

# 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?



### 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

### What is the Timeline?

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

**ORDER 2222 enables DER participation in ISO/RTO Markets**

### Who does this impact?

Customers  
DER  
Aggregators  
Distribution Utilities  
RTOs/ISOs  
Regulators

### 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

### Relevant EPRI Research Areas



# 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

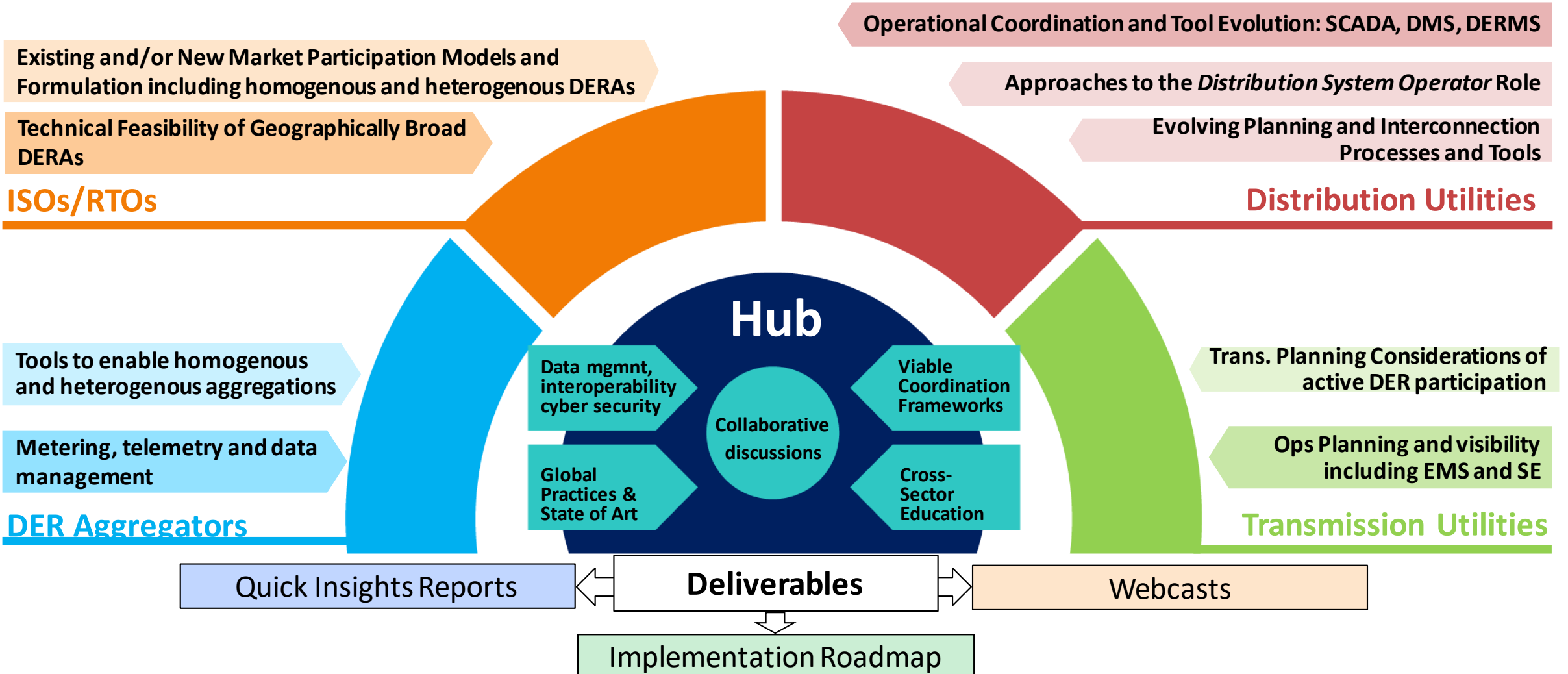


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# FERC Order 2222 Phase 1 Project

## 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.



# DER Aggregation Participation Models

Market Design Aspect	CAISO	NYISO
<b>Filed Tariff Revisions/ FERC Acceptance</b>	<ul style="list-style-type: none"> <li>March 2016/ June 2016</li> </ul>	<ul style="list-style-type: none"> <li>June 2019/ January 2020</li> </ul>
<b>Definitions</b>	❖ Allows for both homogeneous and heterogenous aggregations.	
	<ul style="list-style-type: none"> <li><b>DER:</b> “Any resource with a first point of interconnection to a utility distribution company or a metered subsystem.”</li> <li><b>Metered subsystem:</b> “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.”</li> </ul>	<ul style="list-style-type: none"> <li><b>Aggregation:</b> “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.”</li> <li><b>DER Aggregations:</b> “An Aggregation consisting of one or more Demand Side Resources, or two or more different Resource types.”</li> </ul>
<b>Ineligible Resources</b>	<ul style="list-style-type: none"> <li>Individual DER that is 1 MW or greater</li> <li>DR participating through reliability or proxy demand response</li> <li>Resources participating in retail net metering program</li> </ul>	<ul style="list-style-type: none"> <li>Individual DER that is 20 MW or greater</li> <li>Disallows individual DER participation (exception: DSRs) (scope for potential modification given O2222)</li> <li>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.</li> </ul>

**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

[1] CAISO, Order Accepting Proposed Tariff Revisions subject to Condition, Docket No. ER16-1085-000, June 2016.

[2] CAISO, 2021 Three Year Policy Initiatives Roadmap and Annual Plan, Market and Infrastructure Policy, November 2020.

[3] NYISO, Order Accepting Tariff Revisions and Directing Compliance Filing and Informational Report, Docket Nos. ER19-2276-000, ER19-2276-001, ER19-2276-002, January 2020.

[4] EPRI, Distributed Energy Resource Bulk Service Provision (DERBSP) Technical Working Group, NYISO Aggregation Participation Model, November 2020.

[5] *Wholesale Electricity Market Design in North America: 2019 Review*. EPRI, Palo Alto, CA: 2020. 3002016226.



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Market Design Aspect	CAISO	NYISO
Participation Model	<ul style="list-style-type: none"> <li>❖ DER Aggregations can participate in energy and ancillary services markets.</li> </ul>	
	<ul style="list-style-type: none"> <li>• <b>DER Provider (DERP):</b> Dispatch-only model</li> <li>• <b>RA:</b> DERA presently not recognized as RA resources (scope to modify RA eligibility given O2222)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Aggregation Participation Model:</b> Dispatch-only model</li> <li>• <b>Capacity Market:</b> Plans to modify eligibility, participation, and payment rules so that DERAs can become ICAP suppliers (effective March 2021)</li> </ul>
Metering and Telemetry	<ul style="list-style-type: none"> <li>❖ DER Aggregations are required to satisfy existing metering and telemetry requirements (or standards) analogous to traditional resources               <ul style="list-style-type: none"> <li>▪ Requirements for homogeneous aggregations will be based on the resource type</li> <li>▪ Required to have adequate metering (that includes each individual DER/facility in the Aggregation), and are required to provide RT telemetry for Aggregations</li> </ul> </li> </ul>	
	<ul style="list-style-type: none"> <li>• <b>4-second</b> telemetry</li> <li>• 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)</li> <li>• DERA are required to provide RT telemetry if greater than 10 MW or if providing AS</li> </ul>	<ul style="list-style-type: none"> <li>• <b>6-second</b> telemetry</li> <li>• RT dispatch instructions will be sent to (and RT telemetry will be obtained from) an Aggregation and NOT the individual facilities</li> <li>• Revenue-quality meter data will be collected from the Aggregation (and NOT the individual facilities) for both measuring performance and settlement purposes</li> </ul>

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# DER Aggregation Participation Models

Market Design Aspect	CAISO	NYISO
Minimum Size	<ul style="list-style-type: none"> <li>❖ 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)</li> </ul>	
	<ul style="list-style-type: none"> <li>• <b>500 kW:</b> for DER Aggregations (scope for potential modification given O2222); 100 kW for NGRs</li> <li>• Multi-node aggregations are allowed               <ul style="list-style-type: none"> <li>• PNodes <i>within</i> a single subLAP</li> <li>• Dispatch instructions based on <i>distribution factors</i></li> <li>• Settlement based on <i>weighted-average LMPs</i> across multiple nodes</li> </ul> </li> <li>• <b>Maximum size:</b> 20 MW for multi-node aggregations; no MW upper bound for aggregations behind a single POI</li> </ul>	<ul style="list-style-type: none"> <li>• <b>100 kW:</b> For provision of ancillary services, capacity, and energy by an Aggregation (complies with FERC O2222)</li> <li>• Multi-node aggregations are NOT allowed               <ul style="list-style-type: none"> <li>• PNodes and their corresponding electrical facilities, e.g., DX feeders, to which individual facilities may aggregate will be <i>pre-determined</i> in consultation with NYTOs</li> <li>• PNodes updated <i>annually</i> to account for changing system conditions</li> </ul> </li> <li>• <b>Maximum size:</b> No MW upper bound</li> </ul>

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Market Design Aspect	CAISO	NYISO
Dual Participation	<ul style="list-style-type: none"> <li>• DERAs must participate in <i>all</i> intervals</li> <li>• Disallows resources participating in retail net metering program</li> <li>• Presently working with its stakeholders to further evaluate dual participation</li> </ul>	<ul style="list-style-type: none"> <li>• 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</li> <li>• 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</li> <li>• 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</li> <li>• 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</li> </ul>

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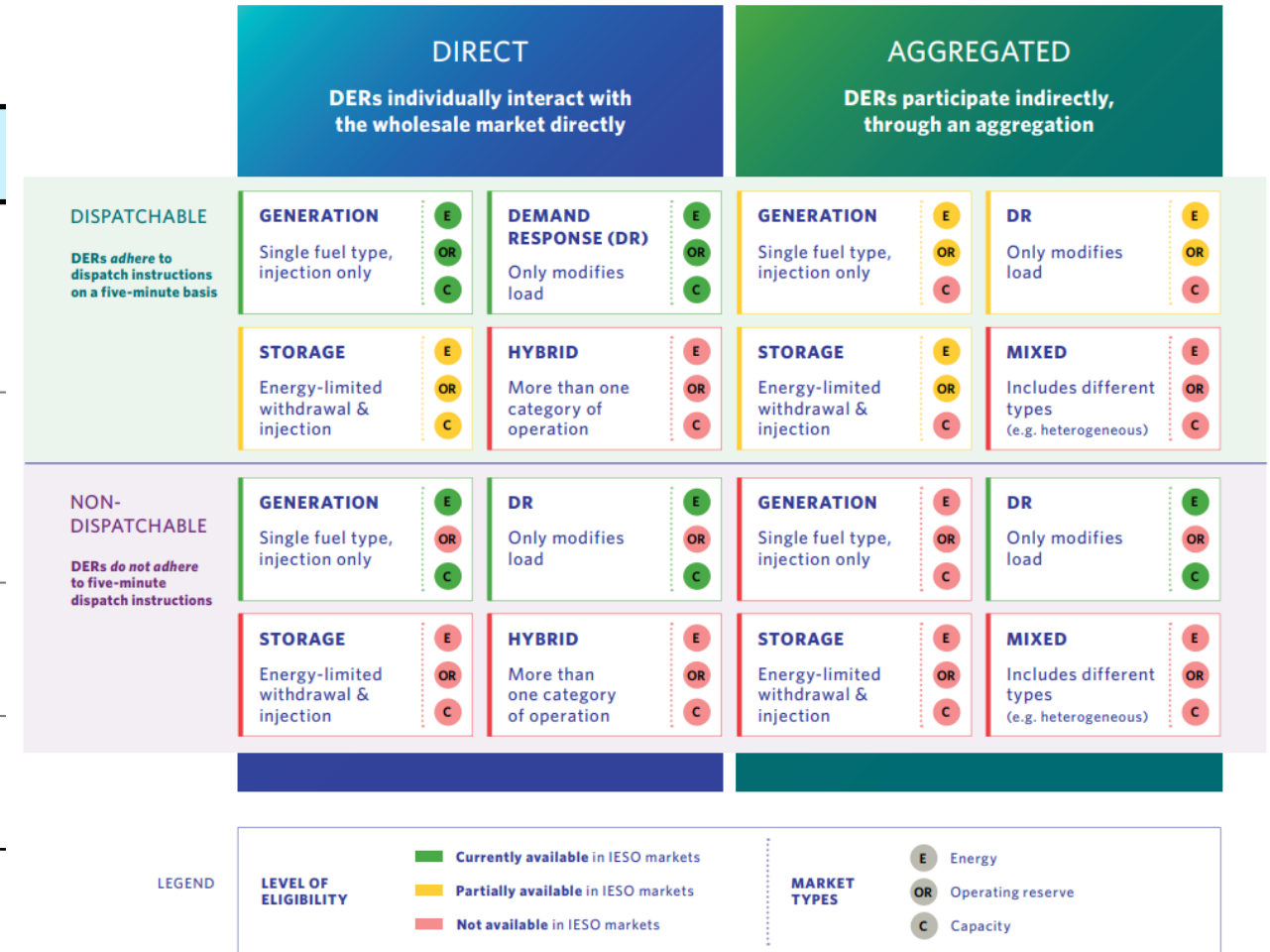


# Stakeholder Discussions Across the Continent



## IESO Participation Models and York Local Distribution Market

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



All ISOs and RTOs are initiating stakeholder processes to address O2222 and DERA market participation

