

180 FERC ¶ 61,017
FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, DC 20426

July 12, 2022

In Reply Refer To:
PJM Interconnection, L.L.C.
Docket Nos. ER22-1420-000
ER22-1420-001
ER22-1420-002

PJM Interconnection, L.L.C.
2750 Monroe Boulevard
Audubon, PA 19403

Attention: Erin Lai

Dear Ms. Lai:

1. On March 22, 2022, as amended on May 13, 2022, PJM Interconnection, L.L.C. (PJM) submitted proposed revisions to the PJM Open Access Transmission Tariff (Tariff) and the Amended and Restated Operating Agreement of PJM (Operating Agreement) to clarify the market participation of certain facilities that feature multiple and distinct generation technologies (i.e., Mixed Technology Facilities) in energy and ancillary services markets. As discussed below, we accept the proposed revisions, effective July 13, 2022, as requested, with the exception of the tariff records related to market participation for Hybrid Resources, which we accept subject to PJM making an informational filing with the precise effective date of these revisions at least 30 days prior to the desired effective date.¹

2. PJM's proposal includes provisions for classification and categorization of various types of Mixed Technology Facilities, which it proposes to make effective July 13, 2022; provisions for clarifying participation in energy and ancillary services markets, which it proposes to make effective 12/31/9998; and other miscellaneous clarifications.² PJM

¹ PJM submitted its proposal in two parts to comply with eTariff limitations of including two versions of a new Tariff section with two different effective dates. Docket No. ER22-1420-001 contains version 1.0.0 of Tariff, Attachment K-Appendix, section 1.4C and Operating Agreement, Schedule 1, section 1.4C.

² March 22 Transmittal at 14; May 13 Transmittal at 4. According to PJM, the earlier date will facilitate orderly classification and processing of planned resources

states that, in order to address any implementation issues that may arise as a result of PJM's software vendor having to make the changes and ensure adequate testing, PJM has proposed a 12/31/9998 effective date for tariff records related to the energy market model (including ancillary services) provisions. PJM pledges to make an informational filing no less than 30 days before the expected effective date indicating the software changes have been completed.³

3. PJM states that resources that share a Point of Interconnection and incorporate at least two different resource types are typically categorized as: (1) co-located resources, which are sets of assets that are modeled and dispatched as two or more separate resources that share a single point of interconnection; or (2) integrated hybrid resources, which are sets of assets that share a single point of interconnection and are modeled and dispatched as a single integrated resource.⁴ In its filing, PJM contends that co-located and integrated hybrid resources constitute 31,496 MW out of 225,356 MW of proposed generation capability under study in the PJM interconnection queue.

4. According to PJM, the proposed Tariff and Operating Agreement revisions are consistent with the Commission's policy objectives of reducing barriers to competition for new technologies, as the proposed revisions provide a mechanism through which resources categorized as Mixed Technology Facilities can provide energy, ancillary services, and capacity in the PJM marketplace. PJM asserts that the proposed reforms will enhance competition and help to ensure that the PJM markets produce just and reasonable rates.⁵

Taxonomy of Mixed Technology Facilities, Effective 7/13/2022

5. PJM proposes the term "Mixed Technology Facility" to refer to a facility that comprises any number of multiple generation technologies (for example, solar and

ahead of their initial entry into service and participation in markets. March 22 Transmittal at 13.

³ *Id.* at 15-16.

⁴ *Id.* at 3. Capitalized terms that are not defined herein have the meanings specified in the Tariff, Operating Agreement, or *PJM, Manual 21A: Rules and Procedures for Determination of Generating Capability*.

⁵ *Id.* at 4-5 (citing *Elec. Storage Participation in Mkts. Operated by Regional Transmission Orgs. & Independent Sys. Operators*, Order No. 841, 162 FERC ¶ 61,127, at P 2 (2018); *Participation of Distributed Energy Resource Aggregations in Mkts. Operated by Regional Transmission Organizations & Indep. Sys. Operators*, Order No. 2222, 172 FERC ¶ 61,247, at P 2 (2020)).

storage) behind the same Point of Interconnection.⁶ Additionally, PJM proposes to add terms to describe how components of a Mixed Technology Facility could participate in PJM markets. When the components participate separately, PJM explains, they are each “Co-Located Resources,” and alternatively, when a generating component and storage component together participate as a single, integrated resource, they comprise a “Hybrid Resource.” According to PJM, each component of a Mixed Technology Facility is either represented in markets as a Co-located Resource or as a part of a Hybrid Resource. PJM notes that for the term Hybrid Resource, combinations of generation technologies that do not include a storage component are not included.⁷ Additionally, PJM states that Hybrid Resources are further differentiated between those for which the storage component can charge from the grid—“Open-Loop Hybrid Resource”—versus those that cannot—“Closed-Loop Hybrid Resource.”⁸

Market Participation of Hybrid Resources, Effective 12/31/9998

6. PJM proposes to settle Hybrid Resources as a single unit, and the revisions allow both Open-Loop and Closed Loop Hybrid Resources to participate in the markets, with the ability to offer quantities equivalent to 0.1 MW or greater into all applicable PJM markets.⁹ Additionally, PJM contends that the proposal clarifies that the PJM capacity market is accessible to all eligible Hybrid Resources under the same general rules as any other Generation Capacity Resource.¹⁰ PJM clarifies that resources meeting the definition of a Hybrid Resource are currently accredited in the capacity market under existing tariff provisions as a Combination Resource using the Effective Load Carrying Capability (ELCC) method.¹¹ For the purposes of the capacity market must offer rule in Tariff, Attachment DD, section 6.6A, PJM states that the proposal provides that Hybrid Resources consisting exclusively of components that in isolation would be Intermittent Resources or Capacity Storage Resources would not be required to offer into the capacity

⁶ *Id.* at 5.

⁷ *Id.* at 5 n.13.

⁸ Further, PJM proposes to adapt existing provisions related to state of charge of an Energy Storage Resource to apply to both Open-Loop and Closed-Loop Hybrid Resources. *Id.* at 5-6.

⁹ *Id.* at 6.

¹⁰ *Id.* at 6-7.

¹¹ *Id.* at 7.

market. Accordingly, PJM states that its proposal treats Hybrid Resources the same as Intermittent Resources and Energy Storage Resources given their similar characteristics.

7. PJM explains that Hybrid Resources consisting exclusively of components that in isolation would be Intermittent Resources or Capacity Storage Resources with a capacity market obligation would follow the same rules for the energy market must offer obligation as Intermittent Resources and Capacity Storage Resources (provided for in Tariff, Attachment K-Appendix, section 1.10.1A(d) and Operating Agreement, Schedule 1, section 1.10.1A(d)).¹² PJM states that like Intermittent Resources and Capacity Storage Resources, Hybrid Resources with a capacity market obligation are not expected to be capable of generating at nameplate for 24 hours a day and therefore are not required to offer into the energy market at such levels for every hour of the day. PJM states that, as provided in the proposed revisions to Tariff, Attachment K-Appendix, section 1.10.1A(j) and (m) and Operating Agreement, Schedule 1, section 1.10.1A(j) and (m), all Hybrid Resources would be subject to the same proposed reserves rules as applied to Energy Storage Resources.¹³

8. PJM states that for solar-storage Hybrid Resources specifically, these resources would participate in PJM's energy and ancillary services markets in a similar way to that of Energy Storage Resource Model Participants.¹⁴ According to PJM, the proposed energy market provisions for solar-storage Open-Loop Hybrid Resources are similar to the existing energy market provisions for Energy Storage Resource Model Participants. PJM further asserts that the proposed energy market provisions for solar-storage Closed-Loop Hybrid Resources also share many characteristics with the Energy Storage Resource Model Participants, but lack provisions for charging because such resources cannot charge from the grid.¹⁵

9. PJM states that in order to best anticipate the immediate real-time behavior of a Hybrid Resource, the proposal requires a Hybrid Resource's provider to indicate to PJM whether a storage component is actively managing the output of such resource.¹⁶ PJM contends that a wind or solar Hybrid Resource with an idle storage component will produce power in the same way as a standalone wind or solar resource, which exhibit

¹² *Id.* at 8.

¹³ *Id.* at 9.

¹⁴ *Id.* Energy Storage Resource Model Participants are Energy Storage Resources utilizing the Energy Storage Resource Participation Model. *See* Tariff Definitions - E-F.

¹⁵ *Id.* at 9-10.

¹⁶ *Id.* at 10.

variability that is accounted for in PJM operations, for example by way of the wind and solar forecasts. By contrast, if the storage is active, PJM asserts its operations would expect the PJM dispatch signal to be the primary driver for the output, rather than the available wind or solar resource, and the forecast would be less relevant. PJM notes that Co-Located Resources could participate in markets using the status quo rules for the corresponding standalone technology type, and Hybrid Resources and Co-Located Resources are eligible for recovery of certain costs of Reactive Service under the provisions of Tariff, Attachment K-Appendix, section 3.2.3B consistent with rules for Energy Storage Resources Model Participants.

10. PJM proposes that Mixed Technology Facilities that feature significant interactions between the generation and storage components be required to participate in its markets as a single Hybrid Resource.¹⁷ According to PJM, because of the interaction between generation and storage components, Mixed Technology Facilities cannot behave in the same way as their standalone resource counterparts. Rather than prescriptively identify each interdependency of such interactions and model it in PJM systems, PJM proposes to instead place the responsibility on the Market Participant to manage such interdependencies. Specifically, PJM proposes to require that participants facing such interdependencies present a single, integrated resource to PJM systems. According to PJM, this aspect of its proposal results in a market model that can more flexibly accommodate innovations by requiring the Market Participant to adapt its control systems to manage new technologies.

11. Additionally, PJM states that the proposed revisions provide that, for a Mixed Technology Facility that is eligible to participate in capacity and energy markets as either a Hybrid Resource or as multiple Co-Located Resources, the modeling classification chosen for the energy market and capacity market shall match for the applicable Delivery Year.¹⁸ For example, PJM explains that if a Mixed Technology Facility provider chooses to offer the facility into the Base Residual Auction as a single ELCC Combination Resource, rather than as a Variable Resource and a separate Limited Duration Resource, the resource must participate in energy markets as a Hybrid Resource. According to PJM, this requirement supports consistent modeling between the capacity and energy markets, which ensures clear requirements during the operational Delivery Year when parameters in the Capacity Market flow through to the Energy Market and vice versa and provides better alignment between the markets for more predictable outcomes for other Market Participants.

¹⁷ *Id.* at 11.

¹⁸ *Id.* at 12.

12. PJM also proposes that for a Mixed Technology Facility that has no components that participate in the capacity market, and that is eligible to participate in the energy market as either a Hybrid Resource or as multiple Co-Located Resources, the modeling classification can be changed once per calendar year with notice to PJM no later than May 30 for the upcoming January 1 to December 31 participation months.¹⁹ PJM avers that this provides adequate flexibility to accommodate the business interests of the owners of such resources, while providing a stable basis from which to administer market outcomes. Once a modeling status is chosen for a particular resource, PJM explains that the status remains until another request is received. For an energy-only Mixed Technology Facility within the new resource interconnection queue process, PJM states that the modeling choice must be made no later than six months in advance of its initial start in the energy markets, which PJM maintains provides sufficient time for the modeling choice to be reflected in PJM's energy management system, market systems, and settlement systems.²⁰

13. On May 13, 2022, PJM filed an amendment to correct certain clerical errors that were included in the original filing. Specifically, PJM explains that the original filing incorrectly included the "secondary reserve" definition and reflected the proposed provisions in Tariff, Attachment K-Appendix, section 1.4D and Operating Agreement, Schedule 1, section 1.4D without redline in Attachment A. PJM states that the amended filing corrects these issues.²¹ PJM proposes to apply a new effective date of July 13, 2022 to the tariff records that were previously requested to be effective June 1, 2022.

14. Notice of the filing was published in the *Federal Register*, 87 Fed. Reg. 18,011 (Mar. 29, 2022), with interventions and protests due on or before April 12, 2022. Delaware Division of the Public Advocate, American Electric Power Service Corporation, Rockland Electric Company, Monitoring Analytics, LLC, acting in its capacity as the Independent Market Monitor for PJM, Calpine Corporation, Old Dominion Electric Cooperative, and New Jersey Division of Rate Counsel each filed timely motions to intervene. American Municipal Power, Inc. (AMP) filed a motion to intervene out-of-time. Notice of PJM's amended filing was published in the *Federal Register*, 87 Fed. Reg. 30,933 (May 20, 2022) with interventions and protests due on or before May 23, 2022. None was filed.

15. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2021), the timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding. Pursuant to Rule 214(d) of the

¹⁹ *Id.*

²⁰ *Id.* at 13.

²¹ May 13 Transmittal at 1-3.

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

16. We find that PJM's proposal is just and reasonable because it sets appropriate conditions under which Mixed Technology Facilities can participate in PJM markets and would thereby reduce barriers to entry for new technologies, specifically for resources that are composed of multiple generation technologies, such as Mixed Technology Facilities. Barriers to the participation of new technologies in RTO/ISO markets can occur when the rules governing participation in those markets preclude emerging technologies from providing services that they are technically capable of providing.²² PJM's proposal makes clear that PJM's capacity market is accessible to all eligible Hybrid Resources under the same general rules as any other Generation Capacity Resource.

17. The Commission hereby accepts PJM's proposed revisions to the PJM Tariff and Operating Agreement for filing, effective as requested, as discussed in the body of this order, subject to PJM making an informational filing. Specifically, we direct PJM to make an informational filing with the precise effective date of the tariff records related to market participation for Hybrid Resources at least 30 days prior to the desired effective date of those tariff records.

18. Acceptance of Tariff, Attachment K-Appendix, section 1.10.1A(d), (j), (m) does not constitute acceptance of pending language in any other proceedings.²³ Once all relevant proceedings have been completed, we expect PJM to make a true-up filing with

²² See, e.g., Order No. 841, 162 FERC ¶ 61,127 at P 2; see also Order No. 2222, 172 FERC ¶ 61,247 at P 2.

²³ PJM also states that the original filing included language inconsistencies between the proposed tariff revisions to Tariff, Attachment K-Appendix, section 1.10.1A(d), (j), (m) in this proceeding and currently effective versions of these tariff sections, which are still pending in other filings. See May 13 Transmittal at 3. PJM states that it recognizes that Commission approval of the language in this proceeding will not constitute approval of language pending in other proceedings and that a clean-up filing will be necessary in this or a subsequent docket. See *Id.* at 4.

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the Commission to clean-up the language in these proceedings, consistent with the Commission's orders.

By direction of the Commission.

Debbie-Anne A. Reese,
Deputy Secretary.

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