

Tariff, Definitions C-D; Operating Agreement, Definitions C-D

“Aggregated DER” shall mean any resource, within the PJM Region, that is located on a distribution system, any subsystem thereof, or behind a customer meter, and is used in a DER Aggregation Resource by a DER Aggregator to participate in the energy, capacity, and/or ancillary services markets of PJM through the DER Aggregator Participation Model. An Aggregated DER may not exceed 5 MW.

“DER Aggregator” shall mean an entity that is a Market Participant that uses one or more DER Aggregation Resources to: (i) participate in the energy, capacity, and/or ancillary services markets of PJM through the DER Aggregator Participation Model; and (ii) has a fully-executed DER Aggregator Participation Service Agreement.

“DER Aggregation Resource” shall be comprised of one or more Aggregated DERs. A DER Aggregation Resource is used by a DER Aggregator to participate in the energy, capacity, and/or ancillary services markets of PJM through the DER Aggregator Participation Model. A DER Aggregation Resource is capable of satisfying a minimum market offer of 100 kW. The market participation of a DER Aggregation Resource shall be determined in accordance with the underlying Aggregated DERs that comprise the DER Aggregation Resource.

“DER Capacity Aggregation Resource” shall mean a DER Aggregation Resource that participates in the Reliability Pricing Model, or is otherwise treated as capacity in PJM’s markets, such as through a Fixed Resource Requirement Capacity Plan.

“DER Aggregator Participation Model” shall mean the participation model described in Tariff, Attachment K- Appendix, section 1.4C.

Tariff, Attachment K-Appendix, section 1.4C; Operating Agreement, Schedule 1, section 1.4C.

1.4C – DER Aggregator Participation Model

- a. The rules and procedures for the participation of DER Aggregators are established pursuant to this section 1.4C and the PJM Manuals. Aggregated DERs that are also Economic Load Response shall be subject to the provisions applicable to Economic Load Response in the PJM Tariff and Operating Agreement.
- b. In order to participate in the energy, capacity, and/or ancillary services markets of PJM through the DER Aggregator Participation Model, a DER Aggregator shall register each DER Aggregation Resource with the Office of the Interconnection, in accordance with the procedures established under the PJM Manuals. The registration review process shall commence after: (1) the Office of the Interconnection has received an executed DER

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Aggregator Participation Service Agreement; (2) verification of the Aggregated DERs electrical location through processes specified in the PJM Manuals; and (3) the Office of the Interconnection receives a complete and valid registration from the DER Aggregator, in a form specified in the PJM Manuals. As part of the registration, the DER Aggregator shall submit an inventory of the individual Aggregated DERs within the DER Aggregation Resource. The DER Aggregator shall only submit a registration for Aggregated DERs that are under contract for the term of the registration. A registration for an Aggregated DER that will inject megawatts onto the distribution system will only be submitted after the Aggregated DER receives approval to inject megawatts onto the distribution system by the electric distribution company. The DER Aggregator shall submit the following information as further described in the PJM Manuals:

- i. The electric distribution company account number and associated physical and electrical location information, including compliance with applicable metering and telemetry requirements;
- ii. Operational and physical characteristics including an inventory of the individual Aggregated DERs' location-specific capability to reduce load and/or produce electricity to be used in market capability determination;
- iii. The specific PJM markets and associated term;
- iv. Approved local interconnection rights and retail program information;
- v. Confirmation that the Aggregated DERs are not in another DER Aggregation Resource registration or otherwise participating in PJM markets through another participation model; and
- vi. Confirmation that the Aggregated DERs are not being compensated for the same sale transaction for generation injection megawatts as a transaction in the energy, capacity and/or ancillary service markets in PJM, including by not limited to an Aggregated DER's participation in a net energy metering retail program.

Upon the Office of the Interconnection's receipt of the DER Aggregator's registration, the Office of the Interconnection shall review the registration and data submitted therein for completeness, and verify that the DER Aggregator meets the eligibility criteria for participation in the DER Aggregator Participation Model, as defined under the PJM Tariff and Operating Agreement and Manuals. After completing its review, the Office of the Interconnection shall notify the appropriate electric distribution company of the DER Aggregator's registration through the appropriate PJM system. A single registration shall only be comprised of individual DERs in the same electric distribution company, Transmission Zone and pricing node unless otherwise noted below. Upon receipt of notification by the Office of the Interconnection, the electric distribution company shall

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have 60 days to review the registration and verify the accuracy of the following review criteria:

- i. All electric distribution company account number and related information, as defined in the PJM Manuals, is accurate;
- ii. Participation of the Aggregated DERs in an electric distribution company's retail program does not preclude participation of the Aggregated DERs in the energy, capacity, and/or ancillary services markets of PJM;
- iii. The DER Aggregator's participation in the PJM energy, capacity, and/or ancillary service markets complies with the rules and regulations of any applicable Relevant Electric Retail Regulatory Authority;
- iv. The Relevant Electric Retail Regulatory Authority allows the participation of any applicable Aggregated DERs that are also end-use customers of an Electric distribution company, in accordance with the provisions of Tariff, Attachment K-Appendix, section 1.4C(g), and Operating Agreement, Schedule 1, section 1.4C(g)
- v. The applicable Aggregated DERs are operationally or physically capable of participation in the DER Aggregation Resource; and
- vi. Participation of the Aggregated DERs in the PJM energy, capacity, and/or ancillary service markets does not pose significant risks to the reliable and safe operation of the distribution system, individually or in aggregate.

If the electric distribution company identifies concerns based on these factors, the electric distribution company may notify the Office of the Interconnection and the DER Aggregator, and the electric distribution company and the DER Aggregator may first attempt to resolve those concerns bilaterally, prior to seeking initiating of the dispute resolution process described in Operating Agreement, Schedule 5. In the event that the electric distribution company's concerns are resolved within the 60-day review period, the electric distribution company may recommend that the Office of the Interconnection approve the registration. In the event that the concerns identified by the electric distribution company are not resolved, the electric distribution company may, within the 60-day review period, recommend that the Office of the Interconnection: (i) reject the registration, (ii) approve the registration with certain operational limitations on the DER Aggregation Resource identified in the registration, or (iii) approve the registration with the removal of one or more specific Aggregated DERs from the DER Aggregation Resource identified in the registration.

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The Office of the Interconnection shall either approve or deny the DER Aggregator's registration after receipt and review of the electric distribution company's comments and recommendation and determine the DER Aggregation Resource's capabilities for market participation. To the extent that no comments or recommendations are provided by the electric distribution company, the Office of the Interconnection shall approve the DER Aggregator's registration.

Transmission Owners shall provide all data to the Office of the Interconnection reasonably required to accurately represent the DER Aggregation Resource in the Regional Transmission Expansion Plan, in accordance with Operating Agreement, section 1.5.4 and the PJM Manuals.

A DER Aggregator shall report to the Office of the Interconnection any proposed update to the inventory of the individual Aggregated DERs within the DER Aggregation Resource identified in the DER Aggregator's registration to reflect any proposed addition or subtraction of a Aggregated DER, and any applicable information or data associated with the Aggregated DER, in accordance with the specifications described in the PJM Manuals. Any proposed update to the inventory of the individual Aggregated DERs within the DER Aggregation Resource shall not require a new registration of the existing Aggregated DERs within the approved DER Aggregation Resource. Upon notification of any proposed update to the inventory of the individual Aggregated DERs within the DER Aggregation Resource identified in the DER Aggregator's registration, the electric distribution company shall have an opportunity to conduct a renewed 60-day review period and make a recommendation to the Office of the Interconnection, in accordance with the provisions of this section, prior to the Office of the Interconnection approving or denying the proposed update to the DER Aggregation Resource. The DER Aggregator may continue to participate in the energy, capacity, and/or ancillary services markets of PJM through the DER Aggregator Participation Model using its existing approved DER Aggregation Resource during the course of any renewed 60-day review conducted by the electric distribution company. A DER Capacity Aggregation Resource registration may not be modified during the course of an applicable Delivery Year.

- c. All Aggregated DERs in a DER Aggregation Resource shall interface with the same primary pricing node, except that in the case of a DER Aggregation Resource that only provides ancillary services and is less than or equal to 5 MW, the Aggregated DERs within the DER Aggregation Resource may interface with multiple primary pricing nodes, so long as those primary pricing nodes are in the same service territory of a single electric distribution company. Aggregated DERs in a DER Capacity Aggregation Resource shall be located within a defined Locational Deliverability Area.
- d. DER Aggregators self-schedule their DER Aggregation Resources into the PJM Day-ahead Energy Market and Real-time Energy Market based on bidding parameters for the applicable technology-type, as described in the PJM Manuals. DER Aggregators shall be

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eligible, at their election, to offer a dispatchable range in submitting bidding parameters into the Day-ahead Energy Market and Real-time Energy Market.

- e. A DER Aggregator shall provide telemetry for each DER Aggregation Resource participating in the energy, capacity, and/or ancillary services markets of PJM through the DER Aggregator Participation Model, in accordance with the technical specifications described in the PJM Manuals. This telemetry shall represent one or more values indicative of the total electrical output of the DER Aggregation Resource, and inclusive of the all underlying Aggregated DERs.

A DER Aggregator shall provide to PJM all individual Aggregated DER data necessary to facilitate the settlement of the DER Aggregator's DER Aggregation Resource, in accordance with Operating Agreement, Section 14 and the PJM Manuals. A DER Aggregator shall retain performance data for individual Aggregated DERs in a DER Aggregation Resource for auditing purposes. A DER Aggregator is responsible for ensuring that Aggregated DERs within a DER Aggregation Resource have metering equipment that provides integrated hourly kWh values on an electric distribution company account basis. For non-interval metered Aggregated DERs, the DER Aggregator must ensure that a representative sample of Aggregated DERs have metering equipment that provides integrated hourly kWh values on an electric distribution company account basis, as set forth in the PJM Manuals. For residential DER Aggregation Resources, DER Aggregators shall provide aggregated meter data to PJM for the settlement of the DER Aggregator's DER Aggregation Resource.

The metering equipment shall either meet the electric distribution company requirements for accuracy, or have a maximum error of two percent over the full range of the metering equipment (including potential transformers and current transformers) and the metering equipment and associated data shall meet the requirements set forth herein and in the PJM Manuals.

- f. The electric distribution company should, prior to the deadline for submission of offers into the Day-ahead Energy Market, as described in Tariff, Attachment K-Appendix, Section 1.10.1A and Operating Agreement, Schedule 1, 1.10.1A, notify the DER Aggregator of any operational limitations for the Operating Day that may impact the bidding parameters of an applicable DER Aggregation Resource. In the event that the electric distribution company identifies additional operational concerns after the deadline described in Tariff, Attachment K-Appendix, Section 1.10.1A and Operating Agreement, Schedule 1, 1.10.1A, the DER Aggregator may utilize the generation rebidding period identified in Tariff, Attachment K-Appendix, Section 1.10.9, and Operating Agreement, Schedule 1, Section 1.10.9, to update its bidding parameters.

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During the Operating Day, the Office of the Interconnection shall dispatch DER Aggregation Resources, by communicating with the DER Aggregator, in accordance with the DER Aggregator's submitted bidding parameters. An electric distribution company may override the operation of a DER Aggregation Resource or individual Aggregated DER, by communicating with the DER Aggregator, in the following circumstances, where such override is needed to maintain the reliable and safe operation of the distribution system:

- i. When override is necessary to preserve voltage stability on the distribution system;
- ii. When override is necessary to preserve frequency stability on the distribution system;
- iii. When override is necessary to prevent thermal overloads on the distribution system;
- iv. When override is necessary to prevent load shed or damage to the distribution system;
- v. When override is necessary to comply with any applicable tariffs, agreements, and operating procedures of the electric distribution company, and/or the rules and regulations of any Relevant Electric Retail Regulatory Authority, that the DER Aggregator has attested compliance to upon execution of the applicable DER Aggregator Participation Service Agreement.

Following the exercise of the electric distribution company's override, the DER Aggregator shall reflect the override by updating the applicable bidding parameters of its DER Aggregation Resource. An electric distribution company's override shall not excuse a DER Aggregator's failure to perform any of the obligations established under the PJM Tariff, Operating Agreement, or PJM Manuals.

Any disputes regarding the application of the override criteria stated above shall be addressed with the applicable Relevant Electric Retail Regulatory Authority, and shall not be arbitrated or in any way resolved by the Office of the Interconnection or through the dispute resolution processes under Operating Agreement, Schedule 5.

- g. The Office of the Interconnection shall not permit a DER Aggregator to participate in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator Participation Model if the applicable DER Aggregation Resource includes Aggregated DERs that are end-use customers of an electric distribution company that distributed 4 million MWh or less in the previous fiscal year, as identified by the electric distribution company, unless the electric distribution company determines that the Relevant Electric

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Retail Regulatory Authority permits such end-use customers to participate. The Office of the Interconnection shall permit a DER Aggregator to participate in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator Participation Model if, during the course of the registration process described above in Tariff, Attachment K-Appendix, section 1.4(c)(b) and Operating Agreement, Schedule 1, section 1.4(c)(b), the electric distribution company presents any of the following evidence to PJM:

- i. an order, resolution or ordinance of the Relevant Electric Retail Regulatory Authority permitting or conditionally permitting the end-use customer's participation;
- ii. an opinion of the Relevant Electric Retail Regulatory Authority's legal counsel attesting to the existence of a regulation or law permitting or conditionally permitting the end-use customer's participation; or
- iii. an opinion of the state Attorney General, on behalf of the Relevant Electric Retail Regulatory Authority, attesting to the existence of a regulation or law permitting or conditionally permitting the end-use customer's participation.

The Office of the Interconnection shall permit a DER Aggregator to participate in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator Participation Model if the applicable DER Aggregation Resource includes Aggregated DERs that are end-use customers of an electric distribution company that distributed more than 4 million MWh in the previous fiscal year, as identified by the electric distribution company, unless the DER Aggregation Resource includes one or more Aggregated DERs that are demand response and the Relevant Electric Retail Regulatory Authority has prohibited the participation of demand response in the DER Aggregator Participation Model.

- h. A DER Aggregator may participate in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator Participation Model using DER Aggregation Resources containing one or more Aggregated DERs that also participate in one or more retail programs. The Office of the Interconnection shall only credit a DER Aggregator for a sale transaction in the PJM energy, capacity, and/or ancillary services markets if that same sale transaction is not also credited as part of a retail program, including but not limited to an Aggregated DER participating in a retail net energy metering program.

A DER Aggregator may participate in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator Participation Model using DER Aggregation Resources that provide multiple services in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator Participation Model. An Aggregated DER may not be used in a DER Aggregation Resource if that Aggregated DER is also registered to provide another service in the PJM energy, capacity, and/or ancillary services markets, either individually or as part of another Market Participant. The Office

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of the Interconnection shall only credit a DER Aggregator for a sale transaction in the PJM energy, capacity, and/or ancillary services markets if that same sale transaction is not also credited as part of another wholesale sale.

- i. DER Aggregators providing capacity using a DER Capacity Aggregation shall be subject to the Day-ahead Energy Market must-offer requirement described in Tariff, Attachment K-Appendix, Section 1.10.1A(d) and Operating Agreement, Schedule 1, Section 1.10.1A(d), based on the technology of the Aggregated DERs within the DER Capacity Aggregation.
- j. A DER Capacity Aggregation Resource containing Aggregated DERs directly connected to distribution facilities not co-located with retail end-use load other than Station Power may be subject to a MOPR Floor Offer Price, in a manner consistent with the provisions for Generation Capacity Resources, as described in Tariff, Attachment DD, section 5.14(h-2).

If a DER Capacity Aggregation Resource is subject to the Minimum Floor Offer Price pursuant to Tariff, Attachment DD, sections 5.14(h) and 5.14(h-1), the Capacity Market Seller that owns or controls such resources may submit a Sell Offer with a Minimum Floor Offer Price of no lower than the MW-weighted average of the applicable MOPR Floor Offer Prices (zero if not applicable) of the aggregated resources in such Sell Offer.

- k. A DER Capacity Aggregation Resource containing Aggregated DERs directly connected to distribution facilities not co-located with retail end-use load other than Station Power may be subject to a Market Seller Offer Cap, in a manner consistent with the provisions for Generation Capacity Resources, as described in Tariff, Attachment DD, section 6 and Tariff, Attachment M-Appendix, section II.E.
- l. Projected PJM Market Revenues for DER Capacity Aggregation Resources subject to the Minimum Floor Offer Price or Market Seller Offer Cap shall be determined in accordance with Tariff, Attachment DD, section 6.8(d-1). The determination of PJM Market Revenues by the Market Monitoring Unit or the Office of the Interconnection shall utilize either the hourly output profiles, or the Projected EAS Dispatch, as appropriate
- m. A DER Aggregator's DER Aggregation Resource that contains Aggregated DERs that are also load reduction resources shall be accounted for and settled in accordance with Tariff, Attachment K-Appendix, section 3.3A and Operating Agreement, Schedule 1, section 3.3A.

Market Rule Conforming Revisions

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Tariff, Attachment K-Appendix, Section 1.10(j)(i)(2); Operating Agreement, Schedule 1, Section 1.10(J)(i)(2)

(2) Market Sellers of all other generation resources that (A) are capable of providing Synchronized Reserve or Non-Synchronized Reserve, as specified in the PJM Manuals, (B) are located within the metered boundaries of the PJM Region, and (C) have submitted offers for the supply of energy into the Day-ahead Energy Market and/or Real-time Energy Market shall be deemed to have made their reserve capability available to provide Synchronized Reserve or NonSynchronized Reserve in the Day-ahead Energy Market and/or Real-time Energy Market for each clock hour for which the Market Seller submits an available offer to supply energy; provided, however that hydroelectric generation resources ~~and~~, Energy Storage Resources, and DER Aggregation Resources are not automatically deemed available to provide reserves based on the submission of an available energy offer but may submit offers to supply Synchronized Reserve and Non-Synchronized Reserve, as applicable.

Tariff, Attachment K-Appendix, Section 1.10(j)(ii)(1); Operating Agreement, Schedule 1, Section 1.10(J)(ii)(1)

(1) For each offer to supply reserves by a synchronized resource, the Office of the Interconnection shall determine the MW of available Synchronized Reserve capability offered in the Day-ahead Energy Market and Real-time Energy Market, in accordance with the PJM Manuals; except, however, that the Office of the Interconnection will not make such determination for hydroelectric generation resources, ~~or~~ Energy Storage Resources, or DER Aggregation Resources. Hydroelectric generation resources, ~~and~~ Energy Storage Resources, and DER Aggregation Resources may submit offers for their available Synchronized Reserve capability as part of their offer into the Synchronized Reserve market, provided that such offer equals or exceeds 0.1 MW; however, any such resource which is subject to the must offer requirements in section 1.10.1A(j)(i) above must submit a Synchronized Reserve offer which specifies the MW of available Synchronized Reserve capability in order to remain compliant with such requirements.

Tariff, Attachment K-Appendix, Section 1.10(m)(ii)(1); Operating Agreement, Schedule 1, Section 1.10(m)(ii)(1)

(1) For each offer to supply Secondary Reserve by a generation resource, the Office of the Interconnection shall determine the MW of available Secondary Reserve capability offered in the Day-ahead Energy Market and Real-time Energy Market in accordance with the PJM Manuals; except, however, that the Office of the Interconnection will not make such determination for hydroelectric generation resources, ~~or~~ Energy Storage

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Resources, or DER Aggregation Resources. Hydroelectric generation resources, ~~or~~ Energy Storage Resources, or DER Aggregation Resources may submit their available Secondary Reserve capability as part of their offer into the Secondary Reserve market, provided that such offer equals or exceeds 0.1 MW; however, any such resource which is subject to the must offer requirements in section 1.10.1A(m)(i) above must submit a Secondary Reserve offer which specifies the MW of available Secondary Reserve capability in order to remain compliant with such requirements.

Tariff, Attachment K-Appendix, Section 1.10.1A(d); Operating Agreement, Schedule 1, Section 1.10.1A(d)

(d) Market Sellers in the Day-ahead Energy Market shall submit offers for the supply of energy, demand reductions, or other services for the following Operating Day for each clock hour for which the Market Seller desires or is required to make its resource available to the Office of the Interconnection. Offers for the supply of energy may be cost-based, market-based, or both, and may vary hourly. Offers shall be submitted to the Office of the Interconnection in the form specified by the Office of the Interconnection and shall contain the information specified in the Office of the Interconnection's Offer Data specification, this section 1.10.1A(d), section 1.10.9B below, Operating Agreement, Schedule 2, and the PJM Manuals, as applicable. Market Sellers owning or controlling the output of a Generation Capacity Resource or a Aggregated DER that is a component of a committed DER Aggregation Capacity Resource under Tariff, Attachment DD or RAA, Schedule 8.1, and that has not been rendered unavailable by a Generator Planned Outage, a Generator Maintenance Outage, or a Generator Forced Outage shall submit offers for the available capacity of such Generation Capacity Resource, or a Aggregated DER that is a component of a committed DER Aggregation Capacity Resource, including any portion that is self-scheduled by the Generating Market Buyer. Such offers shall be based on the ICAP equivalent of the Market Seller's cleared UCAP capacity commitment, provided, however, where the underlying resource is a Capacity Storage Resource, ~~or an~~ Intermittent Resource, or a DER Capacity Aggregation Resource, the Market Seller shall satisfy the must offer requirement by either self-scheduling or offering the unit as a dispatchable resource, in accordance with the PJM Manuals, where the hourly day-ahead self-scheduled values for such Capacity Storage Resources, ~~and~~ Intermittent Resources, or DER Capacity Aggregation Resource may vary hour to hour from the capacity commitment. Any offer not designated as a Maximum Emergency offer shall be considered available for scheduling and dispatch under both Emergency and non-Emergency conditions.

Offers may only be designated as Maximum Emergency offers to the extent that the Generation Capacity Resource or DER Capacity Aggregation Resource falls into at least one of the following categories:

....

The submission of offers for resource increments that are not committed as a Capacity Resource under Tariff, Attachment DD or RAA, Schedule 8.1 shall be optional, but any such offers must contain the information specified in the Office of the Interconnection's Offer Data specification, Operating Agreement, Schedule 1, sections 1.10.1A(d), and 1.10.9B, Operating Agreement, Schedule 2, and the PJM Manuals, as applicable. Energy offered from generation resources that

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are not committed as a Capacity Resource under Tariff, Attachment DD or RAA, Schedule 8.1 shall not be supplied from resources that are included in or otherwise committed to supply the Operating Reserves of a Control Area outside the PJM Region.

The foregoing offers:

i) Shall specify the Generation Capacity Resource, ~~or~~ Economic Load Response Participant resource, or a DER Aggregation Resource and energy or demand reduction amount, respectively, for each clock hour in the offer period;

(f) Each Market Seller owning or controlling the output of a Generation Capacity Resource or DER Aggregation Resource committed to service of PJM loads under the Reliability Pricing Model or Fixed Resource Requirement Alternative shall submit a forecast of the availability of each such Generation Capacity Resource for the next seven days. A Market Seller (i) may submit a non-binding forecast of the price at which it expects to offer a generation resource increment to the Office of the Interconnection over the next seven days, and (ii) shall submit a binding offer for energy, along with Start-up Costs and No-load Costs, if any, for the next seven days or part thereof, for any generation resource with minimum notification or start-up requirement greater than 24 hours. Such resources committed by the Office of the Interconnection will not receive Operating Reserve Credits nor otherwise be made whole for its hours of operation for the duration of any portion of such commitment that exceeds the maximum start-up and notification times for such resources during Hot Weather Alerts and Cold Weather Alerts, consistent with Operating Agreement, Schedule 1, section 3.2.3 and Operating Agreement, Schedule 1, section 6.6.

Tariff, Attachment K-Appendix, Section 3.3A.5(b); Operating Agreement Schedule 1, Section 3.3A.6(b)

(b) In cases where the demand reduction follows dispatch, as defined in Tariff, Attachment K-Appendix, section 3.2.3(o-1), as instructed by the Office of the Interconnection, and the demand reduction offer price is equal to or greater than the threshold price established under the Net Benefits Test, and demand reduction is not an Aggregated DER operating as part of a DER Aggregation Resource, payment will not be less than the total value of the demand reduction bid. For the purposes of this subsection, the total value of a demand reduction bid shall include any submitted start-up costs associated with reducing demand, including direct labor and equipment costs and opportunity costs and any costs associated with a minimum number of contiguous hours for which the demand reduction must be committed.

Any shortfall between the applicable Locational Marginal Price and the total value of the demand reduction bid will be made up through normal, real-time operating reserves. In all cases under this subsection, the applicable zonal or aggregate (including nodal) Locational Marginal Price shall be used as appropriate for the individual end-use customer.

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Tariff, Attachment K-Appendix, Section 3.3A.6(b); Operating Agreement, Schedule 1, Section 3.3A.6(b)

(b) Total payments to Economic Load Response Participants for accepted day-ahead demand reduction bids with an offer price equal to or greater than the threshold price established under the Net Benefits Test that follow the dispatch instructions of the Office of the Interconnection, and the demand reduction is not dispatched as part of a DER Aggregation Resource, will not be less than the total value of the demand reduction bid. For the purposes of this subsection, the total value of a demand reduction bid shall include any submitted start-up costs associated with reducing load, including direct labor and equipment costs and opportunity costs and any costs associated with a minimum number of contiguous hours for which the load reduction must be committed. Any shortfall between the applicable Locational Marginal Price and the total value of the demand reduction bid will be made up through normal, day-ahead operating reserves. In all cases under this subsection, the applicable zonal or aggregate (including nodal) Locational Marginal Price shall be used as appropriate for the individual end-use customer.

Tariff, Attachment DD

Each DER Capacity Aggregation Resource committed in a Delivery Year shall be obligated to simultaneously test all Aggregated DERs within the aggregation, on an annual basis, as described in the PJM Manuals. The DER Aggregator may perform an unlimited number of tests during each such period. The Office of Interconnection may, at its discretion, cancel a test and allow a retest, to ensure system reliability. If none of the tests during a testing period certify full delivery of the megawatt amount of nominated capacity the DER Aggregator committed, for such Delivery Year, the DER Aggregation shall be assessed a DER Aggregation Test Failure Charge equal to the net capability testing shortfall.

The DER Aggregation Test Failure Charge rate shall equal such Seller's Weighted Daily Revenue Rate in such Zone for the DER Capacity Aggregation Resource that tested plus the greater of (0.20 times the Weighted Daily Revenue Rate in such Zone for the product(s) tested or \$20/MW-day). Such charge shall be assessed daily and charged monthly (or otherwise in accordance with customary PJM billing practices in effect at the time); provided, however, that a lump sum payment may be required to reflect amounts due, as a result of a test failure, from the start of the Delivery Year to the day that charges are reflected in regular billing.

Revenues collected from assessment of DER Aggregation Test Failure Charges shall be distributed to Load Serving Entities that were charged a Locational Reliability Charge for the Delivery Year for which the DER Aggregation Test Failure Charge was assessed, pro-rata based on such Load Serving Entities' Daily Unforced Capacity Obligations.

Tariff, Attachment DD, section 5.14(h-2)(1)(A)

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(A) By no later than one hundred and fifty (150) days prior to the commencement of the offer period of any RPM Auction conducted for the 2024/2025 Delivery Year and all subsequent Delivery Years, and by the date posted on the PJM website for the 2023/2024 Delivery Year, each Capacity Market Seller must certify to the Office of Interconnection for each Generation Capacity Resource and DER Capacity Aggregation Resource the Capacity Market Seller intends to offer into the RPM Auction, in accordance with the PJM Manuals:

Tariff, Attachment DD, section 6.6A Offer Requirement for Capacity Performance Resources

6.6A (c) Exceptions to the requirement in subsection (a) shall be permitted only for a resource which the Capacity Market Seller demonstrates is reasonably expected to be physically incapable of satisfying the requirements of a Capacity Performance Resource. Intermittent Resources, Capacity Storage Resources, Demand Resources, Energy Efficiency Resources and DER Aggregation Resources shall not be required to offer as a Capacity Performance Resource, but shall not be precluded from being offered as a Capacity Performance Resource at a level that demonstrably satisfies such requirements. Exceptions shall be determined using the same timeline and procedures as specified in section 6.6.

Tariff, Attachment DD, section 10A.

(c) Where the result of such formula is a positive number and where:

Expected Performance =

for Generation Capacity Resources (including external Generation Capacity Resources for any Performance Assessment Interval for which performance by such external resource would have helped resolve a declared Emergency Action; provided, however, that for any Delivery Year up to and including the 2019/2020 Delivery Year, performance of external Generation Capacity Resources shall be assessed only during Performance Assessment Hours for Emergency Actions declared for the entire PJM Region) and Capacity Storage Resources: [(Resource Committed Capacity * the Balancing Ratio)]

The Balancing Ratio = (All Actual Generation Performance, Storage Resource Performance, DER Aggregation Resource Performance, Net Energy Imports, Price Responsive Demand Bonus Performance effective with the 2022/2023 Delivery Year, and Demand Response Bonus Performance) / (All Committed Generation and, Storage Capacity, and DER Aggregation Capacity Resource); provided, however, that Net Energy Imports shall be included in the calculation of the Balancing Ratio only for any Performance Assessment Interval for which performance by any external Generation Capacity Resource would have helped resolve the Emergency Action that was the subject to the Performance Assessment Hour; and provided further that for any Delivery Year up to and including the 2019/2020 Delivery Year, Net Energy Imports shall be included in the calculation of the Balancing Ratio only for any Performance

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Assessment Hour for which the Emergency Action was declared for the entire PJM Region; and provided further that the Balancing Ratio shall not exceed a value of 1.0

All Committed Generation ~~and~~, Storage Capacity, and DER Aggregation Capacity = the total megawatts of Unforced Capacity of all Generation Capacity Resources (including external Generation Capacity Resources for any Performance Assessment Interval for which performance by such external resource would have helped resolve the declared Emergency Action that was the subject to the Performance Assessment Hour; provided, however, that for any Delivery Year up to and including the 2019/2020 Delivery Year, performance of external Generation Capacity Resources shall be assessed only during Performance Assessment Hours for Emergency Actions declared for the entire PJM Region) ~~and~~, all Capacity Storage Resources, and all DER Aggregation Capacity Resources, including only unforced capacity of generating resources within the aggregation, and excluding load reduction capacity committed by all Capacity Market Sellers, FRR Entities, Locational UCAP Sellers

All Actual Generation Performance ~~and~~, Storage Resource Performance, and DER Aggregation Resource Performance = the total amount of Actual Performance for all generation resources (including external Generation Capacity Resources for any Performance Assessment Interval for which performance by such external resource would have helped resolve the declared Emergency Action that was the subject to the Performance Assessment Hour; provided, however, that for any Delivery Year up to and including the 2019/2020 Delivery Year, performance of external Generation Capacity Resources shall be assessed only during Performance Assessment Hours for Emergency Actions declared for the entire PJM Region) ~~and~~, storage resources and DER Aggregation Resources (calculated as actual performance for all generating Aggregated DERs and all bonus performance from demand resource as calculated in (g) below) during the interval;

Net Energy Imports = the sum of interchange transactions importing energy into PJM (not including those associated with external Generation Capacity Resources and therefore included in All Actual Generation Performance) minus the sum of interchange transactions exporting energy out of PJM, but not less than zero;

Demand Response Bonus Performance = the sum of Bonus performance provided by Demand Response resources as calculated in (g) below;

Price Responsive Demand Bonus Performance = the sum of Bonus performance provided by Price Responsive Demand as calculated in (g) below;

and for Demand Resources, Energy Efficiency Resources, and Qualifying Transmission Upgrades: Resource Committed Capacity;
where

Resource Committed Capacity = the total megawatts of capacity committed from such Capacity Resource committed capacity without making any adjustment for the Forecast Pool Requirement

and for PRD Provider: Price Responsive Demand Committed

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where

Price Responsive Demand Committed = the Nominal PRD Value committed by the PRD Provider in the area defined by the Performance Assessment Interval, adjusted to account for any PRD registrations in such area that were not subject to compliance measurement.

and

Actual Performance = for each generation resource, the metered output of energy delivered to PJM by such resource plus the resource's real-time reserve or regulation assignment, if any, during the Performance Assessment Interval;

for each storage resource, the metered output of energy delivered to PJM by such resource plus the resource's real-time reserve or regulation assignment, if any, during the Performance Assessment Interval;

for each Demand Resource, the demand response provided to PJM by such resource, plus such resource's real-time reserve or regulation assignment, if any, during the Performance Assessment Interval, as established through the PJM demand response settlement procedure consistent with the standards specified in RAA, Schedule 6;

for each PRD Provider, the actual load reduction provided by the PRD Provider during a Performance Assessment Interval, determined in accordance with RAA, Schedule 6.1.N and the PJM Manuals;

for each Energy Efficiency Resource, the load reduction quantity approved by PJM subsequent to the pre-delivery year submittal of a post-installation measurement and verification report; **and**

for each Qualified Transmission Upgrade, the megawatt quantity cleared by such Qualified Transmission Upgrade if it is in service during the Performance Assessment Interval, and zero if it is not in service during such Performance Assessment Interval. **and**

For each DER Capacity Aggregation Resource, the sum of Aggregated DERs calculated in accordance with the generation resource, storage resource, demand resource, and energy efficiency resource calculations herein.

Tariff, Attachment Q

1. Applicability

A Market Participant seeking to submit a Sell Offer in any RPM Auction based on any Capacity Resource for which there is a materially increased risk of nonperformance must satisfy the credit requirement specified herein before submitting such Sell Offer. A PRD Provider seeking to commit Price Responsive Demand for which there is a materially increased risk of nonperformance must satisfy the credit requirement specified herein before it may commit the Price Responsive Demand. Credit must be maintained until such risk of non-performance is substantially eliminated, but may be reduced commensurate with the reduction in such risk, as set forth in section IV.B.3 below.

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For purposes of this provision, a resource for which there is a materially increased risk of nonperformance shall mean: (i) a Planned Generation Capacity Resource; (ii) a Planned Demand Resource or an Energy Efficiency Resource; (iii) a Qualifying Transmission Upgrade; (iv) an existing or Planned Generation Capacity Resource located outside the PJM Region that at the time it is submitted in a Sell Offer has not secured firm transmission service to the border of the PJM Region sufficient to satisfy the deliverability requirements of the Reliability Assurance Agreement; ~~or~~ (v) Price Responsive Demand to the extent the responsible PRD Provider has not registered PRD-eligible load at a PRD Substation level to satisfy its Nominal PRD Value commitment, in accordance with Reliability Assurance Agreement, Schedule 6.1 or (vi) a Planned DER Capacity Aggregation Resource.

A Sell Offer based on a Planned Generation Capacity Resource, Planned Demand Resource, ~~or~~ Energy Efficiency Resource or Planned DER Capacity Aggregation Resource may be submitted as a Credit-Limited Offer. A Market Participant electing this option shall specify a maximum amount of Unforced Capacity, in megawatts, and a maximum credit requirement, in dollars, applicable to the Sell Offer.

RAA Revisions

Planned DER Capacity Aggregation Resource:

A “Planned DER Capacity Aggregation Resource” shall mean any DER Capacity Aggregation Resource that does not currently have the capability to provide generation or reduction in demand, but that is scheduled to be capable of providing such generation or reduction in demand on or before the start of the Delivery Year for which such resource is to be committed, as determined in accordance with the requirements of Reliability Assurance Agreement, Schedule 6.2. As set forth in Reliability Assurance Agreement, Schedule 6.2 and Reliability Assurance Agreement, Schedule 8.1, a DER Aggregator submitting a DER Capacity Aggregation Resource Sell Offer Plan shall identify in such plan all DER Capacity Aggregation Resources in excess of those that qualify as Existing DER Capacity Aggregation Resources. A Planned DER Capacity Aggregation Resource must comply with all provisions of the DER Aggregator Participation Model described in Tariff, Attachment K-Appendix, section 1.4C and Operating Agreement, Schedule 1, section 1.4C, prior to the applicable Delivery Year.

DER Capacity Aggregation Resource Sell Offer Plan:

“DER Capacity Aggregation Resource Sell Offer Plan” shall mean the plan required by Reliability Assurance Agreement, Schedule 6.2 and Reliability Assurance Agreement, Schedule 8.1 in support of an intended offer of a DER Capacity Aggregation Resource in an RPM Auction, or an intended inclusion of a DER Capacity Aggregation Resource in an FRR Capacity Plan.

Existing DER Capacity Aggregation Resource:

“Existing DER Capacity Aggregation Resource” shall mean a DER Capacity Aggregation Resource for which the DER Aggregator has identified existing Aggregated DER sites that are

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registered for the current Delivery Year with PJM (even if not registered by such DER Aggregator) and that the DER Aggregator reasonably expects to have under a contract to generate or reduce load based on PJM dispatch instructions by the start of the Delivery Year for which such DER Capacity Aggregation Resource is offered.

DER Aggregator Officer Certification Form:

“DER Aggregator Officer Certification Form” shall mean a DER Aggregator’s certification as to an intended DER Capacity Aggregation Resource Sell Offer, in accordance with Reliability Assurance Agreement, Schedule 6.2 and Reliability Assurance Agreement, Schedule 8.1 and the PJM Manuals.

RAA, Schedule 6.2

DER Capacity Aggregation Resources qualifying under the criteria set forth below may be offered for sale in an RPM auction, or included in an FRR Capacity Plan, for any Delivery Year for which such resource qualifies.

A DER Capacity Aggregation Resource Sell Offer Plan shall consist of a completed template document in the form posted on the PJM website, requiring the information set forth below and in the PJM Manuals, and a DER Aggregator Officer Certification Form signed by an officer of the DER Aggregator that is duly authorized to provide such a certification. The DER Capacity Aggregation Resource Sell Offer Plan must provide information that supports the DER Aggregator’s intended DER Capacity Aggregation Resource Sell Offers and demonstrates that the DER Capacity Aggregation Resources are being offered with the intention that the megawatt quantity that clears the auction is reasonably expected to be physically delivered through DER Capacity Aggregation Resource registration for the relevant Delivery Year. The DER Capacity Aggregation Resource Sell Offer Plan shall include all Existing DER Capacity Aggregation Resources and all Planned DER Capacity Aggregation Resources that the DER Aggregator intends to offer into an RPM Auction or include in an FRR Capacity Plan.

The DER Aggregator shall provide the details of, and key assumptions for underlying Aggregated DERs for the Planned DER Capacity Aggregation Resource contained in the Sell Offer Plan, including but not limited to:

- (i) Nominated megawatt quantities and method(s) of achieving generation or load reductions to meet megawatt quantities
- (ii) equipment and technology to be installed or controlled
- (iii) plan and ability to acquire generating resources or load reductions at customer site(s)assumptions regarding regulatory approval of program(s), if applicable
- (iv) Zone and LDA information
- (v) A schedule of an approximate timeline for procuring Aggregated DERs

DER Aggregator Officer Certification Form.

Each DER Capacity Aggregation Resource Sell Offer Plan must include a DER Aggregator Officer Certification, signed by an officer of the DER Aggregator that is duly authorized to provide such a certification, in the form shown in the PJM Manuals, which form shall include the following certifications:

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(a) that the signing officer has reviewed the DER Capacity Aggregation Resource Sell Offer Plan and the information supplied to PJM in support of the Plan is true and correct as of the date of the certification; and

(b) that the DER Aggregator is submitting the Plan with the reasonable expectation, based upon its analyses as of the date of the certification, to physically deliver all megawatts that clear the RPM Auction through the DER Capacity Aggregation Resource registrations by the specified Delivery Year.

As set forth in the form provided in the PJM Manuals, the certification shall specify that it does not in any way abridge, expand, or otherwise modify the current provisions of the PJM Tariff, Operating Agreement, and/or RAA.

The Unforced Capacity value of a DER Capacity Aggregation Resource will be determined as the sum of the Unforced Capacity value of the Aggregated DERs registered and linked to the DER Capacity Aggregation Resource, in accordance with the provisions of the PJM Manuals.

The DER Aggregator shall register the Aggregated DERs within a DER Capacity Aggregation Resource in the same location within the Zone and LDA as specified in its cleared sell offer, and may be subject to deficiency charges under Tariff, Attachment DD to the extent it fails to provide the Aggregated DERs linked to the applicable DER Capacity Aggregation Resource in such location consistent with its cleared offer.

A DER Aggregator offering a Planned DER Capacity Aggregation Resource must comply with all applicable credit requirements, as set forth in Tariff, Attachment Q.