



FERC Compliance Order on DER Aggregation: Review and Initial Thoughts

PJM Staff

DISRS

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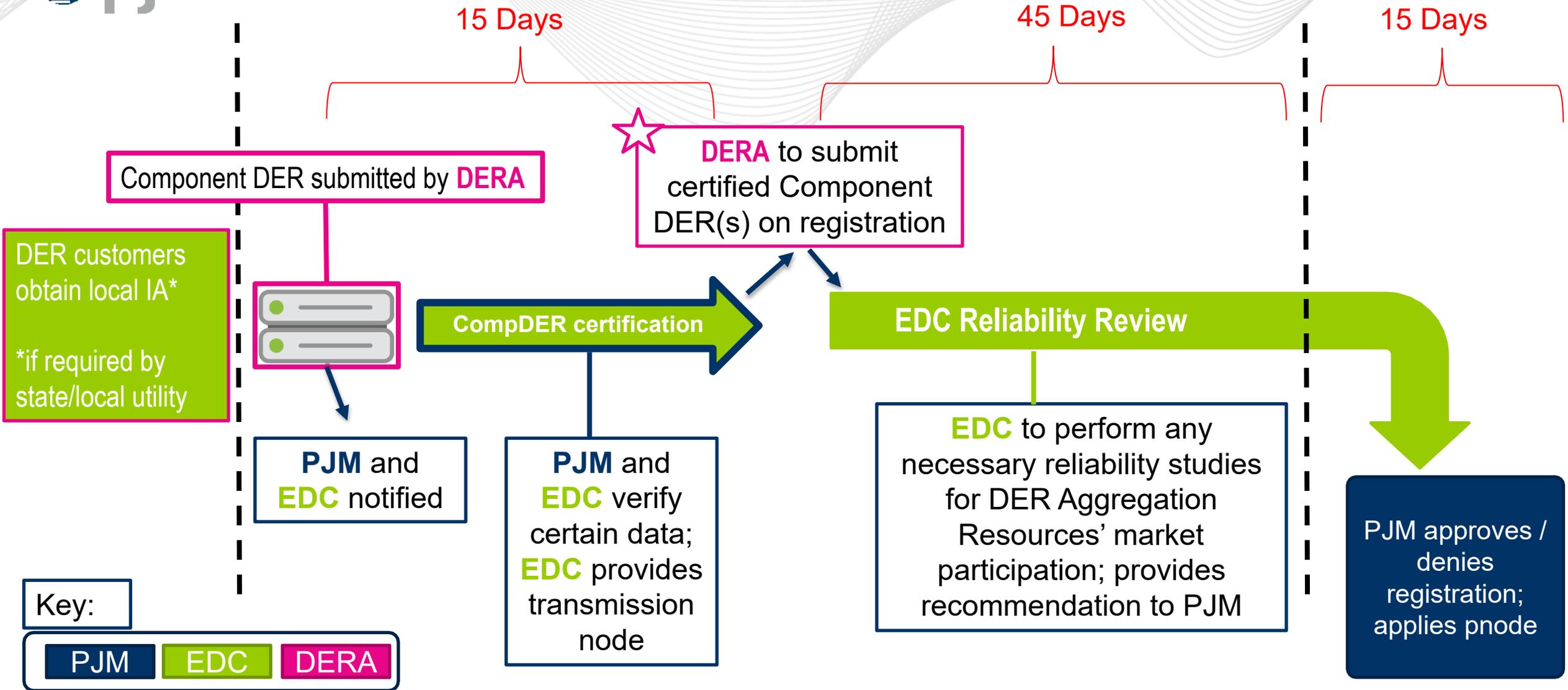
- Utility Review Process
- Information and Data
- Dispatch Agent
- EDC Definition
- Operational Coordination



Utility Review Process

Pre-registration and 60-day review

- Because PJM's proposed preregistration process is mandatory but contains no deadline or obligation for timely coordination and review by the electric distribution company, an electric distribution company could unduly delay or erect barriers to distributed energy resource aggregation participation in the wholesale markets by failing to verify the necessary information in a timely manner or simply through inaction. As a result, the unbounded timeframe for distribution utilities to verify information during the pre-registration process may create undue barriers to entry for distributed energy resource aggregations, in contravention of Order No. 2222. **We find that any distribution utility review, to include verification of information provided by the DER Aggregator, should be completed as part of the 60-day process as set forth in Order No. 2222 through which the distribution utility determines whether the proposed distributed energy resource is capable of participation in the DER aggregation. Accordingly, we direct PJM to file, within 60 days of the date of the issuance of this order, a further compliance filing that revises its distribution utility review process to comply with the requirement to provide adequate and reasonable time for distribution utility review that does not exceed 60 days, and that incorporates any distribution utility verification into the 60-day process, consistent with the discussion above.**



- Component DER certification process used to submit and validate information
 - Component DER = Location (DR/PRD/PSA) = Premise
 - Ensure data is correct before registration is submitted
 - Identify and determine electrical location which determines what can be aggregated on a registration
- Registration process used to “aggregate” Component DER (where needed) and request market participation
- PJM plans to leverage DR Hub for implementation
 - Open API to enable data exchange automation



Component DER certification process

Data	Type	Notes	DERA	EDC	PJM
Name	Component DER		Submits	review	review
EDC account number	Component DER	EDC specific reference, more than one DER or same type may be aggregated at same pnode on one registration	Submits	approve/deny	review
Physical address	Component DER		Submits	approve/deny	review
Transmission Zone	Component DER		Submits	approve/deny	review
EDC	Component DER		Submits	approve/deny	review
LSE	Component DER	load serving entity - work in progress, may only need for negative dec in DA energy market			
DER type	Component DER	Distributed Gen (DG), DR, DRwDI (distribution injection), RBTMGwDI (retail BTMG where only the distribution injection will participate in wholesale market), EE	Submits	review	review
PJM Telemetry setup	Component DER	Reference to telemetry code for SCADA link	Submits	review	approve/deny
EDC Interval Meter	Component DER	Indicate if EDC meter or other meter used for settlements	Submits	approve/deny	review
CSP interval Meter	Component DER	If CSP interval meter than provide details	Submits		approve/deny
RERRA Evidence	Component DER	Small EDC reference to RERRA that allows participation	Submits	approve/deny	review

Work in progress



Component DER certification process (continued)

Data	Type	Notes	DERA	EDC	PJM
Transmission node	Component DER	EDC to provide PSSE ID (and weighting if more than 1)	review	submits	submits
Pricing point	Component DER	PJM to translate transmission node to "pnode"	review	review	submits
Max Load (kW)	Component DER	Max hourly load over prior 12 months	Submits	approve/deny	review
Max Injection (kW)	Component DER	Max injection amount based on interconnection process	Submits	approve/deny	review
Max Market Eligibility	Component DER	Maximum amount that will be offered in the market	Submits	review	review
Load Reduction Method	Component DER	If DR or RBTMGwDI then indicate load reduction capability (kw) for each load reduction capability (HVAC, Refrigeration, Generation, Lighting, Industrial Process, etc.)	Submits	review	review
Generator Details	Component DER	For each Generator indicate the technology (battery, solar, CT, etc.), nameplate capacity, inverter type, installation date, ride through capability enabled, voltage control enabled and other details.	Submits	review	review
EDC Interconnection ID	Component DER	Reference to approved EDC interconnection	Submits	approve/deny	review
Retail Agreements	Component DER	NEM, PURPA, etc.	Submits	approve/deny	review
Peak Load Contribution (PLC)	Component DER	Used to determine capacity nomination for DR related DER	Submits	approve/deny	review
Loss Factor	Component DER		Submits	approve/deny	review

Work in progress

Data	Type	Notes	DERA	EDC	PJM
Registration Start/End date	Registration		Submits	review	review
Registration Status	Registration		Submits	review	review
Market	Registration	DA/RT Energy, Capacity, SR, Regulation	Submits	review	approve/deny
EDC reliability issue	Registration	EDC provides input to PJM if DER should not be allowed to participate because it will create a reliability issues for Distribution System	review	submits	approve/deny

Work in progress

- Pg 221: First, while it may be necessary for PJM to require the DER Aggregator to provide evidence of approval to interconnect, we agree with JCA that PJM has not clearly identified or explained the information that it requires, as required by Order No. 2222. PJM’s proposal requires “[e]vidence of approval to interconnect, including but not limited to a finalized interconnection agreement, with the applicable Component DER,” but the phrase “**not limited to**” introduces ambiguity as to what evidence PJM is requiring. Further, **PJM should explain whether the required interconnection agreement should be between the electric distribution company and the Component DER, or the electric distribution company and the DER Aggregator.**

Current thinking...

- The agreement should be between the EDC and the Component DER
- Purposefully added “but not limited to” to allow for flexibility across 14 jurisdictions. PJM just needs ‘evidence’ that the utility has approved the connection of a DER.

Request for feedback:

- What is the appropriate evidence to provide here? Anything other than IA?
- Who should provide evidence? *Aggregator*

- Pg 222: Second, PJM’s proposed tariff language requiring the DER Aggregator to provide **“associated physical and transmission system electrical location information of the applicable Component DER” is also unclear.** While we believe that PJM has generally explained the need for this electrical location information, in that it enables PJM to map the Component DER participating in a DER Aggregation Resource to an individual node, **PJM has not identified the specific information that the DER Aggregator is required to provide.** Therefore, we find that PJM must identify what specific information it requires related to the physical and transmission system electrical location of the Component DER and explain why the specific information is necessary, consistent with Order No. 2222.

Current thinking...

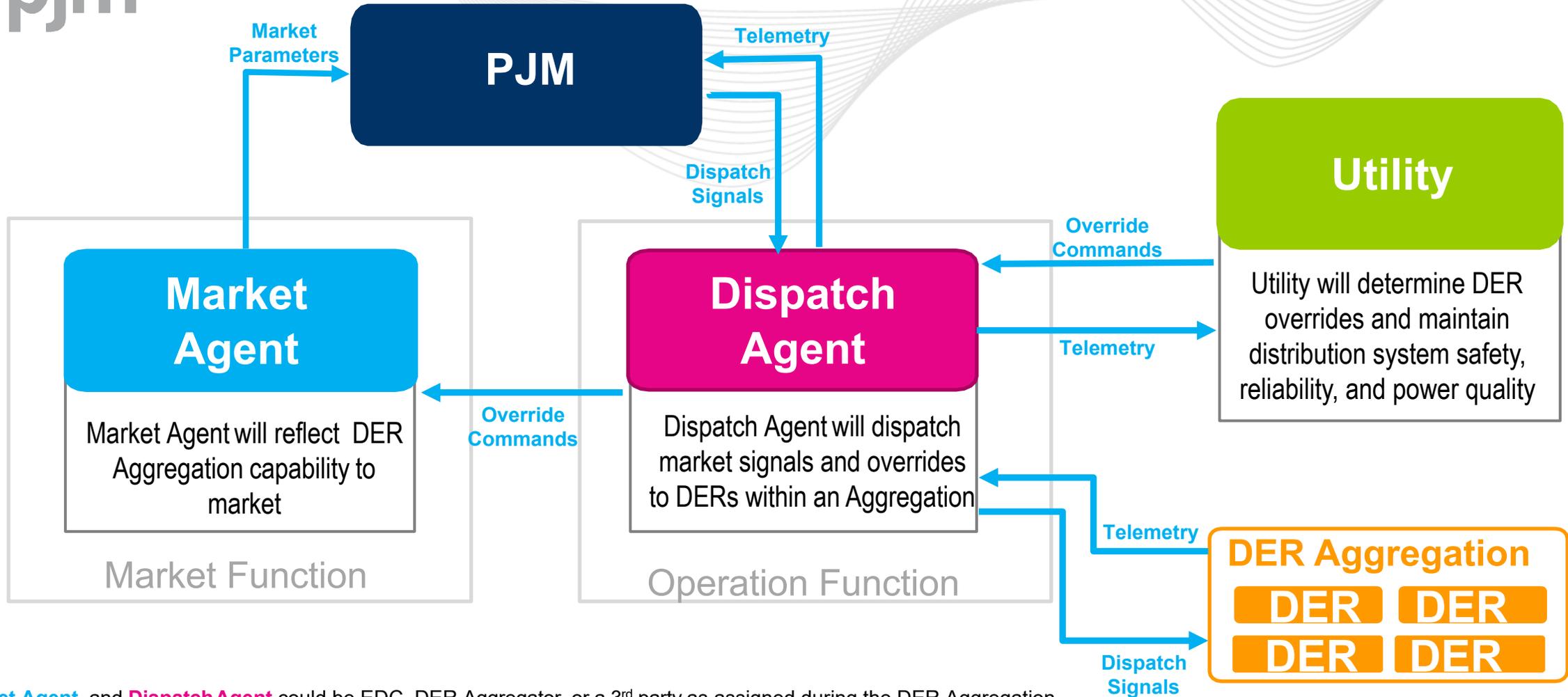
- DER Aggregator needs to provide the physical address associated with the Component DER
- The EDC, not the Aggregator, will provide the PJM Planning Model (PSS/E) bus ID(s) that the distribution circuit associated with the Component DER is fed from; if multiple bus IDs, provide weighting factor (%)



Dispatch Agent

- As for PJM's proposal to allow the RERRA to assign authority to physically operate and/or dispatch Component DER during the registration process, we find that **PJM's filing does not appear to comply with the plain language of Order No. 2222, which states that the "distributed energy resource aggregator would be responsible for . . . dispatching . . . the individual distributed energy resources in its aggregation."** We find that PJM's proposal does not account for the Commission's requirement that a distributed energy resource aggregator is responsible for dispatching the distributed energy resources in its aggregation in response to RTO/ISO direction. While Order No. 2222 contemplated certain roles for the RERRA, it did not identify assignment of dispatch responsibility for the distributed energy resource aggregation as one of those possible roles. We note that the assignment of dispatch responsibility to the DER Aggregator was not challenged on rehearing of Order No. 2222 and **emphasize that the assignment of responsibility to the DER Aggregator does not conflict with the ability of the RERRA or distribution utility to maintain distribution system reliability.** For example, Order No. 2222 specifically reserved rights for the distribution utility to override RTO/ISO dispatch if needed to maintain reliable and safe operation of the distribution system, which should alleviate concerns raised by commenters regarding the role of the distribution utility in maintaining distribution system reliability. Therefore, **we direct PJM to submit, within 60 days of the date of issuance of this order, a further compliance filing that revises its tariff to designate the DER Aggregator as responsible for dispatching the Component DER in its aggregation or to explain how its proposed tariff language is consistent with this requirement.**

- Original: During the registration process, the responsibility for physically operating the Component DER within a DER Aggregation Resource and/or dispatching the DER Aggregation Resource will be assigned to the electric distribution company, the DER Aggregator, or another entity, in accordance with any applicable tariffs, agreements, and operating procedures of the electric distribution company, and/or the rules and regulations of any Relevant Electric Retail Regulatory Authority.
- Proposed: ~~During the registration process, the responsibility for physically operating the Component DER within a DER Aggregation Resource and/or dispatching the DER Aggregation Resource will be assigned to the electric distribution company, the DER Aggregator, or another entity, in accordance with any applicable tariffs, agreements, and operating procedures of the electric distribution company, and/or the rules and regulations of any Relevant Electric Retail Regulatory Authority.~~



- **Market Agent** and **Dispatch Agent** could be EDC, DER Aggregator, or a 3rd party as assigned during the DER Aggregation registration process in accordance with RERRA / PUC and Utility requirements. **DER Aggregator by default**
- Existing **PJM** to Transmission Operator communications remain in place but are not shown in this model.
- This model represents necessary **PJM** communications but is not necessarily inclusive of all communications required by the utility

- Removing the tariff language will not remove the existing PJM processes that are available to market participants.
 - DER Aggregators will have access to a DOA (delegation of authority) and can assign dispatching function to another entity.
 - Utilizing (or not) the DOA will be within the discretion of the DER Aggregator; an EDC cannot reject a registration based on dispatch agent designation.
- EDCs and RERRAs would still have the flexibility to develop local rules for dispatch. PJM processes would allow the EDC to be the Dispatch Agent (exchanging telemetry with PJM) and have the Aggregator and EDC coordinate physical movement of Component DERs (via DSO, DERMS, DMS, etc.)

Electric Distribution Company (EDC) definition

- Paragraph 333
 - *We agree with commenters that the lack of a definition creates uncertainty as to the precise entity responsible for the significant roles ascribed to the electric distribution company in PJM’s proposed coordination-related tariff revisions, including the electric distribution company review process. Accordingly, we direct PJM to file, within 60 days of the date of issuance of this order, a further compliance filing to revise its tariff to include a definition of electric distribution company.*

- Utilities proposed definition in FO2222 Docket:

For purposes of Attachment K-Appendix, section 1.4C and OA Schedule 1, section 1.4C, “Electric Distribution Company” or “EDC” shall mean the entity that owns and operates the portion of the electric grid that delivers electric power to end-use consumers under rates and tariffs approved or authorized by the applicable Relevant Electric Retail Regulatory Authority.

- The “EDC” interfacing with PJM on the review process needs to be a PJM Member.
 - Not all municipalities and/or co-ops are PJM Members, current practice is to have an entity participate in PJM on their behalf and that scenario should allow the authorized party to be the “EDC”
- The “EDC” needs to own and/or operate electric distribution facilities that are used to provide electric distribution service to retail electric load within the PJM Region
- EDC needs to:
 - Interpret and implement RERRA evidence for participation
 - Data validation on customer information and electrical location
 - Determine if aggregation that will inject power onto the distribution system has necessary state interconnection agreement and avoid any safety or reliability issues
- If a new definition is established, it should be exclusively for purposes of Attachment K-Appendix, section 1.4C and OA Schedule 1, section 1.4C, to not inadvertently implicated other tariff provisions.

- Current Tariff Definition for Electric Distributor
 - 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

Request for feedback:

- Can we utilize Electric Distributor for electric distribution company?
- Can we utilize Electric Distributor with an additional caveat?
 - “ for an Electric Distributor to participate in the DER Aggregation Model review process...”
- Do we need a new “Electric Distribution Company” definition?

- PJM effectively uses the Electric Distributor definition today
 - This allows muni or coop that is not a member to have PJM member (generation and transmission company or other) implement DR related requirements in wholesale market
 - PJM member that is authorized coordinates directly with muni/coop on DR activity



Operational Coordination

- We find that, while PJM’s proposal addresses ongoing coordination between: (1) PJM and the DER Aggregator; and (2) the distribution utility and the DER Aggregator, as discussed above, PJM does not sufficiently address ongoing coordination, including operational coordination, such as data flows and communication between PJM and the distribution utility. Moreover, while PJM discusses data flows and communication between the distribution utility and the DER Aggregator with respect to overriding DER Aggregation Resources or underlying Component DER under PJM dispatch in its filing, PJM does not include this process in its tariff, as required by Order No. 2222. Accordingly, **we direct PJM to file, within 60 days of the date of issuance of this order, a further compliance filing that revises its tariff to establish a process for ongoing coordination, including operational coordination, that addresses data flows and communication between: (1) the distribution utility and the DER Aggregator, with respect to overrides during the Operating Day; and (2) PJM and the distribution utility in both day-ahead and real-time markets.**

Request for feedback:

- What level and type of detail is appropriate in PJM’s tariff?

1. **Registration / Utility Review Process:** Prior to approving an aggregation for market participation, EDCs review and approve a dispatchable range for the proposed aggregation.
 - Aggregations submitting ranges the EDC cannot reliably expose to PJM on a “normal” basis should be denied (or modified).
2. **Day-Ahead:** Prior to day-ahead submittal, EDCs and Aggregators should coordinate an agreed upon range of MW dispatch per hour for DERA to submit to market.
 - MW levels impermissible by the EDC shall not be submitted in ECOMIN/ECOMAX.
3. **Real-Time:** For reliability concerns, any action the EDC deems necessary shall be executed by the aggregate.
 - EDCs should provide explanation after the fact as to the reliability concern and need to override for both PJM and the Aggregator.
 - This transparency will be useful for understanding potential persistent issues with an aggregation’s operations.

Note: DERAs are not eligible for LOC or PAI excusals due to EDC override and will be subject to any applicable deviation changes / penalties.

- EDC should coordinate with aggregator on planned maintenance and other distribution work that will impact dispatchability of DER/DERA prior to day-ahead to allow aggregator to accurately reflect DERA capability in the market.
- PJM expects economic parameters from the aggregator to be in the form of a dispatchable range verified by the EDC prior to submittal.
- Ideally, day-ahead bid parameters will match those in real-time

- PJM expects to dispatch an aggregation within its agreed upon range (ecommin to ecomax), based on PJM system needs and economic dispatch, unless there is an EDC declared condition for an override.
 - If an override is required by the EDC, the aggregator shall follow EDC dispatch direction and update their economic parameters accordingly in PJM Markets
 - PJM markets and pricing will react based on the aggregation's submitted parameters
- The EDC can require additional controls for distribution reliability within the local interconnection process (override: registration).

Day Ahead bid parameter update

Prior to Day Ahead Run (11:00)

EDC

Notify Aggregator of any Ops Limitations

DERA

Submits Market Bids to PJM

PJM

Clears DERA based on updated bid-in parameters

After Day Ahead Run (13:30)

PJM

Provide Aggregator and Utility (TBD) with DA schedule

EDC

Receives DA Schedule (TBD)

DERA

Receives DA Schedule

EDC

Submits any pre-dispatch bid parameter updates for unplanned outages and/or transfers.

Real-time bid parameter update

Re-Bid and Intraday (14:15)

DERA

Provide updates to allowable parameters to PJM

PJM

Receives parameters, dispatches based on updated parameters, and communicates response

EDC

Submits or executes any post-dispatch overrides for unplanned outages and/or transfers.

Real-time override

DER Dispatch

DER DISPATCHER

Executes require dispatch through DER telemetry

PJM

Receives dispatch confirmation

EDC / DERA

Receives dispatch confirmation

Updates to bid parameters should be done prior to Day Ahead, when possible. Bid parameters shall be updated in real-time, as needed, especially if an override to dispatch instructions for unplanned outages or reliability is required.

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