FERC Order 2222 and DER Aggregation Participation in Wholesale Electricity Markets

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FERC ORDER 2222
A High Level Overview

What is a DER? What is a DER Aggregator?

**DER:** any resource located on the distribution system, any subsystem thereof or behind a customer meter

**DERA:** Entity that aggregates one or more DER for purposes of participation in RTO and ISO markets

What are the Key Implementation Challenges?

- **Operational Coordination**
- **Aggregator Management**
- **Metering and Telemetry**
- **Market Design**

How Does 2222 Enable DER to Participate in ISO/RTO Markets?

**Key Eligibility Requirements**

- All DER technologies can **heterogeneously** aggregate to meet RTO/ISO requirements, if aggregation is at least **100 kW** in size
- Aggregation as **geographically broad as technically feasible**
- Data, bidding, metering, and telemetry for DERA aligned with existing requirements but **balanced** with existing infrastructure, reduce burden on small resources
- Limit compensation for the **same service** in other programs

ORDER 2222 enables DER participation in ISO/RTO Markets

How Will Market Participation Be Coordinated?

- **Main market interface:**

  - **RTO/ISO** ↔ **AGGREGATOR**

- **Key Elements of Coordination**
  - Distribution utility **preclears** DER to join an aggregator
  - Distribution utility may **override** DERA schedule to ensure distribution system safety and reliability
  - **Data sharing** practices between all parties
  - Allow for regional **flexibility** in coordination framework

Who does this impact?

- **Customers**
- **DER**
- **Aggregators**
- **Distribution Utilities**
- **RTOs/ISOs**
- **Regulators**

What is the Timeline?

- ISO tariff modifications due within 270 days. (7/19/21)
- Implementation date part of each RTO/ISO proposal.

Relevant EPRI Research Areas

- Grid Operations & Planning
- **DER & DER Integration**
- Information & Communications
- Energy Utilization
FERC Order 2222
Technical Challenge Areas

- T & D Reliability and Safety
- Coordination Frameworks
- Situational Awareness & Operational Control
- Privacy, Data Management & Interoperability
- Wholesale Market Operation & Design
- Responding to Customer Behavior
- Metering, Verification & Validation

DER Bulk Service Provision WG
DER Distribution Services WG
TSO/DSO Coordination for DER Management WG

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FERC Order 2222 Phase 1 Project
Collaborative Forum, Gap Assessment and Implementation Roadmap

Single collaborative project providing framework for coordination across stakeholders (Hub) and specific stakeholder guidance (stakeholder spokes). Participants receive all hub and spoke deliverables.

**Hub**
- Collaborative discussions
- Viable Coordination Frameworks
- Cross-Sector Education
- Global Practices & State of Art
- Data mgmnt, interoperability cyber security

**Operational Coordination and Tool Evolution:** SCADA, DMS, DERMS

**Approaches to the Distribution System Operator Role**

**Evolving Planning and Interconnection Processes and Tools**

**Distribution Utilities**
- Trans. Planning Considerations of active DER participation
- Ops Planning and visibility including EMS and SE
- Transmission Utilities

**ISOs/RTOs**
- Tools to enable homogenous and heterogenous aggregations
- Metering, telemetry and data management
- DER Aggregators

**Existing and/or New Market Participation Models and Formulation including homogenous and heterogenous DERAs**

**Technical Feasibility of Geographically Broad DERAs**

**Data mgmnt, interoperability cyber security**

**Viable Coordination Frameworks**

**Cross-Sector Education**

**Global Practices & State of Art**

**Quick Insights Reports**

**Webcasts**

**Implementation Roadmap**
## DER Aggregation Participation Models

<table>
<thead>
<tr>
<th>Market Design Aspect</th>
<th>CAISO</th>
<th>NYISO</th>
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### Definitions
- **DER**: "Any resource with a first point of interconnection to a utility distribution company or a metered subsystem."
- **Metered subsystem**: "A geographically contiguous system located within a single CAISO zone which has been operating as an electric utility for a number of years prior to the CAISO Operations Date."
- **Aggregation**: "A Resource, comprised of two or more individual Generators, Demand Side Resources, or [DERs]; or one or more individual Demand Side Resources at separate points of interconnection; and that are grouped and dispatched as a single unit by the ISO, and for which Energy injections, withdrawals and Demand Reductions are modeled at a single Transmission Node."
- **DER Aggregations**: "An Aggregation consisting of one or more Demand Side Resources, or two or more different Resource types."

### Ineligible Resources
- Individual DER that is 1 MW or greater
- DR participating through reliability or proxy demand response
- Resources participating in retail net metering program
- Individual DER that is 20 MW or greater
- Disallows individual DER participation (exception: DSRs) (scope for potential modification given O2222)
- Generators with PURPA contracts, limited control run-of-river resources, Behind-the-Meter Net Generation resources, municipally-owned generation, system resources, and control area system resources.
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| **Participation Model** | DER Aggregations can participate in energy and ancillary services markets. | DER Aggregations can participate in energy and ancillary services markets. | Aggregation Participation Model: Dispatch-only model
RA: DERA presently not recognized as RA resources (scope to modify RA eligibility given O2222) | Capacity Market: Plans to modify eligibility, participation, and payment rules so that DERAs can become ICAP suppliers (effective March 2021) |
| **Metering and Telemetry** | DER Aggregations are required to satisfy existing metering and telemetry requirements (or standards) analogous to traditional resources
- Requirements for homogeneous aggregations will be based on the resource type
- Required to have adequate metering (that includes each individual DER/facility in the Aggregation), and are required to provide RT telemetry for Aggregations | 4-second telemetry
RT dispatch instructions will be sent to (and RT telemetry will be obtained from) an Aggregation and NOT the individual facilities (applies to multi-node aggregations as well)
DERA are required to provide RT telemetry if greater than 10 MW or if providing AS | 6-second telemetry
RT dispatch instructions will be sent to (and RT telemetry will be obtained from) an Aggregation and NOT the individual facilities
Revenue-quality meter data will be collected from the Aggregation (and NOT the individual facilities) for both measuring performance and settlement purposes |

**AS**: Ancillary Service; **DER**: Distributed Energy Resource; **DERA**: DER Aggregation; **DERP**: DER Provider; **DR**: Demand Response; **DSO**: Distribution System Operator; **DSR**: Demand Side Resource; **ICAP**: Installed Capacity; **NGR**: Non-Generator Resource; **NYTO**: New York Transmission Owners; **POI**: Point of Interconnection; **PURPA**: Public Utility Regulatory Policies Act; **RA**: Resource Adequacy; **RT**: Real-time
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<td>Minimum Size</td>
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<tr>
<td>❖ No upper bound: on the number of individual facilities that constitute an Aggregation, or the total MW quantity of an Aggregation (if behind a single POI)</td>
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<tr>
<td>• <strong>500 kW</strong>: for DER Aggregations (scope for potential modification given O2222); 100 kW for NGRs</td>
<td>• <strong>100 kW</strong>: For provision of ancillary services, capacity, and energy by an Aggregation (complies with FERC O2222)</td>
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<tr>
<td>• Multi-node aggregations are allowed</td>
<td>• Multi-node aggregations are NOT allowed</td>
<td></td>
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<tr>
<td>• PNodes <strong>within</strong> a single subLAP</td>
<td>• PNodes and their corresponding electrical facilities, e.g., DX feeders, to which individual facilities may aggregate will be <strong>pre-determined</strong> in consultation with NYTOs</td>
<td></td>
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<tr>
<td>• Dispatch instructions based on <strong>distribution factors</strong></td>
<td>• PNodes updated <strong>annually</strong> to account for changing system conditions</td>
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<tr>
<td>• Settlement based on <strong>weighted-average LMPs</strong> across multiple nodes</td>
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<td>• <strong>Maximum size</strong>: 20 MW for multi-node aggregations; no MW upper bound for aggregations behind a single POI</td>
<td>• <strong>Maximum size</strong>: No MW upper bound</td>
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| **Dual Participation** | • DERAs must participate in all intervals  
  • Disallows resources participating in retail net metering program  
  • Presently working with its stakeholders to further evaluate dual participation | • Tariff revisions in May 2020 allowed DERs to offer energy and other services to a local distribution utility or host load and participate in the ISO-administered markets simultaneously  
  • DER Aggregations are required to bid in a way that warrants that they will be dispatched by the NYISO for each operating interval in sync with the way these Aggregations will operate to satisfy obligations outside of the wholesale market  
  • NYISO: Will consult with NYTOs to coordinate the schedule and dispatch of Aggregations that are engaged in dual participation, but will retain the authority to schedule and/or dispatch all the Market Participants including the Aggregations that are involved in dual participation  
  • NYTOs/DSOs: May use NYISO’s supplemental resource evaluation procedures that provides them with the option to contact the ISO and submit requests to schedule resource(s) that are necessary to address local reliability needs |

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## Stakeholder Discussions Across the Continent

### RTO/ISO | Working Group Latest Update
---|---
PJM | DER and Inverter-based Resources Subcommittee (DIRS): Actively working with its stakeholders to develop its compliance filing
MISO | Distributed Energy Resources Task Force (DERTF): Held a workshop with its stakeholders on November 17
SPP | Market Working Group: Has identified several issues to address in its compliance filing
ISONE | Markets Committee: Currently evaluating what is needed for compliance

All ISOs and RTOs are initiating stakeholder processes to address O2222 and DERA market participation
Together...Shaping the Future of Electricity

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