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July 7, 2022

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., Docket No. ER22-962-001*
Response to May 18, 2022 Request for Additional Information

Dear Secretary Bose,

Pursuant to the May 18, 2022 Request for Additional Information of Federal Energy Regulatory Commission ("FERC" or "Commission") Staff in the above-referenced proceeding,[1] PJM Interconnection, L.L.C. ("PJM") hereby submits the following responses to the questions presented.

A. RESPONSES TO REQUEST FOR ADDITIONAL INFORMATION

PJM's responses are presented below, and correspond to the order in which the questions featured in the Request for Additional Information were organized.

I. Small Utility Opt-In

In Order No. 2222, the Commission added section 35.28(g)(12)(iv) to the Commission's regulations to provide that RTOs/ISOs may not accept bids from distributed energy resource aggregators aggregating customers of small utilities unless the Relevant Electric Retail Regulatory Authority (RERRA) allows such customers of small utilities to participate in distributed energy resource aggregations (i.e., to opt in). Specifically, the Commission directed each RTO/ISO to amend its market rules as necessary to (1) accept bids from a distributed

[1] *PJM Interconnection, L.L.C.*, Request for Additional Information of Commission Staff, Docket No. ER22-962-000 (May 18, 2022) ("Request for Additional Information"). *See also PJM Interconnection, L.L.C.*, Notice of Extension of Time, Docket No. ER22-962-000 (Jun. 3, 2022) ("Upon consideration, notice is hereby given that PJM's requested extension of time is granted, and the deadline for submitting its response to the Commission's request is extended to and including July 7, 2022.").

energy resource aggregator if its aggregation includes distributed energy resources that are customers of utilities that distributed more than 4 million MWh in the previous fiscal year, and (2) not accept bids from distributed energy resource aggregators if its aggregation includes distributed energy resources that are customers of utilities that distributed 4 million MWh or less in the previous fiscal year, unless the RERRA permits such customers to be bid into RTO/ISO markets by a distributed energy resource aggregator (small utility opt-in). The Commission also required each RTO/ISO to explain how it will implement this small utility opt-in, noting that an RTO/ISO may choose to implement this requirement in a similar manner as it currently implements the small utility opt-in provision under Order No. 719-A.

1. *PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(g) and Operating Agreement, Schedule 1, section 1.4B(g) state, in part, that the Office of the Interconnection will not permit a DER Aggregator to participate in the DER Aggregation Participation Model if an aggregation includes Component DER that are end-use customers of a small utility "unless the electric distribution company determines that the [RERRA] permits such end-use customers to participate." PJM states that it is implementing the Commission's directive in accordance with its provisions related to demand response.*

a. *Please explain what type of "determination" an electric distribution company would make with respect to the RERRA's decision to permit such customers to participate, how the electric distribution company would make that determination, and the extent to which its role in making that determination complies with the requirement that bids be accepted if the RERRA so permits.*

PJM Response:

Under PJM's proposed DER Aggregator Participation Model, the distribution utility is responsible for interpreting the RERRA's local rules regarding whether or not a particular end-use customer is eligible to be included in a DER Aggregation Resource. PJM believes that this is appropriate, given the distribution utility's direct, ongoing interface with the RERRA's regulatory oversight, and central role in implementing the RERRA's retail programs. This determination would take place during the registration process, and specifically during the 60-day distribution utility review process. Timely notification of this determination will be available to the RERRA, if they so choose, via the software platform that PJM intends to develop for purposes of Order No. 2222 implementation.

This contemplated role for the distribution utility in the DER Aggregator Participation Model is identical to the role that distribution utilities currently play with respect to PJM's demand response model, and has been implemented in this manner for close to a decade.

b. *In circumstances where a RERRA and an electric distribution company are the same entity, such as a municipally owned utility or electric cooperative, please explain how PJM's proposal does not create barriers to entry for DER Aggregations and is not*

unjust, unreasonable, or unduly discriminatory with respect to conflicts of interest between the RERRA and such electric distribution company that may arise in the context of coordination, implementation, and dispute resolution.

PJM Response:

Staff's question goes more to the Commission's policy decision recognizing the role of the RERRA than to any particular aspect of PJM's compliance filing. As a result, to the extent that the Commission is concerned about a conflict of interest in the role of a RERRA overseeing municipal or cooperative utilities, this issue is one that would have been more appropriate for rehearing, rather than an issue associated with the Commission's review of PJM's compliance filing.

As a factual matter, PJM is not aware of an instance in which the circumstances contemplated by this question have, to date, caused concerns or been protested by Market Participants. The RERRA is typically the City Council for a municipality, or Board of Directors for a cooperative, each of which is elected by the residents of the municipality in the case of the City Council, or the customers of the cooperative in the case of an electric cooperative. In this way, both RERRAs are accountable to the voters, who are also the customers of the municipal utility or cooperative. This provides an appropriate check over any potential conflicts of interest as between the interests of the customers versus the interest of the municipal or cooperative utility as an enterprise.

Finally, PJM notes that the Commission ordered PJM to implement this identical "opt-in" structure for small utilities (those that deliver less than 4,000,000 MWh per year) for demand response under Order No. 719-A,[2] and did not identify any specific conflicts of interest.

c. *Please explain whether and to what extent PJM is aware of disputes, concerns, or difficulties in the context of its implementation of Order No. 719-A related to situations where the RERRA and the electric distribution company are the same entity.*

[2] *See, e.g.*, *Wholesale Competition in Regions with Organized Electric Markets*, 128 FERC ¶ 61,059 at P 51 (2009) ("Order No. 719-A") ("We direct RTOs and ISOs to amend their market rules as necessary to accept bids from ARCs that aggregate the demand response of: (1) the customers of utilities that distributed more than 4 million MWh in the previous fiscal year, and (2) the customers of utilities that distributed 4 million MWh or less in the previous fiscal year, where the relevant electric retail regulatory authority permits such customers' demand response to be bid into organized markets by an ARC. RTOs and ISOs may not accept bids from ARCs that aggregate the demand response of: (1) the customers of utilities that distributed more than 4 million MWh in the previous fiscal year, where the relevant electric retail regulatory authority prohibits such customers' demand response to be bid into organized markets by an ARC, or (2) the customers of utilities that distributed 4 million MWh or less in the previous fiscal year, unless the relevant electric retail regulatory authority permits such customers' demand response to be bid into organized markets by an ARC.").

PJM Response:

PJM is not aware of any disputes, concerns, or difficulties in the context of its implementation of Order No. 719-A related to situations where the RERRA and the distribution utility are the same entity, for the reasons stated above. PJM believes that the current Order No. 719-A process works well for all distribution utilities, customers, and market participants.

2. *PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(g) and Operating Agreement, Schedule 1, section 1.4B(g) state, in part, that the Office of the Interconnection will permit a DER Aggregator to participate in the DER Aggregation Participation Model if an aggregation includes Component DERs that are end-use customers of a small utility "if, during the course of the registration process … the electric distribution company presents…" certain evidence of a RERRA's decision "permitting or conditionally permitting the end-use customer's participation."*

a. *Please explain why PJM proposes that only the electric distribution company can present such evidence to PJM regarding whether the RERRA permits small-utility customer participation. Could the DER Aggregator or RERRA provide this information to PJM?*

PJM Response:

The designation of the distribution utility as the entity responsible for presenting the applicable evidence under PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(g) and Operating Agreement, Schedule 1, section 1.4B(g), is consistent with the process PJM has had in place for demand response for over seven years. The existing process for demand response, whereby the distribution utility provides valid RERRA evidence to PJM, has worked well. The distribution utility understands what qualifies as valid evidence under the PJM Tariff, and is ultimately responsible for interpreting such evidence to make a determination regarding whether or not an existing retail customer may participate, based on such RERRA evidence. PJM is not aware of *any* circumstances where the distribution utility has not been forthcoming with the provision of valid RERRA evidence where it exists.

A DER Aggregator or RERRA can provide evidence to PJM by coordinating with the applicable distribution utility. If there were ever any issue with a distribution utility withholding or not being forthcoming with the evidence, a DER Aggregator could raise the issue directly with PJM, the RERRA, the Independent Market Monitor, or the Commission.

b. *Please explain the purpose of accepting evidence of a RERRA's "conditional" permission of small-utility customer participation and how this complies with the Commission's decision to allow such customers to participate if the RERRA so permits.*

PJM Response:

Under PJM's Commission-approved Order No. 719-A implementation, distribution utilities can provide conditional RERRA permission for demand response participation, as the Commission itself directed.[3] The reasoning behind this approach is to provide the RERRA with greater flexibility around the parameters of their respective local rules, which may warrant a more sophisticated response than simply "yes" or "no." PJM believes that this approach—used for the last seven years in PJM—would similarly be useful for purposes of Order No. 2222 implementation.

PJM also believes that this approach is consistent with the directive to allow participation if the RERRA so permits, because the RERRA is still responsible for making this determination—PJM's language simply acknowledges that different jurisdictions may have different, more complex requirements related to this general question.

II. Demand Response Opt-Out

In Order No. 2222-B, the Commission stated, "the participation of demand response in distributed energy resource aggregations is subject to the opt-out and opt-in requirements of Order Nos. 719 and 719-A. Therefore, if the relevant electric retail regulatory authority where a demand response resource is located has either chosen to opt out or has not opted in [pursuant to Order Nos. 719 and 719-A], then the demand response resource may not participate in a distributed energy resource aggregation."

1. *PJM's currently effective Tariff, Attachment K-Appendix, section 1.5A.3 (1)(a)(i) and Operating Agreement, Schedule 1, section 1.5A.3 (1)(a)(i) states that if an electric distribution company or load serving entity seeks to assert that the laws or regulations of a RERRA prohibit or condition an end-use customer's participation in a demand response program, it must provide certain enumerated evidence to PJM in accordance with the process set forth in the Tariff and Operating Agreement. Similarly, PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(g) and Operating Agreement, Schedule 1, section 1.4B(g) identifies specific evidence that must be provided to PJM and a corresponding process to demonstrate that a RERRA permits small utility customers to*

[3] *See, e.g., PJM Interconnection, L.L.C.*, 128 FERC ¶ 61,238 at P 22 (2009) ("Order No. 719-A thus clarified that relevant retail regulatory authorities retain substantial flexibility in establishing requirements for eligibility of retail customers to provide demand response. In light of that clarification, we find that PJM's proposal would, in practice, excessively limit a retail regulatory authority's ability to condition the eligibility of its retail customers to participate in PJM's Demand Response Programs. Accordingly, we condition our acceptance of the proposal on PJM revising its tariff and Operating Agreement to recognize a retail regulatory authority's ability to condition such eligibility, consistent with Order No. 719-A. Consistent with the Commission's statement in Order No. 719-A, any such retail regulatory authority decision, policy, or condition should be clear and explicit so that PJM is not tasked with interpreting ambiguities.") (emphasis added).

participate in the DER Aggregator Participation Model. However, PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(g) and Operating Agreement, Schedule 1, section 1.4B(g) state, in part, that "[t]he 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."

a. *Please explain why PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(g) and Operating Agreement, Schedule 1, section 1.4B(g) do not identify specific evidence that must be provided to PJM and a corresponding process to demonstrate that a RERRA has prohibited the participation of demand response by large utility customers in the DER Aggregator Participation Model.*

PJM Response:

In light of the fact that PJM's demand response opt-out rules are already described in detail in Tariff, Attachment K-Appendix, section 1.5A.3 (1)(a)(i) and Operating Agreement, Schedule 1, section 1.5A.3 (1)(a)(i), PJM did not believe it was necessary to repeat those identical rules for demand response in a separate section under the DER Aggregator Participation Model. These rules detail the specific evidence that must be provided to PJM. However, if the Commission feels that it is necessary to explicitly repeat or cross-reference those rules, PJM will make the corresponding modifications on compliance.

b. *Please explain whether and to what extent the process set forth in Tariff, Attachment K-Appendix, section 1.5A.3 (1)(a)(i) and Operating Agreement, Schedule 1, section 1.5A.3 (1)(a)(i) should be utilized to demonstrate that a RERRA has prohibited the participation of demand response in the DER Aggregator Participation Model.*

PJM Response:

As referenced in the prior response, PJM intends to utilize the process set forth in Tariff, Attachment K-Appendix, section 1.5A.3 (1)(a)(i) and Operating Agreement, Schedule 1, section 1.5A.3 (1)(a)(i) to demonstrate that a RERRA has prohibited the participation of demand response in the DER Aggregator Participation Model.

III. Eligibility to Participate

A. Participation Model

In Order No. 2222, the Commission added section 35.28(g)(12)(i) to the Commission's regulations to require each RTO/ISO to establish distributed energy resource aggregators as a type of market participant and to allow distributed energy resource aggregators to register distributed energy resource aggregations under one or more participation models in the RTO's/ISO's tariff that accommodate the physical and operational characteristics of the distributed energy resource aggregation. The Commission stated that it would evaluate each proposal submitted on compliance to determine whether it meets the goals of Order No. 2222 to allow distributed energy resources to provide all services that they are technically capable of providing through aggregation.

1. *PJM states that the DER Aggregator Participation Model is structurally designed to account for the physical and operational characteristics of the DER Aggregation Resource through the identification of the underlying capabilities of the Component DER in the registration process, and through the definition of DER Aggregation Resource. PJM highlights that the definition of DER Aggregation Resource specifically notes that "[t]he market participation eligibility of a DER Aggregation Resource shall be determined in accordance with the physical and operational characteristics of the underlying Component DER that comprise the DER Aggregation Resource," and also that a DER Aggregation Resource "shall be comprised of one or more Component DER," thereby ensuring the accommodation of heterogeneous DER aggregations in PJM. PJM states that resources may continue to participate in PJM's energy, capacity, and ancillary services markets via existing participation models, including demand response, the energy storage resource participation model, or the generator model, so long as those resources meet the associated requirements and criteria.*

a. *Please clarify whether and to what extent homogeneous DER Aggregations, including homogeneous aggregations of generators, electric storage resources, and demand response resources, will be able to use either existing participation models for which they qualify and/or the new DER Aggregation Participation Model? Can such aggregations choose to participate under existing models or the new DER Aggregation Participation Model?*

PJM Response:

Individual resources will be able to participate in either the existing models or the new DER Aggregator Participation Model. Homogeneous demand response aggregations will be able to participate in either the existing demand response model, or the DER Aggregator Participation Model. All other homogenous aggregations will only have access to the DER Aggregator Participation Model, because the other participation models in PJM (beyond demand response) do

not presently support aggregation of resources.

> *2. PJM explains in its Answer that a single DER Aggregation Resource can reflect both demand capability and injection capability, including reflecting both attributes at a single Component DER site. PJM explains that the only separation of capability from the demand side and injection side in a DER Aggregation Resource is in the settlement of these resources, whereby PJM will settle demand activities under Order No. 745 business rules, as directed by the Commission. PJM explains that DER Aggregation Resources will be able to simultaneously offer demand reduction and injection capability into the PJM market under the DER Aggregator Participation Model with the following approach: (1) all reduction MW capability in the capacity market will be evaluated against a site's Peak Load Contribution (PLC), and all reduction MW capability in the energy market will be evaluated against the Customer Baseline Load (CBL); and (2) all injection MW capability in the capacity market will be evaluated against a site's [PLC] based on the characteristics of a customer's load, and all injection MW capability in the energy market will be evaluated against real-time injections.*

a. Please indicate whether these provisions are included in PJM's Tariff, Operating Agreement or RAA and, if so, where they are located.

PJM Response:

Proposed Attachment K-Appendix, section 1.4B(n), and Operating Agreement, Schedule 1, section 1.4B(n), states:

> (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. (emphasis added)

In light of the explicit cross-reference to Tariff, Attachment K-Appendix, section 3.3A and Operating Agreement, Schedule 1, section 3.3A, PJM is not proposing repetition of the approach described above in its governing documents, but instead proposes to record these resource-specific details in its manuals.

b. Please explain whether and the extent to which a non-net metered Component DER can participate in all markets where they are combined with net metered technologies at the same site.

PJM Response:

When a non-net metered Component DER is combined with net metered technologies at the same site, the resources are located behind the same retail meter. As a result, PJM's proposed language in Tariff, Attachment K-Appendix, section 1.4B(b) and Operating Agreement, Schedule

1, section 1.4B(b) would apply to the question of whether or not these resources can participate.

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.

To the extent that the Commission feels that this specific configuration needs to be addressed in these sections, PJM could modify the language on compliance to specify that "Component DER that participate <u>at</u> net energy metering retail program <u>site</u> . . . " or modify in another manner that the Commission deems appropriate.

3. PJM states that DER Aggregators will be required to submit both price and cost-based offers for DER Aggregation Resources and will follow applicable cost development requirements and guidelines currently enforced in PJM. PJM explains that DER Aggregators wanting to reflect a non-zero cost into the PJM energy market will need to have an approved Fuel Cost Policy on file with PJM. For homogenous DER Aggregation Resources consisting of Component DER that have the technology type documented in PJM Manual 15 (e.g., CT, battery, etc.), PJM explains that DER Aggregators should follow the documented cost development guidelines for submitting Fuel Cost Policies. PJM states that heterogeneous DER Aggregation Resources, or homogenous DER Aggregation Resources that consist of Component DER that do not have the technology type documented in PJM Manual 15 (e.g., demand response), will have a default cost-based offer of $0.

PJM explains that any DER Aggregator seeking to submit a non-zero cost-based offer would be able to utilize PJM's Manual 15, section 1.8 cost methodology and approval process to obtain an exception to its cost methodology calculation. PJM states that it recognizes that a $0 cost-based offer may not always accurately represent the DER Aggregation Resources' costs and encourages DER Aggregators or other PJM stakeholders to bring a problem statement to the PJM Cost Development Subcommittee to further develop cost methodology for these types of aggregations.

a. Please identify which specific technology types are not documented in PJM Manual 15 and would have a $0/MWh default cost-based offer.

PJM Response:

The only technology type currently participating in PJM's markets that does not have cost-based energy offer rules documented in PJM Manual 15 is demand response. PJM Manual 15[4] currently addresses the following technology types: nuclear, fossil steam, combined cycle (CC), combustion turbine (CT), diesel engines, hydro, wind units, solar units, batteries & flywheels.

Homogeneous technologies not addressed in Manual 15 and heterogeneous aggregations may submit a proposed cost-offer methodology at any time using Manual 15, section 1.8.

b. Please explain whether and the extent to which DER Aggregations containing technology types that have a default $0/MWh cost-based offer may be disadvantaged with regard to participation in PJM markets.

PJM Response:

These resources are not disadvantaged, because all Market Sellers (including DER Aggregators) have the option to offer $0/MWh or to submit a cost offer methodology through Manual 15, section 1.8. These resources would only be impacted if they are committed on their cost-based offer.

c. Please describe the process by which a DER Aggregation Resource that includes technology types that submit a $0/MWh default cost-based offer could utilize PJM's Manual 15, section 1.8 cost methodology and approval process to obtain an exception to its cost methodology calculation.

[4] PJM, *Manual 15: Cost Development Guidelines* (rev. 40, June 7, 2022), https://www.pjm.com/~/media/documents/manuals/m15.ashx.

PJM Response:

If the Market Seller has a proposed method for estimating their cost, then they can submit their proposed calculation in an email to PJM and the IMM. PJM will determine if the proposed methodology is compliant with Manual 15 and Operating Agreement, Schedule 2. PJM and the IMM must provide a determination to the Market Seller within 30 days of receiving the request.

PJM or the IMM will bring a Problem Statement to the Cost Development Subcommittee ("CDS") to define cost development methodology once additional information is understood regarding the applicable technologies and related costs. If a situation arises where a DER Aggregator believes there is a need for additional cost development discussion for DER Aggregation Resources, they can take part in the long standing opportunity in PJM to bring a Problem Statement to the CDS to address, at any time.

If the proposed method is approved, PJM would update Manual 15 to include this methodology at the next biennial review.

4. *PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(k) and Operating Agreement, Schedule 1, section 1.4B(k) provides that: "A DER Capacity Aggregation Resource containing DER Aggregation Resource(s) with a Component DER directly connected to distribution facilities not co-located with retail end-use load other than Station Power may be subject to a Minimum Offer Price Rule 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)." Tariff section 1.4B(l) provides that: "A DER Capacity Aggregation Resource containing DER Aggregation Resource(s) with a 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."*

a. *Please explain whether DER Aggregation Resources that include Component DER that inject to the grid and are co-located with retail load would be subject to the Minimum Offer Price Rule and Market Seller Offer Cap.*

PJM Response:

DER Aggregation Resources that include Component DER(s) that inject onto the grid and are co-located with retail load will not be subject to the Minimum Offer Price Rule and Market Seller Offer Cap.

b. Please explain whether these proposed requirements are consistent with PJM's existing performance requirements for participation in the capacity market.

PJM Response:

Yes, the determination for all resources co-located with retail load to not be subject to MOPR and MSOC was made in light of the current demand response rules for retail load participation. These resources are multi-use installations, developed with a purpose to serve retail load, and will have inherent size restrictions due to site loads and distribution interconnection processes. These factors act in concert to minimize the market power concerns.

Capacity and Deliverability

5. PJM explains that the capacity value of a DER Capacity Aggregation Resource will be determined as a summation based on the underlying Component DER within the DER Aggregation Resources linked to the DER Capacity Aggregation Resource. PJM states that it will set the maximum MW value that can be offered into the Base Residual Auction (BRA), Incremental Auction, or used in a Fixed Resource Requirement (FRR) plan. PJM states that the DER Capacity Aggregation Resource capacity value will be calculated based on the technology type and site configuration of the underlying Component DER within the underlying DER Aggregation Resources using PJM's Effective Load Carrying Capability (ELCC) methodology. PJM states that DER Aggregators will be able to offer up to the maximum DER Capacity Aggregation Resource calculated capability into the capacity market.

PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(o) and Operating Agreement, Schedule 1, section 1.4B(o) state that "[C]omponent 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."

a. Please explain whether and how the requirements of OATT Part VI (Administration and Study of New Service Requests; Rights Associated with Customer-Funded Upgrades) apply to DER Aggregation Resources and/or Component DER. Please provide an overview of how PJM will evaluate new service requests for Component DER and/or DER Aggregation Resources and whether that process is the same as for other resources.

PJM Response:

In accordance with the Commission's explicit disclaimer of interconnection jurisdiction in

Order Nos. 2222[5] and 2222-A,[6] Part VI of the PJM Tariff will not apply to DER Aggregation Resources or Component DERs. Component DERs participating in an aggregation will have initially interconnected through the local (retail) interconnection processes. Thus, those units will be either already interconnected, or already have permission to connect to the distribution system through a local interconnection process. Such resources will be required to satisfy state or local-jurisdictional requirements, and the retail distribution utility requirements to interconnect. DERs will continue to have the option to enter the PJM queue for interconnection rights under the PJM Tariff, or choose the path under the DER Aggregator Participation Model (which would not involve entering the queue). Whether a DER elects to submit an interconnection request in PJM's queue or chooses to interconnect solely through a state or local-jurisdictional interconnection process, the distribution utility is the entity responsible for studying the interconnection for distribution impacts.

b. Please explain if PJM will evaluate a DER Aggregation Resource seeking to provide capacity in order to award Capacity Injection Rights (CIRs). If so, please explain the evaluation process and studies performed and how does that evaluation compare to the evaluation process for other resources?

PJM Response:

Part VI of the PJM Tariff will not apply to DER Aggregation Resources or Component DERs, and therefore these resources will not be awarded CIRs. This is because CIRs are only awarded to resources that go through the PJM queue study process, which is not the case for any resources under the DER Aggregator Participation Model. The distribution utility will be

[5] *Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 172 FERC ¶ 61,247 at P 97 (2020) ("Order No. 2222") ("Because we decline here to exercise our jurisdiction over the interconnection of a distributed energy resource to a distribution facility for the purpose of participating in RTO/ISO markets exclusively through a distributed energy resource aggregation, the interconnection of such a resource for the purpose of participating in a distributed energy resource aggregation would not constitute a first interconnection for the purpose of making wholesale sales under the 'first use' test. As such, only a distributed energy resource requesting interconnection to the distribution facility for the purpose of directly engaging in wholesale transactions (i.e., not through a distributed energy resource aggregation) would create a 'first use' and any subsequent distributed energy resource interconnecting for the purpose of directly engaging in wholesale transactions would be considered a Commission-jurisdictional interconnection. We believe that this approach will minimize any increase in the number of distribution-level interconnections subject to the Commission's jurisdiction that this final rule may cause.").

[6] *Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 174 FERC ¶ 61,197 at P 43 (2021) ("Order No. 2222-A") ("We grant Xcel's request to clarify the Commission's jurisdictional approach to the interconnections of QFs that participate in distributed energy resource aggregations. Specifically, as discussed further below, we clarify that we decline to exercise our jurisdiction over the interconnections of distributed energy resources, including the interconnections of QFs, to distribution facilities for the purpose of participating in RTO/ISO markets exclusively as part of a distributed energy resource aggregation.").

responsible for performing the studies necessary to ensure that these resources can reliably interconnect.

PJM will require that the load flow cases include aggregated modeling of the DER Aggregation Resources by fuel type to assess any transmission impacts due to the cumulative interconnection of DER Aggregation Resources.

c. Please provide an overview of how PJM will evaluate Component DER and DER Aggregation Resources for deliverability and whether that process is the same as for other resources.

PJM Response:

Component DERs will be required to satisfy state or local-jurisdictional requirements, and applicable distribution utility requirements to interconnect. Whether a DER opts to submit an interconnection request in PJM's queue, or chooses to interconnect solely through a state or local-jurisdictional interconnection process, the distribution utility is the entity responsible to study the interconnection for distribution impacts.

d. Are there any studies that Component DER and/or DER Aggregation Resources must undergo to be eligible to participate in PJM markets? Please include cites to any applicable section(s) of the Tariff and/or PJM Manuals.

PJM Response:

In order to be eligible to participate in PJM's markets through the DER Aggregator Participation Model, Component DER and DER Aggregation Resources must: (i) satisfy any requisite state or local-jurisdictional study requirements, and attest their compliance with these requirements in their executed DER Aggregator Participation Service Agreement ("DAPSA"); and (ii) undergo the 60-day distribution utility review process. There are no required studies performed by PJM staff for either the Component DER or DER Aggregation Resources to be eligible for participation in PJM Markets.

PJM will incorporate DER Aggregation Resources into its planning model, such that the generation capability is explicitly modeled in the RTEP studies, in accordance with Tariff, Attachment K-Appendix, section 1.4B(b) and Operating Agreement, Schedule 1, section 1.4B(b):

> 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. (emphasis added)

Ancillary Services

6. *PJM states that under the DER Aggregation Participation Model, DER Aggregators will be able to aggregate Component DER to form DER Aggregation Resources to participate in the PJM regulation or reserves markets as "ancillary service only" resources, participating exclusively in regulation or reserves. However, Tariff section 1.4B(c) only specifies that for 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." PJM states that all DER Aggregation Resources will need to meet existing capacity and performance requirements for the ancillary service markets.*

a. *While PJM states that DER Aggregators will be able to provide ancillary services, the proposed Tariff revisions do not appear to include specific requirements governing such participation. Please identify the provision(s) in the Tariff, Operating Agreement, or the RAA establishing a DER Aggregator's ability to participate in PJM's ancillary service markets, including the provision(s) establishing rules for ancillary service-only DER Aggregation Resources.*

PJM Response:

PJM's proposed definition of "DER Aggregation Resource" reads as follows:

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

DER Aggregation Resource. (emphasis added)

Accordingly, if a DER Aggregation Resource contains Component DERs that are physically and operationally capable of providing ancillary services, the market participation of the DER Aggregation Resource may include the provision of ancillary services. This would extend to a DER Aggregation Resource that was only capable of providing ancillary services, by virtue of its underlying Component DERs. The same is true for DER Aggregation Resources providing energy or capacity.

Generally speaking, PJM's Tariff, Operating Agreement, or RAA provisions do not specifically "memorialize the technical, performance or operational requirements" of individual kinds of resources for the provision of ancillary services. This is the reason why PJM's markets-related provisions use the term "Market Participant," and its included sub-definition "Market Seller," rather than delineated, specific resource technologies.[7] Unit-specific references for the provision of ancillary services are not contained in PJM's Tariff, Operating Agreement, or RAA due to the fact that all resources are required to provide the same service and comply with the same performance requirements, irrespective of resource type.

b. Please explain whether and to what extent DER Aggregation Resources that choose to participate in the PJM regulation or reserves markets would be able to provide other ancillary services, such as voltage support, under existing rules in PJM. In your response, please identify the relevant Tariff, Operating Agreement, or RAA provisions that memorialize the technical, performance or operational requirements for DER Aggregation Resources' provision of ancillary services.

PJM Response:

As referenced above, PJM's proposed definition of "DER Aggregation Resource" reads as follows:

> **"DER Aggregation Resource"** shall be comprised of one or more Component DER. A DER Aggregation Resource is used by a DER Aggregator to participate in the energy, capacity, and/or ancillary services markets of PJM through the DER Aggregator Participation Model. A DER Aggregation Resource is capable of satisfying a minimum energy and/or ancillary services market offer of 100 kW. The market participation eligibility of a DER Aggregation Resource shall be determined in accordance with the physical and operational

[7] *See, e.g.,* Tariff, Attachment K-Appendix, sections 1.10, 1.11; Operating Agreement Schedule 1, sections 1.10, 1.11.

> characteristics of the underlying Component DER that comprise the DER Aggregation Resource. (emphasis added)

Accordingly, if a DER Aggregation Resource contains Component DERs that are physically and operationally capable of providing ancillary services, the market participation of the DER Aggregation Resource may include the provision of ancillary services. This would extend to a DER Aggregation Resource that was only capable of providing ancillary services, by virtue of its underlying Component DERs. The same is true for DER Aggregation Resources providing energy or capacity.

Generally speaking, PJM's Tariff, Operating Agreement, or RAA provisions do not specifically "memorialize the technical, performance or operational requirements" of individual kinds of resources. This is the reason why PJM's markets-related provisions use the term "Market Participant," and its included sub-definition "Market Seller," rather than delineated, specific resource technologies.[8]

c. *Please explain whether and to what extent a DER Aggregation Resource will only qualify to offer the ancillary services that all Component DER in the DER Aggregation are qualified to provide.*

PJM Response:

All Component DERs in a DER Aggregation Resource do not need to be qualified to provide ancillary services in order for the DER Aggregation Resource to be capable of providing ancillary services. This is in part the foundational purpose of permitting heterogeneous DER Aggregation Resources, in accordance with the Commission's explicit directive.[9]

B. Types of Technologies

To implement section 35.28(g)(12)(ii)(a) of the Commission's regulations, the Commission required in Order No. 2222 that each RTO's/ISO's rules not prohibit any particular type of distributed energy resource technology from participating in distributed energy resource aggregations. In Order No. 2222, the Commission stated that the requirements in Order No. 745 would apply to demand response resources participating in heterogeneous aggregations.

[8] *See, e.g.,* Tariff, Attachment K-Appendix, sections 1.10, 1.11; Operating Agreement Schedule 1, sections 1.10, 1.11.

[9] *See* Order No. 2222 at P 142 ("Requiring that RTOs/ISOs allow heterogeneous aggregations will further enhance competition in RTO/ISO markets by ensuring that complementary resources, including those with different physical and operational characteristics, can meet qualification and performance requirements such as minimum run times, which will help ensure that these markets produce just and reasonable rates.").

1. *Tariff section 1.4B(n) states: "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." Tariff section 3.3A.5 addresses Market Settlements in Real-time Energy Market. PJM proposes revisions to subsection (b), which states that, "[i]n cases where the demand reduction follows dispatch, as defined in Tariff, Attachment K-Appendix, section 3.2.3(o-1), as instructed by the Office of the Interconnection, and the demand reduction offer price is equal to or greater than the threshold price established under the Net Benefits Test, and demand reduction is not a Component DER operating as part of a DER Aggregation Resource, payment will not be less than the total value of the demand reduction bid." (emphasis added). PJM also proposes revisions to Tariff section 3.3A.6(b), which states that, "Total payments to Economic Load Response Participants for accepted day-ahead demand reduction bids with an offer price equal to or greater than the threshold price established under the Net Benefits Test that follow the dispatch instructions of the Office of the Interconnection, and the demand reduction is not dispatched as part of a DER Aggregation Resource, will not be less than the total value of the demand reduction bid." (emphasis added).*

a. *Please explain whether and how PJM applies the requirements in Order No. 745 to demand response resources participating in PJM's energy market as part of heterogeneous aggregations. Please indicate where in the Tariff any applicable requirements are located.*

PJM Response:

PJM will apply the requirements of Order No. 745 for demand response resources within a heterogeneous DER Aggregation Resource. PJM will separate the demand response resources within the aggregation to uphold Order No. 745 requirements. The demand response resources in a DER Aggregation Resource will be subject to the Net Benefits Price check, which will be performed at the DER Aggregation Resource pricing point. *See* PJM Manual 11, section 10.3.4.

b. *Please explain the purpose of the revisions proposed to Tariff sections 3.3A.5 and 3.3A.6 referenced above and how the revisions are necessary to comply with Order No. 2222. If possible, please provide examples of how PJM would apply these provisions in practice.*

PJM Response:

PJM revised Tariff, sections 3.3A.5 and 3.3A.6 because demand resources that are part of a DER Aggregation Resource are not subject to make-whole credits, (as a demand response resource operating in the DR model would (potentially) be). The reason demand response operating within a DER Aggregation Resource, either of the homogenous or heterogeneous type, will not be subject to make-whole credits as defined in PJM Tariff, sections 3.3A.5 and 3.3A.6 is

that the resources in a DER Aggregation Resource are operating under the self-commit model, defined for the DER Aggregator Participation Model. The demand response resources will be assessed in aggregate, not individually, in the DER Aggregation Resource, for any potential deviation charges or credits, under the applicable DER Aggregation Resource business rules.

2. *PJM explains that it is not establishing an Emergency or Pre-Emergency DER Aggregation Resource, similar to the Emergency or Pre-Emergency demand response program currently in PJM. PJM explains that, given the distinction of DER Aggregation Resources, their ability to inject onto the distribution system, and their ability to locate anywhere on the distribution system, it is important for PJM to have visibility and control of these resources, and to be able to use these resources to meet system demand and constraint control, and not only access these MWs during emergency events.*

a. *Please clarify whether all DER Aggregation Resources must be able to inject onto the distribution system.*

PJM Response:

No. In accordance with the Commission's explicit clarification in Order No. 2222,[10] DER Aggregation Resources may consist of homogeneous demand response resources, and accordingly, not all DER Aggregation Resources must be able to inject.

b. *Please explain whether a demand response resource that participates in an Emergency or Pre-Emergency demand response program is also (or alternatively) eligible to participate as a Component DER in a DER Aggregation Resource? Please include any relevant Tariff citations.*

PJM Response:

A demand response resource that participates in an Emergency or Pre-Emergency demand response program is alternatively (not also) eligible to participate as a Component DER in a DER Aggregation Resource. There are no Emergency or Pre-Emergency DER Aggregation Resources under the proposed DER Aggregator Participation Model.

To this point, Tariff, Attachment K-Appendix, section 4.1B(h), and Operating Agreement, Schedule 1, section 4.1B(h) states in relevant part:

> A DER Aggregator may participate in the PJM energy, capacity, and/or ancillary services markets through the DER Aggregator

[10] *See* Order No. 2222 at P 118 ("We clarify that, because demand response falls under the definition of distributed energy resource, an aggregator of demand response could participate as a distributed energy resource 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. (emphasis added)

C. Double Counting of Services

To implement section 35.28(g)(12)(ii)(a) of the Commission's regulations, the Commission in Order No. 2222 allowed RTOs/ISOs to limit the participation of resources in RTO/ISO markets through a distributed energy resource aggregator that are receiving compensation for the same services as part of another program.

1. *PJM asserts that, under its proposed Tariff and Operating Agreement language, it is possible for retail net metering programs to be designed in a manner that would allow participation in capacity and energy markets without triggering double compensation concerns. Therefore, PJM proposes to allow Component DER in a net energy metering retail program to participate in the energy and capacity markets if: (a) the electric distribution company confirms to the Office of the Interconnection that participation of the resource will not violate the restrictions on duplicative compensation; and (b) the Office of the Interconnection determines that the participation of the resource otherwise meets the requirements for energy or capacity market participation.*

a. *Please explain in greater detail the roles of the electric distribution company and the Office of the Interconnection in deciding whether a resource can participate in both retail net energy metering and the energy market or capacity market.*

PJM Response:

Under PJM's implementation of the DER Aggregator Participation Model, the distribution utility will assume the role of verifying that the submitted customer account number is or is not enrolled in a net energy metering program, and make a determination as to whether or not the customer is already being compensated for energy and/or capacity.

In the event that the distribution utility determines that participation of the resource will not violate the restrictions on duplicative compensation, PJM will then conduct a separate review to determine whether or not the resource can meet the necessary operational and legal requirements

for energy or capacity market participation. For example, for capacity market participation, PJM will ensure that there is no double counting of capacity (*i.e.*, not reducing the load forecast and offering as a supply resource into the capacity market), ensure that if the resource is capable of meeting the capacity must-offer requirements, and ensure that the resource is not already registered or operating under another PJM participation mode. For energy market participation, PJM will ensure that the resource is capable of providing energy without triggering the applicable double counting restrictions.

b. Please explain whether and to what extent there will be any coordination between the electric distribution company and the Office of the Interconnection when making the determination that a Component DER participating in retail net energy metering may or may not participate in the energy market and capacity market.

PJM Response:

The coordination between the distribution utility and PJM will primarily occur through the software program that PJM intends to construct for purposes of implementing the DER Aggregator Participation Model. The distribution utility will communicate its determination, and provide any applicable evidence, to PJM using this program. PJM does not intend to actively participate in the distribution utility's interpretation of RERRA rules or regulations.

c. Please explain the appeal process (if any) for a party (Component DER, DER Aggregator, Office of the Interconnection, or other interested party) to challenge the decision of an electric distribution company to allow or disallow the participation in the energy market or capacity market of a Component DER participating in retail net energy metering.

PJM Response:

The language cited above in Tariff, Attachment K-Appendix, section 1.4(B)(b)(iv)(a) and Operating Agreement, Schedule 1, section 1.4(B)(b)(iv)(a)) is fundamentally designed to allocate reasonability for reviewing potential conflicts under local RERRA rules or regulations to the distribution utility, and to correspondingly allocate responsibility for reviewing potential conflicts under the Tariff and Operating Agreement to PJM. Both the distribution utility and PJM must, after their respective examination of their respective rules, agree that no double counting issues are present in order for the resource to participate in the DER Aggregator Participation Model.

Because PJM's language contemplates a division of responsibility for reviewing local RERRA rules and Commission-jurisdictional rules, an entity that disagrees with either the distribution utility or PJM's determination may appeal to the appropriate regulatory body (in the case of the distribution utility, this would be the RERRA; in the case of PJM, this would be the Commission).

2. *PJM states that 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. *Please explain the process to determine whether the "same product is not also credited as part of a retail program." Does the Office of the Interconnection make this determination? If so, how will the Office of the Interconnection verify this determination?*

PJM Response:

The process to implement the double compensation restrictions contemplated by Tariff, Attachment K-Appendix, section 1.4(B)(h) and Operating Agreement, Schedule 1, section 1.4(B)(h) will involve coordination between the distribution utility and PJM through the software program that PJM intends to construct for purposes of implementing the DER Aggregator Participation Model. During the registration process, the distribution utility will identify and communicate any RERRA-jurisdictional compensation for products sold in PJM's markets (*e.g.*, energy, capacity), given the distribution utility's role in implementing any such RERRA-jurisdictional program. PJM will integrate the distribution utility's determination into its own assessment as to whether or not the double-counting restrictions are implicated and whether or not the resource should be permitted to participate.

D. Minimum and Maximum Capacity Requirements for Distributed Energy Resources Participating in an Aggregation

To implement section 35.28(g)(12)(ii)(a) of the Commission's regulations, the Commission in Order No. 2222 did not establish a minimum or maximum capacity requirement for individual distributed energy resources to participate in RTO/ISO markets through a distributed energy resource aggregation. Although the Commission declined to establish a specific maximum capacity requirement for individual distributed energy resources in an aggregation, the Commission directed each RTO/ISO to propose a maximum capacity requirement for individual distributed energy resources participating in its markets through a distributed energy resource aggregation or, alternatively, to explain why such a requirement is not necessary.

1. *PJM proposes to establish a cap of 5 MW on the maximum capacity of individual Component DER participating in a DER Aggregation Resource. PJM states that it is codifying this maximum capacity requirement in the definition of Component DER. According to PJM, the maximum capacity of 5 MW appropriately balances the removal of barriers to the participation of small Component DER with PJM's operational and visibility needs, both from a planning and operations perspective. When dealing with a larger resource than 5 MW, PJM contends it requires*

greater visibility via individual telemetry and greater operational control to maintain reliability.

a. Please explain how a maximum capacity threshold of 5 MW for individual Component DER was selected, including for resources that do not inject power onto the grid.

PJM Response:

PJM discussed the determination of the 5 MW threshold at length in its February 1 Compliance Filing.[11] With respect to resources that do not inject power onto the grid, PJM did not see a compelling reason to modify the 5 MW threshold *only* for non-injecting resources, given the availability of other participation models in PJM's markets, such as the technology-neutral demand response model. Moreover, existing rules in the demand response model do not allow for multiple large resources (above 5 MW) to aggregate together.

IV. Locational Requirements

In Order No. 2222, the Commission added section 35.28(g)(12)(ii)(b) to the Commission's regulations to require each RTO/ISO to revise its tariff to establish locational requirements for distributed energy resources to participate in a distributed energy resource aggregation that are as geographically broad as technically feasible.[12]

1. PJM proposes a nodal model for energy participation, and simultaneously a multi-nodal model for capacity and ancillary services-only DER Aggregation Resources. Specifically, PJM Tariff, Attachment K-Appendix, section 1.4B(c) and Operating Agreement, Schedule 1, section 1.4B(c) state, in part, that all Component DER in a DER Aggregation Resource shall interface with the same primary pricing node, except: (1) when a DER Aggregation, less than 5 MW, provides ancillary services only, 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 (2) with 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 pricing nodes, so long as those primary pricing nodes are within a defined zone or sub-zonal locational deliverability area.

a. Please explain whether this requirement is consistent with existing locational requirements for demand response resources in PJM. To the extent that these proposed

[11] *See PJM Interconnection, L.L.C.*, Order No. 2222 Compliance Filing of PJM Interconnection, L.L.C., Docket No. ER22-962-000 at 39-43 (Feb. 1, 2022) ("February 1 Compliance Filing").

[12] Order No. 2222, 172 FERC ¶ 61,247 at P 204.

requirements are more restrictive, please explain why these additional restrictions are appropriate for aggregations of distributed energy resources.

PJM Response:

This is not consistent with existing locational requirements for demand response, as a DER Aggregation Resource is a different resource for purposes of wholesale market participation. The main difference between demand response and a DER Aggregation Resource is that demand response cannot, by definition, exceed in value the amount of load that it is offsetting—meaning it cannot inject. By contrast, a DER Aggregation Resource can inject. In light of this potentiality for injection, the locational requirements for DER Aggregation Resources are more akin to the generator participation model, and their impacts on operational constraint control must be considered, as discussed at length in the Affidavit of Donald Bielak included in PJM's February 1 Compliance Filing.

b. Please explain the basis for the proposed limitation that a Component DER within a DER Aggregation Resource can only interface with multiple primary pricing nodes if those primary pricing nodes are in the same state and service territory of a single electric distribution company.

PJM Response:

DER Aggregation Resources can only interface with multiple primary pricing nodes within a distribution utility footprint, due to the reliability studies and reviews necessary for participation. In particular, regulation participation can provide a need for distribution-system reliability analysis, given the dynamic nature of its participation. There is a practical limitation and complexity if Component DERs were to aggregate across distribution utility boundaries, by virtue of the coordination between multiple distribution utilities for separate distribution modeling and study review (and potentially occurring under separate RERRAs).

2. PJM states that a multi-nodal model would raise significant concerns regarding PJM's ability to maintain compliance with NERC mandatory Reliability Standards TOP-001, R1, R12, and R14, as well as IRO-009, R1, R2, R3, and R4, and lead to degradation in accurate market pricing and operational constraint control. In its Answer, PJM acknowledges that a transition to a multi-nodal approach may be appropriate in the future, once additional data regarding the operational impacts of DER Aggregation Resources in PJM becomes available and can be analyzed. PJM asserts that such an analysis must be conducted once implementation has begun, as data from a study conducted now would be stale by the time of implementation in 2026, given numerous changes in generator installations and retirements, transmission system upgrades, and shifts in load patterns.

a. Please explain why the single node requirement is necessary to maintain reliability and meet the cited reliability standards. In your explanation, please also include an example where a multi-node injection could jeopardize PJM's ability to maintain any specific NERC Reliability Standards. Could PJM meet these reliability standards in other ways while permitting multi-nodal aggregations?

PJM Response:

In sequence, TOP-001-5 R1, R12, and R14 read as follows:

R1. Each Transmission Operator shall act to maintain the reliability of its Transmission Operator Area via its own actions or by issuing Operating Instructions.

R12. Each Transmission Operator shall not operate outside any identified Interconnection Reliability Operating Limit (IROL) for a continuous duration exceeding its associated IROL Tv.

R14. Each Transmission Operator shall initiate its Operating Plan to mitigate a SOL exceedance identified as part of its Real-time monitoring or Real-time Assessment.

IRO-009, R1, R2, R3, and R4 read as follows:

R1. For each IROL (in its Reliability Coordinator Area) that the Reliability Coordinator identifies one or more days prior to the current day, the Reliability Coordinator shall have one or more Operating Processes, Procedures, or Plans that identify actions the Reliability Coordinator shall take or actions the Reliability Coordinator shall direct others to take (up to and including load shedding):

1.1. That can be implemented in time to prevent the identified IROL exceedance.

1.2. To mitigate the magnitude and duration of an IROL exceedance such that the IROL exceedance is relieved within the IROL's Tv .

R2. Each Reliability Coordinator shall initiate one or more Operating Processes, Procedures, or Plans (not limited to the Operating Processes, Procedures, or Plans developed for Requirement R1) that are intended to prevent an IROL exceedance, as identified in the Reliability Coordinator's Real-time monitoring or Real-time Assessment.

R3. Each Reliability Coordinator shall act or direct others to act so that the magnitude and duration of an IROL exceedance is mitigated within the IROL's Tv, as identified in the Reliability Coordinator's Real-time monitoring or Real-time Assessment.

R4. Each Reliability Coordinator shall operate to the most limiting IROL and Tv in instances where there is a difference in an IROL or its Tv between Reliability Coordinators

that are responsible for that Facility (or group of Facilities).

Collectively, these requirements represent a mandate in federal law that PJM maintain System Operating Limits ("SOLs") and Interconnection Reliability Operating Limits ("IROLs") at all times.

As discussed at length in the Affidavit of Donald Bielak, included with PJM's February 1, Compliance Filing, due to its size and complexity, the PJM Transmission System almost always experiences constraints on Bulk Electric System ("BES") facilities. The primary tool PJM Dispatchers will utilize in relieving these constraints is off-cost "constraint control." During this process, PJM's Real-Time Security-Constrained Economic Dispatch ("RT-SCED") engine will analyze system conditions, and determine the most cost-effective dispatch scenario for relieving a given constraint. RT SCED will then present this case to the PJM Dispatcher for selection. An essential component of RT SCED's analysis is the unique distribution factor ("DFAX") of each Pnode on the Transmission System, which provides the Dispatcher with an accurate reading of the precise amount of constraint control that can be provided from a given Pnode.

However, under a multi-nodal model, RT SCED would, by definition, examine *multiple* Pnodes, each with its own unique DFAX, and synthesize an *average* DFAX across those multiple Pnodes. RT SCED would not be able to accurately assess which specific Component DER interfaces with which specific Pnode, because the DER Aggregation Resource containing those Component DER would no longer be associated with a defined Pnode. As a result, the case presented to the Dispatcher would provide dramatically less accurate information regarding the amount of constraint control that could be relied upon from a given DER Aggregation Resource, when balanced with the contemplated scale of Order No. 2222.

Because PJM uses generation dispatch for constraint relief to maintain operating limits within the bounds permitted by these NERC standards, incorporating resources on the PJM system that are unable to be precisely used for constraint control would constitute removing a critical tool for PJM Dispatch. To illustrate this point, take an example provided by PJM Affiant Donald Bielak in PJM's April 26 Answer.[13] Mr. Bielak provided an example which assumed a thermal constraint on a branch in Northern Virginia as a reference.[14] The table below highlights the differences in node impact, even across small geographic areas.

Pricing Node	Location	Distance from constraint	Distribution Factor (%)	Initial output	Dispatched output	Constraint flow impact (MW)

[13] *PJM Interconnection, L.L.C.*, Answer of PJM Interconnection, L.L.C., Docket No. ER22-962-000 (Apr. 26, 2022) ("April 26 Answer").

[14] *Id*. at Reply Affidavit of Donald Bielak, ¶ 11.

		(miles)		(MW)	(MW)	Negative = Help Positive = Hurt
Node A	Northern VA	25	6 raise	0	50	50*(-0.06) = **-3**
Node B	Northern VA	13	15 lower	0	50	50*0.15 = **+7.5**
Aggregated Resource (Node A &B)	Northern VA		9 lower (composite 6 raise and 15 lower)	0	100	50*(-0.06) + 50*0.15 = **+4.5**

In this example, Nodes A and B represent resources PJM has historically used to help control this thermal constraint in Northern Virginia. The constraint is localized to the Northern Virginia area, and has nodes, geographically close, with opposing impacts to the constraint. With localized constraints that have limited effective resources to help control, it is crucial for PJM operators to know the precise impact of resources in order to take corrective actions. If resources at Node A and B were to aggregate into one resource, PJM would lose the effective control at these nodes for the constraint. The aggregated resource would receive a "+4.5 hurt impact" when one resource in the aggregation would help the constraint and the other resource would hurt. Since PJM would only have control over the aggregate resource and not the individual resources at the specific nodes, the result could be the resource at Node A responds to the "lower help" when they are really a "raise help" on the constraint, proving ineffective to operational constraint control.

As Commission Staff correctly notes, PJM in its February 1 Compliance Filing stated that a multi-nodal model would raise "significant concerns" regarding PJM's ability to maintain compliance with NERC mandatory Reliability Standards TOP-001, R1, R12, and R14, as well as IRO-009, R1, R2, R3, and R4, and lead to degradation in accurate market pricing and operational constraint control. This does not mean that a multi-nodal model will, by itself, automatically causes PJM to violate these requirements. However, a multi-nodal model, implemented at the scale envisioned by Order No. 2222, would significantly increase the likelihood that PJM would need to increase its reliance on other actions, up to and including emergency operating procedures, to maintain compliance.

This point can be best illustrated via PJM Manual 37, Attachment C, which lays out PJM's procedures for constraint control prioritization. Degradation of PJM's ability to use non-cost and off-cost operational actions (demarcated in green), would, by definition, increase the likelihood that PJM would have to rely on the sequential emergency operating procedures (demarcated in yellow and then red in increasing severity) to maintain operating limits.

b. What specific additional data regarding the operational impacts of DER Aggregation Resources will PJM review to evaluate the feasibility of a transition to permitting multi-node aggregations in the energy market? Please explain why these impacts cannot be anticipated or accounted for at this time.

PJM Response:

Order No. 2222 represents a new paradigm in many respects, including the future operational impact of DER Aggregation Resources. While PJM's assessment at this time is that a multi-nodal model for energy market participation would raise significant operational concerns, evidence may emerge in the future, after implementation, that mitigate these concerns. For example, future enhancements in technological infrastructure may facilitate a more efficient transmission of data between the transmission and distribution functions, which by extension may mitigate the pnode/RT-SCED accuracy concerns described above. Similarly, a DER Aggregator's technological ability to communicate distribution factors, and PJM's ability to receive that data, could improve in the future, which could also potentially mitigate the pnode/RT-SCED accuracy concerns described above.

While these technological enhancements have not occurred to date, they may occur in the future, after implementation in 2026, and PJM would need to assess their operational impacts at that time. PJM anticipates examining this issue through the DIRS, which is the primary forum for PJM's ongoing Order No. 2222 implementation, or through the Emerging Technologies Forum.

V. Distribution Factors and Bidding Parameters

In Order No. 2222, the Commission added section 35.28(g)(12)(ii)(c) to the Commission's regulations to require each RTO/ISO to establish market rules that address distribution factors and bidding parameters for distributed energy resource aggregations. Specifically, the Commission required each RTO/ISO that allows multinode aggregations to revise its tariff to (1) require that distributed energy resource aggregators give to the RTO/ISO the total distributed energy resource aggregation response that would be provided from each pricing node, where applicable, when they initially register their aggregation, and to update these distribution factors if they change; and (2) incorporate appropriate bidding parameters into its participation models as necessary to account for the physical and operational characteristics of distributed energy resource aggregations. The Commission stated that, in meeting the requirement to account for distribution factors and bidding parameters, each RTO/ISO may revise its tariff to manage the locational attributes of distributed energy resource aggregations in a manner that reflects the RTO's/ISO's unique network configuration, infrastructure, and existing operational processes.[15]

[15] Order No. 2222, 172 FERC ¶ 61,247 at P 225.

1. PJM states that its Tariff, Attachment K-Appendix, section 1.4B(d) and Operating Agreement, Schedule 1, section 1.4B(d) would allow DER Aggregators to self-schedule their resources in the day-ahead and real-time energy markets based on the bidding parameters for the applicable technology-type as described in the PJM Manuals.

a. *Please list the bidding parameters that DER Aggregators will use based on technology-type and indicate where these parameters are located in the PJM Manuals.*

PJM Response:

DER Aggregators will have access to all of the general operating parameters in Markets Gateway for operations: Status, Emergency Min/Max MW, Economic Min/Max MW, and Ramp Rate. Given that it is July 2022, PJM does not yet have its proposed documentation for Order No. 2222 drafted, but will do so upon conclusion of this compliance proceeding. PJM's Markets Gateway User Guide will contain more information regarding these parameters and their availability to DER Aggregation Resources.

b. *Please explain why specific parameters for each technology-type are not "realistically susceptible to specification" in the text of the PJM's Tariff, and therefore are better suited in the PJM Manuals.*

PJM Response:

Regarding bidding parameters, proposed Tariff, Attachment K-Appendix, section 1.4B(d) and Operating Agreement, Schedule 1, section 1.4B(d) will allow DER Aggregators to self-schedule their DER Aggregation Resources into the PJM Day-ahead Energy Market and Real-time Energy Market based on bidding parameters for the applicable technology-type, as described in the PJM Manuals.

Because a Component DER is defined in part as "*any resource*, within the PJM Region, that is located on a distribution system, any subsystem thereof, or behind a customer meter . . ." the specific bidding parameters for each conceivable technology type are not "realistically susceptible to specification" in the text of the Tariff and Operating Agreement, and accordingly are better suited for the PJM Manuals under the Commission's Rule of Reason policy.[16]

[16] *City of Cleveland v. FERC*, 773 F.2d 1368, 1376 (D.C. Cir. 1985) ("As we observed earlier, there is an infinitude of practices affecting rates and service. The statutory directive must reasonably be read to require the recitation of only those practices that affect rates and service significantly, that are realistically susceptible of specification, and that are not so generally understood in any contractual arrangement as to render recitation superfluous.").

VI. Information and Data Requirements

In Order No. 2222, the Commission added section 35.28(g)(12)(ii)(d) to the Commission's regulations to require each RTO/ISO to establish market rules that address information requirements and data requirements for distributed energy resource aggregations. As discussed in more detail below, the Commission required each RTO/ISO to revise its tariff to (1) include any requirements for distributed energy resource aggregators that establish the information and data that a distributed energy resource aggregator must provide about the physical and operational characteristics of its aggregation; (2) require distributed energy resource aggregators to provide a list of the individual resources in their aggregations; and (3) establish any necessary information that must be submitted for the individual distributed energy resources. The Commission also required each RTO/ISO to revise its tariff to require distributed energy resource aggregators to provide aggregate settlement data for the distributed energy resource aggregation and to retain performance data for individual distributed energy resources in a distributed energy resource aggregation for auditing purposes.

1. *PJM states that its proposed pre-registration and registration processes in Tariff, Attachment K-Appendix, section 1.4B(b) and Operating Agreement, Schedule 1, section 1.4B(b) describe in specific detail the types of information and data that a DER Aggregator must provide regarding the physical and operational characteristics of its DER Aggregation Resource and the underlying Component DER. PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(b) states, in part, that a DER Aggregator shall obtain and verify certain location and data components, including "the electric distribution company customer account number and associated physical and transmission system electrical location information."*

a. *Please identify and explain the specific physical and electrical location information that a DER Aggregator must obtain and verify.*

PJM Response:

The physical and electrical locational information contemplated by Attachment K-Appendix, section 1.4B(b) and Operating Agreement, Schedule 1, section 1.4B(b) consists of the information necessary for the distribution utility, the load-serving entity, and PJM to appropriately map the Component DERs participating through a DER Aggregation Resource to an individual Pnode. The specific information that will be required for each individual distribution utility across PJM's fourteen distinct state jurisdictions and sub-jurisdictions therein has not been explicitly defined as of July 2022, given that implementation is targeted for 2026. Identifying this information will require additional work and coordination between PJM and all other impacted parties (*e.g.*, the distribution utility, the DER Aggregators, RERRAs, etc.).

b. *If PJM needs additional information about the individual distributed energy resources within an aggregation, beyond the list of individual resources, to conduct transmission*

planning, interconnection or reliability studies, real time operations, or for other relevant purposes, what process will PJM follow to obtain such information?

PJM Response:

PJM is requesting that all DER Aggregation Resources be sorted by fuel type at the appropriate PJM planning model buses for PJM to perform its annual reliability studies, as described in Manual 14B.[17] Section 1.5.4 of Schedule 6 of the PJM Operating Agreement gives PJM the authority to request the necessary data to perform the RTEP.

> 1.5.4 Supply of Data.
>
> (a) The Transmission Owners shall provide to the Office of the Interconnection on an annual or periodic basis as specified by the Office of the Interconnection, any information and data reasonably required by the Office of the Interconnection to perform the Regional Transmission Expansion Plan, including but not limited to the following: (i) a description of the total load to be served from each substation; (ii) the amount of any interruptible loads included in the total load (including conditions under which an interruption can be implemented and any limitations on the duration and frequency of interruptions); (iii) a description of all generation resources to be located in the geographic region encompassed by the Transmission Owner's transmission facilities, including unit sizes, VAR capability, operating restrictions, and any must-run unit designations required for system reliability or contract reasons; the (iv) current local planning information, including all criteria, assumptions and models used by the Transmission Owners, such as those used to develop Supplemental Projects. The data required under this Section shall be provided in the form and manner specified by the Office of the Interconnection.

PJM has an existing process in place to collect this data from PJM Transmission Owners and intends to utilize that process for purposes of Order No. 2222 implementation.

c. Please clarify how the DER Aggregator will share any specific information regarding Component DER with the RTO/ISO and affected distribution utilities.

PJM Response:

The DER Aggregator will be able to share any specific information

[17] PJM, *Manual 14B: PJM Regional Transmission Planning Process* (rev. 51, Dec. 15, 2021), https://www.pjm.com/~/media/documents/manuals/m14b.ashx.

regarding the Component DERs to PJM and the applicable distribution utility through the proposed software tool used for registration, coordination, and sharing of information will all needed parties.

2. *PJM proposes that a DER Aggregator 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. PJM also states that 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. *Please explain how PJM's proposal to require a DER Aggregator to provide individual Component DER meter data is consistent with the requirement of Order No. 2222 that the RTO/ISO require each distributed energy resource aggregator to maintain and submit aggregate settlement data for the distributed energy resource aggregation. Please explain and justify the need for individual Component DER meter data for use in settlements.*

PJM Response:

PJM's proposal is directly aligned with the Commission's explicit clarification in Order No. 2222 that the requirements for settlement and performance data be consistent with the settlement and auditing data requirements for other market participants.[18]

Accordingly, PJM's proposal is consistent with its existing requirements for demand response resources (*i.e.*, the only other kind of aggregation in PJM). PJM settlement processes are still utilizing *aggregate settlement* data for DER Aggregations. PJM is requesting *individual performance* meter data to allow PJM to properly settle resources within the DER Aggregator Participation Model, and verify Order No. 745 settlements, double counting, etc. These requirements have been utilized in the PJM demand resource model for over seven years. Additionally, PJM has proposed provisions whereby mass market DER Aggregation Resources would be able to only submit aggregate sample data to PJM.

b. *Please identify the PJM Manual(s) where additional details are established.*

PJM Response:

[18] *See* Order No. 2222 at P 240 ("Therefore, we adopt the NOPR proposal to require each RTO/ISO to revise its tariff to require each distributed energy resource aggregator to maintain and submit aggregate settlement data for the distributed energy resource aggregation, so that the RTO/ISO can regularly settle with the distributed energy resource aggregator for its market participation, and to provide, upon request from the RTO/ISO, performance data for individual resources in a distributed energy resource aggregation for auditing purposes. However, we clarify that the requirements for settlement and performance data should be consistent with the settlement and auditing data requirements for other market participants.") (emphasis added)

Given that it is currently July 2022, PJM has not yet developed language for its proposed 2026 implementation of Order No. 2222, but anticipates that the eventual language will reside in PJM Manual 28,[19] which governs market settlements operations.

c. Please indicate whether PJM's requirements for settlement and performance data are consistent with the settlement and auditing data requirements for other market participants.

PJM Response:

Yes. As indicated above, PJM's proposed settlement and performance data requirements are consistent with PJM's rules for demand response aggregations—the only other kind of aggregation currently contemplated under PJM's market rules.

VII. Metering and Telemetry System Requirements

In Order No. 2222, the Commission added section 35.28(g)(12)(ii)(f) to the Commission's regulations to require each RTO/ISO to revise its tariff to establish market rules that address metering and telemetry hardware and software requirements necessary for distributed energy resource aggregations to participate in RTO/ISO markets. The Commission stated that it would not prescribe the specific metering and telemetry requirements that each RTO/ISO must adopt; rather, the Commission provided the RTOs/ISOs with flexibility to establish the necessary metering and telemetry requirements for distributed energy resource aggregations, and required each RTO/ISO to explain in its compliance filing why such requirements are just and reasonable and do not pose an unnecessary and undue barrier to individual distributed energy resources joining a distributed energy resource aggregation.

The Commission stated that each RTO's/ISO's proposed metering requirements should rely on meter data obtained through compliance with distribution utility or local regulatory authority metering system requirements whenever possible for settlement and auditing purposes. To the extent that the RTO/ISO proposes that such information come from or flow through distribution utilities, the Commission required that RTOs/ISOs coordinate with distribution utilities and Relevant Electric Retail Regulatory Authorities (RERRAs) to establish protocols for sharing metering and telemetry data, and that such protocols minimize costs and other burdens and address concerns raised with respect to privacy and cybersecurity.

1. PJM's Transmittal contains a table explaining that DER telemetry will be required at a 1-minute scan rate, except for energy resources smaller than 10 MW (no real-time telemetry required) and regulation resources (2/10 second scan rate). PJM states that for both metering and telemetry, its Tariff and Operating Agreement language reserves a sufficient amount of detail to the PJM Manuals, explaining that this is appropriate in light of its broad definition of Component

[19] PJM, *Manual 28: Operating Agreement Accounting* (rev. 86, June 1, 2022), https://www.pjm.com/~/media/documents/manuals/m28.ashx.

DER and multitude of configurations that may exist across its geographically diverse footprint. PJM's proposed Tariff and Operating Agreement provisions state that the "DER Aggregator…shall provide telemetry for each DER Aggregation Resource participating in the energy, capacity, and/or ancillary services markets…in accordance with the technical specifications described in the PJM Manuals."

a. Please specify the proposed Tariff and Operating Agreement language that sets forth the telemetry scan rates and metering accuracy described in the Transmittal.[20]

PJM Response:

The specific details associated with the telemetry scan rates and metering accuracy are contained in the PJM manuals, and are not contained in the Tariff. This is a long-standing practice that applies for all resources in PJM, not just resources under the proposed DER Aggregator Participation Model. PJM details the telemetry scan rates applicable to resources, by market participation in PJM Manual 01.[21] PJM Manual 14D[22] provides additional details on metering and telemetry points and PJM Manual 03A[23] describes sufficient telemetry for observability of the BES.

b. Please explain whether and to what extent the metering and telemetry requirements differ depending on whether Component DER participates in the energy, capacity, or ancillary services markets.

PJM Response:

Metering and telemetry requirements do differ, depending on the specific market activity a resource is engaged in, consistently among all resources participating in PJM. These specific rules are established in PJM Manual 01 and PJM Manual 14D. Specifically for DER Aggregation Resources the metering and telemetry requirements would differ as detailed in the chart below:

[20] Transmittal at 60.

[21] PJM, *Manual 1: Control Center and Data Exchange Requirements* (rev. 44, Apr. 27, 2022), https://www.pjm.com/~/media/documents/manuals/m01.ashx.

[22] PJM, *Manual 14D: Generator Operational Requirements* (rev. 58, Dec. 15, 2021), https://www.pjm.com/~/media/documents/manuals/m14d.ashx.

[23] PJM, *Manual 3A: Energy Management System (EMS) Model Updates and Quality Assurance (QA)*, (rev. 21, May 25, 2022), https://www.pjm.com/~/media/documents/manuals/m03a.ashx.

Market		Telemetry	Accuracy
Capacity		1 minute data	+/- 2%
Energy Only	<10 MW	no real-time telemetry required	+/- 2%
	>=10 MW	1minute data	+/- 2%
Regulation		2/10 second data	+/- 2%
Reserves		1 minute data	+/- 2%

c. Please clarify whether the DER Aggregator is the entity responsible for providing any required metering and telemetry information to PJM.

PJM Response:

Yes, under PJM's proposed DER Aggregator Participation Model, the DER Aggregator is the entity ultimately responsible for providing any required metering and telemetry information to PJM. However, the DER Aggregator may coordinate with the applicable distribution utility, and use existing distribution utility metering and telemetry infrastructure, depending on the arrangement agreed to by the DER Aggregator and the distribution utility, and any applicable requirements or operating procedures at the local level.

d. To the extent that PJM proposes that such information come from or flow through distribution utilities, please explain whether PJM coordinated with distribution utilities and RERRAs to establish protocols for sharing metering and telemetry data. If so, please describe such protocols and how they minimize costs and other burdens and address privacy and cybersecurity concerns.

PJM Response:

As referenced above, PJM's language places the default responsibility for providing metering and telemetry data on the *DER Aggregator*, not the distribution utility. To the extent that the distribution utility is the entity responsible for physically operating the Component DER within a DER Aggregation Resource and/or dispatching a DER Aggregation Resource, the specific protocols for that data sharing may be arranged bilaterally between the DER Aggregator and the distribution utility. Given the non-jurisdictional nature of distribution utilities, and the diversity of RERRA-jurisdictional rules that may proliferate across PJM's fourteen distinct state jurisdictions and sub-jurisdictions therein, PJM has not memorialized specific protocols in its Tariff or Operating Agreement, to allow for distribution utility and RERRA flexibility in this area. While PJM is willing to serve as a forum to facilitate discussions on these issues leading up to the effective date of Order No. 2222, a third-party entity, such as IEEE, may be more appropriate to develop data protocols so as to ensure more uniformity in such arrangements across the nation.

2. PJM states that DER Aggregators will be required to provide all individual Component DER meter data necessary to facilitate the settlement of the DER

> *Aggregator's DER Aggregation Resource, in accordance with existing standard metering requirements. PJM further states that DER Aggregators will be required to ensure that Component DER within a DER Aggregation Resource provide integrated hourly kWh values on an electric distribution company account basis, and that a "representative sample" of Component DER have metering equipment that provides the same for non-interval metered residential DER Aggregation Resources.*

a. Please explain whether and to what extent PJM's proposed metering requirements rely on meter data obtained through compliance with distribution utility or local regulatory authority metering system requirements for settlement and auditing purposes, and that PJM's requirements rely on existing telemetry infrastructure whenever possible.

PJM Response:

PJM's proposed DER Aggregator Participation Model does not explicitly rely on meter data obtained through compliance with distribution utility or local regulatory authority metering system requirements for settlement and auditing purposes. However, DER Aggregators have the option to rely on existing distribution utility infrastructure, whereby they would have to comply with applicable local rules. This is aligned with the current practice in PJM today for distribution-connected resources. For example, under the current demand response model, some resources rely on existing distribution utility metering and telemetry infrastructure, and others install their own, at their own expense. PJM allows for this flexibility to minimize the burden on both resources and distribution utilities.

b. Please explain in detail the information required and process by which a DER Aggregator would provide a "representative sample" of Component DER within a non-interval metered residential DER Aggregation Resource, and please explain whether this term is defined in the PJM Tariff, Operating Agreement, or PJM Manuals.

PJM Response:

PJM has documented the ability for DER Aggregators operating a DER Aggregation Resource in the DER Aggregator Participation Model that consists solely of residential customers without interval meters to provide a statistical sample (the "representative sample") extrapolated to the population to determine compliance and energy settlements in the proposed Tariff, Attachment K-Appendix, section 1.4B(e), and Operating Agreement, Schedule 1, section 1.4B(e).

> 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.

The details of how the requirements for providing the "representative sample" will be documented in the PJM Manuals. This approach is the same as PJM's Demand Response model today, where the details of residential demand response resources utilizing the "representative sample" approach is documented in PJM Manual 19[24] in Attachment C: Residential Non-Interval Metered Guidelines.

PJM will utilize the same requirements for Qualification, Sample Size Determination & Recalibration as currently utilized in PJM Demand Response programs. Requirement details for this approach include:

- DER Aggregation Resource consists entirely of residential customers.
- Locations can be sampled to accurately reflect the population load data.
- Samples must be designed to achieve a maximum error of 10% at 90% confidence.
- The locations in the sample must be randomly selected from all the locations in the population group.
- The sample must be stratified by control device size (minimum of 2 strata) and geographic location, unless otherwise approved by PJM.
- A sample is required for each combination of Component DER groupings, if there is substantial variation among installed capability and operations.
- A variance study is used to determine the initial sample size. Interval data must be collected from at least 75 randomly selected and stratified customers during the season that the end use device is in use in order to determine the variance of data.
- The sample must be recalibrated annually, using the same methods and using data from all locations in the sample.
- If the population was expanded in a non-random manner, the sample must be expanded appropriately.
- The number of locations in each stratum in the sample must be adjusted so that the number of locations in each stratum is proportional to the population in that stratum within +/- 1 location.

c. Please clarify whether PJM's proposed metering requirements allow the use of sub-metering (i.e., metering located at the Behind-the-Meter DER).

PJM Response:

Generally speaking, PJM does not intend to use sub-metering (*i.e.*, metering located at the Behind-the-Meter DER) to meet its metering requirements. One notable exception would be in

[24] PJM, *Manual 19: Load Forecasting and Analysis* (rev. 35, Dec. 31, 2021), https://www.pjm.com/~/media/documents/manuals/m19.ashx.

the case of certain configurations for regulation, in accordance with the existing rules for demand response outline in PJM Manual 11, section 10.7.[25]

Defined rules for regulation sub-metering in PJM Manual 11, section 10.7 are as follows:

- Clearly identify for the Office of the Interconnection all electrical devices that provide Regulation and identify all other devices used for similar processes within the same Location that do not provide Regulation.
- The Location must contribute to management of frequency control on the PJM electric grid or PJM shall deny use of Sub-metered data for the Location.
- Must submit single line diagrams to PJM unless otherwise approved by PJM with Sub-metered device(s) clearly specified at the Location.
- PJM verifies that all similar devices at the Location are Sub-metered and if the similar devices are not Sub-metered, PJM will deny the use of Sub-meter data.
- If the registration to participate in the Regulation Market contains an aggregation of Locations, data for each Location must be submitted.

  All telemetry data to PJM is to be based on device electricity consumption which must include data from all Locations and from all devices approved. Sub-metering participation will be subject to audit and the Office of the Interconnection may suspend the Regulation market activity for non-compliance, and may refer the matter to the Independent Market Monitor and/or the Federal Energy Regulatory Commission Office of Enforcement.

VIII. Coordination between the RTO/ISO, Aggregator, and Distribution Utility

A. Role of Distribution Utilities

To implement § 35.28(g)(12)(ii)(g) of the Commission's regulations, Order No. 2222 required each RTO/ISO to develop a distribution utility review process that includes criteria by which distribution utilities would determine whether (1) each proposed distributed energy resource is capable of participation in a distributed energy resource aggregation; and (2) the participation of each proposed distributed energy resource in a distributed energy resource aggregation will not pose significant risks to the reliable and safe operation of the distribution system. The Commission also stated that the distribution utility should have the opportunity to request that the RTO/ISO place operational limitations on an aggregation or removal of a distributed energy resource from an aggregation based on specific significant reliability or

[25] PJM, *Manual 11: Energy & Ancillary Services Market Operations* (rev. 120, May 25, 2022), https://www.pjm.com/~/media/documents/manuals/m11.ashx.

safety concerns that it clearly demonstrates to the RTO/ISO and distributed energy resource aggregator on a case-by-case basis.

In Order No. 2222-A, the Commission clarified that, although it is providing each RTO/ISO with the flexibility to develop review procedures and criteria appropriate for its region, the Commission expects that the criteria proposed on compliance will require that an RTO/ISO decision to deny wholesale market access to a distributed energy resource for reliability reasons be supported by a showing that the distributed energy resource presents significant risks to the reliable and safe operation of the distribution system.

In Order No. 2222-A, the Commission clarified that RTO's/ISO must permit sharing any necessary information and data collected about the individual distributed energy resources participating in a distributed energy resource aggregation with distribution utilities and the distributed energy resource aggregator. Such information could include whether a resource affects the safety and reliability of the distribution system or is capable of participating in an aggregation.

In Order No. 2222-A, the Commission required that the review criterion on impacts on distribution system reliability must include "any incremental impacts from a resource's participation in a distributed energy resource aggregation that were not previously considered by the distribution utility during the interconnection study process for that resource."

In Order No. 2222, the Commission required each RTO/ISO to revise its tariff to incorporate dispute resolution provisions as part of its proposed distribution utility review process. The Commission stated that each RTO/ISO should describe how existing dispute resolution procedures are sufficient or, alternatively, propose amendments to its procedures or new dispute resolution procedures specific to this subject.

In Order No. 2222-A, the Commission stated that disputes regarding the distribution utility review process—including those between non-host distribution utilities and a host distribution utility or the RTO/ISO—may be resolved through the RTO's/ISO's dispute resolution process, the Commission's Dispute Resolution Service, or complaints filed pursuant to section 206 of the Federal Power Act at any time.

1. *PJM in its proposal refers to the involvement of the "electric distribution company" in several sections of the Tariff, including those pertaining to metering, telemetry, and coordination. While PJM does not define the term in the Tariff, it states that the use of the term "electric distribution company" is just and reasonable in the context of PJM's demand response rules, and by extension, is just and reasonable in the context of Order No. 2222. PJM further states that it is open to considering a different definition and is willing to provide a forum in the PJM stakeholder process to discuss the issue further.*

a. Please explain how PJM defines "electric distribution company" in the context of its existing demand response rules, and whether that definition would be the same under PJM's DER Aggregator Participation Model.

PJM Response:

"Electric distribution company" for purposes of PJM's demand response rules is interpreted the same way that an Electric Distributor is defined in the Operating Agreement. Under that definition, Electric Distributor "shall mean a Member that 1) owns or leases with rights equivalent to ownership electric distribution facilities that are used to provide electric distribution service to electric load within the PJM Region; or 2) is a generation and transmission cooperative or a joint municipal agency that has a member that owns electric distribution facilities used to provide electric distribution service to electric load within the PJM Region." In very rare cases where the municipality or cooperative is not a PJM Member or part of a transmission cooperative or joint municipal agency, they may authorize another Member to act on their behalf to perform demand response-related activities. This approach has worked well for over seven years.

PJM believes that this existing application of the term "electric distribution company" under the demand response model would similarly work well for purposes of implementation of the DER Aggregator Participation Model. However, in the coming years, as various distribution utilities and RERRAs advance their implementation of Order No. 2222, a different definition may be appropriate. As referenced in its April 26 Answer, PJM is willing to provide a forum in the PJM stakeholder process to discuss this issue further.[26]

2. PJM explains that, prior to the initiation of the formal registration process, a DER Aggregator must first obtain and verify certain location and data components in coordination with the applicable electric distribution company and, if necessary, any relevant transmission owner. PJM further states that disputes over such pre-registration coordination would be resolved by the RERRA or otherwise in accordance with state or local law because the subject matter of such disputes is generally outside of PJM's core competency. PJM states that this pre-registration coordination is necessary because of the difficulty of data collection coordination is centered on the fact that the distribution system topology in PJM is extraordinarily diverse and complex, and does not have an existing unified "mapping" to corresponding transmission facilities.

a. Please explain how PJM would treat situations where the electric distribution company fails to coordinate with the DER Aggregator in a timely manner.

PJM Response:

[26] April 26 Answer at 22.

As specified in PJM's compliance filing, the pre-registration process is a bilateral interface between the DER Aggregator and the distribution utility. To the extent that a distribution utility refused to coordinate, a DER Aggregator could raise the issue with the RERRA. PJM does not intend to resolve disputes in the pre-registration process, in accordance with its proposed Tariff and Operating Agreement language. To the extent that the DER Aggregator believes the dispute may implicate matters within the Commission's jurisdiction, and not the RERRA's, the Commission's regulations also permit parties to file complaints with the Commission, pursuant to FPA section 206.[27]

b. Please explain why and how PJM's current system topology and its state of unified mapping necessitate pre-registration coordination outside of the 60-day distribution utility review timing specified in Order No. 2222.

PJM Response:

As PJM explained in its February 1 Compliance Filing, "[t]hese locational and data components are essential for PJM to accurately model Component DER in both operations and planning, *and by extension are necessary for the DER Aggregator to initiate a registration*."[28] Because PJM does not currently have a centralized model that directly correlates distribution circuits to transmission busses, this data must be obtained *in advance* of submission of a registration (*i.e.*, before the 60-day review period) because it is needed to determine which facilities may be physically aggregated on a registration. In other words, without this data, there would be nothing for the distribution utility to "review" within the 60-day window.

c. Please explain how any necessary information and data collected about the individual distributed energy resources participating in a DER Aggregation by PJM will be shared with distribution utilities and the distributed energy resource aggregator.

PJM Response:

As referenced above, PJM will construct a software program that will facilitate coordination and communication between PJM, the DER Aggregator, and the distribution utility. The DER Aggregator will be required to provide any necessary information and data from each individual Component DER during the registration process. This data includes the type of Component DER, the associated capability, and other details as determined in the PJM manuals. This is similar to the process already in place today for demand response, as outlined in Manual 11, section 10.2.2. The information will be available to all parties—PJM, the affected distribution

[27] 18 C.F.R. 385.206(a) ("Any person may file a complaint seeking Commission action against any other person alleged to be in contravention or violation of any statute, rule, order, or other law administered by the Commission, or for any other alleged wrong over which the Commission may have jurisdiction.").

[28] February 1 Compliance Filing at 27.

utility, and the DER Aggregator.

3. PJM states that once it has reviewed a DER Aggregator's registration and verified that the DER Aggregator meets the eligibility criteria for participation, it will then notify the relevant distribution utility "through the appropriate PJM system" to initiate the 60-day review process.

a. What PJM system is used to notify to the relevant distribution utility? Please identify the specific action that triggers initiation of the 60-day distribution utility review.

PJM Response:

As referenced above, PJM will operate a software tool to facilitate the registration, coordination, and communication necessary to implement the DER Aggregator Participation Model, just as it has done for the demand response model (DRHub). The exact specifications and parameters around that software tool will be finalized upon resolution of this compliance proceeding.

In accordance with PJM's submitted proposal, the registration review process formally begins after: (1) PJM has an executed DER Aggregator Participation Service Agreement ("DAPSA") on file, to be used for all DER Aggregation Resources associated with the DER Aggregator; (2) PJM has received a complete registration from the DER Aggregator, in a form specified in the PJM Manuals; and (3) the pre-registration activities described above have been completed. Once a registration is submitted, PJM will verify that these additional steps have been completed and notify the relevant distribution utility through the software program, which will initiate the 60-day review process.

b. Please explain whether there is a time limit for PJM to review a DER Aggregator's registration for completeness and notify the relevant distribution utility.

PJM Response:

PJM does not have a specific time limit, but intends to have the system automatically check for completeness and notify the DER Aggregator of missing information if any. The DER Aggregator and distribution utility will be notified through the system when the PJM review is complete.

4. PJM explains that any concerns identified by the distribution utility during the 60-day distribution utility review period may be resolved between the distribution utility and the DER Aggregator bilaterally, or through the applicable RERRA, prior to seeking initiation of the dispute resolution process described in Operating Agreement, Schedule 5. If any such concerns are resolved during the 60-day review period, the distribution utility may recommend that PJM approve the registration; if not, then the distribution utility may recommend that PJM: (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.

Tariff section 1.4B(b) further specifies that: "Within fifteen calendar days, the Office of 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 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." PJM states that it will approve a DER Aggregator's registration in the event that the distribution utility does not provide any comments or recommendations within the 60-day review period. PJM states that it will apply the applicable pricing points to the Component DER, and either approve or deny the DER Aggregator's registration within 15 days of the conclusion of the 60-day distribution utility review period.

a. Please explain whether there are any circumstances that would extend the 60-day distribution utility review period and forestall the automatic approval of a DER Aggregator's registration if the electric distribution company does not provide comments or a recommendation.

PJM Response:

PJM's proposal does not contemplate any circumstances that would extend the 60-day distribution utility review period and forestall the automatic approval of a DER Aggregator's registration if the distribution utility does not provide comments or a recommendation. However, if the registration is denied, the DER Aggregator may resubmit its registration, which will open a new 60-day window. Further, if the DER Aggregator recognizes an issue with its submitted registration, it may withdraw and resubmit the registration through the PJM system portal. This is very similar to how the demand response registration process works today, and helps keep the deadline transparent for all parties.

b. Could the 60-day review period be paused by mutual consent of the electric distribution utility and the DER Aggregator to bilaterally resolve a concern?

PJM Response:

No, as indicated above, PJM's proposal does not contemplate a pause in the 60-day review period. If the parties cannot resolve an issue within the 60-day period, the contemplated path is that the distribution utility would recommend rejection, and once the issue is resolved, the registration could be submitted again to restart the 60-day clock. PJM believes that it is critical to

have clear time lines in order to automate this process as much as possible for all parties. Importantly, the 60-day review period is a *ceiling*—meaning that a resubmitted registration will not necessarily take a subsequent full 60-days for the distribution utility to review; the time for review may be much shorter, depending on the circumstances.

c. Could a distribution utility unilaterally request an extension of the 60-day review period to complete its review? If so, please explain what criteria would be used to evaluate such a request.

PJM Response:

No. As indicated above, PJM's proposal does not contemplate an extension of the 60-day review period. If a distribution utility is unable to complete its review within the specified 60-days, it would need to recommend rejection to PJM. In the absence of any feedback from the distribution utility, PJM would approve the registration, assuming all other requirements are met.

d. Please explain whether entry in formal dispute resolution procedures described in Operating Agreement, Schedule 5 would pause the 60-day review window and forestall the automatic approval of a DER Aggregator's registration.

PJM Response:

No. As indicated above, if the parties enter into formal dispute resolution procedures, and resolution exceeds the 60-day review window, PJM would reject the registration. Once the dispute is resolved, the DER Aggregator could resubmit its registration.

e. Please describe any circumstances where the Office of Interconnection would approve or deny a DER Aggregator's registration contrary to the recommendation of the electric distribution utility.

PJM Response:

PJM's proposed language in Tariff, Attachment K-Appendix, section 1.4B(b) and Operating Agreement, Schedule 1, section 1.4B(b) states that PJM will provide "deference . . . to the electric distribution company's assessment of the impact of the DER Aggregator's registration on the safety and reliability of distribution facilities." Accordingly, there is no circumstance in which PJM would approve a DER Aggregator's registration if a distribution utility had raised concerns over the safety and reliability of distribution facilities that could not be resolved. Note that the distribution utility will need to provide supporting information regarding any such concerns. Outside of this contingency, PJM will make its own determination to approve or deny, based on the specific facts and circumstances presented, and applying its Commission-approved criteria.

PJM notes that this approach is consistent with its current operating practice. PJM operations staff specifically avoid taking actions that would cause a reliability issue on the distribution system, in coordination with the applicable Transmission Owner and distribution utility.

f. Please explain whether there are any circumstances where the Office of Interconnection would deny a DER Aggregator's registration when the electric distribution utility did not provide comments or a recommendation.

PJM Response:

PJM is not aware of any circumstances where PJM would deny the registration when the distribution utility did not provide comments or a recommendation, assuming all other applicable requirements are met, including the requirement for an executed DAPSA whereby the DER Aggregator attests that it is in compliance with all RERRA and distribution utility rules and operating procedures.

g. Please explain whether your answers to any of these questions are different for review of an initial registrant or of a modification to the list of resources.

PJM Response:

No, PJM's answers are the same.

5. Proposed Tariff section 1.4B(b) enumerates seven specific elements of the electric distribution utility review during the 60-day registration review process. Specifically, Tariff section 1.4B(b)(vii) states that the electric distribution company will review and verify that "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." The Tariff further states that "[i]f 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."

a. Please explain the criteria, including any specific metrics, by which the electric distribution companies would determine whether the participation of each Component DER in the PJM energy, capacity, and/or ancillary service markets will pose a threat to the reliable and safe operation of the distribution system, the public, or electric distribution system company personnel.

PJM Response:

As stated in PJM's April answer, PJM is not in the business of building, owning, and operating local distribution facilities. It is not possible for PJM to identify the specific criteria or metrics that a distribution utility may utilize in determining whether or not the participation of each Component DER in the PJM energy, capacity, and/or ancillary service markets will pose a threat to the reliable and safe operation of the distribution system, the public, or electric distribution system company personnel. This is particularly true in light of the fact that PJM's footprint covers fourteen distinct state jurisdictions and sub-jurisdictions therein, each with different local rules governing the physical operation of local distribution facilities.

b. Please explain whether this proposed Tariff language includes a requirement that an electric distribution utility provide a reliability showing to a DER Aggregator in the event reliability concerns are identified during the 60-day review. If so, please explain which types and/or forms of evidence are acceptable in this showing.

PJM Response:

The proposed tariff language states that the applicable distribution utility may provide an "assessment of the impact of the DER Aggregator's registration on the safety and reliability of distribution facilities." This assessment would include information and documentation necessary to support the determination, which will be able to be submitted via the software tool that PJM will ultimately develop to implement the DER Aggregator Participation Model.

c. Please explain how the distribution utility review process will examine any incremental impacts from a resource's participation in a distributed energy resource aggregation that were not previously considered by the distribution utility during the interconnection study process for that resource.

PJM Response:

Under PJM's proposal, PJM provides the applicable distribution utility with a defined time period and stated criteria by which it may review the proposed registration. PJM cannot speak to how each individual distribution utility in its footprint will conduct that review, and how that review interacts with the studies conducted during the RERRA-jurisdictional interconnection process.

d. What is the process (including protocols or communications) that an electric distribution company will follow to notify a DER Aggregator of any specific concerns?

PJM Response:

As referenced above, PJM will operate a software tool to facilitate the registration,

coordination, and communication necessary to implement the DER Aggregator Participation Model, just as it has done for the demand response model (DRHub). The exact specifications and parameters around that software tool will be finalized upon resolution of this compliance proceeding. However, this tool can be utilized by a distribution utility to notify a DER Aggregator of any specific concerns.

e. Please explain where in the Tariff or PJM Manuals any such process (including protocols and communications) is specified.

PJM Response:

Given that it is July 2022, PJM does not currently have the exact specifications and parameters around the software tool finalized in anticipation of the 2026 implementation date. These will be finalized in consultation with PJM stakeholders and memorialized in the PJM manuals upon resolution of this compliance proceeding.

B. Ongoing Operational Coordination

To implement section 35.28(g)(12)(ii)(g) of the Commission's regulations, in Order No. 2222, the Commission required each RTO/ISO to revise its tariff to (1) establish a process for ongoing coordination, including operational coordination, that addresses data flows and communication among itself, the distributed energy resource aggregator, and the distribution utility; and (2) require the distributed energy resource aggregator to report to the RTO/ISO any changes to its offered quantity and related distribution factors that result from distribution line faults or outages. In addition, the Commission required each RTO/ISO to revise its tariff to include coordination protocols and processes for the operating day that allow distribution utilities to override RTO/ISO dispatch of a distributed energy resource aggregation in circumstances where such override is needed to maintain the reliable and safe operation of the distribution system.

1. PJM states that distribution utilities will communicate with the DER Aggregator or the DER Aggregation Resource dispatch agent to inform them of any distribution activities that may require Component DER to modify their operations. PJM explains that this includes activities such as distribution switching work for a pole hit or tree falling, which need to occur in real-time. PJM also states that, in the event that the distribution utility notifies the DER Aggregator of a modified operating range for the DER Aggregation Resource and/or underlying Component DER, the DER Aggregator is expected to update its bidding parameters and capability in the PJM Real-time Energy Market.

a. Please explain how distribution utilities will communicate distribution activities that may require a Component DER to have modified operations to the DER Aggregator or DER Aggregation Resource dispatch agent.

PJM Response:

The operational coordination design that PJM developed with its stakeholders is described in detail in PJM's February 1 Compliance Filing.[29] PJM's proposed operational coordination design allows for maximum flexibility. As such, the designated market and dispatch agent can be one of many different entities. By extension, the flow of information can be different on a detailed basis. However, it will remain consistent on a high-level basis, as shown in the original filing.

The common language for PJM is unit parameters. Specifically, in this case, the communication back to PJM would be in the form of an updated Economic Maximum. When a distribution utility determines that there is activity, either planned or unplanned, they will communicate this to the dispatch and market agents. The market agent will need to update the market parameters accordingly to PJM. PJM has existing software for this type of interaction and a similar type of software will exist for DER Aggregation Resources.

b. Please explain who will be responsible for determining the modified operating range. If the DER Aggregator is responsible for this calculation, please explain the responsibilities of the distribution utility to communicate sufficient detail to the DER Aggregator to perform this calculation.

PJM Response:

Again, the specifics of this can vary based on who is performing the market and dispatch agent functions. Generally speaking, the market agent will develop the bid-in market parameters which will reflect the operating range of the resource. If the distribution utility determines that an override needs to be applied, they will be responsible for determining the new operating range and making the appropriate communication, which will ultimately need to be reflected in the market parameters provided to PJM.

C. Role of Relevant Electric Retail Regulatory Authorities

To implement section 35.28(g)(12)(ii)(g) of the Commission's regulations, in Order No. 2222 the Commission required each RTO/ISO to specify in its tariff, as part of the market rules on coordination between the RTO/ISO, the distributed energy resource aggregator, and the distribution utility, how each RTO/ISO will accommodate and incorporate voluntary RERRA involvement in coordinating the participation of aggregated distributed energy resources in RTO/ISO markets.

[29] February 1 Compliance Filing at 72-78.

1. PJM states that RERRAs will play a role in overseeing and settling disputes between DER Aggregators and distribution utilities during pre-registration bilateral coordination regarding the locational and data components necessary for the DER Aggregator's registration with PJM. PJM also states that RERRAs are an option for parties to settle disputes prior to initiating the PJM dispute resolution process; and PJM will require that parties take disputes to the applicable RERRA when the dispute arises under any applicable tariffs, agreements, and operating procedures of the electric distribution company, or the rules and regulations of the RERRA.

a. Please explain how participation in a RERRA dispute resolution process during registration impacts the timing of the 60-day review window.

PJM Response:

The RERRA dispute resolution process will not impact the timing of the 60-day review window. As referenced above, if an element of a registration is submitted to a RERRA for dispute resolution, the 60-day distribution utility review process does not pause. In the event that the dispute cannot be resolved during the 60-day review window, PJM would reject the registration, and the DER Aggregator could resubmit its registration once the issue is resolved.

IX. Modifications to List of Resources

In Order No. 2222, the Commission required each RTO/ISO to revise its tariff to specify that distributed energy resource aggregators must update their lists of distributed energy resources in each aggregation (i.e., reflect additions and subtractions from the list).

In Order No. 2222-A, the Commission encouraged the RTOs/ISOs to propose abbreviated distribution utility review processes for modifications to existing aggregations. The Commission also limited the length of the distribution utility review period to no more than 60 days.

1. PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(b) states in part that 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" (emphasis added).

a. Please explain why PJM proposes to require reporting only additional market services when such reporting is intended to reflect any proposed addition or subtraction of market services.

PJM Response:

Proposed additional market services will, by definition, require certification to participate in such a market. If a DER Aggregator is already certified to participate in a market, then the DER Aggregator has the flexibility, based on the specific market rules, to adjust their offer, which will reflect their availability and participation in such a market. If the DER Aggregator will no longer participate in a market, PJM does *not* need a formal report - it will be transparent in the offer, and policed by applicable market rules (*e.g.*, non-performance penalties). If the registration is terminated, then the DER Aggregator may no longer participate in the wholesale markets.

2. *PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(b) states in part that "[u]pon 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."*

a. *Please explain whether and to what extent the pre-registration process that PJM proposes in Tariff, Attachment K-Appendix, section 1.4B(b) applies to any modifications to an existing DER Aggregation Resource. Please also explain whether or not PJM's review of an EDC's review of a modification incorporates the same deference that applies to an initial registration, i.e., the following proposed language (emphasis added) in Tariff, Attachment K-Appendix, section 1.4B(b): "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."*

PJM Response:

A Component DER must go through the pre-registration process to be included in a registration—whether that be at the time of the initial registration, or when a DER Aggregator seeks to add new Component DERs to an existing registration. This is because the locational and data points identified in the pre-registration process are necessary for PJM to determine which facilities may be physically aggregated in a registration. Pre-registration would not be necessary for removal of a Component DER within a DER Aggregation Resource, because these locational and data elements have already been determined.

PJM will apply the same deference regarding distribution system reliability to a distribution utility's review of a modification.

3. With respect to the capacity market, PJM's proposed Tariff, Attachment K-Appendix, section 1.4B(b) states that 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."

a. What is the timeline for a DER Aggregator to modify the "inventory of individual Component DER within a DER Aggregation Resource registration that is linked to a DER Capacity Aggregation Resource"? Please indicate whether this timeline is included in the Tariff and, if so, where.

PJM Response:

All registrations for DER Capacity Aggregation Resources and associated Component DERs in the Capacity market will need to be finalized prior to the start of the Delivery Year. This timeline is not specifically included in the Tariff, but will be included in the PJM Manuals.

X. Effective Date

In Order No. 2222, the Commission required each RTO/ISO to propose a reasonable implementation date, together with adequate support explaining how the proposal is appropriately tailored for its region and implements Order No. 2222 in a timely manner. The Commission stated that it will establish on compliance the effective date for each RTO's/ISO's compliance filing.

1. PJM requests an effective date of February 2, 2026 for the Tariff, Operating Agreement, and RAA revisions. With respect to the proposed revisions specific to the DER Aggregator offering a Planned DER Capacity Aggregation Resource, PJM requests an effective date of July 1, 2023 to allow Planned DER Capacity Aggregations Resources to participate in the 2026/2027 Delivery Year BRA. PJM states that it is requesting these specific effective dates in part because it will need to plan and budget for a number of software and application changes to support the DER Aggregator Participation Model. PJM also states that there is a larger coordination effort remaining for business practice changes before implementation, included but not limited to RERRA readiness, utility readiness, and PJM readiness. In its Answer, PJM contends that the proposed revisions to become effective in 2023 will not invoke the commencement of the registration process, or imply expectations on RERRAs and distribution utilities to complete interconnection, review aggregations for reliability, or review viability for wholesale participation.

a. Please clarify and provide as much detail as possible regarding important milestones and timetables of the software and application upgrades for the Tariff, Operating Agreement, and RAA revisions effective February 2, 2026.

PJM Response:

Given the breadth of Order No. 2222, PJM, in coordination with its vendors, will need to pursue a number of major software and application upgrades, including:

1. Modifications to Markets Gateway to develop new screens within the application, so that DER Aggregation Resources can effectively offer into PJM's markets and accurately represent their parameters.

2. Create the software tool necessary to facilitate the DER Aggregator Participation Model, which, as indicated above, will be used as the central hub for coordination and communication between PJM, the DER Aggregator, and the applicable distribution utility.

3. Modify PJM's day-ahead and real-time market engines to effectuate the DER Aggregator Participation Model and the implementing applicable business rules.

4. Implement a new modeling structure for Component DERs, to facilitate locational mapping of the resources nodally while protecting the integrity of system performance.

5. Modify the markets settlement systems and underlying supporting databases so that PJM can properly uphold the Commission's directives regarding aggregate settlements, Order No. 745 rules, and double-counting.

At this time in July 2022, PJM is unable to specify the particular milestones necessary to effectuate each of these needed changes, given the prospective outlook spanning multiple fiscal-years, the uncertainty surrounding the outcome of this pending compliance proceeding, and the inability to presently identify future Commission action that may warrant intervening system changes between 2022 and 2026.

b. Please explain in more detail whether the proposed July 1, 2023 effective date for the provisions pertaining to Planned DER Capacity Aggregation Resources takes into consideration appropriate time for affected parties (namely, RERRAs and distribution utilities) to implement the policies, procedures, and processes necessary for DER Aggregators to participate in the 2026/2027 Delivery Year BRA.

PJM Response:

Planned DER Capacity Aggregation Resource participation in the 2026/2027 BRA does not require participation from the RERRAs or distribution utilities, because the 2023 provisions represent the *ability* for a DER Aggregator to provide a plan necessary to preserve the *opportunity* for capacity market participation. The 2023 effective tariff language is narrowly designed to allow DER Aggregators to bring a sell offer plan to PJM for participation in the forward RPM auctions. This effective language will *not* invoke the commencement of the registration process, or imply

expectations on RERRAs and distribution utilities to do any of the following: (1) complete interconnection, (2) review aggregations for reliability, or (3) review viability for wholesale participation. The risk of participation will be borne by the DER Aggregators, not the distribution utilities or RERRAs. When the remaining components of Order No. 2222 are implemented (in 2026), DER Aggregators will then be required to complete the registration process of Component DERs for operations in PJM markets and meet their capacity commitments for the applicable Delivery Year(s).

c. *Please explain whether any double compensation may occur as a result of the staggered implementation dates for the Planned DER Capacity Aggregation Resources and remaining provisions that include protections against double compensation. Specifically, is there any concern that a Component DER that participates in a retail program may offer into the capacity market as part of a Planned DER Capacity Aggregation Resource during the intervening period between July 1, 2023 and February 2, 2026 and potentially receive double compensation in both the wholesale markets and retail programs for the same product during the 2026/2027 Delivery Year or beyond?*

PJM Response:

There is not a risk of double compensation for the staggered implementation of Planned DER Capacity Aggregation Resources. This is due to the evaluation for double counting that is performed in the registration process prior to a DER Aggregation Resource participating in PJM's markets. The Planned DER Capacity Aggregation Resource that is taking on a forward capacity commitment will still need to identify individual Component DERs to form an aggregation to meet that commitment via the registration process that will be effective in 2026.

II. CORRESPONDENCE AND COMMUNICATIONS

Please direct any communications regarding this filing to the following individuals:

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III. SERVICE

PJM has served a copy of this filing on all PJM Members and on all state utility regulatory commissions in the PJM Region by posting this filing electronically. In accordance with the Commission's regulations,[30] PJM will post a copy of this filing to the FERC filings section of its internet site, located at the following link: http://www.pjm.com/documents/ferc-manuals.aspx with a specific link to the newly-filed document, and will send an e-mail on the same date as this filing to all PJM Members and all state utility regulatory commissions in the PJM Region[31] alerting them that this filing has been made by PJM today and is available by following such link. If the document is not immediately available by using the referenced link, the document will be available through the referenced link within 24 hours of the filing. Also, a copy of this filing will be available on the FERC's eLibrary website located at the following link: http://www.ferc.gov/docs-filing/elibrary.asp in accordance with the Commission's regulations and Order No. 714. PJM also served this filing on each person designated on the official service list maintained by the Commission for this proceeding.

[30] *See* 18 C.F.R §§ 35.2(e) and 385.2010(f)(3).

[31] PJM already maintains, updates, and regularly uses e-mail lists for all PJM members and affected commissions.

IV. CONCLUSION

In accordance with the foregoing, PJM respectfully requests that the Commission accept these responses to the Request for Additional Information and associated tariff records, as discussed herein.

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 day caused the foregoing document to be served upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Audubon, PA this 7th day of July, 2022.

/s/ Thomas DeVita
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