



--- MISO ---
Roadmap

Updated February 22, 2022:

- **Added slide 6 with public links to key timeline items**

Software enhancements and future processes

DER Task Force

MSC-2019-2

February 10, 2022

Purpose & Key Takeaways



Purpose:

Discuss systems with DER related improvements and resulting timeline

Key Takeaways:

- Order 2222 requires significant adjustments to several MISO systems, both within and outside the traditional markets systems
- Changes focus on registration, settlements and market systems; creating a system that can accommodate dynamic changes and communications
- MISO anticipates completing all improvements by 2029, enabling a 2030 launch of market functions



Three key anchors enable long-term integration of DERs



Static to Dynamic

Currently, resources, once installed, largely retain the same characteristics

DEARs can shift their composition on a regular basis



Enhanced Communications

Communications will expand from current partners to a broader group of parties, including States, in multiple areas

Secure and confidential communications will need to accommodate partners with multiple needs



Future Flexibility

Order 2222 requires accommodation of current and future technology

System enhancements must not preclude the ability of our members to incorporate and manage DERs

System enhancements exist in the context of ongoing initiatives



--- MISO Roadmap ---

MARKET REDEFINITION INITIATIVES

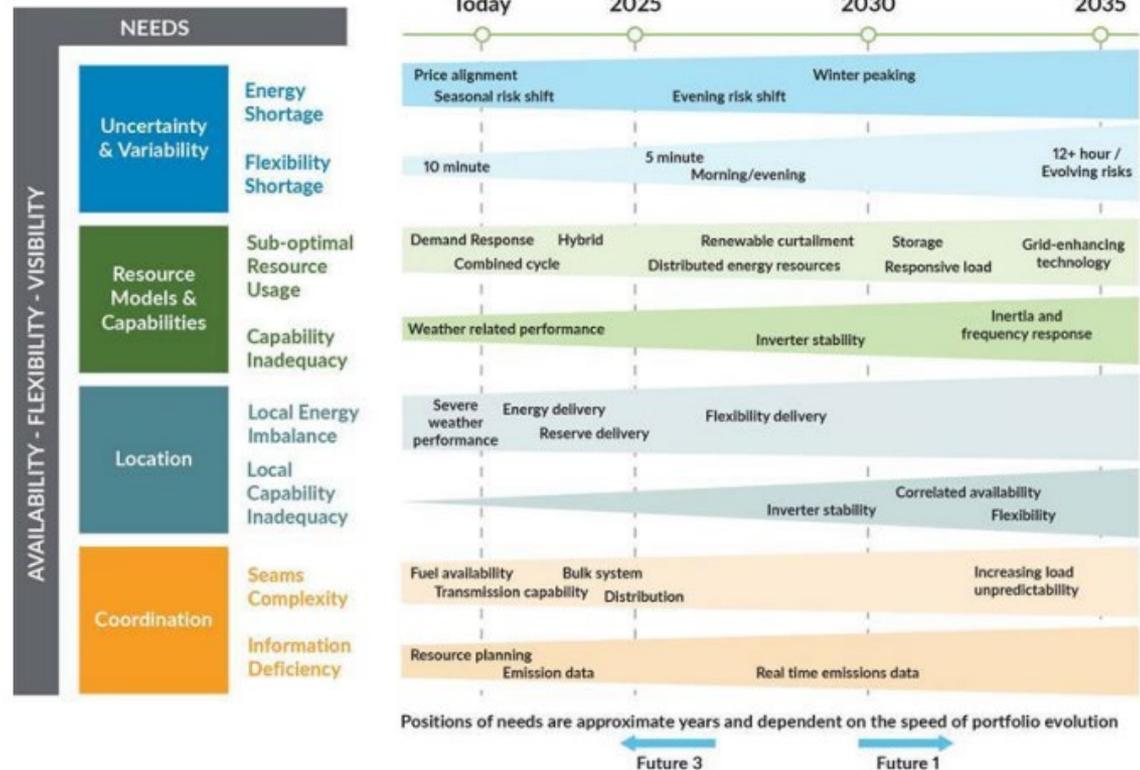
	2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Managing Uncertainty & Variability	<ul style="list-style-type: none"> Implementation of Seasonal Construct and Conventional Accreditation Recommend Accreditation Reforms for Renewables, Hybrids and Storage Update Ancillary amounts and Short-term Reserves Enhance Internal Risk Information Management Improve Scarcity Pricing Assess Severe Weather Implications 							
Resource Models & Capabilities	<ul style="list-style-type: none"> Increase Effectiveness of Demand Response and Load Modifying Resources Implement Energy Storage Resource Participation - FERC Order 841 Compliance File Distributed Energy Resources (DER) - FERC Order 2222 Compliance and Begin Implement Assess Hybrid Resource Participation 							

- Identifying Locational Needs**
 - Update Regional Constraints Based on Conditions
- Enhancing Coordination**
 - Facilitate Ambient Adjusted Line Ratings Adoption
 - Enhance Regional Resource Assessment

OPERATIONS OF THE FUTURE INITIATIVES

- Situational Awareness**
 - Real Time Display Replacement
 - Advance Synchrophaser Applications Evaluation
- Operations Planning**
 - Look Ahead Commitment Needs Definition
 - Operations and Planning Models Alignment
 - Outage Coordination Analysis Processing
- Operations Preparedness**
 - Operations Simulation
 - Operator In Training Programs
- Critical Communications**
 - MISO Communications System Declarations
 - Operator Logging Needs Evaluation
- Business Continuity**
 - Conduct Business Impact Assessment to Identify Needs to Mitigate Emerging Threats

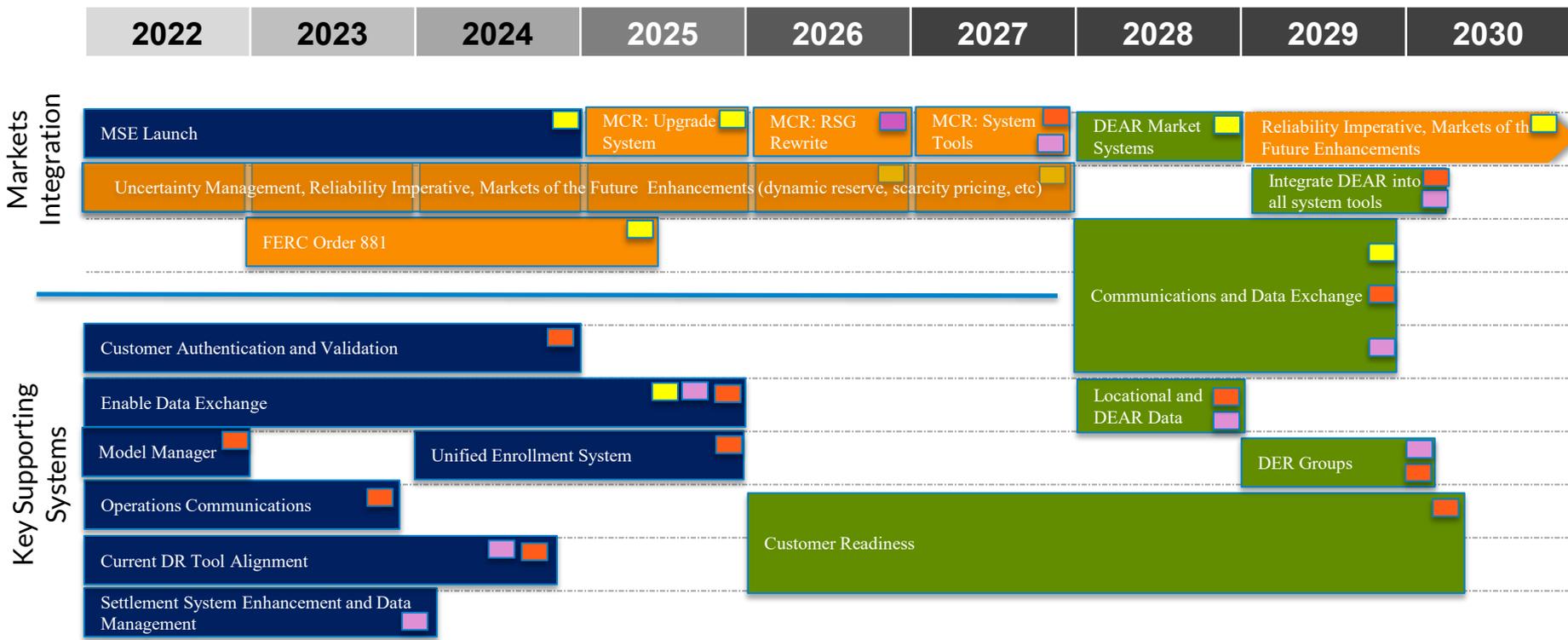
Reliability Needs Timeline



Overall Timeline



- 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

- Market Systems Activity
- Settlements Activity
- Registration Activity

Links

New

- Market Systems Enhancements
 - <https://www.misoenergy.org/markets-and-operations/MSE/>
- Multiconfiguration Resources (MCR)
 - <https://www.misoenergy.org/stakeholder-engagement/MISO-Dashboard/multiple-configuration-resources-fka-enhanced-modeling-of-combined-cycle-generators/>
- Registration, Enrollment, and Current DR Tool Alignment
 - <https://cdn.misoenergy.org/20210916%20MAUG%20Item%2002d%20Demand%20Response%20Enrollment%20Services589571.pdf>
 - <https://cdn.misoenergy.org/20211021%20MAUG%20Item%2002c%20Demand%20Response%20Enrollment%20Services598725.pdf>

Appendix

Stakeholder feedback on: Stakeholder Enhancements

Stakeholder Comments

MISO Response

Policy changes were noted as an active question in comments, with an understanding that the answers regarding such changes are speculative at this point

- Such policy changes could vary for each jurisdiction
- Areas which may be impacted by policy changes include interconnection, DERA registration, dispute resolution, retail tariffs, retail programs, double counting, customer and grid data sharing, integrated planning, distribution system planning and operational safety and reliability standards

Key stakeholder enhancements to enable the integration of DERs focused on internal updates and adapting processes to interface with MISO's systems, including

- Systems to communicate, model and evaluate reliability of DER and DEAR in outage coordination, day-ahead, and real-time operations
- Settlement systems integration and processes design, including metering and verification
- Customer support systems, including registration, enrollment, billing, and communications

Communications and information were a common theme

- To perform the review of DER and DEAR enrollment and modifications
- To communicate to DERs and DEARs regarding distribution system work and outages
- To ensure accurate settlements
- To ensure sufficient controls exist to coordinate and measure new information streams
- To define the physical boundaries of EPNodes that individual DER may reside in to be contained in a given DEAR and assist in jurisdictional disputes

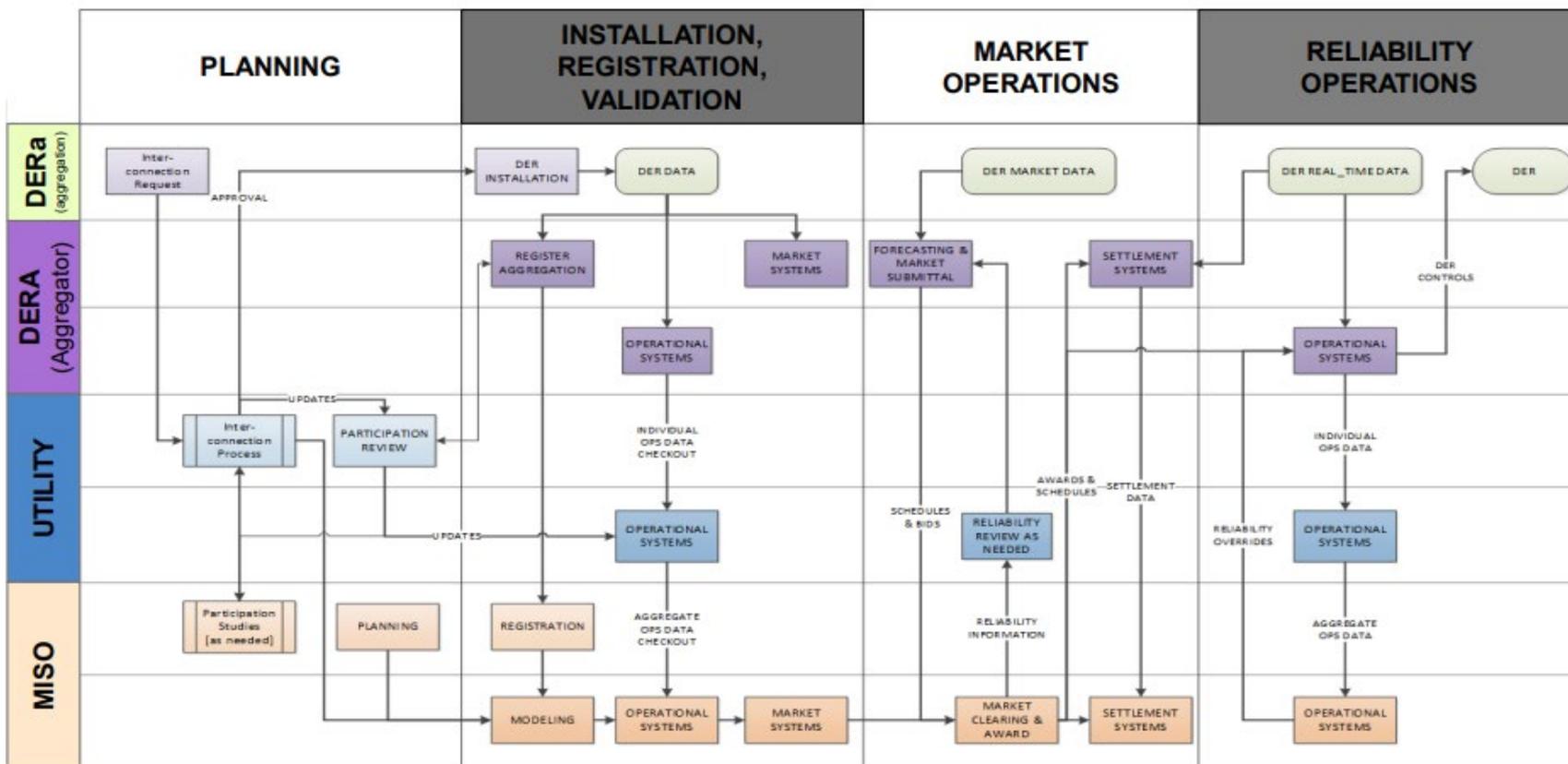
It was noted that implementation likely requires both system changes and additional teams or incremental staff to manage areas such as registration, modeling, controls, and data management

Thank you for the insight.

Stakeholder feedback on: Timeline

Stakeholder Comments	MISO Response
<p>MISO should seek to minimize implementation delays</p> <ul style="list-style-type: none"> MISO should not wait to include every aspect of 2222 compliance before allowing DERAs to register and participate in the market MISO's implementation should not take more than 12 months 	<p>The compliance requirements of Order 2222 require substantial software changes to implement across MISO systems, with registration being one of the critical paths. As a result, we cannot register DERs in compliance with Order 2222 in advance of significant system changes.</p>
<p>Stakeholder timelines depends on the final form of both the compliance filing and state regulations.</p> <ul style="list-style-type: none"> Processes may initially be manual, with enhancements based on volume and experience RERRA concurrence will be required for improvements to support operational enhancements <p>Stakeholder timelines ranged from 3 months to years for implementation</p>	<p>We also recognize that the communications with Market Participants (including DEAR), RERRAs, and EDC will require not only MISO enhancements but coordination and improvements on stakeholder systems.</p> <p>These changes result in an implementation timeline with registration changes concluding in 2029 and market integration in 2030.</p>
<p>DEAR should be able to use existing resource models prior to full implementation, including the Energy Storage Resource model</p>	<p>Resources can participate using existing models to the extent they qualify</p>

Improvements to MISO system must consider new data inputs; requiring coordination with existing and new Market Participants





Most systems within MISO are impacted by Order 2222, both within and outside of our markets

