FERC Order No. 2222: MISO Overview

IURC

December 1, 2022

Purpose & Key Takeaways

Purpose:

Provide an overview of FERC Order 2222 requirements and MISO's proposed compliance filing

Key Takeaways:

- Review MISO stakeholder process
- Provide overview of key implementation requirements
- Describe proposed market reforms
- Describe coordination framework
- Discuss current status and implementation timeline

Snapshot of DER in MISO

MISO system capacity	2020 peak load
~160,000 MW	~117,000 MW

Wholesale DER		Non-Wholesale DER
• ~ 11,500 MW emergency-only load modifying resources (LMR) • ~ 60/40 split between demand response and behind the meter gen • Participating in the capacity market	• ~ 2000 MW market-participating demand response, ancillary services, capacity, or energy market • Often cross-registered as LMR and within multiple DR products	• ~ 4200 MW other DER • Information gathered by survey of members • This is the floor, there is likely more installed • MISO starting to ask for DER in planning processes

Order 2222: Background

- Order No. 2222, issued on September 17, 2020, requires that ISOs/RTOs allow distributed energy resources (DERs) to provide all wholesale services that they are technically capable of providing through an aggregation of resources
  - Order No. 2222-A, issued on March 18, 2021, modified/clarified certain aspects of Order No. 2222 on rehearing, including removing RERRA opt-out rights for "heterogeneous" DER aggregations
  - Order No. 2222-B issued on June 17, 2021, modified/reversed a portion of Order No. 2222-A, deferring the opt-out examination to a Notice of Inquiry proceeding for Order No. 719
  - To comply, ISO/RTOs required to either:
    - Revise their Tariffs consistent with the requirements of the Order - OR –
    - Demonstrate how current Tariff provisions satisfy the intent and objectives of the Order.
- FERC did not establish a specific implementation deadline in Order No. 2222; rather, ISOs/RTOs must propose an implementation deadline in the compliance filings

Relevant Electric Retail Rate Authority – RERRA
Distributed Energy Resource Aggregator - DERA

MISO DER Program Team

- Established to address the complex technical and policy questions with subject matter experts company-wide

Governance & Policy Coordination	Visibility Needs	Markets	Integration Approach
• OMS Engagement • FERC Engagement • Stakeholder Engagement • Stakeholder Communication • Interconnection Coordination • Tariff Change Management	• Market Participation & Situational Awareness • Modeling • Planning Needs • Data Communication Coordination & Standards • Forecasting Operation Process Improvement	• Markets Change Coordination • Market Design Requirements • Market System Enhancement – Requirements for DER	• Integrate Work Stream Deliverables • Create Integration Model Options • DER Integration & Impact Assessment

Stakeholder Process

- MISO & OMS hosted stakeholder DER educational workshops beginning in 2019
  - **DER 100 Workshop** – Focus on developing a common language & technical overview to foster better policy discussion
  - **DER 200 Workshop** – Focus on technical concerns, including communication and latency, visibility, load modification, forecasting, planning, and reliability
  - **DER 300 Workshop** – Moderated discussion with transmission operator and distribution operator participants about impacts and needs for markets, distribution and transmission systems
- Distributed Energy Resource Task Force – Primary stakeholder forum
  - Forty-five (45) total stakeholder meetings, including:
    - Eight (8) meetings with EDCs
    - Four (4) meetings with RERRAs

Image: RTO Insider

Order 2222 requirements

1. **Resource Inclusion** FERC defines DER in Order to include "electric storage resources, distributed generation, demand response, energy efficiency, thermal storage, and electric vehicles and their supply equipment"
2. **Market Participation** Requires ISO to change tariffs to accommodate DER aggregations in energy, ancillary services, and capacity markets
3. **Aggregation Allowed** Aggregations can be one asset, can be as small as 100kW, and can be heterogeneous
4. **Justify Flexibility** Significant flexibility is allowed (single node aggregation, methods of communication, maximum size) but ISO choices must be explained technically and must not be overly burdensome to DER aggregators
5. **State Interconnection** DER aggregations will be subject to state interconnection and cannot go through standard queue process (including Qualifying Facilities (QFs) participating in DER aggregation) though ISO can limit size
6. **ISO Facilitation** FERC suggests the ISO create a "coordination framework" to clarify the communication and responsibilities between ISO, Distribution Company, RERRA, and DERA though DERA itself is ultimately responsible to attest it has met all requirements

Relevant Electric Retail Rate Authority – RERRA
Distributed Energy Resource Aggregator - DERA

Order 2222 Takeaways

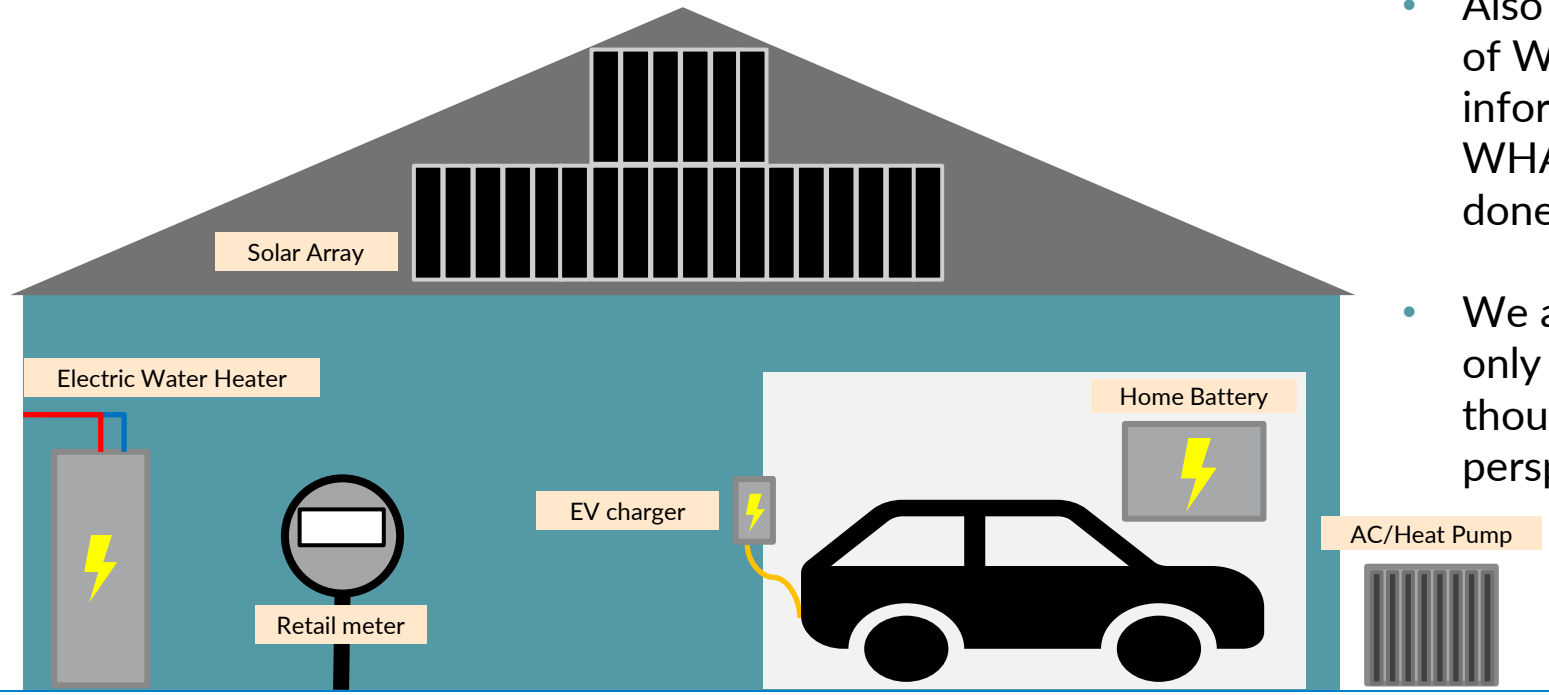
Biggest challenges to solve:

- Coordination between and among RTO/ ISOs, RERRAs, distribution companies, and DERAs must be clear to all parties and have transparent and well-established communications to **ensure system reliability** and prevent double counting.
- Measurement and verification will take considerable thought; distribution operations and transmission **operations must be assured visibility**.
- The distribution system is designed to be more dynamic than the transmission system, and routine switching operations will make the "path" between the DERs and the Bulk Electric System difficult to ascertain – especially important if DEAR can inject energy.

- Some commenters have indicated this is the first time they remember a FERC Order leading (being ahead of) technology in this way.
- Sections of the Order state "including but not limited to" language which reflects anticipated development of distributed energy resource aggregations.
- How much flexibility can/ should MISO build for assets that do not exist yet, whose attributes and capabilities are unknown and evolving?

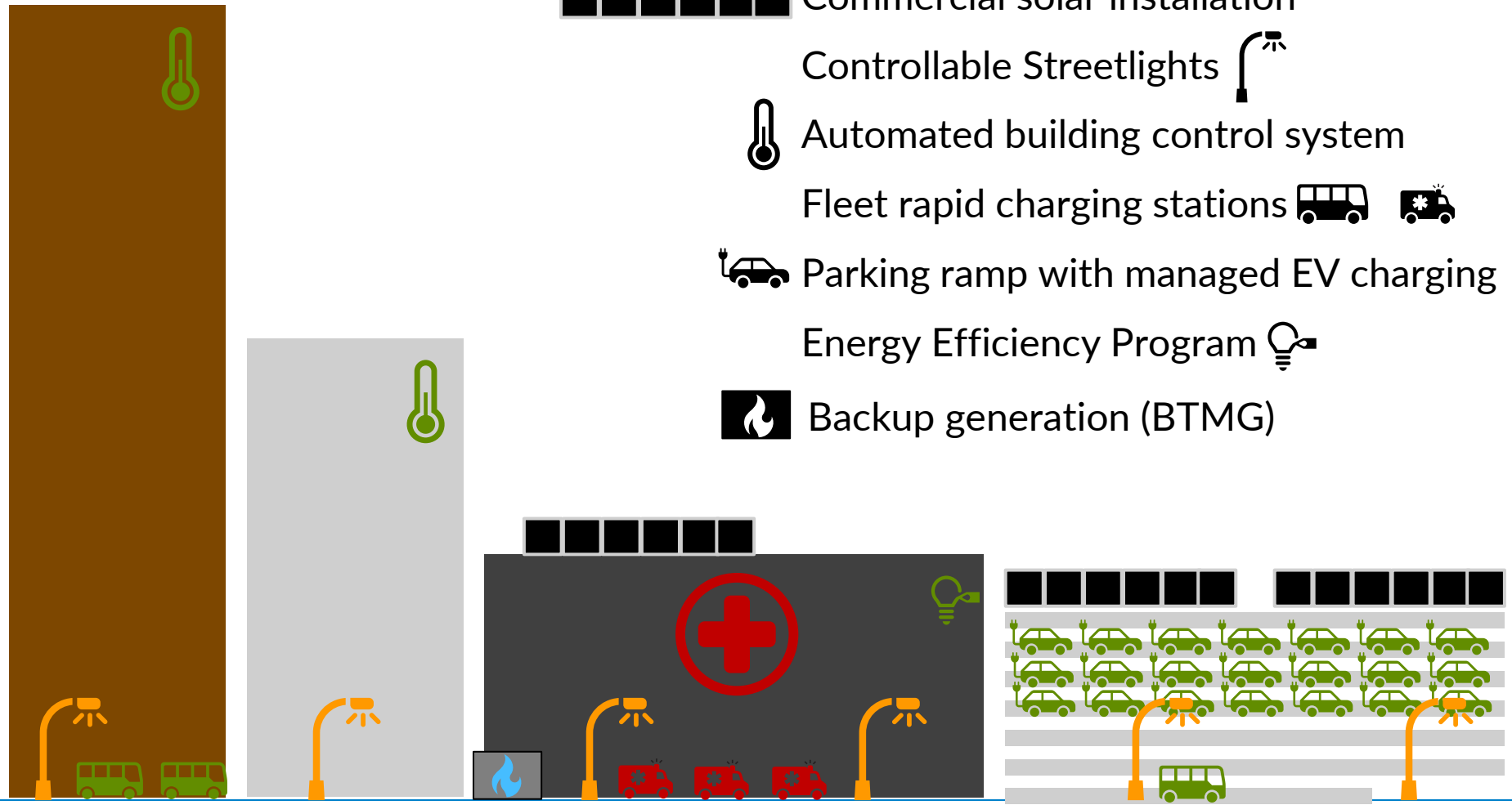
Imagine a House

- Connected home may be enrolled in multiple programs, and both utility programs or 3rd party aggregators may sell different services to retail and wholesale markets
- Understanding how to measure multiple activities behind a single retail meter is important; how can "settlement quality data" be collected/transferred?



- Also raises questions of WHO has the information and WHAT needs to be done?
- We are addressing only wholesale sales, though EDC's perspective is critical

Imagine a Commercial Area



Commercial solar installation

Controllable Streetlights

Automated building control system

Fleet rapid charging stations

Parking ramp with managed EV charging

Energy Efficiency Program

Backup generation (BTMG)

Market Design - Overview

Req.	Question	Recommendation
	How should DEAR be aggregated?	Allow for aggregations to a single EPNode
	How should small resource sizes be address in optimization engines?	All DEAR must self-commit
	Should there be a limit on DEAR or DER size?	DEAR must be a minimum of 0.1 MW, with no upper limit proposed EDC and states may create limits for their review
	How should DER aggregations be represented in the Energy and Ancillary Service Markets?	New DEAR resource type
	How can DEAR participate in MISO's capacity construct?	Participate as a Capacity Resource (non-LMR) Accreditation as 'sum of parts' Deliverability required for net injections
	How should DERs be modeled in reliability, market, and planning models?	Model as a single aggregate generator with positive or negative capability Maintain current Transmission / Distribution interface
	What will be the telemetry requirements for DEAR?	ICCP via WAN Data required every 2 seconds for all dispatchable DEAR
	What is necessary for the market settlement of DEAR?	Meter data will be submitted at the DER group level, in a process similar to ARCs. MISO will aggregate for settlement. DR portions will be settled per Order 745 DERA will report only wholesale transactions to MISO MISO will make submitted meter data available for LSE and EDC review
	Are there impacts to transmission settlements?	DEAR are ineligible for reactive power compensation (Sch 2) No other changes required
	Are any changes required to credit procedures?	No changes required

Market Design - Coordination

Req.	Question	Recommendation
	How will MISO coordinate with DERAs?	MISO will take a facilitation role of certain aspects Coordination will be required between MISO, EDC, RERRA, DERA, and TO
	- for interconnection?	DERA and EDC will communicate regarding interconnection prior to MISO involvement MISO will perform an interconnection review after EDC and TO reviews
	- for registration?	MISO will use RERRA, EDC, and LSE review as part of registration and enrollment, including allowing EDC and RERRA review for dual participation
	- for load forecasting	DERA forecast for DEAR and represent results in EcoMax offers MISO will not provide a forecast for renewable DER
	- for outage coordination?	MISO to study DEAR outages for resources 10 MW or greater for operational planning
	- for operations?	MISO's Day Ahead and Real Time coordination will focus on receiving data from DERA while maintaining communications with TOP/LBA
	How can aggregators change the makeup of their aggregation?	Review of changes will go through general registration process, including EDC review Updates will be coordinated with topology model updates (currently quarterly) Capacity Resource changes may require replacement capacity if changes reduce ZRCs in a given group below cleared amount
	What ability does MISO have if poor performance is observed or incorrect data is submitted?	Create ability to audit DEAR, including disqualifying participation and clawing back improper revenue, with input as needed from the IMM, RERRA, and EDC DEAR will be required to maintain sufficient information for this review
	How should MISO and RERRAs coordinate DER aggregations small utility exclusion and opt-in provisions?	Coordination framework implementation Exclusions will be granted for given Planning Year
	How will the IMM be involved?	IMM review will focus on DEAR 10 MW or greater

FERC has called for collaboration across jurisdictions and seams; successful implementation required developing new frameworks

Key for Roles:

EDC	TO	DERA	DERO	MISO	RERRA
Electric Distribution Company	Transmission Owner	DER Aggregator	DER Owner	Midcontinent Independent System Operator	Relevant Electric Retail Regulatory Authority

FERC/RERRA Jurisdictional Issues

1. FERC jurisdiction
   - DERA becomes FERC jurisdictional utility
   - Distribution utilities can assess wholesale distribution charges on DERA
2. Opt-out/ in
   - MISO must accept bids from DERA:
     - If utility >4 million MWh sales in prior fiscal year
     - If utility ≤ 4 million MWh sales in prior fiscal year, but only with RERRA approval
   - O2222-A and O2222-B removed, then reinstated, the opt-out
3. Interconnection
   - FERC declined to exercise jurisdiction over DER interconnection to distribution
   - FERC may revisit need to assert DER interconnection authority if process used as a barrier to entry
4. MISO/ EDC/ TO coordination needed to share information to study impact of aggregation on the transmission system

Legal citations O2222 P 42, P 62, P 65, P 90, P 96, P 99, P 101; O2222-A P 22-23, P 28

Current Status of MISO Compliance

- April 14, 2022 – MISO submits is filing in compliance with Order 2222

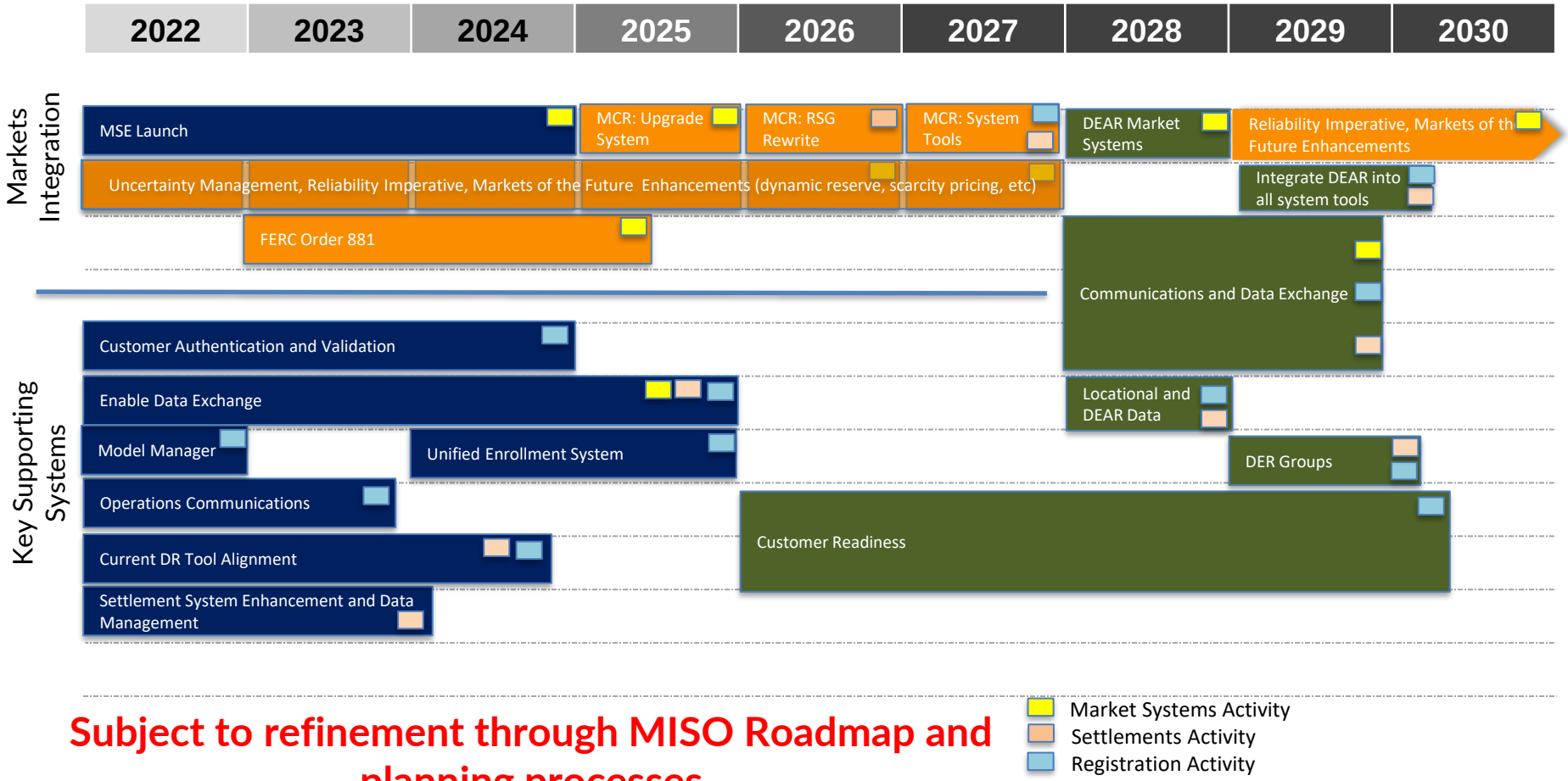
- August 12, 2022 - FERC issued a letter to MISO seeking additional information
  - FERC sought additional information in ten distinct categories, consisting of 76 separate requests.

- October 11, 2022 - MISO submits requested additional information

- Highlights of MISO's response include:
  - Clarified the definitions of Distributed Energy Resource and Distributed Energy Resource Aggregator
  - Clarified its participation model, including the services to be provided by DERs and locational requirements
  - Provided further information on registration of DEARs and coordination between the stakeholders in the DER process, including technical review of resources
  - Provided further information to FERC on why MISO's implementation date of October 1, 2029 is just and reasonable, and why MISO is unable to support an earlier implementation date for 2222

Overall Timeline

- DEAR Registration available in late 2029
- Energy and Ancillary Services Market launch end of Q1 2030
- Integration into 2030/2031 Planning Year



Subject to refinement through MISO Roadmap and planning processes

Coordinated Priorities | System Enabler | Order 2222

APPENDIX

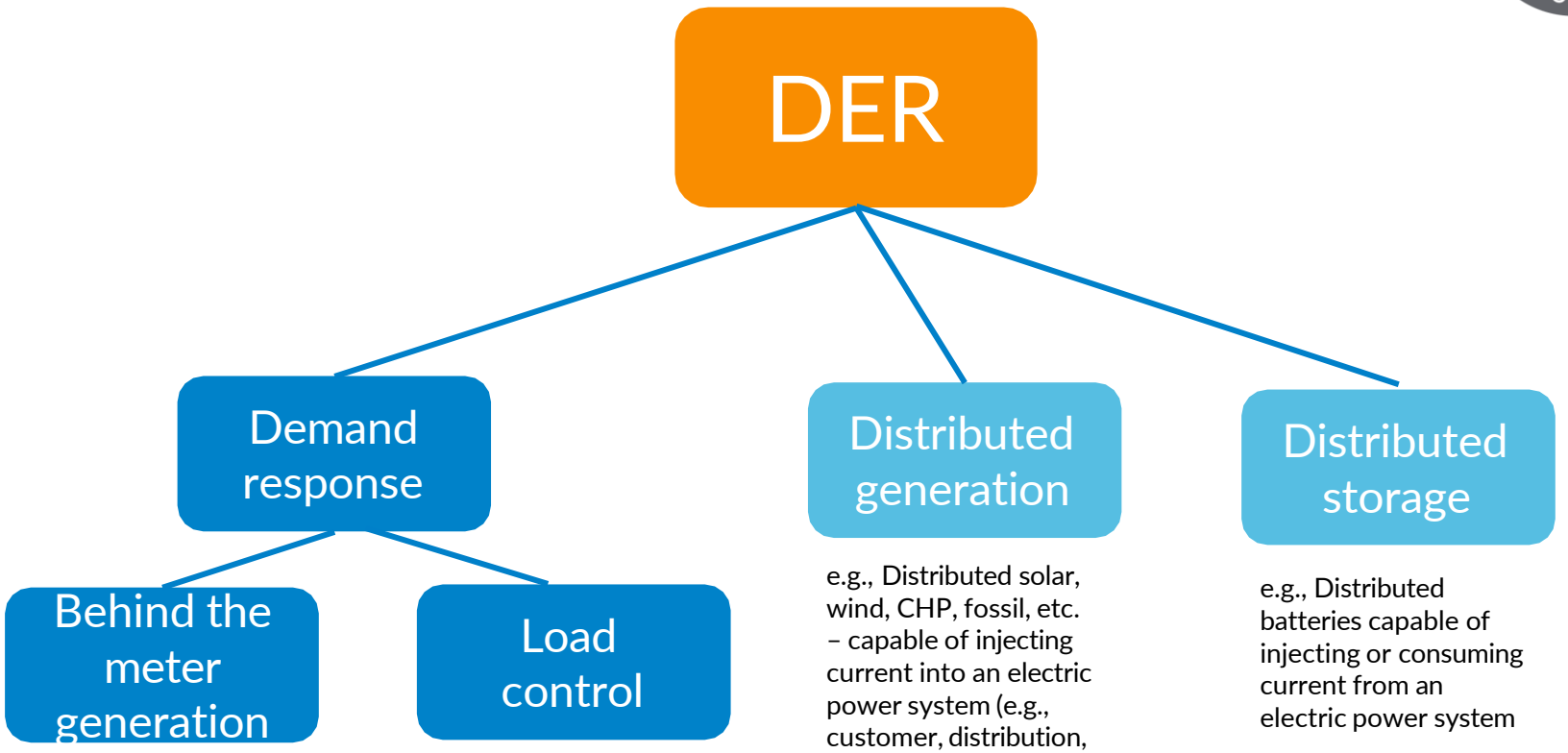
New Defined Terms

DERA: Distributed Energy Resources Aggregator – similar to ARC, which is Aggregator of Retail Customers – this is the market participant.

DEAR: Distributed Energy Aggregated Resource (formerly DERa) – this is the aggregation – is made up of individual DERs (or it can be one DER, but it will still be considered an aggregation if it is registered as a DEAR)

DER: Distributed Energy Resource - any resource located on the distribution system, any subsystem thereof, or behind-a-customer meter. These resources may include but are not limited to: electric storage resources, distributed generation, demand response, energy efficiency, thermal storage, and electric vehicles and their supply equipment. For purposes of this definition, the distribution system includes all electric facilities owned by a Distribution Provider, as that term is defined by NERC, regardless of how such facilities are classified by the Distribution Provider that: (1) are connected to the Transmission System; (2) are not a part of the Transmission System, and (3) are not connected to the Transmission System solely through facilities under the control of another transmission provider.

DER Taxonomy

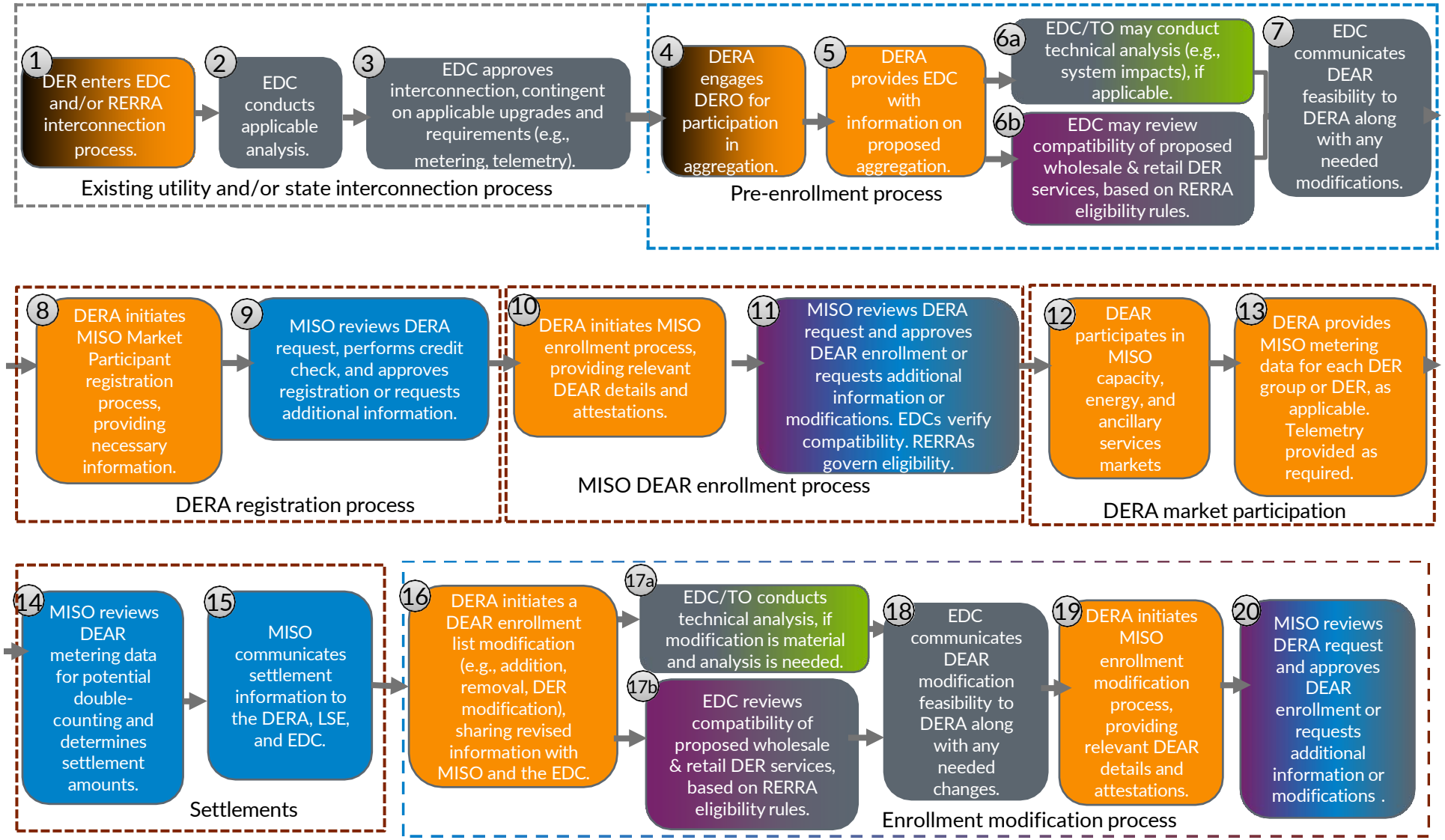


FERC definitions (18 CFR§ 35.28(b)(4)&(5):
Demand response means a reduction in the consumption of electric energy by customers from their expected consumption in response to an increase in the price of electric energy or to incentive payments designed to induce lower consumption of electric energy.
Demand response resource means a resource capable of providing demand response.

MISO's Coordination Framework

- **FERC Order 2222 recommends, but does not require, establishing a "Coordination Framework" to outline roles and responsibilities**
- **Based on meetings with RERRAs, TOs, EDCs, and potential DERAs, MISO has established such a framework to include:**
  - Tariff documentation of roles and operating or market participation agreements, including interoperability and communications
  - MISO resources to manage questions and inquiries related to O2222
  - Business Practices Manuals which outline O2222/ DERA participation in MISO markets and may include interoperability and communications (not usually completed as part of the compliance filing)
- **MISO utilized existing processes and Tariff language to model the O2222 requirements**
  - Metering and Settlements
  - Registration for aggregators of retail customers, including EDC/ LBA/ RERRA review processes
- **No new Attachment required to establish Coordination Framework for DERAs**
  - Unlike ESRs on distribution system (for which Attachment HHH applies), DERAs will become Market Participants subject to Attachment W and MISO Tariff obligations
  - Additional Tariff changes made to establish additional coordination and communications between MISO, DERAs, RERRAs, EDCs, LBAs, TOs and other relevant parties (See e.g., Section 38)

MISO's initial process flow; stakeholders have multiple questions about this chart see breakdown on the following slides



Key for Roles:

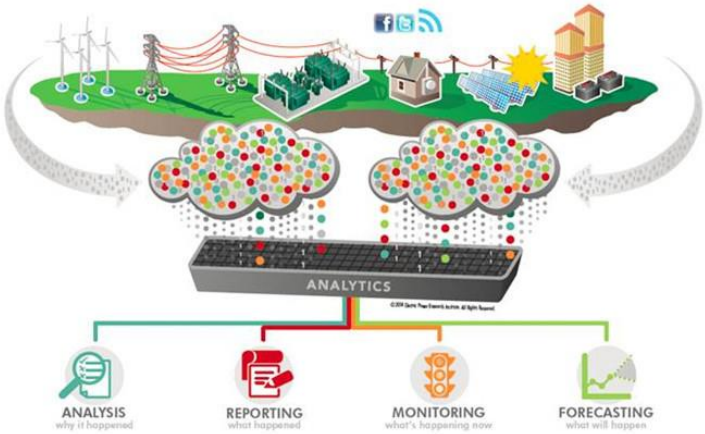
- EDC — Electric Distribution Company
- TO — Transmission Owner
- DERA — DER Aggregator
- DERO — DER Owner
- MISO — Midcontinent Independent System Operator
- RERRA — Relevant Electric Retail Regulatory Authority

MISO's role in sub-process:

- None
- Recommend
- Design

Visibility and Reliability Challenges

- Visibility to information and data across the transmission and distribution interface are key reliability priorities
- Communication of DERs is not clearly defined from resources to and between other layers at the distribution, transmission and regional level
- Equipment to facilitate communication is growing, but significant investment will still need to be made over many years to enable visibility
- MISO continues to research solutions to technical issues



Graphic Source: EPRI
http://smartgrid.epri.com/Data_Analytics_Initiatives_for_Transmission_and_Distribution.aspx

Limits of MISO Tariff

- During the stakeholder process at MISO, and by participating in EPRI working groups as well as following other RTO/ISO's as they develop O2222 responses, the MISO team has identified a number of items which cannot be addressed within the MISO tariff

  - Utilities must define the scale and scope of their technical review for reliability. Disputes may be raised to MISO or FERC. This is not ideal as neither has the technical information to adjudicate such matters.
  - There is the potential to charge for some wholesale market access through something like wholesale distribution service, though this application isn't quite the same as what has come before.
  - Metering and submetering of individual devices is relatively immature and the billing systems of utilities are limited in their ability read more granular data in many cases.
  - There are data privacy concerns for individuals who participate in aggregations, as household-level data may be collected and transmitted in an unaggregated fashion.
  - Communication and cybersecurity of home-based devices may also be subject to new data privacy concerns.
  - Retail rates largely don't anticipate wholesale market access. There are hundreds or thousands of rated within the MISO footprint.
  - There is a time horizon disconnect between the MISO wholesale market and distribution operations, both because of day ahead wholesale markets and unexpected distribution level events.
  - MISO's utilities may deploy a number of technologies to manage DER, investments made locally will not all reach the same result. MISO must interface with all potential users.
  - Ongoing operational coordination is needed between TOs, EDCs and DERA. MISO will communicate with current members and the DERA as the Market Participant.