules, implementation of the accepted reserve market enhancements necessitates defining the ORDCs. PJM explains that new market rules for clearing the reserve markets and determining prices require use of a defined ORDC term. PJM also proposes revisions that define the ORDCs to include both

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<sup>35</sup> *Id.* at 5 (citing proposed Operating Agreement, Schedule 1, sections 2.5(a) (Calculation of Real-time Prices) and 2.6(a) (Calculation of Day-ahead Prices)).

<sup>36</sup> *Id.* (citing proposed Operating Agreement, Schedule 1, sections 3.2.3A(d)(iii) (Synchronized Reserve) and 3.2.3.A.001(c)(iii) (Non-Synchronized Reserve)).

<sup>37</sup> *Id.* (citing Remand Order, 177 FERC ¶ 61,209 at P 47 n.105).

<sup>38</sup> *Id.* at 5-6 (citing proposed Operating Agreement, Schedule 1, section 3.2.3A.01(d)(iii) (Secondary Reserve)).

<sup>39</sup> *Id.* at 8-9 (citing proposed Operating Agreement, Schedule 1, Sections 3.2.3A.001(c)(i) and 3.2.3A.001(c)(ii) (Non-Synchronized Reserve Market Clearing Prices)).

<sup>40</sup> *Id.* at 6.



the reserve requirement and the extended reserve requirement.<sup>41</sup> PJM explains that the ORDCs for clearing each reserve market will be formed using the reserve requirement and extended reserve requirement and Reserve Penalty Factors applicable to that product.<sup>42</sup> PJM explains that the ORDC to meet the 30-minute Reserve Requirement and Extended 30-minute Reserve Requirement will be two-stepped, based on a \$850/MWh Reserve Penalty Factor for the 30-minute Reserve Requirement and a \$300/MWh Reserve Penalty Factor for the Extended 30-minute Reserve Requirement.<sup>43</sup> PJM states that the ORDCs for Synchronized Reserve and Primary Reserve will be similarly formed.

14. PJM states that it is targeting an October 1, 2022 implementation date for its proposed revisions, consistent with a schedule that will allow PJM to test its software and work with its vendors to identify and resolve any issues during the fall season.<sup>44</sup> PJM explains that implementing these changes during the fall ensures that any issues that arise from testing occur during the shoulder months and not during the summer or winter peak months.<sup>45</sup> On August 16, 2022, PJM resubmitted tariff records reflecting a requested October 1, 2022 effective date to replace the ones it initially filed with a requested indeterminate effective date. PJM also states that, for PJM to implement on the October 1, 2022 effective date, it requires Commission action on these compliance filings by no later than September 16, 2022.<sup>46</sup>

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

15. Notice of PJM's February 22, 2022 filing was published in the *Federal Register*, 87 Fed. Reg. 11,061 (Feb. 28, 2022), with protests and interventions due on or before

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<sup>41</sup> *Id.* at 7 (citing proposed Operating Agreement, Schedule 1, section 3.2.3A.02).

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

<sup>43</sup> *Id.* (citing proposed Operating Agreement, Schedule 1, section 3.2.3A.01(d)(iii)).

<sup>44</sup> *Id.* at 12. PJM explains that an October 1, 2022 implementation date would accommodate: (1) the vendor's anticipated delivery date for software updates; (2) the requisite 20-week testing and implementation that must be completed by PJM after completion of all vendor deliveries; and (3) PJM's historic avoidance of implementing major markets initiatives during the summer months, where there is greater potential need to implement emergency procedures or operate the system more conservatively due to adverse weather conditions. *Id.*

<sup>45</sup> *Id.* at 13.

<sup>46</sup> August 16 Transmittal at 1-2, 4-5.

March 14, 2022. Monitoring Analytics, LLC, acting in its capacity as the Independent Market Monitor for PJM (IMM), and PJM Load Coalition<sup>47</sup> timely filed protests. Constellation Energy Generation, LLC (Constellation) and PJM filed answers to the protests.

16. Notice of PJM's August 16, 2022 and August 17, 2022 filings were published in the *Federal Register*, 87 Fed. Reg. 51,662 (Aug. 23, 2022), with protests and interventions due on or before August 24, 2022. No interventions or protests were filed.

#### **IV. Discussion**

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

17. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2021), prohibits an answer to a protest or answer unless otherwise ordered by the decisional authority. We accept the answers submitted by Constellation and PJM because they have provided information that assisted us in our decision-making process.

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

18. In the Remand Order, the Commission directed PJM to submit a compliance filing to revise its Tariff and Operating Agreement records previously accepted in this proceeding (to become effective May 1, 2022) to reflect the then currently-effective Reserve Penalty Factors and ORDCs. The Commission also directed that, if PJM determines that it cannot implement those changes by May 1, 2022, PJM should include tariff records proposing a new effective date for those changes.<sup>48</sup> The Commission explained that, if PJM determined that a later effective date was required for any tariff records, PJM needed to file two sets of tariff records: one set of records to become

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<sup>47</sup> PJM Load Coalition includes the Delaware Division of Public Advocate, Maryland Office of People's Counsel, Old Dominion Electric Cooperative, the Pennsylvania Office of Consumer Advocate, the PJM Industrial Customer Coalition, the Public Power Association of New Jersey, and Southern Maryland Electric Cooperative, Inc.

<sup>48</sup> Remand Order, 177 FERC ¶ 61,209 at P 47 & n.106. The Commission stated that "[s]hould PJM determine that a later effective date is required for any tariff records, it needs to file two sets of tariff records: one set of records to become effective May 1, 2022 with its currently effective tariff provisions (and any tariff provisions accepted by the Commission in other proceedings prior to the compliance filing that will be effective prior to or including May 1, 2022); and a second set of records with the provisions to be effective on a later proposed effective date." *Id.* P 47 n.106.

effective May 1, 2022 with the then currently-effective tariff provisions (and any tariff provisions accepted by the Commission in other proceedings prior to the compliance filing that would be effective prior to or including May 1, 2022); and a second set of records with the provisions to be effective on a later proposed effective date.<sup>49</sup>

19. We find that PJM has submitted Tariff and Operating Agreement revisions that comply with these directives as it could not implement the required changes by May 1, 2022. However, we direct PJM to include certain revisions and corrections in the further compliance filing directed by this order, as discussed below and set forth in Appendix B.

**1. Tariff Records Effective May 1, 2022**

20. With respect to the set of revisions that PJM requests be effective May 1, 2022, we find that PJM has complied with the directives in the Remand Order to submit a set of tariff records with the currently-effective tariff provisions (and any tariff provisions accepted by the Commission in other proceedings prior to the instant filing that would be effective prior to or including May 1, 2022).<sup>50</sup> We therefore accept this set of records, to be effective May 1, 2022

**2. Tariff Revisions to Become Effective October 1, 2022**

21. With respect to the revisions to become effective on October 1, 2022, we accept those provisions to be effective October 1, 2022, as requested. As discussed below, we accept PJM's proposed tariff provision to apply a new \$1,275/MWh price cap for Non-Synchronized Reserve. We also find that certain proposals do not comply with the Remand Order, namely, PJM's proposals to revise the emergency energy price cap and the existing reserve prices during certain emergency actions. In addition, and as discussed below, we find that PJM has included several apparent errors in its tariff revisions. Accordingly, we also direct PJM to correct these errors in the further compliance filing that we direct in this order.

**a. Reserve Price Caps**

**i. Compliance Filing**

22. PJM states that, in accordance with the Clarification Order, it proposes to maintain its reserve price capping framework while incorporating the new 30-minute Reserve

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<sup>49</sup> *Id.* P 47 n.106.

<sup>50</sup> *Id.*

Requirement and Secondary Reserve product.<sup>51</sup> PJM proposes: (1) for Synchronized Reserve, the current price cap of two times the Reserve Penalty Factor, or \$1,700/MWh; (2) for Non-Synchronized Reserve, a price cap of 1.5 times the Reserve Penalty Factor, or \$1,275/MWh, because Non-Synchronized Reserve will contribute toward the Primary Reserve Requirement and the new 30-minute Reserve Requirement; and (3) for Secondary Reserve, a price cap of one Reserve Penalty Factor, or \$850/MWh, because Secondary Reserve will contribute only to the new 30-minute Reserve Requirement.<sup>52</sup>

23. PJM states that its approach values each reserve product relative to each other.<sup>53</sup> PJM explains that the approach retains the current approach of two times the Reserve Penalty Factor for the highest-valued reserve product and one times the Reserve Penalty Factor for the lowest-valued reserve product, while introducing an intermediate price cap of 1.5 times the Reserve Penalty Factor for the reserve product of intermediate value.<sup>54</sup> PJM states that failing to update the reserve price capping provisions would result in applying the same price cap (\$850/MWh) for both Non-Synchronized Reserve and Secondary Reserve, even though Secondary Reserve provides less reliability benefit because it can respond in 30 minutes, not 10 minutes. PJM states that, because of its greater reliability value, Non-Synchronized Reserve can substitute for Secondary Reserve in meeting the 30-minute Reserve Requirement, but Secondary Reserve cannot substitute for Non-Synchronized Reserve in meeting the Primary Reserve Requirement.

24. PJM states that a contrary approach of not allowing any portion of the price impacts associated with a shortage of the 30-minute Reserve Requirement to be reflected in the price of not meeting the Primary Reserve Requirement would prevent prices from differentiating the values of reserve products during certain conditions.<sup>55</sup> PJM states that such an outcome would fail to communicate the greater reliability benefit of Non-Synchronized Reserve over Secondary Reserve because when the system is in a shortage of the 30-minute Reserve Requirement only, this method would inappropriately produce the same clearing price for Secondary Reserve and Non-Synchronized Reserve (\$850/MWh).

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<sup>51</sup> February 22, 2022 Transmittal at 8.

<sup>52</sup> *Id.* at 8-9.

<sup>53</sup> *Id.* at 9.

<sup>54</sup> *Id.* at 9-10.

<sup>55</sup> *Id.* at 10.

**ii. Responsive Pleadings**

25. The IMM contends that PJM is attempting to make a significant and unwarranted market change in a compliance filing.<sup>56</sup> The IMM argues that PJM provides no evidence that the Non-Synchronized Reserve price cap is too low, that a higher price cap would enhance market efficiency, or that the proposed magnitude of the increase has any logical or economic basis.<sup>57</sup> The IMM argues that a higher price cap will not change the clearing of reserves in the economic dispatch because PJM's reserve price caps are implemented after the fact and do not impact the economic dispatch of energy and reserves.<sup>58</sup> The IMM explains that neither PJM's real-time nor day-ahead market engines can procure additional Non-Synchronized Reserves by converting the less valuable Secondary Reserve into Non-Synchronized Reserve.<sup>59</sup> Therefore, the IMM argues, Non-Synchronized Reserve and Secondary Reserve are not direct substitutes, and prices do not need to reflect such product substitution. In addition, the IMM notes that the real-time energy market cannot procure additional Non-Synchronized Reserve at prices above \$850/MWh.<sup>60</sup> Therefore, the IMM argues that the higher additive penalty factors and resulting clearing prices proposed by PJM would simply increase the credits paid to certain reserve products.

26. The IMM also argues that contrary to PJM's assertion, the reliability value of Non-Synchronized Reserve will be no higher due to the implementation of Secondary Reserve.<sup>61</sup> In its protest, PJM Load Coalition agrees with the IMM that PJM has not demonstrated that the Non-Synchronized Reserve price cap is unreasonably low or that a higher cap would enhance market efficiency or promote reliability.<sup>62</sup>

27. In its answer, PJM argues that a reserve product that can respond within 10 minutes (Non-Synchronized Reserve) is axiomatically more valuable for reliability than a reserve product that can only respond within 30 minutes (Secondary Reserve) because that product can be deployed more quickly to address an operational

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<sup>56</sup> IMM Protest at 4.

<sup>57</sup> *Id.* at 2.

<sup>58</sup> *Id.* at 3.

<sup>59</sup> *Id.* at 4.

<sup>60</sup> *Id.*

<sup>61</sup> *Id.* at 2.

<sup>62</sup> PJM Load Coalition Protest at 6-7.

contingency.<sup>63</sup> PJM also reiterates that Non-Synchronized Reserve can substitute for Secondary Reserve in meeting the 30-minute Reserve Requirement, but Secondary Reserve cannot substitute for Non-Synchronized Reserve in meeting the Primary Reserve Requirement.<sup>64</sup> PJM argues that this distinction is meaningful and cannot be ignored. PJM argues that the failure to update the reserve price capping provisions to acknowledge the fundamental distinctions between these two products would illogically fail to incentivize the provision of more valuable Non-Synchronized Reserve over less valuable Secondary Reserve.

28. In its answer, Constellation notes that the maximum value of Non-Synchronized Reserve, if there were no price caps, would hypothetically exceed the maximum value of Secondary Reserve.<sup>65</sup> Therefore, Constellation argues that PJM's proposed \$1,275/MWh price cap maintains this pricing hierarchy for the different reserve products and argues that the higher price cap also is consistent with the different reliability value of the reserve services they provide.

29. In response to the IMM's argument that a higher price cap for Non-Synchronized Reserve will not impact real-time dispatch, Constellation asserts that the IMM fails to recognize that longer-term investment signals are needed to drive efficient market outcomes.<sup>66</sup> Constellation argues that for the market to provide an incentive to invest in resources capable of producing 10-minute reserve products, the prices for these products need to reflect their incremental values. Constellation contends that those price signals will not be achieved if there is no difference between the price for a 10-minute reserve product and a 30-minute reserve product.

### iii. Commission Determination

30. We find that PJM's proposed reserve price caps comply with the directives in the Remand Order because they reflect the addition of the new Secondary Reserve product and 30-minute Reserve Requirement while maintaining PJM's current price capping

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<sup>63</sup> PJM Answer at 4. PJM notes that the Commission linked the responsiveness of a reserve product to that product's value when it stated that "Synchronized Reserves are the most valuable type of reserves to an operator seeking to maintain system balance, because they are already synchronized to the transmission system and should be capable of responding quickly when called upon." *Id.* at 5 (citing May 2020 Order, 171 FERC ¶ 61,153 at P 85).

<sup>64</sup> *Id.* at 5.

<sup>65</sup> Constellation Answer at 5.

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

framework. Specifically, PJM's proposal maintains the existing \$1,700/MWh price cap for Synchronized Reserve, applies the same \$850/MWh price cap to Secondary Reserve that PJM applies to the current lowest-value reserve product, and applies a reasonable intermediate price cap to Non-Synchronized Reserve. We find that, consistent with its currently effective Tariff, PJM's proposal reasonably applies the approach of assigning higher price caps to higher-value reserve products while maintaining the current Synchronized Reserve price cap.

31. We disagree with the IMM's claim that PJM is attempting to make a significant change outside the scope of this compliance filing. In the Clarification Order, the Commission stated that, because the Remand Order affirmed adoption of a new 30-minute Reserve Requirement and Secondary Reserve product, "PJM may propose *revised* reserve price caps to reflect the addition of this new product."<sup>67</sup> Thus, the Commission expressly allowed PJM to propose revisions to its reserve price caps.

32. We also disagree with the IMM's contention (supported by PJM Load Coalition) that the reliability value of Non-Synchronized Reserve will not increase due to the adoption of Secondary Reserve. On the contrary, under PJM's proposal, Non-Synchronized Reserve will continue to help meet the Primary Reserve Requirement while also helping to meet the new 30-minute Reserve Requirement. Because the Reserve Penalty Factor for the 30-minute Reserve Requirement directed in the Remand Order assigns a value of \$850/MWh to maintaining 30-minute Reserve, and Non-Synchronized Reserve can contribute to both the 30-minute Reserve Requirement and the Primary Reserve Requirement, it is reasonable to allow the Non-Synchronized Reserve price to escalate above \$850/MWh. We also agree with PJM that the price caps for Non-Synchronized Reserve and Secondary Reserve should differ because a 10-minute product (Non-Synchronized Reserve) is more valuable than a 30-minute product (Secondary Reserve), and Non-Synchronized Reserve can contribute to meeting both the Primary and 30-minute Reserve Requirements, as noted above, while Secondary Reserve can only contribute to meeting the 30-minute Reserve Requirement.

33. The IMM implies that because reserve price caps do not affect real-time dispatch, the price cap for Non-Synchronized Reserve does not need to differ from the price cap for Secondary Reserve. The IMM, however, fails to recognize that reserve shortage prices are intended not only to reflect the value of energy and reserves in real time, but also to send long-term price signals that encourage investment in new generation and demand resources. As the Commission found in Order No. 719, shortage pricing rules are intended to make it more worthwhile for customers to invest in demand response technologies and encourage entry of new generation and demand resources, among other

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<sup>67</sup> Clarification Order, 178 FERC ¶ 61,085 at P 17 (emphasis added).

purposes.<sup>68</sup> Accordingly, we agree with Constellation that price differentiation during shortages could produce more accurate price signals for long-term investment in higher-quality 10-minute reserve products.

**b. Proposed Revisions Not in Compliance with Remand Order**

**i. Price Cap for Emergency Energy**

34. PJM proposes to change the price cap for emergency energy by replacing the formula in its Tariff and Operating Agreement with a hard-wired cap of \$850/MWh.<sup>69</sup> PJM does not describe this revision in its transmittal letter.

35. Currently, the Tariff and Operating Agreement provide that, when PJM has implemented emergency procedures, resources offering emergency energy are eligible to set locational marginal prices (LMP), capped at “the energy offer cap plus the sum of the applicable Reserve Penalty Factors for the Synchronized Reserve Requirement and Primary Reserve Requirement.”<sup>70</sup> In its 2019 Reserve Markets Complaint, PJM proposed to change the price cap for emergency energy by replacing this formula with a hard-wired cap of \$2,000/MWh. In making this proposal, PJM stated that the revision would bring this tariff provision “in line with the proposed \$2,000/MWh Reserve Penalty Factors, and the \$2,000/MWh cost-based energy offer cap for setting LMP.”<sup>71</sup> No party contested the proposal. In the May 2020 Order, the Commission accepted PJM’s proposed revision,

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<sup>68</sup> *Wholesale Competition in Regions with Organized Elec. Mkts.*, Order No. 719, 125 FERC ¶ 61,071, at P 247 (2008), *as amended*, 126 FERC ¶ 61,261, *order on reh’g*, Order No. 719-A, 128 FERC ¶ 61,059, *order on reh’g*, Order No. 719-B, 129 FERC ¶ 61,252 (2009).

<sup>69</sup> Proposed PJM, Intra-PJM Tariffs, OATT, Attachment K-Appendix Sec 3.2 - Market Buyers (54.2.0), § 3.2.6(a) (Emergency Energy); Proposed PJM, Intra-PJM Tariffs, OA, OA Schedule 1 Sec 3.2, OA Schedule 1 Sec 3.2 - Market Buyers (53.2.0), § 3.2.6(a) (Emergency Energy).

<sup>70</sup> PJM, Intra-PJM Tariffs, OATT, Attachment K-Appendix Sec 3.2 - Market Buyers (54.0.1), § 3.2.6(a) (Emergency Energy); PJM, Intra-PJM Tariffs, OA, Schedule 1 Sec 3.2 - Market Buyers (53.0.1), § 3.2.6(a) (Emergency Energy).

<sup>71</sup> 2019 Reserve Markets Complaint at 103-104.



without discussion, as part of the just and reasonable replacement rate.<sup>72</sup> The Remand Order did not explicitly address the price cap for emergency energy.

36. We find that PJM's proposed \$850/MWh price cap for emergency energy is unsupported and does not comply with the Remand Order. We direct PJM to include revisions that maintain PJM's current formulaic emergency energy price cap in the further compliance filing directed by this order. Although the Remand Order did not explicitly address the current price cap for emergency energy, the Remand Order reversed the Commission's prior determination and denied PJM's 2019 Reserve Markets Complaint with respect to the Reserve Penalty Factors and directed PJM to maintain its currently-effective Reserve Penalty Factors, rather than its proposed replacements.<sup>73</sup> Because the Remand Order reversed the determinations regarding the Reserve Penalty Factors, the underlying predicate for changing the price cap for emergency energy—alignment with the new \$2,000/MWh Reserve Penalty Factors—no longer exists. Accordingly, we find that PJM's proposed price cap for emergency energy does not comply with the Remand Order and direct PJM to maintain its current price cap for emergency energy, as set forth in Appendix B.

**ii. Reserve Prices During Voltage Reductions and Load Shedding**

37. PJM proposes to revise the parallel provisions describing the real-time reserve prices when PJM has initiated either a Voltage Reduction Action or a Manual Load Dump Action (Special Actions) in a Reserve Zone or Reserve Sub-zone. For Synchronized Reserve, the current provision describes the price as "the sum of the Reserve Penalty Factors for the Primary Reserve Requirement and the Synchronized Reserve Requirement for that Reserve Zone or Reserve Sub-zone."<sup>74</sup> This language equates to the current price cap for Synchronized Reserve. PJM proposes to revise this price during Special Actions to be "the sum of the Reserve Penalty Factors for the 30-minute Reserve Requirement, the Primary Reserve Requirement, and the Synchronized Reserve Requirement for each Reserve Zone or Reserve Sub-zone to which

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<sup>72</sup> May 2020 Order, 171 FERC ¶ 61,153 at P 99.

<sup>73</sup> Remand Order, 177 FERC ¶ 61,209 at PP 2, 26, 47.

<sup>74</sup> PJM, Intra-PJM Tariffs, OATT, Attachment K-Appendix Sec 3.2 - Market Buyers (54.0.1), § 3.2.3A(d)(ii); PJM, Intra-PJM Tariffs, OA, Schedule 1 Sec 3.2 - Market Buyers (53.0.1), § 3.2.3A(d)(ii).

it can contribute.”<sup>75</sup> This language equates to the highest possible price for Synchronized Reserve if there were no price cap.

38. Similarly, for Non-Synchronized Reserve, the current provision describes the price as “the Reserve Penalty Factor for the Primary Reserve Requirement for that Reserve Zone or Reserve Sub-zone.”<sup>76</sup> This language equates to the current price cap for Non-Synchronized Reserve. PJM proposes to revise this price to be the “sum of the Reserve Penalty Factors for the 30-minute Reserve Requirement and the Primary Reserve Requirement for each Reserve Zone or Reserve Sub-zone to which it can contribute.”<sup>77</sup> This language equates to the highest possible price for Non-Synchronized Reserve if there were no price cap.

39. Finally, PJM proposes a new similar parallel provision for Secondary Reserve. The proposed tariff language states that the real-time price of Secondary Reserve during Special Actions “for a given Reserve Zone or Sub-zone shall be the sum of the Reserve Penalty Factors for the Minimum 30-minute Reserve Requirements for each Reserve Zone or Reserve Sub-zone to which it can contribute.”<sup>78</sup> This language equates to the theoretically highest possible price for Secondary Reserve, with no price cap.

40. We find that PJM’s proposed tariff language concerning reserve prices during Special Actions does not comply with the Remand Order. The current reserve prices during Special Actions—i.e., the prices of Synchronized Reserve and Non-Synchronized Reserve during Special Actions—equate to the tariff descriptions of the current reserve price caps for Synchronized Reserve and Non-Synchronized Reserve, respectively. In the 2019 Reserve Markets Complaint, PJM proposed to remove the reserve price caps and also proposed changes to prices during Special Actions consistent with that

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<sup>75</sup> Proposed PJM, Intra-PJM Tariffs, OATT, Attachment K-Appendix Sec 3.2 - Market Buyers (54.2.0), § 3.2.3A(d)(ii); Proposed PJM, Intra-PJM Tariffs, OA, Schedule 1 Sec 3.2 - Market Buyers (53.2.0), § 3.2.3A(d)(ii).

<sup>76</sup> PJM, Intra-PJM Tariffs, OATT, Attachment K-Appendix Sec 3.2 - Market Buyers (54.0.1), § 3.2.3A.001(c)(ii); PJM, Intra-PJM Tariffs, OA, Schedule 1 Sec 3.2 - Market Buyers (53.0.1), § 3.2.3A.001(c)(ii).

<sup>77</sup> Proposed PJM, Intra-PJM Tariffs, OATT, Attachment K-Appendix Sec 3.2 - Market Buyers (54.2.0), § 3.2.3A.001(c)(ii); Proposed PJM, Intra-PJM Tariffs, OA, Schedule 1 Sec 3.2 - Market Buyers (53.2.0), § 3.2.3A.001(c)(ii).

<sup>78</sup> Proposed PJM, Intra-PJM Tariffs, OATT, Attachment K-Appendix Sec 3.2 - Market Buyers (54.2.0), § 3.2.3A.01(d)(ii); Proposed PJM, Intra-PJM Tariffs, OA, Schedule 1 Sec 3.2 - Market Buyers (53.2.0), § 3.2.3A.01(d)(ii).

removal.<sup>79</sup> The Remand Order did not remove the reserve price caps and did not direct any changes to the reserve prices during Special Actions. We therefore find that PJM should have proposed reserve prices during Special Actions that equate to the proposed reserve price caps. Accordingly, we direct PJM, in the further compliance filing directed by this order, to modify the reserve prices during Special Actions, as set forth in Appendix B, to conform with PJM's reserve price caps.

**iii. Additional Apparent Errors in Proposed Tariff Revisions**

41. Several sections in PJM's proposed revisions appear to contain ministerial errors, and we direct PJM to include corrections in the further compliance filing directed by this order, as discussed below and set forth in Appendix B.

42. First, in Operating Agreement, Schedule 1, section 3.2.3(b),<sup>80</sup> the definition of "F" in the formula regarding Balancing Operating Reserve Target should reference "Secondary Reserves" rather than "Day-ahead Scheduling Reserves" (which is no longer a defined term). Accordingly, we direct PJM to correct this reference, as set forth in Appendix B, in the further compliance filing directed by this order.

43. Second, in Operating Agreement, Schedule 1, sections 3.2.3A(d)(iv), 3.2.3A.001(c)(iv), and 3.2.3A.01(d)(iv), PJM proposes to revise the language to state that PJM will analyze Market Participants' response to "reserve prices" instead of the current effective language of "prices." This proposed change is inconsistent with the compliance directives in the Remand Order that reversed the changes to these sections. Accordingly, we direct PJM to revise this section to reference "prices" instead of "reserve prices," as set forth in Appendix B, in the further compliance filing directed by this order.

44. Third, in Operating Agreement, Schedule 1, section 3.2.3A.02 regarding ORDCs, the first sentence references the ORDCs for clearing Secondary Reserve, Primary Reserve, and Synchronized Reserve. The reference to "Secondary Reserve" should be "30-minute Reserve" which was the language in that sentence originally accepted in the May 2020 Order. Accordingly, we direct PJM to correct this reference, as set forth in Appendix B, in the further compliance filing directed by this order.

45. Fourth, in Operating Agreement, Schedule 1, section 3.2.3A.01(d)(ii), the sentence regarding the real-time price of Secondary Reserve during Special Actions references

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<sup>79</sup> In the 2019 Reserve Markets Complaint, PJM did not explicitly address why it proposed to change its tariff language regarding reserve prices during Special Actions.

<sup>80</sup> All references to the Operating Agreement, Schedule 1, also are meant to reference the identical provisions in Tariff, Attachment K-Appendix.

“Minimum 30-minute Reserve Requirement,” which is not a defined term and should be “30-minute Reserve Requirement.” Accordingly, we direct PJM to correct this reference, as set forth in Appendix B, in the further compliance filing directed by this order.

**c. Issues Raised in Protests That Are Beyond the Scope of This Proceeding**

46. Repeating its arguments from previous pleadings, PJM Load Coalition advocates for a circuit breaker mechanism that would prevent unintended wealth transfers arising from major PJM system disruptions.<sup>81</sup> PJM Load Coalition requests that the Commission encourage PJM to consider and propose a circuit breaker mechanism before winter.<sup>82</sup>

47. The IMM criticizes how PJM implements its \$3,700/MWh price cap for energy and reserves and protests the lack of documentation regarding that implementation.<sup>83</sup> The IMM asserts that PJM’s capping logic is based on the incorrect assumption that the marginal energy offer is at \$2,000/MWh even when no offers above \$1,000/MWh are approved for setting prices by PJM. Moreover, the IMM states that it has identified instances when the reserve prices are inconsistent with the Tariff-defined ORDCs.<sup>84</sup>

48. In its answer, PJM responds to the IMM’s statements relating to the transparency of PJM’s price cap implementation.<sup>85</sup> PJM states that a whitepaper posted on its website describes how price capping is implemented consistent with the instances described by

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<sup>81</sup> PJM Load Coalition Protest at 5-6 (citing PJM Load Coalition, Protest, Docket Nos. EL19-58-007 and ER19-1486-001, at 32-35 (filed Dec. 7, 2021); PJM Load Coalition, Protest, Attachment D (Affidavit of James F. Wilson), Docket Nos. EL19-58-000 and ER19-1486-000, at P 35 (filed May 15, 2019)).

<sup>82</sup> *Id.* at 8.

<sup>83</sup> IMM Protest at 5.

<sup>84</sup> *Id.* at 6 (citing *2021 State of the Market Report for PJM, Volume II, Section 3 Energy Market*, at 204-205). The IMM states that during a certain interval on December 8, 2021, the Synchronized Reserve price for the RTO Zone reached \$1,668.60/MWh even though the price for Primary Reserve in the RTO Zone was zero. The IMM notes that, according to the Tariff, without a simultaneous Primary Reserve price that is greater than zero, the Synchronized Reserve price for the RTO Zone should not exceed \$850/MWh. *Id.* at 7.

<sup>85</sup> PJM Answer at 6.

the IMM.<sup>86</sup> PJM also notes an ongoing stakeholder process through the Energy Price Formation Senior Task Force, which is examining issues related to limitations on reserve prices.<sup>87</sup>

49. As these protests relate to existing provisions unrelated to the Remand Order's compliance directive, we find these issues to be beyond the scope of this compliance proceeding.

The Commission orders:

(A) PJM's set of tariff records with the tariff provisions that existed prior to the filing of the reserve market changes in its 2019 Reserve Markets Complaint (and any tariff provisions accepted by the Commission in other proceedings prior to the instant filing that would be effective prior to or including May 1, 2022) are hereby accepted, effective May 1, 2022, as discussed in the body of this order.

(B) PJM's set of tariff records with revisions to implement the Remand Order are hereby accepted, effective as of October 1, 2022, as requested, subject to PJM submitting a further compliance filing by September 26, 2022, as discussed in the body of this order.

By the Commission. Commissioner Danly is dissenting with a separate statement attached.  
Commissioner Phillips is not participating.

( S E A L )

Debbie-Anne A. Reese,  
Deputy Secretary.

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<sup>86</sup> *Id.* (citing PJM, *Formation of Locational Marginal Pricing and the System Energy Component of LMP During Reserve Shortage Events* (2021), <https://www.pjm.com/-/media/markets-ops/energy/real-time/shortage-lmp-whitepaper-example.ashx>).

<sup>87</sup> *Id.* (citing PJM, Energy Price Senior Task Force, <https://www.pjm.com/committees-and-groups/task-forces/epfstf>).

**Appendix A****Tariff Records Accepted  
PJM Interconnection, L.L.C.  
Intra-PJM Tariffs****Tariff Records Accepted Effective May 1, 2022**

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [A-B, OATT Definitions – A - B \(18.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [C-D, OATT Definitions – C-D \(32.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [E-F, OATT Definitions – E - F \(32.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [L-M-N, OATT Definitions – L – M - N \(32.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [O-P-Q, OATT Definitions – O – P - Q \(27.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [R-S, OATT Definitions – R - S \(27.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 1.5A, OATT Attachment K Appendix Sec 1.5A Economic Load Resp \(12.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 1.7, OATT Attachment K Appendix Sec 1.7 General \(25.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 1.10, OATT Attachment K Appendix Sec 1.10 - Scheduling \(43.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 1.11, OATT Attachment K Appendix Sec 1.11 - Real-time Dispatch \(8.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 2.2, OATT Attachment K Appendix Sec 2.2 General \(13.0.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 2.5, OATT Attachment K Appendix Sec 2.5 Calculation of Real-time \(11.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 2.6, OATT Attachment K Appendix Sec 2.6 Calculation of Day-ahead \(7.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K Appx Sec 3.2, OATT Attachment K Appendix Sec 3.2 - Market Buyers \(54.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [A-B, OA Definitions A - B \(9.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [C-D, OA Definitions C - D \(28.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [E-F, OA Definitions E - F \(20.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [I-L, OA Definitions I - L \(19.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [M-N, OA Definitions M - N \(18.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [O-P, OA Definitions O - P \(19.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [Q-R, OA Definitions Q - R \(16.0.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [S-T, OA Definitions S - T \(20.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 1.5A, OA Schedule 1 Sec 1.5A Economic Load Response Participant \(12.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 1.7, OA Schedule 1 Sec 1.7 General. \(25.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 1.10, OA Schedule 1 Sec 1.10 - Scheduling \(43.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 1.11, OA Schedule 1 Sec 1.11 - Real-time Dispatch \(8.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 2.2, OA Schedule 1 Sec 2.2 General. \(13.0.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 2.5, OA Schedule 1 Sec 2.5 Calculation of Real-time Prices. \(11.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 2.6, OA Schedule 1 Sec 2.6 Calculation of Day-ahead Prices. \(7.0.1\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 3.2, OA Schedule 1 Sec 3.2 - Market Buyers \(53.0.1\)](#)

### **Tariff Records Accepted Effective October 1, 2022**

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [A-B, OATT Definitions - A - B \(18.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [C-D, OATT Definitions - C-D \(32.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [E-F, OATT Definitions - E - F \(32.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [L-M-N, OATT Definitions - L - M - N \(32.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [O-P-Q, OATT Definitions – O – P - Q \(27.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [R-S, OATT Definitions – R - S \(27.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 1.5A, OATT Attachment K Appendix Sec 1.5A Economic Load Resp \(12.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 1.7, OATT Attachment K Appendix Sec 1.7 General \(25.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 1.10, OATT Attachment K Appendix Sec 1.10 - Scheduling \(43.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 1.11, OATT Attachment K Appendix Sec 1.11 - Real-time Dispatch \(8.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 2.5, OATT Attachment K Appendix Sec 2.5 Calculation of Real-time \(11.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K APPX Sec 2.6, OATT Attachment K Appendix Sec 2.6 Calculation of Day-ahead \(7.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OATT ATT K Appx Sec 3.2, OATT Attachment K Appendix Sec 3.2 - Market Buyers \(54.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [A-B, OA Definitions A - B \(9.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [C-D, OA Definitions C - D \(28.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [E-F, OA Definitions E - F \(20.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [I-L, OA Definitions I - L \(19.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [M-N, OA Definitions M - N \(18.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [O-P, OA Definitions O - P \(19.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [S–T, OA Definitions S – T \(20.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 1.5A, OA Schedule 1 Sec 1.5A Economic Load Response Participant \(12.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 1.7, OA Schedule 1 Sec 1.7 General. \(25.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 1.10, OA Schedule 1 Sec 1.10 - Scheduling \(43.2.0\)](#)



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PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 1.11, OA Schedule 1 Sec 1.11 - Real-time Dispatch \(8.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 2.5, OA Schedule 1 Sec 2.5 Calculation of Real-time Prices. \(11.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 2.6, OA Schedule 1 Sec 2.6 Calculation of Day-ahead Prices. \(7.2.0\)](#)

PJM Interconnection, L.L.C., Intra-PJM Tariffs, [OA Schedule 1 Sec 3.2, OA Schedule 1 Sec 3.2 - Market Buyers \(53.2.0\)](#)

## **Appendix B**

### **Revision to Proposed Operating Agreement, Schedule 1, section 3.2.3(b):<sup>88</sup>**

\* \* \*

F = the sum of all revenues earned for providing ~~Day-ahead Scheduling~~Secondary Reserves, Synchronized Reserves, Non-Synchronized Reserves, and Reactive Services over the applicable Real-time Settlement Intervals.

\* \* \*

### **Revision to Proposed Operating Agreement, Schedule 1, sections 3.2.3A(d)(iv), 3.2.3A.001(c)(iv), and 3.2.3A.01(d)(iv):**

By no later than April 30 of each year, the Office of the Interconnection will analyze Market Participants' response to ~~reserve~~ prices exceeding \$1,000/MWh on an annual basis and will provide its analysis to PJM stakeholders. \* \* \*

### **Revisions to Proposed Operating Agreement, Schedule 1, section 3.2.3A(d)(ii):**

\* \* \*

If the Office of the Interconnection has initiated in a Reserve Zone or Reserve Sub-zone either a Voltage Reduction Action as described in the PJM Manuals or a Manual Load Dump Action as described in the PJM Manuals, the Real-time Synchronized Reserve Market Clearing Price shall be the sum of the Reserve Penalty Factors for ~~the 30-minute Reserve Requirement~~, the Primary Reserve Requirement, and the Synchronized Reserve Requirement for ~~each that~~ each Reserve Zone or Reserve Sub-zone ~~to which it can contribute~~.

### **Revisions to Proposed Operating Agreement, Schedule 1, section 3.2.3A.001(c)(ii):**

\* \* \*

If the Office of the Interconnection has initiated in a Reserve Zone or Reserve Sub-zone either a Voltage Reduction Action as described in the PJM Manuals or a Manual Load Dump Action as described in the PJM Manuals, the Real-time Non-Synchronized Reserve Market Clearing Price shall be ~~sum of the~~ product of 1.5 multiplied by the Reserve Penalty Factors for ~~the 30-minute Reserve Requirement and the Primary Reserve Requirement for each that~~ each Reserve Zone or Reserve Sub-zone ~~to which it can contribute~~.

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<sup>88</sup> The revisions in Appendix B also apply to the parallel provisions in Tariff, Attachment K-Appendix.

**Revisions to Proposed Operating Agreement, Schedule 1, section 3.2.3A.01(d)(ii):**

\* \* \*

If the Office of the Interconnection has initiated in a Reserve Zone or Reserve Sub-zone either a Voltage Reduction Action or a Manual Load Dump Action as described in the PJM Manuals, the Real-time Secondary Reserve Market Clearing Price for a given Reserve Zone or Sub-zone shall be the ~~sum of the~~ Reserve Penalty Factors for the ~~Minimum 30-minute Reserve Requirements for each that~~ Reserve Zone or Reserve Sub-zone ~~to which it can contribute~~.

**Revision to Proposed Operating Agreement, Schedule 1, section 3.2.3A.02:**

The Office of the Interconnection shall establish Operating Reserve Demand Curves for clearing ~~Secondary Reserve~~ 30-minute Reserve, Primary Reserve, and Synchronized Reserve, for, as applicable, \* \* \*

**Revisions to Proposed Operating Agreement, Schedule 1, section 3.2.6(a):**

When the Office of the Interconnection has implemented Emergency procedures, resources offering Emergency energy are eligible to set real-time Locational Marginal Prices, capped at ~~\$850/MWh~~ the energy offer cap plus the sum of the applicable Reserve Penalty Factors for the Synchronized Reserve Requirement and Primary Reserve Requirement, provided that the Emergency energy is needed to meet demand in the PJM Region.

UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.

Docket Nos. EL19-58-012  
EL19-58-014  
EL19-58-015

(Issued September 1, 2022)

DANLY, Commissioner, *dissenting*:

1. I dissent from today's order<sup>1</sup> because, by approving the instant compliance filings, it continues the errors established in the Commission's prior orders<sup>2</sup> finding that PJM Interconnection, L.L.C.'s (PJM) Open Access Transmission Tariff and the Amended and Restated Operating Agreement provisions regarding the PJM reserve market are unjust and unreasonable and setting a replacement rate<sup>3</sup> under Federal Power Act section 206.<sup>4</sup>

2. I write separately to highlight that I have previously explained both why I object to the process by which this proceeding had come before the Commission and why I dissent on the merits.<sup>5</sup> As to process, the FERC Solicitor's office (Solicitor's Office)<sup>6</sup>

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<sup>1</sup> *PJM Interconnection, L.L.C.*, 180 FERC ¶ 61,135 (2022).

<sup>2</sup> *PJM Interconnection, L.L.C.*, 177 FERC ¶ 61,209 (2022) (Remand Order); *see also PJM Interconnection, L.L.C.*, 178 FERC ¶ 61,085 (2022) (Clarification Order) (order granting PJM's request for clarification as to how PJM should reflect the reserve price caps in its filing to comply with the Remand Order); *PJM Interconnection, L.L.C.*, 180 FERC ¶ 61,051 (2022) (order addressing arguments raised on rehearing).

<sup>3</sup> *PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,153 (May 2020 Order), *order on reh'g*, 173 FERC ¶ 61,123 (2020) (November 2020 Rehearing Order); *PJM Interconnection, L.L.C.*, 173 FERC ¶ 61,134 (2020) (November 2020 Compliance Order), *order on reh'g*, 174 FERC ¶ 61,180 (2021) (March 2021 Compliance Rehearing Order).

<sup>4</sup> 16 U.S.C. § 824e.

<sup>5</sup> Commissioner Danly January 20, 2022 Dissent to Remand Order (Accession No. 20220120-3114); Clarification Order, 178 FERC ¶ 61,085 (Danly, Comm'r, dissenting).

<sup>6</sup> I refer to the lawyers who submitted the motion for voluntary remand as the "Solicitor's Office" because they acted at the Chairman's direction without the Commission's knowledge or assent. The motion filed by the Solicitor's Office was not, in any meaningful sense, the *Commission's* motion. *See* Motion of Respondent Federal

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was directed by the Chairman to seek voluntary remand without the knowledge or acquiescence of the other Commissioners, which at least violated longstanding Commission practice and may have been unlawful. On the merits, this order perpetuates the reckless and arbitrary changes to a fundamental element of PJM's market design, over PJM's and litigants' objections, without a full understanding of the consequences of those decisions.<sup>7</sup>

For these reasons, I respectfully dissent.

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James P. Danly  
Commissioner

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Energy Regulatory Commission, *Am. Mun. Power, Inc. v. FERC*, Case Nos. 20-1372, 20-1373, 20-1374, 21-1117 (D.C. Cir. Aug. 13, 2021).

<sup>7</sup> See *PJM Interconnection, L.L.C.*, 180 FERC ¶ 61,051 (Danly, Comm'r, dissenting); Clarification Order, 178 FERC ¶ 61,085 (Danly, Comm'r, dissenting).

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