

172 FERC ¶ 61,029  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Neil Chatterjee, Chairman;  
Richard Glick, Bernard L. McNamee,  
and James P. Danly.

PJM Interconnection, L.L.C.

Docket No. ER19-469-003

ORDER ON COMPLIANCE FILING

(Issued July 16, 2020)

1. On October 17, 2019, the Commission issued an order accepting, subject to further compliance,<sup>1</sup> a filing that PJM Interconnection, L.L.C. (PJM) made to comply with the requirements of Order No. 841, which removes barriers to the participation of electric storage resources in the capacity, energy, and ancillary service markets operated by Regional Transmission Organizations and Independent System Operators (RTOs/ISOs).<sup>2</sup>
2. On December 16, 2019, PJM submitted further proposed revisions to its Open Access Transmission Tariff (Tariff) and Amended and Restated Operating Agreement (Operating Agreement) (together, tariff) to comply with the Second Compliance Order (Third Compliance Filing).
3. In this order, we accept PJM's Third Compliance Filing, to become effective December 3, 2019, with a limited number of revisions to become effective March 31, 2024, subject to a further compliance filing, as discussed below.

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<sup>1</sup> *PJM Interconnection, L.L.C.*, 169 FERC ¶ 61,049 (2019) (Second Compliance Order). On February 1, 2019, the Commission accepted PJM's first compliance filing to conform its definitions of Energy Storage Resource and Capacity Storage Resource to the Commission's definition of electric storage resource in Order No. 841. *PJM Interconnection, L.L.C.*, 166 FERC ¶ 61,087 (2019) (First Compliance Order).

<sup>2</sup> *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order No. 841, 162 FERC ¶ 61,127 (2018), *order on reh'g*, Order No. 841-A, 167 FERC ¶ 61,154 (2019), *aff'd sub nom. Nat'l Ass'n of Regulatory Util. Comm'rs v. FERC*, No. 19-1142 (D.C. Cir. July 10, 2020).

## I. Background

4. In Order No. 841, the Commission modified § 35.28 of its regulations<sup>3</sup> to remove barriers to the participation of electric storage resources in RTO/ISO markets.<sup>4</sup> The Commission found that Order No. 841 will enhance competition and, in turn, help to ensure that the RTO/ISO markets produce just and reasonable rates, pursuant to the Commission's legal authority under FPA section 206.<sup>5</sup>

5. Order No. 841 requires each RTO/ISO to revise its tariff to establish a participation model for electric storage resources consisting of market rules that, recognizing the physical and operational characteristics of electric storage resources, will help facilitate their participation in the RTO/ISO markets.<sup>6</sup> Specifically, for each RTO/ISO, the tariff provisions for the participation model for electric storage resources must: (1) ensure that a resource using the participation model is eligible to provide all capacity, energy, and ancillary services that it is technically capable of providing in the RTO/ISO markets; (2) ensure that a resource using the participation model can be dispatched and can set the wholesale market clearing price as both a wholesale seller and wholesale buyer consistent with existing market rules that govern when a resource can set the wholesale price; (3) account for the physical and operational characteristics of electric storage resources through bidding parameters or other means; and (4) establish a minimum size requirement for participation in the RTO/ISO markets that does not exceed 100 kW. Additionally, each RTO/ISO must specify that the sale of electric energy from the RTO/ISO markets to an electric storage resource that the resource then resells back to those markets must be at the wholesale locational marginal price (LMP).<sup>7</sup>

6. On December 3, 2018, PJM filed revisions to its tariff to comply with the requirements of Order No. 841. The Commission accepted PJM's compliance filing in the Second Compliance Order, subject to a further compliance filing.<sup>8</sup>

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<sup>3</sup> 18 C.F.R. § 35.28 (2019).

<sup>4</sup> Order No. 841, 162 FERC ¶ 61,127 at P 1.

<sup>5</sup> 16 U.S.C. § 824e (2018).

<sup>6</sup> Order No. 841, 162 FERC ¶ 61,127 at P 3. In Order No. 841, the Commission referred to a set of tariff provisions that are created for a particular type of resource as a participation model. *Id.*

<sup>7</sup> *Id.* P 4.

<sup>8</sup> In the First Compliance Order, the Commission accepted PJM's first compliance filing to conform its definitions of Energy Storage Resource and Capacity Storage

7. In the Second Compliance Order, the Commission found that PJM's compliance filing, with certain modifications, complied with the requirements that the Commission adopted in Order No. 841.<sup>9</sup> First, the Commission found that PJM's proposed tariff revisions partially complied with the requirement of Order No. 841 to create a participation model for electric storage resources that ensures the eligibility of such resources to participate in PJM's markets in a way that recognizes their physical and operational characteristics.<sup>10</sup> Thus, the Commission directed PJM to file a further compliance filing proposing tariff language that describes the three modes of Energy Storage Resource<sup>11</sup> participation in the energy market (i.e., continuous, charge, and discharge).<sup>12</sup>

8. Second, the Commission found that PJM's proposed tariff revisions did not comply with the requirement of Order No. 841 to account for the State of Charge, Maximum State of Charge, and Minimum State of Charge of resources using the Energy Storage Resource Participation Model (hereinafter Storage Participation Model).<sup>13</sup> Thus, the Commission directed PJM to file a further compliance filing that modifies PJM's proposed Storage Participation Model to more appropriately account for an Energy Storage Resource's State of Charge, Maximum State of Charge, and Minimum State of Charge through bidding parameters or other means in both its day-ahead and real-time market dispatch, as required by Order No. 841.<sup>14</sup> The Commission also directed PJM to define Minimum and Maximum Charge Limit, Minimum and Maximum Discharge Limit, and Charge and Discharge Ramp Rate bidding parameters in its tariff.<sup>15</sup>

9. Third, the Commission found that PJM partially complied with the requirement to refrain from assessing transmission charges to an Energy Storage Resource that is

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Resource to the Commission's definition of electric storage resource in Order No. 841. First Compliance Order, 166 FERC ¶ 61,087.

<sup>9</sup> Second Compliance Order, 169 FERC ¶ 61,049 at PP 19-20.

<sup>10</sup> *Id.* P 35.

<sup>11</sup> Capitalized terms that are not defined in this order have the meaning specified in the tariff.

<sup>12</sup> Second Compliance Order, 169 FERC ¶ 61,049 at P 36.

<sup>13</sup> *Id.* P 173.

<sup>14</sup> *Id.* P 174 (citing Order No. 841, 162 FERC ¶ 61,127 at P 213).

<sup>15</sup> *Id.* P 175.

dispatched to withdraw energy to provide a service, stating that PJM had not defined the services that constitute Dispatched Charging Energy.<sup>16</sup> The Commission thus directed PJM to provide tariff provisions describing the services that constitute Dispatched Charging Energy.<sup>17</sup>

10. Fourth, the Commission found that PJM's proposed tariff revisions partially complied with the requirements of Order No. 841 pertaining to metering and accounting practices for electric storage resources.<sup>18</sup> The Commission directed PJM to file tariff revisions to include a general description of the metering and accounting practices for Energy Storage Resources as well as references directing market participants to any other PJM documents containing the details of those practices.<sup>19</sup> The Commission directed PJM to revise its tariff to state that PJM will not charge a distribution-connected Energy Storage Resource for charging energy if the distribution utility is unwilling or unable to net out any energy purchases associated with the Energy Storage Resource's wholesale charging activities from the host customer's retail bill.<sup>20</sup> The Commission directed PJM to explain how its metering and accounting practices will allow for participation in retail and wholesale markets and to make any necessary tariff changes to ensure the separation and proper accounting of wholesale and retail uses.<sup>21</sup>

11. Fifth, the Second Compliance Order initiated an FPA section 206 proceeding and established paper hearing procedures in Docket No. EL19-100-000 to investigate whether PJM's minimum run-time rules and procedures are unjust, unreasonable, unduly discriminatory or preferential as applied to Capacity Storage Resources.<sup>22</sup> The FPA section 206 proceeding also applies to PJM's minimum run-time rules and procedures for non-electric storage resources and the order directed PJM to submit tariff provisions reflecting these minimum run-time rules and procedures as currently specified in its manuals for every resource type.<sup>23</sup> PJM filed the tariff provisions in Docket No. ER20-584-000. The Commission consolidated

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<sup>16</sup> *Id.* P 220.

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

<sup>18</sup> *Id.* P 240.

<sup>19</sup> *Id.* P 243.

<sup>20</sup> *Id.* P 244.

<sup>21</sup> *Id.* P 246.

<sup>22</sup> *Id.* P 142.

<sup>23</sup> *Id.* P 140.

this proceeding with the paper hearing proceeding in Docket No. EL19-100-000, and established paper hearing procedures to examine the rules for determining capacity values for all resources.<sup>24</sup> The Commission held these proceedings in abeyance through October 30, 2020, to permit PJM and the PJM stakeholders time to consider a methodology or methodologies to determine the capability of all resource types.<sup>25</sup>

## II. Third Compliance Filing

12. In the Third Compliance Filing, PJM proposes tariff revisions describing the three modes of Energy Storage Resource participation in the energy market (i.e., continuous, charge, and discharge).<sup>26</sup> PJM further proposes to modify its participation model to more appropriately account for an Energy Storage Resource's State of Charge, Maximum State of Charge, and Minimum State of Charge using bidding parameters that will be incorporated into its day-ahead and real-time market clearing engines.<sup>27</sup> PJM additionally proposes to add definitions to its tariff for the bidding parameters Minimum and Maximum Charge Limit, Minimum and Maximum Discharge Limit, and Charge and Discharge Ramp Rate.<sup>28</sup>

13. PJM proposes tariff revisions specifying the services that constitute Dispatched Charging Energy as: (1) energy imbalance service; (2) regulation; (3) tier 2 synchronized reserves; and (4) reactive service.<sup>29</sup> PJM further proposes to add a new subsection to its tariff that provides a general description of the metering and accounting practices for Energy Storage Resources and directs market participants to other PJM documents that

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<sup>24</sup> *PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,015, at P 1 & n.2 (2020).

<sup>25</sup> *Id.* PP 22, 34.

<sup>26</sup> Third Compliance Filing, Transmittal at 5-6 (citing Tariff, Definitions – C-D; Operating Agreement, Definitions – C-D).

<sup>27</sup> *Id.* at 7-10 (citing Tariff, Definitions – C-D, L-M-N, R-S; Operating Agreement, Definitions – C-D, M-N, Q-R, S-T; Tariff, Attachment K-Appendix, § 1.7.6; Operating Agreement, Schedule 1, § 1.7.6).

<sup>28</sup> *Id.* at 10-13 (citing Tariff, Definitions – C-D; Operating Agreement, Definitions – C-D).

<sup>29</sup> *Id.* at 14-15 (citing Tariff, Definitions – C-D; Operating Agreement, Definitions – C-D).

contain the details of those practices.<sup>30</sup> PJM explains that it also proposes a tariff provision stating that PJM will not charge a distribution-connected Energy Storage Resource for charging energy if the distribution utility is unwilling or unable to net out any energy purchases associated with the Energy Storage Resource's wholesale charging activities from the host customer's retail bill.<sup>31</sup> Lastly, PJM explains how its metering and accounting practices will allow for participation in retail and wholesale markets, and states that it proposes tariff language to ensure the separation and proper accounting of wholesale and retail uses.<sup>32</sup>

14. PJM requests an effective date of December 3, 2019 for its proposed revisions, except those revisions related to more appropriately accounting for an Energy Storage Resource's State of Charge, for which PJM seeks an effective date of March 31, 2024.<sup>33</sup>

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

15. Notice of PJM's filing was published in the *Federal Register*, 84 Fed. Reg. 70,178 (Dec. 20, 2019), with interventions and protests due on or before January 6, 2020. None were filed.

### **IV. Discussion**

16. As discussed below, we accept the Third Compliance Filing, to be effective December 3, 2019, with a limited number of revisions to become effective March 31, 2024, subject to a further compliance filing to be submitted within 90 days of the date of issuance of this order. We accept the ministerial changes that comply with the Second Compliance Order to be effective December 3, 2019, as requested. We accept the revisions related to more appropriately accounting for an Energy Storage Resource's State of Charge, to be effective March 31, 2024, as requested.

17. As a preliminary matter, we find that PJM has complied with the following directives in the Second Compliance Order: (1) propose tariff language describing the three modes of Energy Storage Resource participation in the energy market (i.e.,

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<sup>30</sup> *Id.* at 16-18 (citing Tariff, Attachment K-Appendix, § 1.4A.1; Operating Agreement, Schedule 1, § 1.4A.1).

<sup>31</sup> *Id.* at 18-20 (citing Tariff, Attachment K-Appendix, § 1.4A.1; Operating Agreement, Schedule 1, § 1.4A.1).

<sup>32</sup> *Id.* at 20-23 (citing Tariff, Attachment K-Appendix, § 1.4A.1; Operating Agreement, Schedule 1, § 1.4A.1).

<sup>33</sup> *Id.* at 1-2, 23-27.

continuous, charge, and discharge);<sup>34</sup> (2) modify PJM's proposed Storage Participation Model to more appropriately account for an Energy Storage Resource's State of Charge, Maximum State of Charge, and Minimum State of Charge through bidding parameters or other means in both its day-ahead and real-time market dispatch, as required by Order No. 841;<sup>35</sup> (3) include Minimum and Maximum Charge Limit, Minimum and Maximum Discharge Limit, and Charge and Discharge Ramp Rate bidding parameters in its tariff;<sup>36</sup> (4) provide tariff provisions describing the services that constitute Dispatched Charging Energy;<sup>37</sup> (5) include in the tariff a general description of the metering and accounting practices for Energy Storage Resources as well as references directing market participants to any other PJM documents containing the details of those practices;<sup>38</sup> and (6) explain how PJM's metering and accounting practices will allow for participation in retail and wholesale markets and make any necessary tariff changes to ensure the separation and proper accounting of wholesale and retail uses.<sup>39</sup> We address the remaining compliance requirement related to metering and accounting practices for charging energy below.

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<sup>34</sup> Second Compliance Order, 169 FERC ¶ 61,049 at P 36. *See* Third Compliance Filing, Transmittal at 5-6 and Attachment A; *see also* Tariff, Definitions – C-D; Operating Agreement, Definitions – C-D.

<sup>35</sup> Second Compliance Order, 169 FERC ¶ 61,049 at P 174. *See* Third Compliance Filing, Transmittal at 7-10 and Attachment A; *see also* Tariff, Definitions – C-D, L-M-N, R-S; Operating Agreement, Definitions – C-D, M-N, Q-R, S-T; Tariff, Attachment K-Appendix, § 1.7.6; Operating Agreement, Schedule 1, § 1.7.6.

<sup>36</sup> Second Compliance Order, 169 FERC ¶ 61,049 at P 175. *See* Third Compliance Filing, Transmittal at 10-13; *see also* Tariff, Definitions – C-D; Operating Agreement, Definitions – C-D.

<sup>37</sup> Second Compliance Order, 169 FERC ¶ 61,049 at P 220. *See* Third Compliance Filing, Transmittal at 14-15; *see also* Tariff, Definitions – C-D; Operating Agreement, Definitions – C-D. We note our understanding that Dispatched Charging Energy does not include self-scheduled charging at a fixed megawatt quantity.

<sup>38</sup> Second Compliance Order, 169 FERC ¶ 61,049 at P 243. *See* Third Compliance Filing, Transmittal at 16-18; *see also* Tariff, Attachment K-Appendix, § 1.4A.1; Operating Agreement, Schedule 1, § 1.4A.1.

<sup>39</sup> Second Compliance Order, 169 FERC ¶ 61,049 at P 246. *See* Compliance Filing, Transmittal at 20-23; *see also* Tariff, Attachment K-Appendix, § 1.4A.1; Operating Agreement, Schedule 1, § 1.4A.1.

**A. Order No. 841 Requirements for Metering and Accounting Practices for Charging Energy**

18. Order No. 841 requires RTOs/ISOs to prevent electric storage resources from paying twice for the same charging energy (i.e., they should not have to pay both the wholesale and retail price for the same charging energy).<sup>40</sup> To the extent that the host distribution utility is unable—due to a lack of the necessary metering infrastructure and accounting practices—or unwilling to net out any energy purchases associated with an electric storage resource’s wholesale charging activities from the host customer’s retail bill, the Commission found that RTOs/ISOs would be prevented from charging that resource wholesale rates for the charging energy for which it is already paying retail rates.<sup>41</sup>

19. Order No. 841-A clarifies that an RTO/ISO could require verification from the host distribution utility that it is unable or unwilling to net wholesale demand from retail settlement before the RTO/ISO ceases to settle an electric storage resource’s wholesale demand at the wholesale LMP.<sup>42</sup> Order No. 841-A clarifies further that the Commission would consider on compliance each RTO’s/ISO’s proposal to identify whether a distribution utility is unable or unwilling to net out from a host customer’s retail bill the wholesale energy purchases associated with charging an electric storage resource that is participating in the RTO/ISO market.<sup>43</sup> However, Order No. 841-A denies CAISO’s request for clarification that when an RTO/ISO cannot verify the host distribution utility’s inability or unwillingness to net out wholesale charging energy, the RTO/ISO can require the electric storage resource to use a participation model designed for retail customer participation. Order No. 841-A states that, while Order No. 841 provides flexibility with respect to how each RTO/ISO implements the requirement to prevent electric storage resources from paying twice for the same charging energy, it would be

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<sup>40</sup> Order No. 841, 162 FERC ¶ 61,127 at P 326.

<sup>41</sup> Paragraph 326 of the preamble of Order No. 841 used the term “resources using the participation model for electric storage resources” with respect to the requirements set forth therein (e.g., “we require each RTO/ISO to prevent resources using the participation model for electric storage resources from paying twice for the same charging energy”). However, § 35.28(g)(9)(ii) of the Commission’s regulations (as modified by Order No. 841), which these requirements are intended to implement, specifies that it applies to electric storage resources. Thus, the Commission used the incorrect term in paragraph 326 of Order No. 841. In this order, we use the correct term throughout.

<sup>42</sup> Order No. 841-A, 167 FERC ¶ 61,154 at P 138.

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



inappropriate for an RTO/ISO to meet that requirement by requiring an electric storage resource to use a participation model designed for retail customer participation.<sup>44</sup>

**B. Second Compliance Order**

20. In the Second Compliance Order, the Commission found that PJM's proposed tariff revisions partially comply with the requirements of Order No. 841 pertaining to metering and accounting practices for electric storage resources.<sup>45</sup> The Commission explained that PJM stated in its Data Request Response that, because Energy Storage Resources located behind a retail meter are potentially subject to retail billing for charging energy, PJM staff will coordinate with the distribution utility to identify whether it intends to bill charging energy at retail, and if it does, PJM will not set up metering or accounting that would bill the resource for charging energy at wholesale. The Commission thus directed PJM to file a further compliance filing revising its tariff to state that PJM will not charge a distribution-connected Energy Storage Resource for charging energy if the distribution utility is unwilling or unable to net out any energy purchases associated with the Energy Storage Resource's wholesale charging activities from the host customer's retail bill.<sup>46</sup>

**C. Third Compliance Filing**

21. PJM states that it complies with the Commission's directive by proposing the following tariff provision: "If the distribution utility is unwilling or unable to net out Direct Charging Energy associated with an Energy Storage Resource that is co-located with end-use load other than Station Power from the host customer's retail bill, PJM shall not bill the Energy Storage Resource for any Direct Charging Energy."<sup>47</sup>

**D. Commission Determination**

22. We find that PJM's proposed revisions partially comply with the directive in the Second Compliance Order. The Commission directed PJM to file a further compliance filing revising its tariff to state that PJM will not charge a *distribution-connected* Energy Storage Resource for charging energy if the distribution utility is unwilling or unable to net out any retail energy purchases associated with the Energy Storage Resource's

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<sup>44</sup> *Id.* P 139 (citing Order No. 841, 162 FERC ¶ 61,127 at P 326).

<sup>45</sup> Second Compliance Order, 169 FERC ¶ 61,049 at P 240.

<sup>46</sup> *Id.* P 244.

<sup>47</sup> Third Compliance Filing, Transmittal at 19-20; Tariff, Attachment K-Appendix, § 1.4A.1; Operating Agreement, Schedule 1, § 1.4A.1.

wholesale charging activities from the host customer's retail bill.<sup>48</sup> PJM did not comply with this direction, but instead filed tariff language specifying that the provision only applies to an Energy Storage Resource that is "co-located with end-use load." We are concerned that this language could exclude a distribution-connected Energy Storage Resource that is not directly on the site of end-use load but nonetheless receives a retail bill because it is located behind a distribution utility meter. We thus direct PJM, within 90 days of the date of issuance of this order, to submit a further compliance filing to either clarify how its proposed tariff provisions prevent *all* distribution-connected electric storage resources from paying twice for the same charging energy or propose tariff revisions to ensure this outcome.

The Commission orders:

(A) PJM's compliance filing is hereby accepted, to become effective as of the dates requested, subject to a further compliance filing, as discussed in the body of this order.

(B) PJM is hereby directed to submit a further compliance filing, within 90 days of the date of issuance of this order, as discussed in the body of this order.

By the Commission.

( S E A L )

Nathaniel J. Davis, Sr.,  
Deputy Secretary.

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<sup>48</sup> Second Compliance Order, 169 FERC ¶ 61,049 at P 244.

Appendix – eTariff Designations

PJM Interconnection, L.L.C., Intra-PJM Tariffs

[C-D, OATT Definitions – C-D, 23.0.0](#)

[C-D, OATT Definitions – C-D, 22.0.0](#)

[E-F, OATT Definitions – E - F, 26.0.0](#)

[L-M-N, OATT Definitions – L – M - N, 24.0.0](#)

[OATT Definitions – R - S, OATT Definitions – R - S, 21.0.0](#)

[OATT ATT K APPX Sec 1.4A, OATT Attachment K Appendix Sec 1.4A Energy Storage Resource, 1.0.0](#)

[OATT ATT K APPX Sec 1.7, OATT Attachment K Appendix Sec 1.7 General, 21.0.0](#)

[C-D, OA Definitions C - D, 24.0.0](#)

[C-D, OA Definitions C - D, 23.0.0](#)

[E-F, OA Definitions E - F, 17.0.0](#)

[M-N, OA Definitions M - N, 14.0.0](#)

[Q-R, OA Definitions Q - R, 13.0.0](#)

[S–T, OA Definitions S – T, 16.0.0](#)

[OA Schedule 1 Sec 1.4A, OA Schedule 1 Sec 1.4A Energy Storage Resource Participation, 1.0.0](#)

[OA Schedule 1 Sec 1.7, OA Schedule 1 Sec 1.7 General., 21.0.0](#)