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March 31, 2023

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

*Re: PJM Interconnection, L.L.C., ER22-962-002
Order No. 2222 30-Day Compliance Filing*

Dear Secretary Bose,

In compliance with the Federal Energy Regulatory Commission's ("FERC" or the "Commission") March 1, 2023 Order¹ in the above-captioned proceeding related to PJM's compliance with Order No. 2222,² PJM hereby submits the following revisions to the PJM Open Access Transmission Tariff ("Tariff") and the Amended and Restated Operating Agreement of PJM Interconnection, L.L.C. ("Operating Agreement").³

¹ *PJM Interconnection, L.L.C.*, 182 FERC ¶ 61,143 (2023) (hereafter, the "March 1, 2023 Order"). See March 1, 2023 Order at P 87 ("Accordingly, we direct PJM to file, within 30 days of the date of issuance of this order, a further compliance filing that removes its proposed tariff language that exempts DER Capacity Aggregation Resources containing Component DER directly connected to distribution facilities co-located with retail end-use load from capacity market power mitigation rules. However, given that capacity market power mitigation rules are necessary to allow DER Capacity Aggregation Resources to participate directly in PJM's markets, we also require PJM, as part of its compliance filing, to revise its tariff to apply its existing capacity market mitigation rules to DER Capacity Aggregation Resources based on the composition of the DER Capacity Aggregation Resource and consistent with such requirements applied to all resources in PJM.").

² *Participation of Distributed Energy Res. Aggregations in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, 172 FERC ¶ 61,247 (2020) ("Order No. 2222"), *order on reh'g*, 174 FERC ¶ 61,197 ("Order No. 2222-A"), *order on reh'g*, 175 FERC ¶ 61,227 (2021) ("Order No. 2222-B").

³ Terms not otherwise defined herein shall have the same meaning as set forth in the Tariff, the Operating Agreement, and the Reliability Assurance Agreement Among Load-Serving Entities in the PJM Region ("RAA"). The Tariff, Operating Agreement, and RAA are currently located under PJM's "Intra-PJM Tariffs" eTariff title, available here: <https://etariff.ferc.gov/TariffBrowser.aspx?tid=1731>.

I. BACKGROUND

On February 1, 2022, PJM submitted proposed revisions to the PJM Tariff, Operating Agreement, and RAA,⁴ in compliance with Order No. 2222 and associated orders.⁵ As relevant here, PJM proposed that DER Capacity Aggregation Resources consisting of Component DER not co-located with retail end-use load (*i.e.*, not demand response) may be subject to a Minimum Offer Price Rule (“MOPR”) Floor Offer Price and a Market Seller Offer Cap (“MSOC”), consistent with applicable tariff provisions.⁶

In its July 7, 2022 Response to Request for Additional Information,⁷ PJM further clarified that DER Capacity Aggregation Resources that include Component DER that inject onto the grid *and* Component DER that are co-located with retail end-use load will *not* be subject to the MOPR and MSOC.⁸ PJM explained that this proposal was consistent with PJM’s existing performance requirements for participation in the capacity market, in light of the current demand response rules for retail load participation.⁹ PJM stated that these resources are “multi-use” installations,

⁴ *PJM Interconnection, L.L.C.*, Order No. 2222 Compliance Filing of PJM Interconnection, L.L.C., Docket No. ER22-962-000 (Feb. 1, 2022) (hereafter, the “February 1, 2022 Compliance Filing”).

⁵ See Order No. 2222 at P 360 (“[A]fter consideration of the comments submitted, we will require each RTO/ISO to file the tariff changes needed to implement the requirements of this final rule within 270 days of the publication date of this final rule in the Federal Register.”). See also *Participation of Distributed Energy Res. Aggregations in Mkts. Operated by Reg’l Transmission Orgs. & Indep. Sys. Operators*, Notice of Correction in Federal Register of Compliance Deadline, Docket No. RM18-9-000 (Oct. 29, 2020) (“Notice is hereby given that the deadline to submit filings to comply with Order No. 2222 has been corrected and is July 19, 2021.”). See also *Midcontinent Indep. Sys. Operator, Inc.*, 175 FERC ¶ 61,013, at P 5 (2021) (“We grant MISO’s, SPP’s, and PJM’s requests for extension, until April 18, 2022, April 28, 2022, and February 1, 2022, respectively, to submit their filings in compliance with the requirements of Order No. 2222”).

⁶ February 1, 2023 Compliance Filing at proposed Tariff, Attachment K-Appendix., § 1.4B(k), (l); Operating Agreement, Schedule 1, § 1.4B(k), (l).

⁷ *PJM Interconnection, L.L.C.*, Response to Request for Additional Information of PJM Interconnection, L.L.C., Docket No. ER22-962-000 (Jul. 7, 2022) (hereafter, the “July 7, 2022 Response to Request for Additional Information”).

⁸ *Id.* at 11-12.

⁹ *Id.*

developed with a purpose to serve retail load, and will have inherent size restrictions due to site loads and distribution interconnection processes—factors which act in concert to minimize market power concerns.¹⁰

In the March 1, 2023 Order, the Commission found that PJM’s proposed revisions “do not comply with Order No. 2222 because they constitute reforms to PJM’s capacity market mitigation rules, which are outside the scope of this proceeding.”¹¹ The Commission found that under PJM’s existing capacity market mitigation rules, resources are subject to the MOPR and MSOC based on their resource *type*, and accordingly, PJM’s proposal would revise its existing capacity market power mitigation rules as applied to DER Capacity Aggregation Resources by exempting them from mitigation if any of the constituent Component DER in the aggregation are co-located with retail end-use load.¹²

Accordingly, the Commission directed PJM to, within 30 days, remove its proposed language exempting DER Capacity Aggregation Resources from capacity market power mitigation rules if any of the Component DER are co-located with retail end-use load.¹³ The Commission also directed PJM to submit revisions applying PJM’s existing capacity market mitigation rules to DER Capacity Aggregation Resources “based on the composition of the DER Capacity Aggregation Resource and consistent with such requirements applied to all resources in PJM.”¹⁴

¹⁰ *Id.*

¹¹ March 1, 2023 Order at P 87.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*

II. COMPLIANCE FILING

In compliance with the Commission's directive in the March 1, 2023 Order, PJM proposes to modify the original language identified by the Commission in Tariff, Attachment K-Appendix, § 1.4B(k) and Operating Agreement, Schedule 1, § 1.4B(k). Under PJM's existing capacity market mitigation rules, resources that *are* co-located with retail end-use load (*i.e.*, demand response) *are not* subject to MOPR or MSOC. Resources that *are not* co-located with retail end-use load *are* subject to MOPR and MSOC. PJM proposes to carry this existing framework forward to the DER Aggregator Participation Model. Specifically, PJM proposes to revise the language to apply PJM's existing capacity market mitigation rules for MOPR and MSOC based on resource *type* within the DER Capacity Aggregation Resource, and remove any exemption from mitigation if any of the constituent Component DER in the DER Capacity Aggregation Resource are co-located with retail end-use load.

Accordingly, PJM proposes to modify the originally proposed language to read as follows:

A DER Capacity Aggregation Resource shall be subject to a MOPR Floor Offer Price in accordance with the provisions applicable to MOPR Floor Offer Price for Generation Capacity Resources, as described in Tariff, Attachment DD, section 5.14(h-2), and Market Seller Offer Cap for Generation Capacity Resources in a manner consistent with the provisions applicable to Market Seller Offer Cap for Generation Capacity Resources, as described in Tariff, Attachment DD, section 6.4 and Tariff, Attachment M-Appendix, section II.E, based on the underlying technology of the Component DER.

A DER Capacity Aggregation Resource comprised solely of Component DER connected to distribution facilities shall be subject to MOPR Floor Offer Price and Market Seller Offer Cap.

A DER Capacity Aggregation Resource comprised solely of Component DER co-located with retail end-use load shall not be subject to MOPR Floor Offer Price or Market Seller Offer Cap.

A DER Capacity Aggregation Resource containing one or more Component DER directly connected to distribution facilities and one or more Component DER co-located with retail end-use load may segment offers for the Component DER subject to mitigation, based on the underlying technology of the Component DER in the DER Capacity Aggregation Resource, and further described in the PJM Manuals.

If a DER Capacity Aggregation Resource is subject to the Minimum Floor Offer Price pursuant to Tariff, Attachment DD, sections 5.14(h-2), 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.

This revised proposed language specifically designates the three possible configurations for purposes of capacity market power mitigation in the context of the DER Aggregator Participation Model. These include:

1. DER Capacity Aggregation Resources that consist solely of Component DER that *are not* co-located with retail end-use load (*i.e.*, connected to distribution facilities);
2. DER Capacity Aggregation Resources that consist solely of Component DER co-located with retail end-use load; and
3. DER Capacity Aggregation Resources that contain *both* Component DER co-located with retail end-use load *and* Component DER not co-located with retail end-use load.

In the event that a DER Capacity Aggregation Resource contains *both* Component DER co-located with retail end-use load *and* Component DER not co-located with retail end-use load, PJM proposes to provide the DER Aggregator with the option to segment its capacity market offers, as between those Component DER that are subject to market power mitigation and those that are not, within the same DER Capacity Aggregation Resource. This will allow for consistent application of PJM's existing capacity market power mitigation rules based on resource type, in the specific context of DER Capacity Aggregation Resources.

III. DOCUMENTS INCLUDED WITH THIS FILING

In accordance with the requirements of Order No. 714¹⁵ and the Commission's eTariff regulations, PJM hereby submits an eTariff XML filing package consisting of the following materials:

1. This transmittal letter;
2. Attachment A – Revisions to the Tariff and Operating Agreement, in redlined format;¹⁶
3. Attachment B – Revisions to the Tariff and Operating Agreement, in clean format.

¹⁵ *Electronic Tariff Filings*, Order No. 714, 124 FERC ¶ 61,270 (2008), *final rule*, Order No. 714-A, 147 FERC ¶ 61,115 (2014).

¹⁶ The illustrative redlines submitted in this filing show the difference between what was submitted in the February 1, 2022 Compliance Filing and this compliance filing.

IV. CONCLUSION

In accordance with the foregoing, PJM respectfully requests that the Commission accept these proposed revisions as compliant with the directive from the March 1, 2023 Order.

Respectfully submitted,

/s/ Thomas DeVita

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*On behalf of
PJM Interconnection, L.L.C.*

CERTIFICATE OF SERVICE

I hereby certify that I have this 31st day of March, 2023 caused a copy of the foregoing document to be served upon each person designated on the official service list compiled by the Secretary in this proceeding.

/s/ Thomas DeVita

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Attachment A

Revisions to the PJM Open Access Transmission Tariff and Operating Agreement

(Identified by Additional Cover Pages)

(Marked/Redline Format)

PJM Open Access Transmission Tariff
Attachment KK-Appendix, section 1.4B

1.4B DER Aggregator Participation Model

(a) The rules and procedures for the participation of DER Aggregators are established pursuant to this section 1.4B and the PJM Manuals.

(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 and DER Capacity Aggregation Resource with the Office of the Interconnection, in accordance with the procedures established under the PJM Manuals.

Prior to the initiation of the registration review process by the Office of the Interconnection, a DER Aggregator shall obtain and verify, through good faith efforts and in coordination with the applicable electric distribution company, and, if necessary, any relevant Transmission Owner, the following location and data components needed for the DER Aggregator's registration with the Office of the Interconnection:

- i. With the express written consent of the applicable Component DER, the electric distribution company customer account number and associated physical and transmission system electrical location information of the applicable Component DER, including compliance with applicable PJM and electric distribution company metering and telemetry requirements;
- ii. Evidence of approval to interconnect, including but not limited to a finalized interconnection agreement, with the applicable Component DER, in accordance 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, to the distribution system for identified megawatts, and identification of participation in an electric distribution company program that recognizes grid withdrawals and/or injections, including but not limited to a net energy metering program.

Disputes between the DER Aggregator and the electric distribution company regarding the location and data components needed for the DER Aggregator's registration with the Office of the Interconnection described above shall be resolved in accordance with applicable state or local law, 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.

The registration review process shall commence after: (1) the Office of the Interconnection has an executed DER Aggregator Participation Service Agreement on file, to be used for all DER Aggregation Resources associated with the DER Aggregator; (2) the Office of the Interconnection receives a complete registration from the DER Aggregator, in a form specified in the PJM Manuals; and (3) pre-registration activities have been completed, consisting of the DER Aggregator obtaining and verifying the location and data components described above needed for its 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. The DER Aggregator shall only submit a registration for Component DER that are under contract for the term of the registration, and only one DER Aggregator may operate Component DER at a specific location. 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 Component DER in the same state, electric distribution company, Transmission Zone, and pricing point unless otherwise noted below. Upon receipt of notification by the Office of the Interconnection, the electric distribution company may, within 60 calendar days, review and verify, as applicable, the registration and the following information contained therein:

- i. Operational and physical characteristics, including an inventory of the individual Component DER location-specific capability to reduce load and/or produce electricity;
- ii. The specific PJM markets in which the DER Aggregation Resource plans to participate and, if applicable, the effective and termination dates for participation;
- iii. The electric distribution company customer account number(s) which represent Component DER location(s) and related information, as defined in the PJM Manuals;
- iv. Participation of the Component DER in an electric distribution company's retail program at the time of registration, and whether such participation precludes participation of the Component DER in the energy, capacity, and/or ancillary services markets of PJM, and as defined in the PJM Manuals;
 - a. Component DER that participate in a net energy metering retail program may only participate with grid injections in the PJM ancillary services markets, and may not participate in PJM energy or capacity markets, unless:
 1. the electric distribution company confirms to the Office of the Interconnection that participation of the Component DER in a net energy metering retail program or tariff approved by the Relevant Electric Retail Regulatory Authority will not violate the restrictions on duplicative compensation, as described in Tariff, Attachment K-Appendix, section 1.4B(h) and Operating Agreement, Schedule 1, section 1.4B(h); and
 2. the Office of the Interconnection determines that the participation of the Component DER otherwise meets the applicable requirements for energy market or capacity market participation.

- v. 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;
- vi. The Relevant Electric Retail Regulatory Authority allows the participation of any applicable Component DER that are also end-use customers of an electric distribution company, in accordance with the provisions of Tariff, Attachment K-Appendix, section 1.4B(g), and Operating Agreement, Schedule 1, section 1.4B(g).
- vii. The participation of the Component DER in the PJM energy, capacity, and/or ancillary service markets do not pose a threat to the reliable and safe operation of the distribution system, the public, or electric distribution company personnel.

If the electric distribution company identifies concerns based on factors (i) through (vii) within the 60 calendar day review period, 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, or in accordance with applicable state or local law, prior to seeking initiation of the dispute resolution process described in Operating Agreement, Schedule 5. Disputes arising under 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, shall be resolved in accordance with applicable state or local law, 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.

In the event that the electric distribution company's concerns are resolved within the 60 calendar 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 calendar 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 Component DER from the DER Aggregation Resource identified in the registration.

Within fifteen calendar days, the Office of the Interconnection shall apply the applicable pricing points to the Component DER, and shall either approve or deny the DER Aggregator's registration based on the Office of the Interconnection's review of the registration and receipt and review of the electric distribution company's comments and recommendation, with deference given to the electric distribution company's assessment of the impact of the DER Aggregator's registration on the safety and reliability of distribution facilities. To the extent that no comments or recommendations are provided by the electric distribution company, including after the Office of the Interconnection provides final notice to the electric distribution company prior to the expiration

of the 60 calendar day review period, the Office of the Interconnection shall approve the DER Aggregator's registration.

During the registration process, the responsibility for physically operating the Component DER within a DER Aggregation Resource and/or dispatching the DER Aggregation Resource will be assigned to the electric distribution company, the DER Aggregator, or another entity, in accordance 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.

All DER Aggregators shall remain in full compliance with the tariffs, agreements, and operating procedures of the applicable electric distribution company, and the rules and regulations of any Relevant Electric Retail Regulatory Authority, in accordance with their executed DER Aggregator Participation Service Agreement, at all times while participating in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator Participation Model.

Transmission Owners shall, in coordination with the Office of the Interconnection, 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 Component DER within the DER Aggregation Resource, or proposed additional market services provided by the DER Aggregation Resource, identified in the DER Aggregator's registration to reflect any proposed addition or subtraction of a Component DER or market service, and any applicable information or data associated with the Component DER or market service, in accordance with the specifications described in the PJM Manuals. Any proposed update shall not require a new registration of the existing Component DER within the approved DER Aggregation Resource. Upon notification of any proposed update, the electric distribution company shall have an opportunity to conduct a review, for a period of up to 60 calendar days, in accordance with the provisions of this section related to initial registration, and make a recommendation to the Office of the Interconnection, 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 such review conducted by the electric distribution company. An inventory of the individual Component DER within a DER Aggregation Resource registration that is linked to a DER Capacity Aggregation Resource may not be modified during the course of an applicable Delivery Year.

(c) All Component DER in a DER Aggregation Resource shall interface with the same primary pricing node, except: (i) in the case of a DER Aggregation Resource that only provides ancillary services and is less than or equal to 5 MW, the Component DER within the DER Aggregation Resource may interface with multiple primary pricing nodes, so long as those primary pricing nodes are in the same state and service territory of a single electric distribution company; and (ii) in the case of a DER Capacity Aggregation Resource, the Component DER within a DER Aggregation Resource(s) linked to the DER Capacity Aggregation Resource may interface with

multiple primary pricing nodes, so long as those primary pricing nodes are located within a defined zone or sub-zonal Locational Deliverability Area.

The Office of the Interconnection will establish a periodic review, in coordination with the electric distribution company and DER Aggregator, no less than annually, or more frequently as needed, to identify any permanent electrical location change that would modify the pricing node associated with a DER Aggregation Resource or its underlying Component DER. During this review, the Office of the Interconnection shall: (i) confirm that applicable data reviewed and verified in the registration process is still complete and accurate, and (ii) request any updates to such data as a condition of continued participation in the DER Aggregator Participation Model.

(d) A DER Aggregator shall self-schedule their DER Aggregation Resource 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. A DER Aggregator shall be 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 or the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource 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. A DER Aggregator or the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource may provide telemetry for the individual Component DER within a DER Aggregation Resource. This telemetry shall represent one or more values indicative of the total electrical output of the DER Aggregation Resource and inclusive of all underlying Component DER.

A DER Aggregator shall provide to the Office of the Interconnection all individual Component DER meter 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 Component DER in a DER Aggregation Resource for auditing purposes, in accordance with the PJM Manuals. A DER Aggregator is responsible for ensuring that Component DER 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 residential DER Aggregation Resources, the DER Aggregator must ensure that a representative sample of Component DER have metering equipment that provides integrated hourly kWh values on an electric distribution company account basis, as set forth in the PJM Manuals. For DER Aggregation Resources containing Component DER that are mass market customers, DER Aggregators shall provide aggregated meter data to the Office of the Interconnection for the settlement of the DER Aggregator's DER Aggregation Resource. The measurement systems shall comply with the applicable electric distribution company accuracy requirements for meters, and/or as described in the PJM Manual 01. Additional details for the configuration of such measurement systems under various specific configurations are specified in PJM Manual 14D.

The metering equipment shall meet the electric distribution company requirements for accuracy, or otherwise 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, section 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, section 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.

During the Operating Day, the Office of the Interconnection shall dispatch DER Aggregation Resources, by communicating with the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource, in accordance with the DER Aggregator's submitted bidding parameters. During the Operating Day, an electric distribution company may exercise its ability to override the physical operation of a DER Aggregation Resource or individual Component DER within a DER Aggregation Resource, for purposes of maintaining safe and reliable operation of distribution facilities, pursuant to 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. 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, RAA, or PJM Manuals.

Any disputes regarding an electric distribution company's exercise of its ability to override the physical operation of a DER Aggregation Resource or individual Component DER within a DER Aggregation Resource, for purposes of maintaining safe and reliable operation of distribution facilities, pursuant to 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, shall be addressed in accordance with applicable state or local law, 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 Component DER 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 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 with a DER Aggregation Resource including Component DER 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, if, during the course of the registration process described above in Tariff, Attachment K-Appendix, section 1.4B(b) and Operating Agreement, Schedule 1, section 1.4B(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 Component DER 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 Component DER 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 Component DER that also participate in one or more retail programs. The Office of the Interconnection shall only credit a DER Aggregator for the sale of a product in the PJM energy, capacity, and/or ancillary services markets if that same product is not also credited as part of a retail program, including but not limited to a Component 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. A Component DER shall not be registered with multiple DER Aggregation Resources, or participate as part of another Market Participant outside of the DER Aggregator Participation Model. The Office of the Interconnection shall only credit a DER Aggregator for the sale of a product in the PJM energy, capacity, and/or ancillary services markets if that same product is not also credited as part of another wholesale sale.

(i) DER Aggregators providing capacity using a DER Capacity Aggregation Resource 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 Component DER within the DER Aggregation Resource linked to the DER Capacity Aggregation Resource, in accordance with the PJM Manuals.

(j) DER Aggregation Resources are subject to offer price cap and associated three pivotal supplier test provisions of Operating Agreement, Schedule 1, section 6.4.

(k) A DER Capacity Aggregation Resource ~~containing DER Aggregation Resource(s) with Component DER directly connected to distribution facilities not co-located with retail end-use load other than Station Power may~~ shall be subject to a MOPR Floor Offer Price, in accordance with the provisions applicable to MOPR Floor Offer Price for Generation Capacity Resources, as described in Tariff, Attachment DD, section 5.14(h-2), and Market Seller Offer Cap for Generation Capacity Resources in a manner consistent with the provisions applicable to Market Seller Offer Cap for Generation Capacity Resources, as described in Tariff, Attachment DD, section 6.4 and Tariff, Attachment M-Appendix, section II.E, based on the underlying technology of the Component DER.

A DER Capacity Aggregation Resource comprised solely of Component DER connected to distribution facilities shall be subject to MOPR Floor Offer Price and Market Seller Offer Cap.

A DER Capacity Aggregation Resource comprised solely of Component DER co-located with retail end-use load shall not be subject to MOPR Floor Offer Price or Market Seller Offer Cap.

A DER Capacity Aggregation Resource containing one or more Component DER directly connected to distribution facilities and one or more Component DER co-located with retail end-use load may segment offers for the Component DER subject to mitigation, based on the underlying technology of the Component DER in the DER Capacity Aggregation Resource, and further described in the PJM Manuals.

If a DER Capacity Aggregation Resource is subject to the Minimum Floor Offer Price pursuant to Tariff, Attachment DD, sections 5.14(h-2), 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.

~~(l) A DER Capacity Aggregation Resource containing DER Aggregation Resource(s) with Component DER 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 applicable to Market Seller Offer Cap for Generation Capacity Resources, as described in Tariff, Attachment DD, section 6 and Tariff, Attachment M-Appendix, section II.E.~~

~~(m)~~ (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)~~ (n) A DER Aggregator's DER Aggregation Resource that contains Component DER 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.

~~(m)~~ (n) Component DER interconnecting to distribution facilities for purposes of participating in the energy, capacity, and/or ancillary services markets of PJM exclusively through the DER Aggregator Participation Model shall not be subject to the Part IV of the Tariff relating to interconnections with the Transmission System, and shall exclusively interconnect to distribution facilities pursuant to applicable state or local law.

PJM Operating Agreement
Schedule 1, section 1.4B

1.4B DER Aggregator Participation Model

(a) The rules and procedures for the participation of DER Aggregators are established pursuant to this section 1.4B and the PJM Manuals.

(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 and DER Capacity Aggregation Resource with the Office of the Interconnection, in accordance with the procedures established under the PJM Manuals.

Prior to the initiation of the registration review process by the Office of the Interconnection, a DER Aggregator shall obtain and verify, through good faith efforts and in coordination with the applicable electric distribution company, and, if necessary, any relevant Transmission Owner, the following location and data components needed for the DER Aggregator's registration with the Office of the Interconnection:

- i. With the express written consent of the applicable Component DER, the electric distribution company customer account number and associated physical and transmission system electrical location information of the applicable Component DER, including compliance with applicable PJM and electric distribution company metering and telemetry requirements;
- ii. Evidence of approval to interconnect, including but not limited to a finalized interconnection agreement, with the applicable Component DER, in accordance 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, to the distribution system for identified megawatts, and identification of participation in an electric distribution company program that recognizes grid withdrawals and/or injections, including but not limited to a net energy metering program.

Disputes between the DER Aggregator and the electric distribution company regarding the location and data components needed for the DER Aggregator's registration with the Office of the Interconnection described above shall be resolved in accordance with applicable state or local law, 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.

The registration review process shall commence after: (1) the Office of the Interconnection has an executed DER Aggregator Participation Service Agreement on file, to be used for all DER Aggregation Resources associated with the DER Aggregator; (2) the Office of the Interconnection receives a complete registration from the DER Aggregator, in a form specified in the PJM Manuals; and (3) pre-registration activities have been completed, consisting of the DER Aggregator obtaining and verifying the location and data components described above needed for its 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. The DER Aggregator shall only submit a registration for Component DER that are under contract for the term of the registration, and only one DER Aggregator may operate Component DER at a specific location. 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 Component DER in the same state, electric distribution company, Transmission Zone, and pricing point unless otherwise noted below. Upon receipt of notification by the Office of the Interconnection, the electric distribution company may, within 60 calendar days, review and verify, as applicable, the registration and the following information contained therein:

- i. Operational and physical characteristics, including an inventory of the individual Component DER location-specific capability to reduce load and/or produce electricity;
- ii. The specific PJM markets in which the DER Aggregation Resource plans to participate and, if applicable, the effective and termination dates for participation;
- iii. The electric distribution company customer account number(s) which represent Component DER location(s) and related information, as defined in the PJM Manuals;
- iv. Participation of the Component DER in an electric distribution company's retail program at the time of registration, and whether such participation precludes participation of the Component DER in the energy, capacity, and/or ancillary services markets of PJM, and as defined in the PJM Manuals;
 - a. Component DER that participate in a net energy metering retail program may only participate with grid injections in the PJM ancillary services markets, and may not participate in PJM energy or capacity markets, unless:
 1. the electric distribution company confirms to the Office of the Interconnection that participation of the Component DER in a net energy metering retail program or tariff approved by the Relevant Electric Retail Regulatory Authority will not violate the restrictions on duplicative compensation, as described in Tariff, Attachment K-Appendix, section 1.4B(h) and Operating Agreement, Schedule 1, section 1.4B(h); and
 2. the Office of the Interconnection determines that the participation of the Component DER otherwise meets the applicable requirements for energy market or capacity market participation.

- v. 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;
- vi. The Relevant Electric Retail Regulatory Authority allows the participation of any applicable Component DER that are also end-use customers of an electric distribution company, in accordance with the provisions of Tariff, Attachment K-Appendix, section 1.4B(g), and Operating Agreement, Schedule 1, section 1.4B(g).
- vii. The participation of the Component DER in the PJM energy, capacity, and/or ancillary service markets do not pose a threat to the reliable and safe operation of the distribution system, the public, or electric distribution company personnel.

If the electric distribution company identifies concerns based on factors (i) through (vii) within the 60 calendar day review period, 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, or in accordance with applicable state or local law, prior to seeking initiation of the dispute resolution process described in Operating Agreement, Schedule 5. Disputes arising under 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, shall be resolved in accordance with applicable state or local law, 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.

In the event that the electric distribution company's concerns are resolved within the 60 calendar 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 calendar 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 Component DER from the DER Aggregation Resource identified in the registration.

Within fifteen calendar days, the Office of the Interconnection shall apply the applicable pricing points to the Component DER, and shall either approve or deny the DER Aggregator's registration based on the Office of the Interconnection's review of the registration and receipt and review of the electric distribution company's comments and recommendation, with deference given to the electric distribution company's assessment of the impact of the DER Aggregator's registration on the safety and reliability of distribution facilities. To the extent that no comments or recommendations are provided by the electric distribution company, including after the Office of the Interconnection provides final notice to the electric distribution company prior to the expiration

of the 60 calendar day review period, the Office of the Interconnection shall approve the DER Aggregator's registration.

During the registration process, the responsibility for physically operating the Component DER within a DER Aggregation Resource and/or dispatching the DER Aggregation Resource will be assigned to the electric distribution company, the DER Aggregator, or another entity, in accordance 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.

All DER Aggregators shall remain in full compliance with the tariffs, agreements, and operating procedures of the applicable electric distribution company, and the rules and regulations of any Relevant Electric Retail Regulatory Authority, in accordance with their executed DER Aggregator Participation Service Agreement, at all times while participating in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator Participation Model.

Transmission Owners shall, in coordination with the Office of the Interconnection, 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 Component DER within the DER Aggregation Resource, or proposed additional market services provided by the DER Aggregation Resource, identified in the DER Aggregator's registration to reflect any proposed addition or subtraction of a Component DER or market service, and any applicable information or data associated with the Component DER or market service, in accordance with the specifications described in the PJM Manuals. Any proposed update shall not require a new registration of the existing Component DER within the approved DER Aggregation Resource. Upon notification of any proposed update, the electric distribution company shall have an opportunity to conduct a review, for a period of up to 60 calendar days, in accordance with the provisions of this section related to initial registration, and make a recommendation to the Office of the Interconnection, 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 such review conducted by the electric distribution company. An inventory of the individual Component DER within a DER Aggregation Resource registration that is linked to a DER Capacity Aggregation Resource may not be modified during the course of an applicable Delivery Year.

(c) All Component DER in a DER Aggregation Resource shall interface with the same primary pricing node, except: (i) in the case of a DER Aggregation Resource that only provides ancillary services and is less than or equal to 5 MW, the Component DER within the DER Aggregation Resource may interface with multiple primary pricing nodes, so long as those primary pricing nodes are in the same state and service territory of a single electric distribution company; and (ii) in the case of a DER Capacity Aggregation Resource, the Component DER within a DER Aggregation Resource(s) linked to the DER Capacity Aggregation Resource may interface with

multiple primary pricing nodes, so long as those primary pricing nodes are located within a defined zone or sub-zonal Locational Deliverability Area.

The Office of the Interconnection will establish a periodic review, in coordination with the electric distribution company and DER Aggregator, no less than annually, or more frequently as needed, to identify any permanent electrical location change that would modify the pricing node associated with a DER Aggregation Resource or its underlying Component DER. During this review, the Office of the Interconnection shall: (i) confirm that applicable data reviewed and verified in the registration process is still complete and accurate, and (ii) request any updates to such data as a condition of continued participation in the DER Aggregator Participation Model.

(d) A DER Aggregator shall self-schedule their DER Aggregation Resource 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. A DER Aggregator shall be 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 or the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource 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. A DER Aggregator or the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource may provide telemetry for the individual Component DER within a DER Aggregation Resource. This telemetry shall represent one or more values indicative of the total electrical output of the DER Aggregation Resource and inclusive of all underlying Component DER.

A DER Aggregator shall provide to the Office of the Interconnection all individual Component DER meter 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 Component DER in a DER Aggregation Resource for auditing purposes, in accordance with the PJM Manuals. A DER Aggregator is responsible for ensuring that Component DER 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 residential DER Aggregation Resources, the DER Aggregator must ensure that a representative sample of Component DER have metering equipment that provides integrated hourly kWh values on an electric distribution company account basis, as set forth in the PJM Manuals. For DER Aggregation Resources containing Component DER that are mass market customers, DER Aggregators shall provide aggregated meter data to the Office of the Interconnection for the settlement of the DER Aggregator's DER Aggregation Resource. The measurement systems shall comply with the applicable electric distribution company accuracy requirements for meters, and/or as described in the PJM Manual 01. Additional details for the configuration of such measurement systems under various specific configurations are specified in PJM Manual 14D.

The metering equipment shall meet the electric distribution company requirements for accuracy, or otherwise 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, section 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, section 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.

During the Operating Day, the Office of the Interconnection shall dispatch DER Aggregation Resources, by communicating with the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource, in accordance with the DER Aggregator's submitted bidding parameters. During the Operating Day, an electric distribution company may exercise its ability to override the physical operation of a DER Aggregation Resource or individual Component DER within a DER Aggregation Resource, for purposes of maintaining safe and reliable operation of distribution facilities, pursuant to 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. 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, RAA, or PJM Manuals.

Any disputes regarding an electric distribution company's exercise of its ability to override the physical operation of a DER Aggregation Resource or individual Component DER within a DER Aggregation Resource, for purposes of maintaining safe and reliable operation of distribution facilities, pursuant to 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, shall be addressed in accordance with applicable state or local law, 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 Component DER 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 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 with a DER Aggregation Resource including Component DER 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, if, during the course of the registration process described above in Tariff, Attachment K-Appendix, section 1.4B(b) and Operating Agreement, Schedule 1, section 1.4B(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 Component DER 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 Component DER 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 Component DER that also participate in one or more retail programs. The Office of the Interconnection shall only credit a DER Aggregator for the sale of a product in the PJM energy, capacity, and/or ancillary services markets if that same product is not also credited as part of a retail program, including but not limited to a Component 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. A Component DER shall not be registered with multiple DER Aggregation Resources, or participate as part of another Market Participant outside of the DER Aggregator Participation Model. The Office of the Interconnection shall only credit a DER Aggregator for the sale of a product in the PJM energy, capacity, and/or ancillary services markets if that same product is not also credited as part of another wholesale sale.

(i) DER Aggregators providing capacity using a DER Capacity Aggregation Resource 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 Component DER within the DER Aggregation Resource linked to the DER Capacity Aggregation Resource, in accordance with the PJM Manuals.

(j) DER Aggregation Resources are subject to offer price cap and associated three pivotal supplier test provisions of Operating Agreement, Schedule 1, section 6.4.

(k) A DER Capacity Aggregation Resource ~~containing DER Aggregation Resource(s) with Component DER directly connected to distribution facilities not co-located with retail end-use load other than Station Power may~~ shall be subject to a MOPR Floor Offer Price, in accordance with the provisions applicable to MOPR Floor Offer Price for Generation Capacity Resources, as described in Tariff, Attachment DD, section 5.14(h-2), and Market Seller Offer Cap for Generation Capacity Resources in a manner consistent with the provisions applicable to Market Seller Offer Cap for Generation Capacity Resources, as described in Tariff, Attachment DD, section 6.4 and Tariff, Attachment M-Appendix, section II.E, based on the underlying technology of the Component DER.

A DER Capacity Aggregation Resource comprised solely of Component DER connected to distribution facilities shall be subject to MOPR Floor Offer Price and Market Seller Offer Cap.

A DER Capacity Aggregation Resource comprised solely of Component DER co-located with retail end-use load shall not be subject to MOPR Floor Offer Price or Market Seller Offer Cap.

A DER Capacity Aggregation Resource containing one or more Component DER directly connected to distribution facilities and one or more Component DER co-located with retail end-use load may segment offers for the Component DER subject to mitigation, based on the underlying technology of the Component DER in the DER Capacity Aggregation Resource, and further described in the PJM Manuals.

If a DER Capacity Aggregation Resource is subject to the Minimum Floor Offer Price pursuant to Tariff, Attachment DD, sections 5.14(h-2), 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.

~~(l) A DER Capacity Aggregation Resource containing DER Aggregation Resource(s) with Component DER 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 applicable to Market Seller Offer Cap for Generation Capacity Resources, as described in Tariff, Attachment DD, section 6 and Tariff, Attachment M-Appendix, section II.E.~~

~~(m)~~ (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)~~ (n) A DER Aggregator's DER Aggregation Resource that contains Component DER 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.

~~(m)~~ (n) Component DER interconnecting to distribution facilities for purposes of participating in the energy, capacity, and/or ancillary services markets of PJM exclusively through the DER Aggregator Participation Model shall not be subject to the Part IV of the Tariff relating to interconnections with the Transmission System, and shall exclusively interconnect to distribution facilities pursuant to applicable state or local law.

Attachment B

Revisions to the PJM Open Access Transmission Tariff and Operating Agreement

(Identified by Additional Cover Pages)

(Clean Format)

PJM Open Access Transmission Tariff
Attachment KK-Appendix, section 1.4B

1.4B DER Aggregator Participation Model

(a) The rules and procedures for the participation of DER Aggregators are established pursuant to this section 1.4B and the PJM Manuals.

(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 and DER Capacity Aggregation Resource with the Office of the Interconnection, in accordance with the procedures established under the PJM Manuals.

Prior to the initiation of the registration review process by the Office of the Interconnection, a DER Aggregator shall obtain and verify, through good faith efforts and in coordination with the applicable electric distribution company, and, if necessary, any relevant Transmission Owner, the following location and data components needed for the DER Aggregator's registration with the Office of the Interconnection:

- i. With the express written consent of the applicable Component DER, the electric distribution company customer account number and associated physical and transmission system electrical location information of the applicable Component DER, including compliance with applicable PJM and electric distribution company metering and telemetry requirements;
- ii. Evidence of approval to interconnect, including but not limited to a finalized interconnection agreement, with the applicable Component DER, in accordance 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, to the distribution system for identified megawatts, and identification of participation in an electric distribution company program that recognizes grid withdrawals and/or injections, including but not limited to a net energy metering program.

Disputes between the DER Aggregator and the electric distribution company regarding the location and data components needed for the DER Aggregator's registration with the Office of the Interconnection described above shall be resolved in accordance with applicable state or local law, 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.

The registration review process shall commence after: (1) the Office of the Interconnection has an executed DER Aggregator Participation Service Agreement on file, to be used for all DER Aggregation Resources associated with the DER Aggregator; (2) the Office of the Interconnection receives a complete registration from the DER Aggregator, in a form specified in the PJM Manuals; and (3) pre-registration activities have been completed, consisting of the DER Aggregator obtaining and verifying the location and data components described above needed for its 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. The DER Aggregator shall only submit a registration for Component DER that are under contract for the term of the registration, and only one DER Aggregator may operate Component DER at a specific location. 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 Component DER in the same state, electric distribution company, Transmission Zone, and pricing point unless otherwise noted below. Upon receipt of notification by the Office of the Interconnection, the electric distribution company may, within 60 calendar days, review and verify, as applicable, the registration and the following information contained therein:

- i. Operational and physical characteristics, including an inventory of the individual Component DER location-specific capability to reduce load and/or produce electricity;
- ii. The specific PJM markets in which the DER Aggregation Resource plans to participate and, if applicable, the effective and termination dates for participation;
- iii. The electric distribution company customer account number(s) which represent Component DER location(s) and related information, as defined in the PJM Manuals;
- iv. Participation of the Component DER in an electric distribution company's retail program at the time of registration, and whether such participation precludes participation of the Component DER in the energy, capacity, and/or ancillary services markets of PJM, and as defined in the PJM Manuals;
 - a. Component DER that participate in a net energy metering retail program may only participate with grid injections in the PJM ancillary services markets, and may not participate in PJM energy or capacity markets, unless:
 1. the electric distribution company confirms to the Office of the Interconnection that participation of the Component DER in a net energy metering retail program or tariff approved by the Relevant Electric Retail Regulatory Authority will not violate the restrictions on duplicative compensation, as described in Tariff, Attachment K-Appendix, section 1.4B(h) and Operating Agreement, Schedule 1, section 1.4B(h); and
 2. the Office of the Interconnection determines that the participation of the Component DER otherwise meets the applicable requirements for energy market or capacity market participation.

- v. 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;
- vi. The Relevant Electric Retail Regulatory Authority allows the participation of any applicable Component DER that are also end-use customers of an electric distribution company, in accordance with the provisions of Tariff, Attachment K-Appendix, section 1.4B(g), and Operating Agreement, Schedule 1, section 1.4B(g).
- vii. The participation of the Component DER in the PJM energy, capacity, and/or ancillary service markets do not pose a threat to the reliable and safe operation of the distribution system, the public, or electric distribution company personnel.

If the electric distribution company identifies concerns based on factors (i) through (vii) within the 60 calendar day review period, 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, or in accordance with applicable state or local law, prior to seeking initiation of the dispute resolution process described in Operating Agreement, Schedule 5. Disputes arising under 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, shall be resolved in accordance with applicable state or local law, 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.

In the event that the electric distribution company's concerns are resolved within the 60 calendar 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 calendar 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 Component DER from the DER Aggregation Resource identified in the registration.

Within fifteen calendar days, the Office of the Interconnection shall apply the applicable pricing points to the Component DER, and shall either approve or deny the DER Aggregator's registration based on the Office of the Interconnection's review of the registration and receipt and review of the electric distribution company's comments and recommendation, with deference given to the electric distribution company's assessment of the impact of the DER Aggregator's registration on the safety and reliability of distribution facilities. To the extent that no comments or recommendations are provided by the electric distribution company, including after the Office of the Interconnection provides final notice to the electric distribution company prior to the expiration

of the 60 calendar day review period, the Office of the Interconnection shall approve the DER Aggregator's registration.

During the registration process, the responsibility for physically operating the Component DER within a DER Aggregation Resource and/or dispatching the DER Aggregation Resource will be assigned to the electric distribution company, the DER Aggregator, or another entity, in accordance 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.

All DER Aggregators shall remain in full compliance with the tariffs, agreements, and operating procedures of the applicable electric distribution company, and the rules and regulations of any Relevant Electric Retail Regulatory Authority, in accordance with their executed DER Aggregator Participation Service Agreement, at all times while participating in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator Participation Model.

Transmission Owners shall, in coordination with the Office of the Interconnection, 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 Component DER within the DER Aggregation Resource, or proposed additional market services provided by the DER Aggregation Resource, identified in the DER Aggregator's registration to reflect any proposed addition or subtraction of a Component DER or market service, and any applicable information or data associated with the Component DER or market service, in accordance with the specifications described in the PJM Manuals. Any proposed update shall not require a new registration of the existing Component DER within the approved DER Aggregation Resource. Upon notification of any proposed update, the electric distribution company shall have an opportunity to conduct a review, for a period of up to 60 calendar days, in accordance with the provisions of this section related to initial registration, and make a recommendation to the Office of the Interconnection, 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 such review conducted by the electric distribution company. An inventory of the individual Component DER within a DER Aggregation Resource registration that is linked to a DER Capacity Aggregation Resource may not be modified during the course of an applicable Delivery Year.

(c) All Component DER in a DER Aggregation Resource shall interface with the same primary pricing node, except: (i) in the case of a DER Aggregation Resource that only provides ancillary services and is less than or equal to 5 MW, the Component DER within the DER Aggregation Resource may interface with multiple primary pricing nodes, so long as those primary pricing nodes are in the same state and service territory of a single electric distribution company; and (ii) in the case of a DER Capacity Aggregation Resource, the Component DER within a DER Aggregation Resource(s) linked to the DER Capacity Aggregation Resource may interface with

multiple primary pricing nodes, so long as those primary pricing nodes are located within a defined zone or sub-zonal Locational Deliverability Area.

The Office of the Interconnection will establish a periodic review, in coordination with the electric distribution company and DER Aggregator, no less than annually, or more frequently as needed, to identify any permanent electrical location change that would modify the pricing node associated with a DER Aggregation Resource or its underlying Component DER. During this review, the Office of the Interconnection shall: (i) confirm that applicable data reviewed and verified in the registration process is still complete and accurate, and (ii) request any updates to such data as a condition of continued participation in the DER Aggregator Participation Model.

(d) A DER Aggregator shall self-schedule their DER Aggregation Resource 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. A DER Aggregator shall be 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 or the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource 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. A DER Aggregator or the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource may provide telemetry for the individual Component DER within a DER Aggregation Resource. This telemetry shall represent one or more values indicative of the total electrical output of the DER Aggregation Resource and inclusive of all underlying Component DER.

A DER Aggregator shall provide to the Office of the Interconnection all individual Component DER meter 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 Component DER in a DER Aggregation Resource for auditing purposes, in accordance with the PJM Manuals. A DER Aggregator is responsible for ensuring that Component DER 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 residential DER Aggregation Resources, the DER Aggregator must ensure that a representative sample of Component DER have metering equipment that provides integrated hourly kWh values on an electric distribution company account basis, as set forth in the PJM Manuals. For DER Aggregation Resources containing Component DER that are mass market customers, DER Aggregators shall provide aggregated meter data to the Office of the Interconnection for the settlement of the DER Aggregator's DER Aggregation Resource. The measurement systems shall comply with the applicable electric distribution company accuracy requirements for meters, and/or as described in the PJM Manual 01. Additional details for the configuration of such measurement systems under various specific configurations are specified in PJM Manual 14D.

The metering equipment shall meet the electric distribution company requirements for accuracy, or otherwise 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, section 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, section 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.

During the Operating Day, the Office of the Interconnection shall dispatch DER Aggregation Resources, by communicating with the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource, in accordance with the DER Aggregator's submitted bidding parameters. During the Operating Day, an electric distribution company may exercise its ability to override the physical operation of a DER Aggregation Resource or individual Component DER within a DER Aggregation Resource, for purposes of maintaining safe and reliable operation of distribution facilities, pursuant to 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. 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, RAA, or PJM Manuals.

Any disputes regarding an electric distribution company's exercise of its ability to override the physical operation of a DER Aggregation Resource or individual Component DER within a DER Aggregation Resource, for purposes of maintaining safe and reliable operation of distribution facilities, pursuant to 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, shall be addressed in accordance with applicable state or local law, 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 Component DER 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 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 with a DER Aggregation Resource including Component DER 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, if, during the course of the registration process described above in Tariff, Attachment K-Appendix, section 1.4B(b) and Operating Agreement, Schedule 1, section 1.4B(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 Component DER 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 Component DER 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 Component DER that also participate in one or more retail programs. The Office of the Interconnection shall only credit a DER Aggregator for the sale of a product in the PJM energy, capacity, and/or ancillary services markets if that same product is not also credited as part of a retail program, including but not limited to a Component 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. A Component DER shall not be registered with multiple DER Aggregation Resources, or participate as part of another Market Participant outside of the DER Aggregator Participation Model. The Office of the Interconnection shall only credit a DER Aggregator for the sale of a product in the PJM energy, capacity, and/or ancillary services markets if that same product is not also credited as part of another wholesale sale.

(i) DER Aggregators providing capacity using a DER Capacity Aggregation Resource 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 Component DER within the DER Aggregation Resource linked to the DER Capacity Aggregation Resource, in accordance with the PJM Manuals.

(j) DER Aggregation Resources are subject to offer price cap and associated three pivotal supplier test provisions of Operating Agreement, Schedule 1, section 6.4.

(k) A DER Capacity Aggregation Resource shall be subject to a MOPR Floor Offer Price in accordance with the provisions applicable to MOPR Floor Offer Price for Generation Capacity Resources, as described in Tariff, Attachment DD, section 5.14(h-2), and Market Seller Offer Cap for Generation Capacity Resources in a manner consistent with the provisions applicable to Market Seller Offer Cap for Generation Capacity Resources, as described in Tariff, Attachment DD, section 6.4 and Tariff, Attachment M-Appendix, section II.E, based on the underlying technology of the Component DER.

A DER Capacity Aggregation Resource comprised solely of Component DER connected to distribution facilities shall be subject to MOPR Floor Offer Price and Market Seller Offer Cap.

A DER Capacity Aggregation Resource comprised solely of Component DER co-located with retail end-use load shall not be subject to MOPR Floor Offer Price or Market Seller Offer Cap.

A DER Capacity Aggregation Resource containing one or more Component DER directly connected to distribution facilities and one or more Component DER co-located with retail end-use load may segment offers for the Component DER subject to mitigation, based on the underlying technology of the Component DER in the DER Capacity Aggregation Resource, and further described in the PJM Manuals.

If a DER Capacity Aggregation Resource is subject to the Minimum Floor Offer Price pursuant to Tariff, Attachment DD, sections 5.14(h-2), 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.

(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 Component DER 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.

(n) Component DER interconnecting to distribution facilities for purposes of participating in the energy, capacity, and/or ancillary services markets of PJM exclusively through the DER Aggregator Participation Model shall not be subject to the Part IV of the Tariff relating to interconnections with the Transmission System, and shall exclusively interconnect to distribution facilities pursuant to applicable state or local law.

PJM Operating Agreement
Schedule 1, section 1.4B

1.4B DER Aggregator Participation Model

(a) The rules and procedures for the participation of DER Aggregators are established pursuant to this section 1.4B and the PJM Manuals.

(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 and DER Capacity Aggregation Resource with the Office of the Interconnection, in accordance with the procedures established under the PJM Manuals.

Prior to the initiation of the registration review process by the Office of the Interconnection, a DER Aggregator shall obtain and verify, through good faith efforts and in coordination with the applicable electric distribution company, and, if necessary, any relevant Transmission Owner, the following location and data components needed for the DER Aggregator's registration with the Office of the Interconnection:

- i. With the express written consent of the applicable Component DER, the electric distribution company customer account number and associated physical and transmission system electrical location information of the applicable Component DER, including compliance with applicable PJM and electric distribution company metering and telemetry requirements;
- ii. Evidence of approval to interconnect, including but not limited to a finalized interconnection agreement, with the applicable Component DER, in accordance 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, to the distribution system for identified megawatts, and identification of participation in an electric distribution company program that recognizes grid withdrawals and/or injections, including but not limited to a net energy metering program.

Disputes between the DER Aggregator and the electric distribution company regarding the location and data components needed for the DER Aggregator's registration with the Office of the Interconnection described above shall be resolved in accordance with applicable state or local law, 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.

The registration review process shall commence after: (1) the Office of the Interconnection has an executed DER Aggregator Participation Service Agreement on file, to be used for all DER Aggregation Resources associated with the DER Aggregator; (2) the Office of the Interconnection receives a complete registration from the DER Aggregator, in a form specified in the PJM Manuals; and (3) pre-registration activities have been completed, consisting of the DER Aggregator obtaining and verifying the location and data components described above needed for its 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. The DER Aggregator shall only submit a registration for Component DER that are under contract for the term of the registration, and only one DER Aggregator may operate Component DER at a specific location. 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 Component DER in the same state, electric distribution company, Transmission Zone, and pricing point unless otherwise noted below. Upon receipt of notification by the Office of the Interconnection, the electric distribution company may, within 60 calendar days, review and verify, as applicable, the registration and the following information contained therein:

- i. Operational and physical characteristics, including an inventory of the individual Component DER location-specific capability to reduce load and/or produce electricity;
- ii. The specific PJM markets in which the DER Aggregation Resource plans to participate and, if applicable, the effective and termination dates for participation;
- iii. The electric distribution company customer account number(s) which represent Component DER location(s) and related information, as defined in the PJM Manuals;
- iv. Participation of the Component DER in an electric distribution company's retail program at the time of registration, and whether such participation precludes participation of the Component DER in the energy, capacity, and/or ancillary services markets of PJM, and as defined in the PJM Manuals;
 - a. Component DER that participate in a net energy metering retail program may only participate with grid injections in the PJM ancillary services markets, and may not participate in PJM energy or capacity markets, unless:
 1. the electric distribution company confirms to the Office of the Interconnection that participation of the Component DER in a net energy metering retail program or tariff approved by the Relevant Electric Retail Regulatory Authority will not violate the restrictions on duplicative compensation, as described in Tariff, Attachment K-Appendix, section 1.4B(h) and Operating Agreement, Schedule 1, section 1.4B(h); and
 2. the Office of the Interconnection determines that the participation of the Component DER otherwise meets the applicable requirements for energy market or capacity market participation.

- v. 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;
- vi. The Relevant Electric Retail Regulatory Authority allows the participation of any applicable Component DER that are also end-use customers of an electric distribution company, in accordance with the provisions of Tariff, Attachment K-Appendix, section 1.4B(g), and Operating Agreement, Schedule 1, section 1.4B(g).
- vii. The participation of the Component DER in the PJM energy, capacity, and/or ancillary service markets do not pose a threat to the reliable and safe operation of the distribution system, the public, or electric distribution company personnel.

If the electric distribution company identifies concerns based on factors (i) through (vii) within the 60 calendar day review period, 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, or in accordance with applicable state or local law, prior to seeking initiation of the dispute resolution process described in Operating Agreement, Schedule 5. Disputes arising under 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, shall be resolved in accordance with applicable state or local law, 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.

In the event that the electric distribution company's concerns are resolved within the 60 calendar 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 calendar 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 Component DER from the DER Aggregation Resource identified in the registration.

Within fifteen calendar days, the Office of the Interconnection shall apply the applicable pricing points to the Component DER, and shall either approve or deny the DER Aggregator's registration based on the Office of the Interconnection's review of the registration and receipt and review of the electric distribution company's comments and recommendation, with deference given to the electric distribution company's assessment of the impact of the DER Aggregator's registration on the safety and reliability of distribution facilities. To the extent that no comments or recommendations are provided by the electric distribution company, including after the Office of the Interconnection provides final notice to the electric distribution company prior to the expiration

of the 60 calendar day review period, the Office of the Interconnection shall approve the DER Aggregator's registration.

During the registration process, the responsibility for physically operating the Component DER within a DER Aggregation Resource and/or dispatching the DER Aggregation Resource will be assigned to the electric distribution company, the DER Aggregator, or another entity, in accordance 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.

All DER Aggregators shall remain in full compliance with the tariffs, agreements, and operating procedures of the applicable electric distribution company, and the rules and regulations of any Relevant Electric Retail Regulatory Authority, in accordance with their executed DER Aggregator Participation Service Agreement, at all times while participating in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator Participation Model.

Transmission Owners shall, in coordination with the Office of the Interconnection, 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 Component DER within the DER Aggregation Resource, or proposed additional market services provided by the DER Aggregation Resource, identified in the DER Aggregator's registration to reflect any proposed addition or subtraction of a Component DER or market service, and any applicable information or data associated with the Component DER or market service, in accordance with the specifications described in the PJM Manuals. Any proposed update shall not require a new registration of the existing Component DER within the approved DER Aggregation Resource. Upon notification of any proposed update, the electric distribution company shall have an opportunity to conduct a review, for a period of up to 60 calendar days, in accordance with the provisions of this section related to initial registration, and make a recommendation to the Office of the Interconnection, 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 such review conducted by the electric distribution company. An inventory of the individual Component DER within a DER Aggregation Resource registration that is linked to a DER Capacity Aggregation Resource may not be modified during the course of an applicable Delivery Year.

(c) All Component DER in a DER Aggregation Resource shall interface with the same primary pricing node, except: (i) in the case of a DER Aggregation Resource that only provides ancillary services and is less than or equal to 5 MW, the Component DER within the DER Aggregation Resource may interface with multiple primary pricing nodes, so long as those primary pricing nodes are in the same state and service territory of a single electric distribution company; and (ii) in the case of a DER Capacity Aggregation Resource, the Component DER within a DER Aggregation Resource(s) linked to the DER Capacity Aggregation Resource may interface with

multiple primary pricing nodes, so long as those primary pricing nodes are located within a defined zone or sub-zonal Locational Deliverability Area.

The Office of the Interconnection will establish a periodic review, in coordination with the electric distribution company and DER Aggregator, no less than annually, or more frequently as needed, to identify any permanent electrical location change that would modify the pricing node associated with a DER Aggregation Resource or its underlying Component DER. During this review, the Office of the Interconnection shall: (i) confirm that applicable data reviewed and verified in the registration process is still complete and accurate, and (ii) request any updates to such data as a condition of continued participation in the DER Aggregator Participation Model.

(d) A DER Aggregator shall self-schedule their DER Aggregation Resource 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. A DER Aggregator shall be 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 or the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource 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. A DER Aggregator or the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource may provide telemetry for the individual Component DER within a DER Aggregation Resource. This telemetry shall represent one or more values indicative of the total electrical output of the DER Aggregation Resource and inclusive of all underlying Component DER.

A DER Aggregator shall provide to the Office of the Interconnection all individual Component DER meter 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 Component DER in a DER Aggregation Resource for auditing purposes, in accordance with the PJM Manuals. A DER Aggregator is responsible for ensuring that Component DER 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 residential DER Aggregation Resources, the DER Aggregator must ensure that a representative sample of Component DER have metering equipment that provides integrated hourly kWh values on an electric distribution company account basis, as set forth in the PJM Manuals. For DER Aggregation Resources containing Component DER that are mass market customers, DER Aggregators shall provide aggregated meter data to the Office of the Interconnection for the settlement of the DER Aggregator's DER Aggregation Resource. The measurement systems shall comply with the applicable electric distribution company accuracy requirements for meters, and/or as described in the PJM Manual 01. Additional details for the configuration of such measurement systems under various specific configurations are specified in PJM Manual 14D.

The metering equipment shall meet the electric distribution company requirements for accuracy, or otherwise 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, section 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, section 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.

During the Operating Day, the Office of the Interconnection shall dispatch DER Aggregation Resources, by communicating with the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource, in accordance with the DER Aggregator's submitted bidding parameters. During the Operating Day, an electric distribution company may exercise its ability to override the physical operation of a DER Aggregation Resource or individual Component DER within a DER Aggregation Resource, for purposes of maintaining safe and reliable operation of distribution facilities, pursuant to 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. 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, RAA, or PJM Manuals.

Any disputes regarding an electric distribution company's exercise of its ability to override the physical operation of a DER Aggregation Resource or individual Component DER within a DER Aggregation Resource, for purposes of maintaining safe and reliable operation of distribution facilities, pursuant to 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, shall be addressed in accordance with applicable state or local law, 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 Component DER 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 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 with a DER Aggregation Resource including Component DER 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, if, during the course of the registration process described above in Tariff, Attachment K-Appendix, section 1.4B(b) and Operating Agreement, Schedule 1, section 1.4B(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 Component DER 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 Component DER 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 Component DER that also participate in one or more retail programs. The Office of the Interconnection shall only credit a DER Aggregator for the sale of a product in the PJM energy, capacity, and/or ancillary services markets if that same product is not also credited as part of a retail program, including but not limited to a Component 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. A Component DER shall not be registered with multiple DER Aggregation Resources, or participate as part of another Market Participant outside of the DER Aggregator Participation Model. The Office of the Interconnection shall only credit a DER Aggregator for the sale of a product in the PJM energy, capacity, and/or ancillary services markets if that same product is not also credited as part of another wholesale sale.

(i) DER Aggregators providing capacity using a DER Capacity Aggregation Resource 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 Component DER within the DER Aggregation Resource linked to the DER Capacity Aggregation Resource, in accordance with the PJM Manuals.

(j) DER Aggregation Resources are subject to offer price cap and associated three pivotal supplier test provisions of Operating Agreement, Schedule 1, section 6.4.

(k) A DER Capacity Aggregation Resource shall be subject to a MOPR Floor Offer Price in accordance with the provisions applicable to MOPR Floor Offer Price for Generation Capacity Resources, as described in Tariff, Attachment DD, section 5.14(h-2), and Market Seller Offer Cap for Generation Capacity Resources in a manner consistent with the provisions applicable to Market Seller Offer Cap for Generation Capacity Resources, as described in Tariff, Attachment DD, section 6.4 and Tariff, Attachment M-Appendix, section II.E, based on the underlying technology of the Component DER.

A DER Capacity Aggregation Resource comprised solely of Component DER connected to distribution facilities shall be subject to MOPR Floor Offer Price and Market Seller Offer Cap.

A DER Capacity Aggregation Resource comprised solely of Component DER co-located with retail end-use load shall not be subject to MOPR Floor Offer Price or Market Seller Offer Cap.

A DER Capacity Aggregation Resource containing one or more Component DER directly connected to distribution facilities and one or more Component DER co-located with retail end-use load may segment offers for the Component DER subject to mitigation, based on the underlying technology of the Component DER in the DER Capacity Aggregation Resource, and further described in the PJM Manuals.

If a DER Capacity Aggregation Resource is subject to the Minimum Floor Offer Price pursuant to Tariff, Attachment DD, sections 5.14(h-2), 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.

(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 Component DER 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.

(n) Component DER interconnecting to distribution facilities for purposes of participating in the energy, capacity, and/or ancillary services markets of PJM exclusively through the DER Aggregator Participation Model shall not be subject to the Part IV of the Tariff relating to interconnections with the Transmission System, and shall exclusively interconnect to distribution facilities pursuant to applicable state or local law.