



Managing Increased Complexity

IURC IRP Workshop

September 22, 2022

Executive Summary



- Aggressive decarbonization strategies and accelerated policies are driving rapid change in our region
- As the evolution of the resource fleet accelerates, variability is increasing, and attributes required to reliably operate the system are diminishing
- Increased complexity is leading to an expanded scope and reprioritization across the elements of MISO's Reliability Imperative
- We must develop a coordinated transition plan to reliably navigate from the present to the future

Members and States in the MISO Region continue to set ambitious deep decarbonization goals



17 utilities have energy goals greater than 80%

4 states have 100% clean energy goals

1 state with 100% clean energy law

The region's energy landscape is evolving and will continue to evolve toward a more complex, less predictable future

Past

- Primarily controllable resources
- Ample reserve margins
- Predictable resource outages
- Relatively predictable weather
- Focus on providing energy in *the worst peak load hour* during the summer

Present

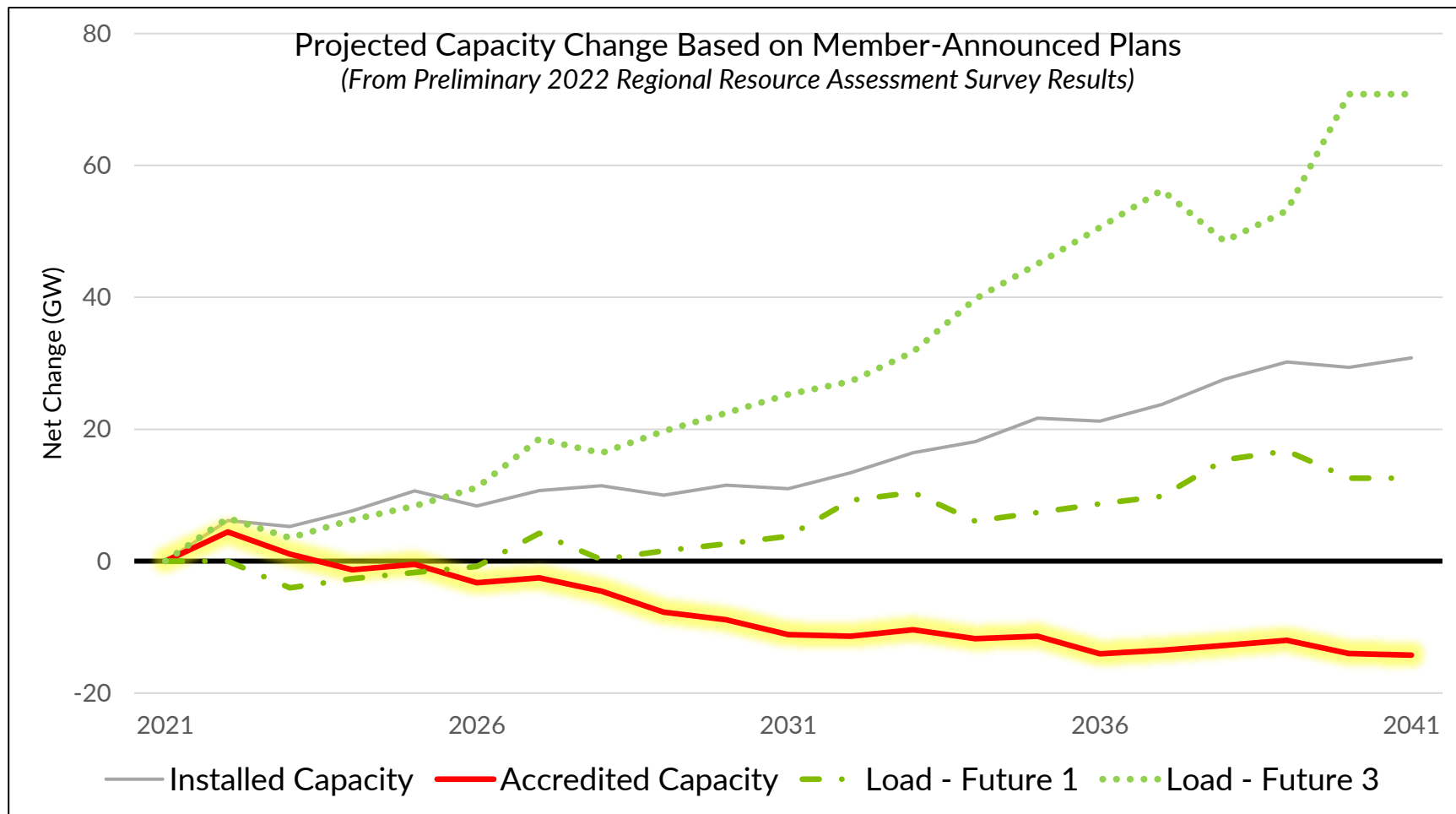
- Transitioning resource mix
- Tightening reserve margins
- Less predictable resource outages or unavailability
- Growing uncertainty in weather conditions
- Greater inter-dependence between utilities, states, and RTOs
- Focus on providing energy on *the worst day in each season*

Future

- Primarily weather-dependent resources
- Risk-adjusted reserve margin requirements
- Less predictable resource outages or unavailability
- Less predictable weather
- Increasing scarcity of essential reliability attributes
- Increasing electric load
- Increasing importance of accurate load and renewable forecasting
- Focus on providing energy for *the worst week in each season*

Policy drivers – such as EPA regulations; Environmental, Social, and Governance criteria; State Energy Policy; and the Inflation Reduction Act – are accelerating the fleet transition and associated risks

A survey of member plans indicates accredited capacity will continue to decline, combined with increasing intermittent resources and demand



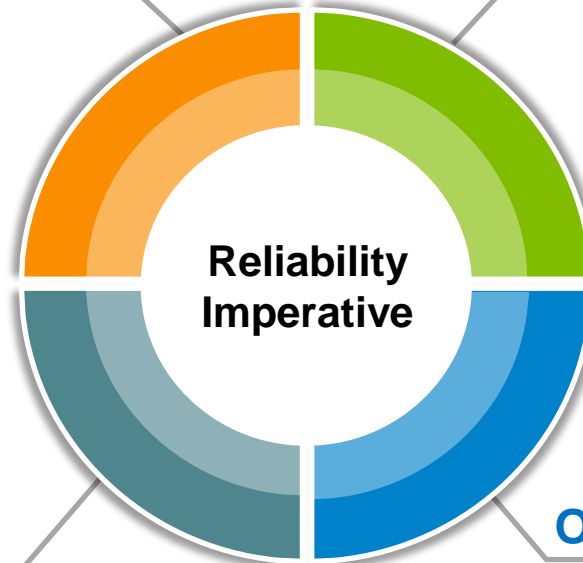
MISO's Reliability Imperative defines the changes necessary to reliably manage the changing resource portfolio and system risks

Market Redefinition

Aims to ensure that resources with needed capabilities and attributes will be available in the highest risk periods across the year

Long Range Transmission Planning (LRTP)

Assesses future transmission needs holistically, reflecting utility/state plans for new generation; will also consider potential cost-allocation changes



Market System Enhancements (MSE)

Transforms MISO's legacy platform into a flexible, upgradeable, and secure system that can evolve for years to come; will also integrate advanced technologies to process increasingly complex information

Operations of the Future

Focuses on the skills, processes, and technologies needed to ensure MISO Operations can effectively manage the grid into the future under increased complexity

FERC recently approved MISO's resource adequacy filing to better align resource requirements with system risks

Seasonal Resource Adequacy Construct

- Identifies reliability needs unique to each season and aligns resource availability with seasonal needs
- Facilitates seasonal outages or partial year operation

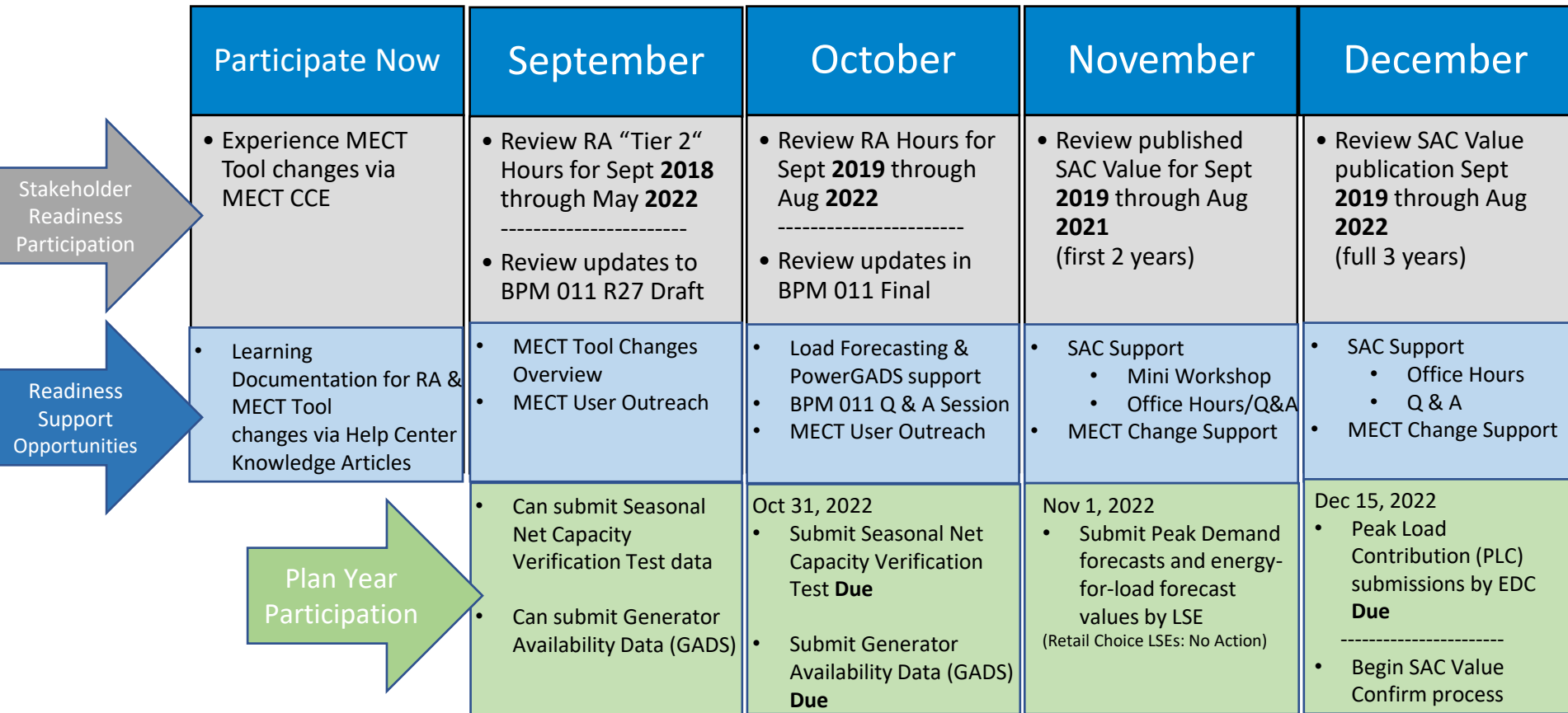
Improved Resource Capacity Accreditation

- Improves estimation and confidence of a resource's expected availability during future times of need in a season
- Incentivizes owners to maximize resource availability during high-risk hours

Updated planned outage thresholds

- Ensures that a resource is available for the season to which it commits

Stakeholder Readiness Engagement & Support*



MISO continues working on reforms to align fleet capability with system needs

Recently Approved by FERC

Resource Adequacy Construct

- Moves from annual to seasonal model, improves accreditation, and updates planned outage thresholds

Ongoing Activities

Improved Resource Accreditation

- Renewable and Load Modify Resources the focus in 2022

Resource Adequacy Construct

- Potential improvements to the Planning Resource Auction, including reevaluation of a reliability-based demand curve

Pricing

- Continued refinement of scarcity price reforms
- Improved modeling to achieve more efficient market outcomes and price signals

Resource Attributes

- Evaluating approaches to value resource attributes critical to reliably operating the evolving portfolio

Maintaining reliability with the changing resource portfolio and evolving risks also increases the importance of ensuring adequate attributes

