

State Regulatory Opportunities to Advance Distributed Energy Resource Aggregations in Wholesale Markets

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Agenda

- Welcome and housekeeping
- Background and motivation
- Methods
- FERC Order 2222: Compliance and implementation issues
- Opportunities for state regulators



Housekeeping

- All participants are muted.
- If you have a comment or question, please use the Q&A box.
- The webinar is being recorded.
- The report is available on Berkeley Lab's website. The recording and slides will be posted there in 2-3 days. <https://emp.lbl.gov/publications/state-regulatory-opportunities>
- When it is available, we will send the link to the recording and slides to everyone registered for the webinar.



Background and Motivation



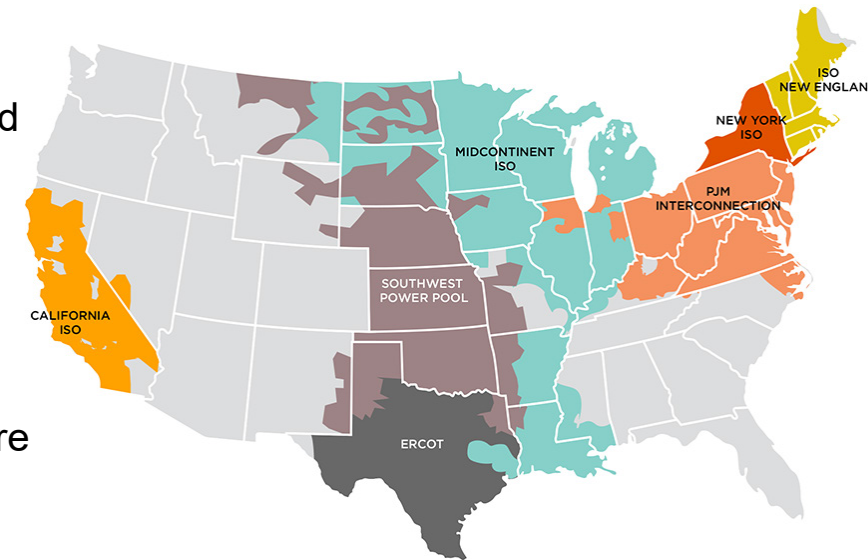
Background

- Distributed energy resource (DER) adoption continues to increase in the U.S. across a variety of technologies (e.g., batteries, solar, demand response)
- Majority of small DERs provide household value (bill reduction, resilience), but could provide more societal value (grid services) and have unique benefits compared to incumbent, utility-scale systems
 - ▣ Shorter siting, planning, and construction timelines
 - ▣ Co-location with load/close to load centers
 - ▣ Deferral or avoided grid infrastructure upgrades improve affordability
- State regulators can influence the success of a DER program at the retail and bulk system level, which we explore in this report. Motivations for doing so could include:
 - ▣ High levels of DER adoption
 - ▣ Aligning with other relevant state goals (e.g., promote affordability, adoption goals or targets.)
 - ▣ Improve grid conditions (e.g., resource adequacy)



Current state of DERs' wholesale market participation

- Currently, DERs are participating in wholesale markets -- primarily within demand response aggregations as load
 - States that previously opted out of third-party aggregations providing wholesale market services have begun to explore relaxing restrictions (e.g., MI, MO, WI)
 - Majority of participating customers are large commercial or industrial flexible load as opposed to smaller DERs
 - DR model does not leverage full capabilities of all DERs
 - FERC Order 2222 seeks to alleviate some market and regulatory barriers for DER aggregations' participation in wholesale markets
 - Challenges may persist related to data sharing, metering and telemetry, operational coordination and communication, avoiding double counting, and more
- Limited examples of DERs participating as supply
 - 291 MW of backup generation approved to inject power in PJM capacity market in 2023
 - 20 MW from 5,000 small distributed batteries were bid into ISO-NE's capacity market and delivered 1.8 GWh during 2022 summer peak
 - 14.5 MW of energy services and 8.6 MW of ancillary services were deployed from aggregated DERs (mostly batteries) in ERCOT



Methods



Methodology

- Of the 18 categories of requirements for RTO/ISO compliance with Order 2222, we identify four “Compliance and Implementation Issues” that satisfy the following requirements:
 - ▣ Multiple RTO/ISOs required more than one filing in order to reach compliance
 - ▣ Stakeholders’ comments identified material concerns with approaches proposed by the RTO/ISOs
 - ▣ The revisions necessary to reach compliance were nontrivial
 - ▣ The issue is relevant to state regulator jurisdiction
- For each Issue, we describe approaches and proposals by RTO/ISOs and stakeholders including those that were given consideration but not adopted.
- Where relevant, we summarize opportunities identified by stakeholders and RTO/ISOs for state regulators to play a role in facilitating the wholesale market integration of DER aggregations.
- We focused our review on FERC decision documents but supported our findings with original filing documents and interviews conducted with 10 organizations actively engaged in this area.
 - ▣ Interviewees included state regulatory staff and commissioners, aggregators, and other organizations with perspective on the role of the state regulator



Progress towards implementation

	CAISO		NYISO		PJM		ISO-NE		MISO	SPP
	Filing 1 Jun-22	Filing 2 May-23	Filing 1 Jun-22	Filing 2 Apr-23	Filing 1 Mar-23	Filing 4 Jul-24	Filing 1 Mar-23	Filing 3 Nov-23	Filing 1 Oct-23	Filing 1 Mar-24
Small Utility Opt-In	○	○	○	○	○	○	○			○
Interconnection†			○	○			○		○	
Definitions of DER and DER Aggregator			○							
Participation Model*	●	●	●	○	○	○	●	●	○	●
Types of Technologies	○		○		○	○	○			○
Allow a DER to Serve as its Own Aggregator										
Double Counting of Services	●	●	○		●	○			○	●
Min and Max Size of Aggregation	○	○								
Min and Max Size for DER in an Aggregation	○									○
Distribution Factors and Bidding Parameters	○				○	○			○	○
Locational Requirements*			○		●	●			●	●
Information and Data Requirements†			○		○	○	○	○		
Metering and Telemetry System Requirements	●	●	●	●	●	○	●	●	○	●
Role of Distribution Company	●	●	●	●	○	○			●	●
Ongoing Operational Coordination	●	●	●	●	○	○	○	○	○	●
Role of Relevant Electric Retail Regulatory Authority†	○		○		○	○			○	○
Modifications to List of Resources in Aggregation			○		○	○	○			
Market Participation Agreements†			○	○						

○	= Minor discussion among stakeholders on this issue in this filing
●	= Major discussion among stakeholders on this issue in this filing
	= Issue resolved during current filing or already resolved
■	= Not yet in compliance

* Indicates an issue that has proven challenging for RTO/ISOs to resolve but does not have a material role for retail regulators

† Indicates an issue with a material role for retail regulators but which has not proven challenging for RTO/ISOs to resolve



FERC Order 2222: Compliance and Implementation Issues



Four RTO/ISO Compliance and Implementation Issues

Double Counting

Requires RTO/ISOs to limit the participation of resources in wholesale markets if a DER aggregation is receiving compensation for the same services as part of another program.

Key Issues: Services provided from DER aggregations, overruling default restrictions

Role of the Distribution Company

Requires a distribution utility review process that takes place during the registration of a DER for participation in wholesale markets.

Key Issues: Registration

Ongoing Coordination

Requires each RTO/ISO to: (1) establish a process for data coordination, (2) include protocols to override RTO/ISO dispatch, and (3) apply a performance penalty to a DER aggregator

Key Issues: Override requirements

Metering & Telemetry

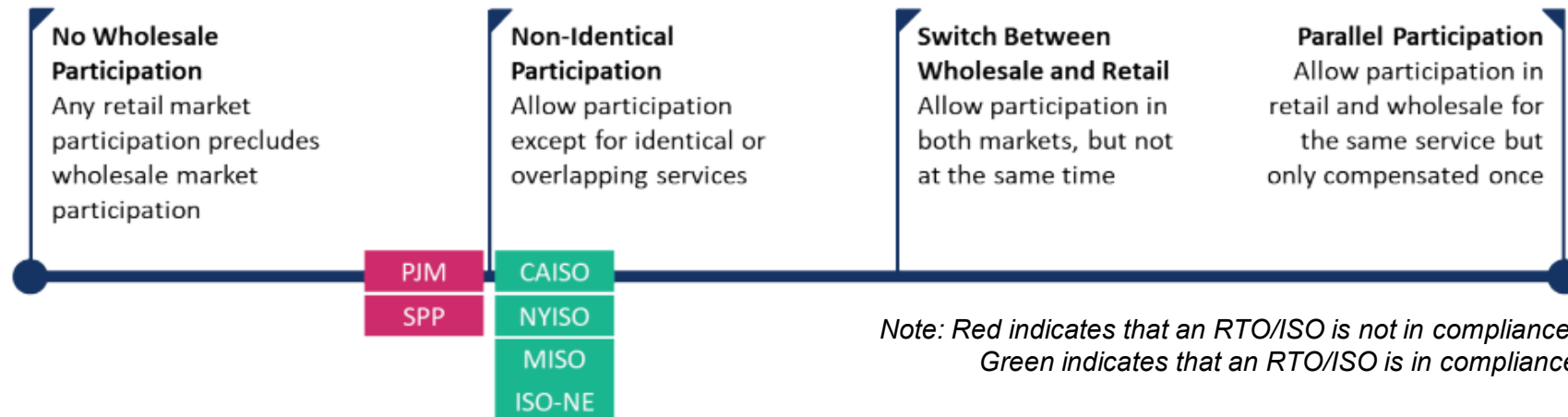
Requires rules that determine how DER aggregations have their energy injection and withdrawal measured, and “telemetry” refers to how aggregations report real-time data (e.g., voltage and frequency) needed to provide fast-response services such as frequency regulation.

Key Issues: Telemetry requirements



Double counting – Services provided

- **Why it matters:** Dual participation across both retail and wholesale markets can maximize DER value, but those DERs cannot be compensated for overlapping or identical services.



Little/no risk of double counting

but...

Overly restrictive and discourages dual participation

vs

Wide flexibility to move between retail and wholesale markets

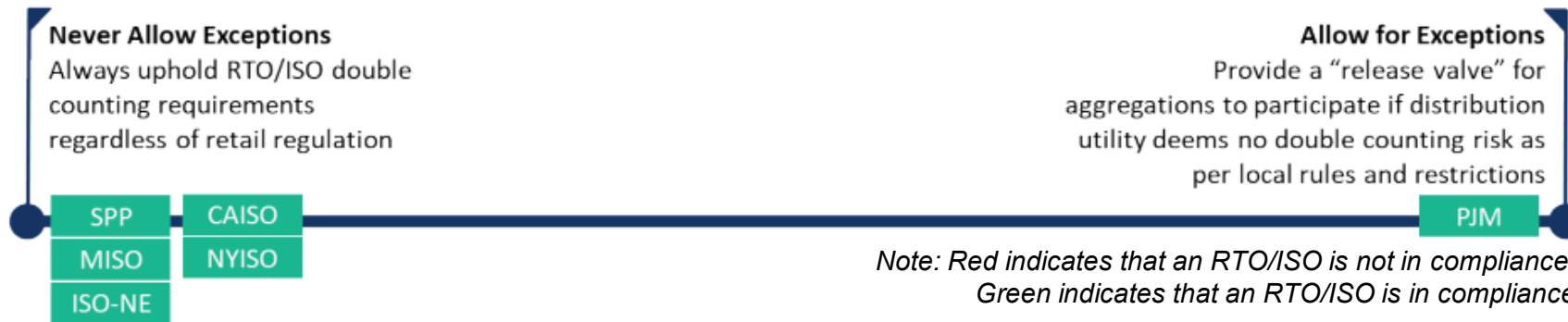
but...

Greater chance of simultaneous dispatch instructions



Double counting – Overruling default restrictions

- **Why it matters:** Local retail regulation may be less restrictive than RTO/ISO rules and an override could encourage more dual participation, but could risk double counting



No risk that distribution utilities use exception to prevent DER wholesale market participation

but...

Blanket restrictions may limit services that otherwise could be provided by aggregations

vs

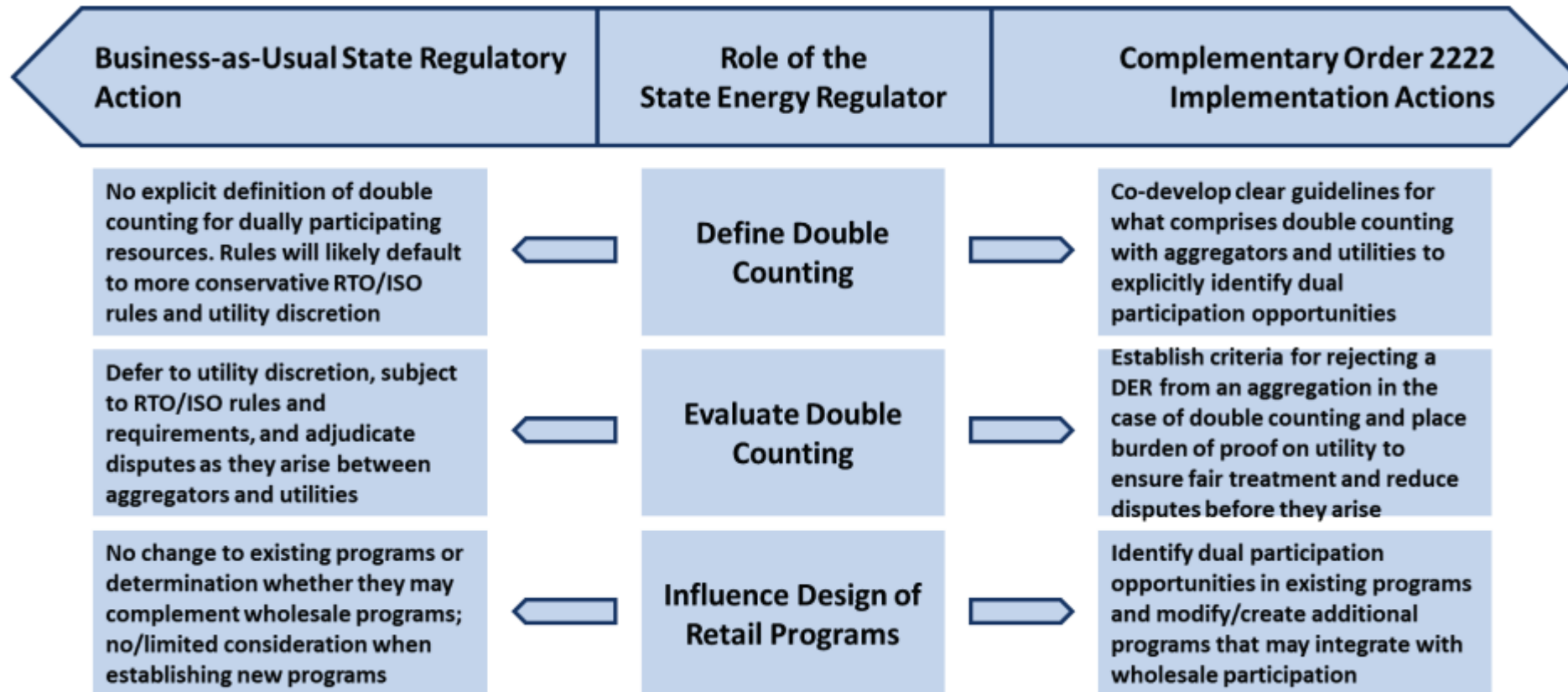
A “release valve” could enable participation where otherwise disallowed

but...

Distribution utilities may use the release value to prevent wholesale market participation for certain DERs

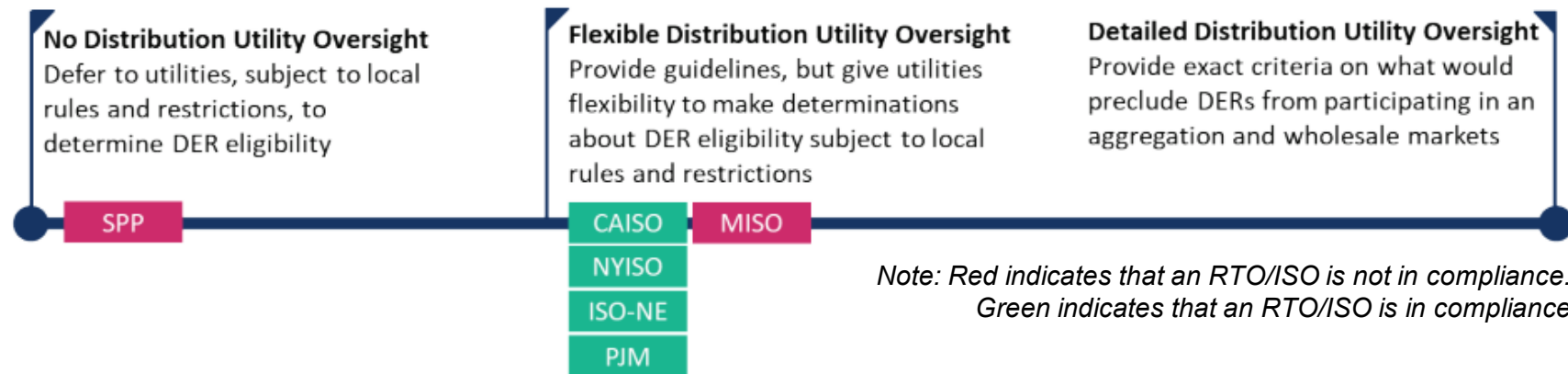


Double counting – Opportunities for state energy regulators



Role of the distribution company – Review process

- **Why it matters:** Creating strict guidelines for approving/rejecting DER participation that are detailed and transparent would ensure that distribution utilities are applying identical and appropriate evaluation criteria to all DER; however, flexibility for distribution utilities allows for determinations that accommodate unique needs of their local system.



Creates a clear opening for meaningful regulatory intervention and influence

but...

Could lead to restrictive and/or confusing exclusion criteria

vs

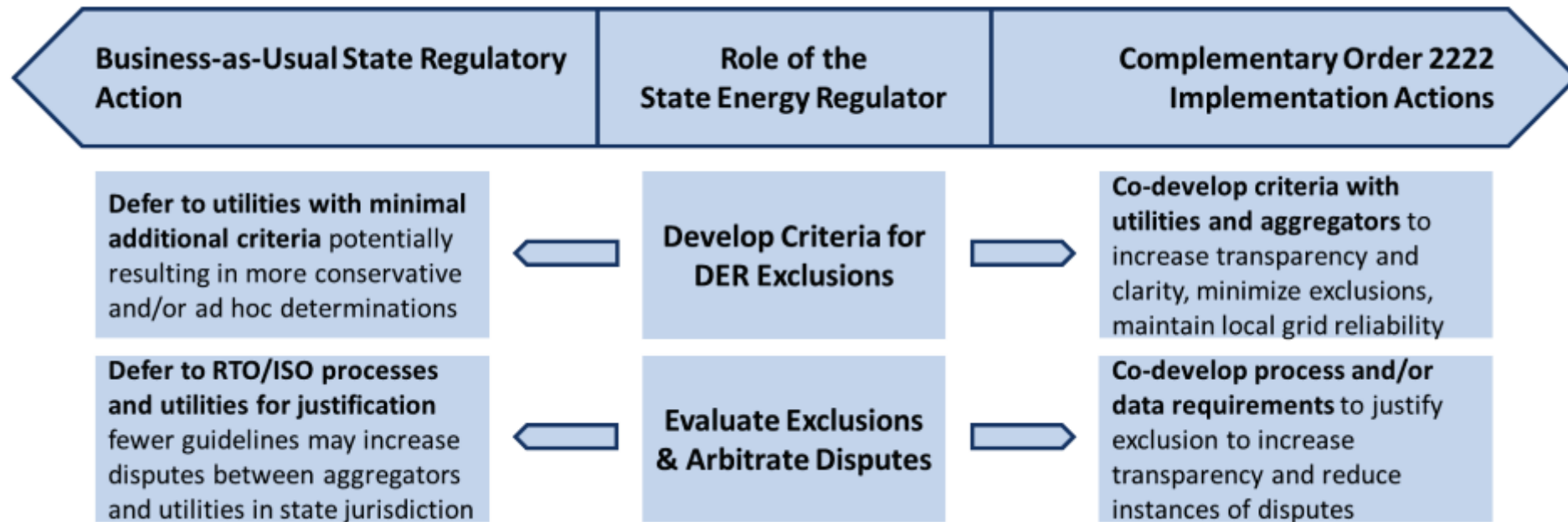
Would prevent utilities from rejecting DERs without clear reason

but...

Is an overstep of RTO/ISO jurisdiction

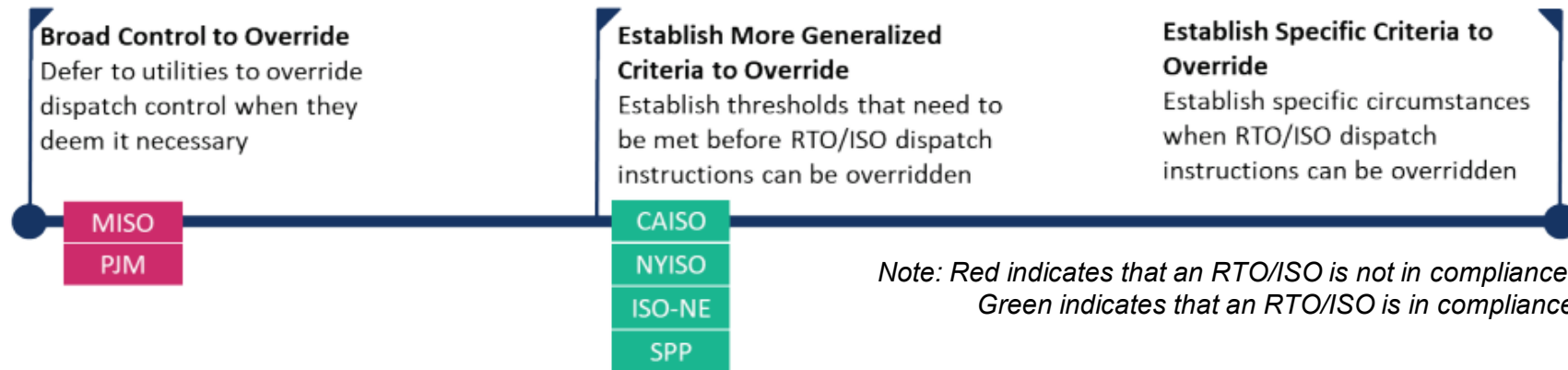


Role of the distribution company – Opportunities for state energy regulators



Ongoing coordination – Override requirements

- **Why it matters:** Narrowly defining override requirements ensures local grid reliability and safety, but must be transparent and reasonable so as not to create barriers to participation (non-performance and risk of penalties).



Gives utilities greater discretion to identify and address distribution grid issues

but...

Concern that utilities could implement conservative rules or rules that prioritize their own aggregations

VS

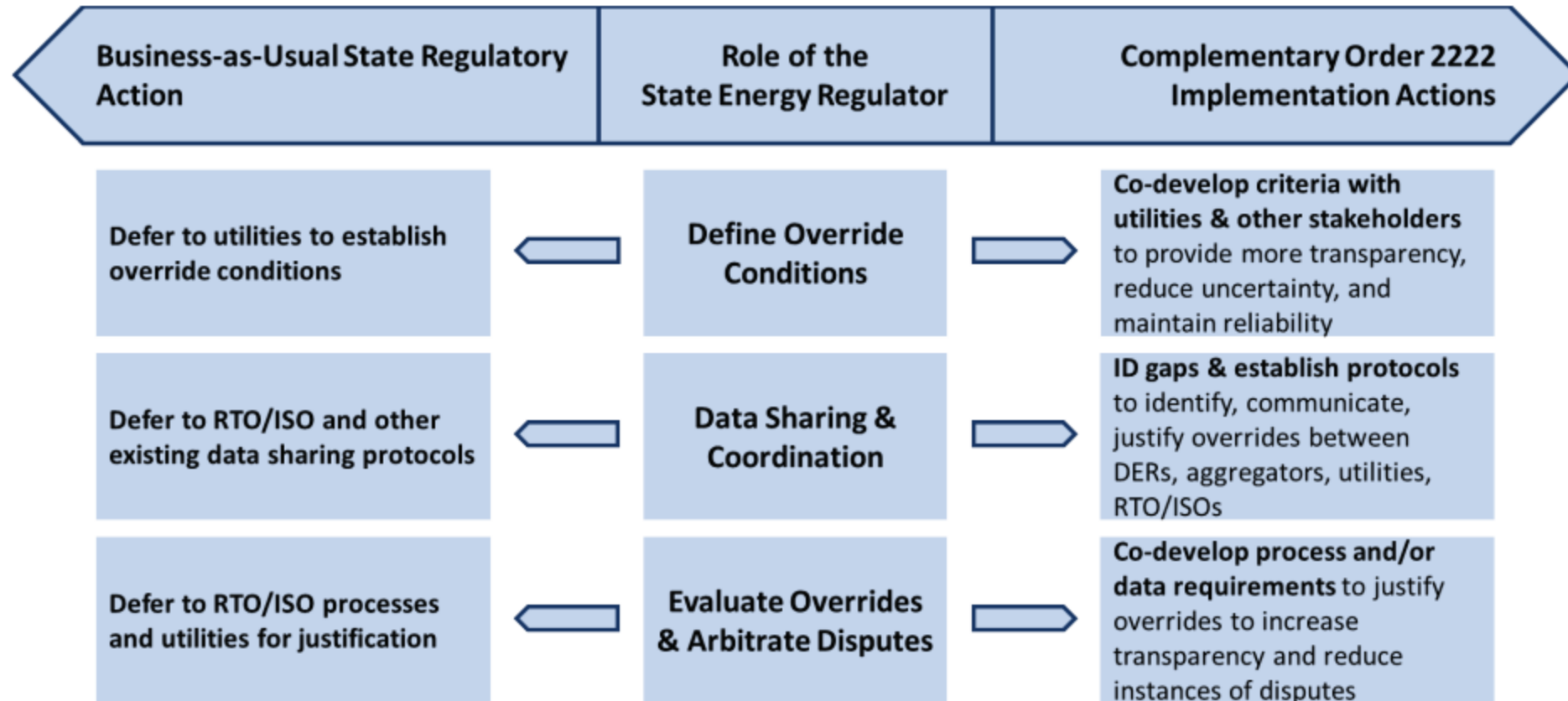
Clear criteria ensures that overrides would only occur for safety and reliability reasons, are well understood, and are non-discriminatory

but...

May contribute to distribution system reliability challenges by limiting utility operational flexibility



Ongoing coordination – Opportunities for state energy regulators



Metering and telemetry – Telemetry requirements

- **Why it matters:** Requiring more advanced telemetry at the aggregation level (i.e., measuring real-time performance) allows system operators to monitor and manage the grid but can be burdensome for individual, small DERs.



Promotes reliable operation of the power system and avoids providing preferential treatment to DER aggregations

but...

Could be a costly barrier to entry for DER aggregations

VS

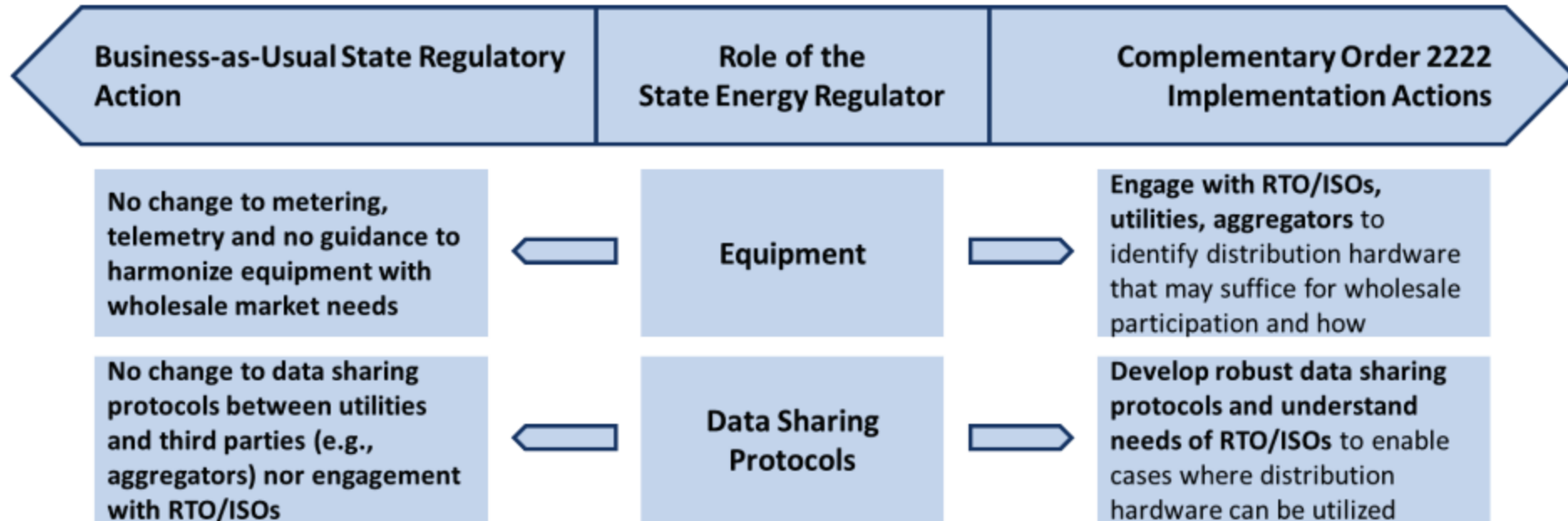
Smaller aggregations pose less risk to system reliability and can be monitored with less stringent requirements

but...

As market participation of DER aggregations grows, lack of sufficient performance monitoring introduces increasing risk



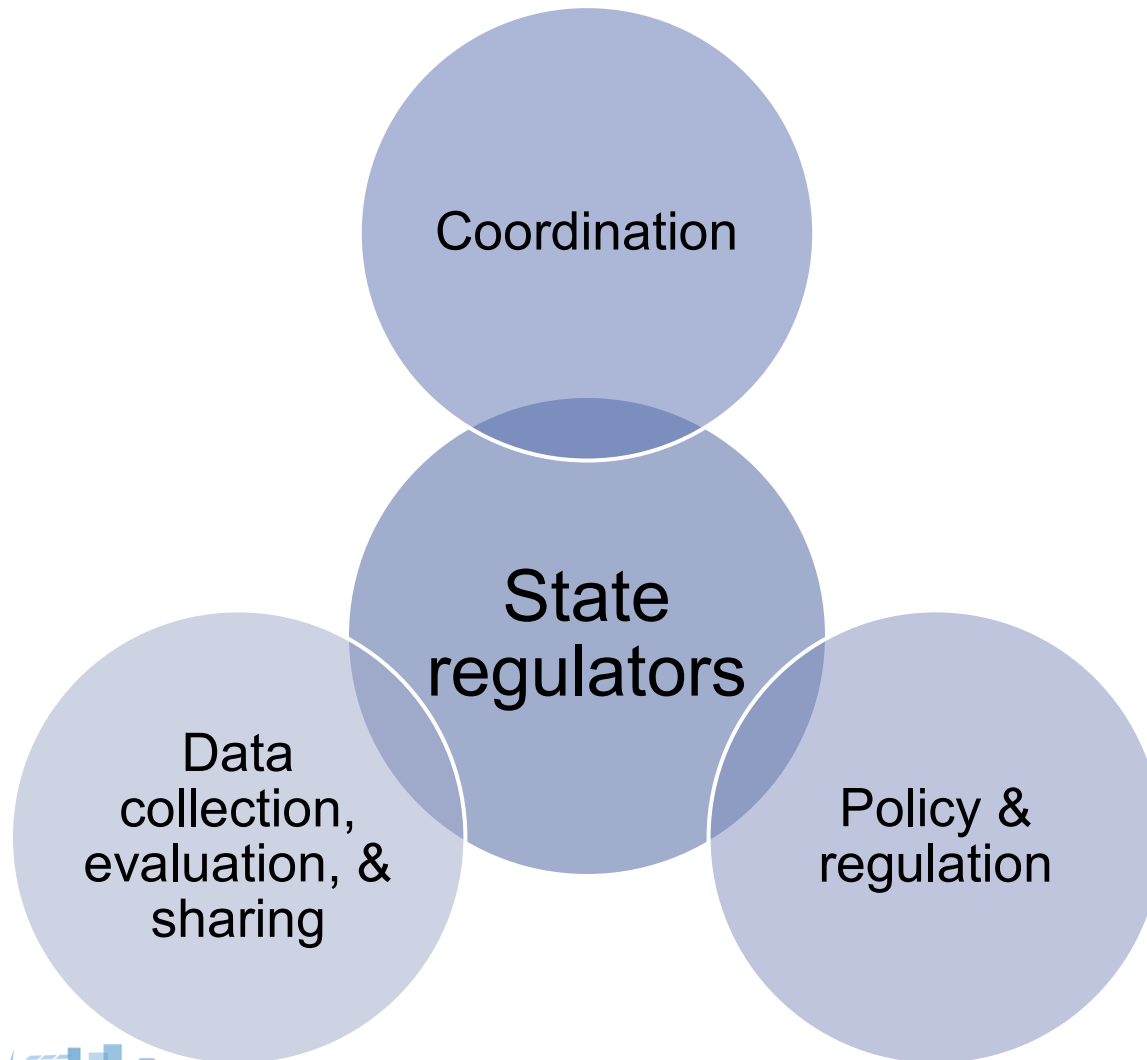
Metering and Telemetry – Opportunities for State Energy Regulators



Opportunities for state regulators



State regulators have influence over DER participation in wholesale markets



- These categories are cross-cutting and relevant to all Compliance and Implementation Issues
- **Coordination**
 - ▣ Established processes for stakeholder engagement
 - ▣ Formal relationships with various relevant parties
- **Policy & regulation**
 - ▣ Developing incentive structures-- via rates, programs, or other means-- to promote state goals
 - ▣ Standardizing guidelines, rules, processes
- **Data collection, evaluation, & sharing**
 - ▣ Determine software and hardware requirements
 - ▣ Establish reporting and evaluation structure



Coordination

- ❑ Established stakeholder engagement processes: investigatory dockets, working groups
 - Various states have opened regulatory proceedings for stakeholders to comment on key DER aggregation issues ([PA](#), [NJ](#), [WI](#), [MI](#), [IN](#))
- ❑ Inter-state regional coordination
 - States participate in regional coordination in working groups on specific topics
 - Can encourage standardization, where possible, for things like metrics, service agreements or other contracts, data collection, standards and requirements, terminology, etc. to allow easier participation across local markets
 - Examples include NARUC and NASEO's [DER Integration and Compensation Initiative](#) and Collaborative Utility Solutions' [DER registry](#) to encourage partnerships and standardize data for easier coordination
- ❑ Coordination with wholesale market operators
 - Regional organizations representing states can coordinate with RTO/ISOs
 - Example: the Organization of MISO States (OMS) has been vocal about the need for resource adequacy and promoting pushing MISO's implementation timeline forward as well as [coordinating data efforts](#) (see right)
 - Example: the New England Conference of Public Utility Commissioners has a [regional working group](#) focused on winter reliability challenges

OMS Stresses Need for Data Coordination Under Order 2222; MISO Extends DER Task Force



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Source: RTO Insider



Policy and regulation

- Local valuation of DERs: driving beneficial adoption and operation
 - Tariffs, incentive program design, performance metrics
- Developing related state-level goals and targets
 - DER deployment targets, etc.
- Resource planning
 - Integrated resource planning, distribution system planning
- Adoption of rules and standards
 - Advanced inverter standards, metering and telemetry, etc.
- Developing specific guidelines for Order 2222
 - Dual participation rules and restrictions
 - Guidelines on registration and override conditions
 - Example: [Indiana Utility Regulatory Commission](#) in 2022 introduced an initiative focused on Order 2222 implementation and has hosted several stakeholder meetings and discussions on interconnection rules, DER registration processes, cost of DER aggregation, and other topics. *Note that no consequent policy has been enacted as of this report.*
 - Example: [Pennsylvania PUC](#) initiated a regulatory proceeding in 2024 to facilitate Order 2222 implementation focused on interconnection rules, metering requirements, cost allocation, adjudication of DER registration disputes, dispatch override, consumer protections, double counting, and data exchange. *Note that no consequent policy has been enacted as of this report.*



Data collection, evaluation, & sharing

- Data was identified as a major barrier for DERs providing grid services in our interviews
 - Aggregators cited a lack of uniform, high quality utility data access including meter data, hosting capacity, real-time grid conditions, location and ownership of DERs
 - Necessary to know operational needs and constraints for program and siting, enrollment, registration, developing bids, and performance validation for settlement
 - Utilities concerned with data privacy and protection
 - Call for standardization and simplified enrollment requirements to reduce barriers
- State regulators influence data practices
 - Interconnection and operation agreements, required metering and telemetry
 - Tariff requirements
 - Evaluations: defining metrics and procedures, measuring and verification for benchmarking, performance verification and settlement
 - Data sharing practices
- Few states have begun to address this issue, though many have begun to consider it
 - Example: New York completed phase I of its [Integrated Energy Data Resource](#) platform to expand utility data access. Phase I includes hosting capacity maps, locational installed DER capacity, tools for tariff information, Phase II will include energy consumption, emissions data
 - Example: New Jersey Board of Public Utilities issued an [ROI](#) related to Order 2222 implementation on issues that included cybersecurity, metering and telemetry, and more
 - Example: NARUC began a data sharing collaboration in 2022 and has published a [framework](#) and [playbook](#) for grid data sharing that states can use and tailor to their needs



Main Takeaways



Main Takeaways

- DER adoption is increasing and has the potential to provide grid services for the distribution and bulk system
- State regulators have direct influence over their jurisdictional utilities and the DERs within that footprint
- State regulators are voluntary actors in regards to Order 2222 implementation, but have influence over success and could see benefits of encouraging DER aggregation participation in markets
- State regulators have cross-cutting skills...
 - Coordination
 - Policy and regulation
 - Data collection, evaluation, and sharing
- ...relevant to a selection of RTO/ISO Order 2222 requirements
 - Double counting
 - Role of the distribution utility
 - Ongoing coordination
 - Metering and telemetry
- States have begun to tackle these issues to align Order 2222 implementation with state goals



Questions?



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