The Energy Council Annual Meeting

Little Rock, Arkansas

September 15, 2023

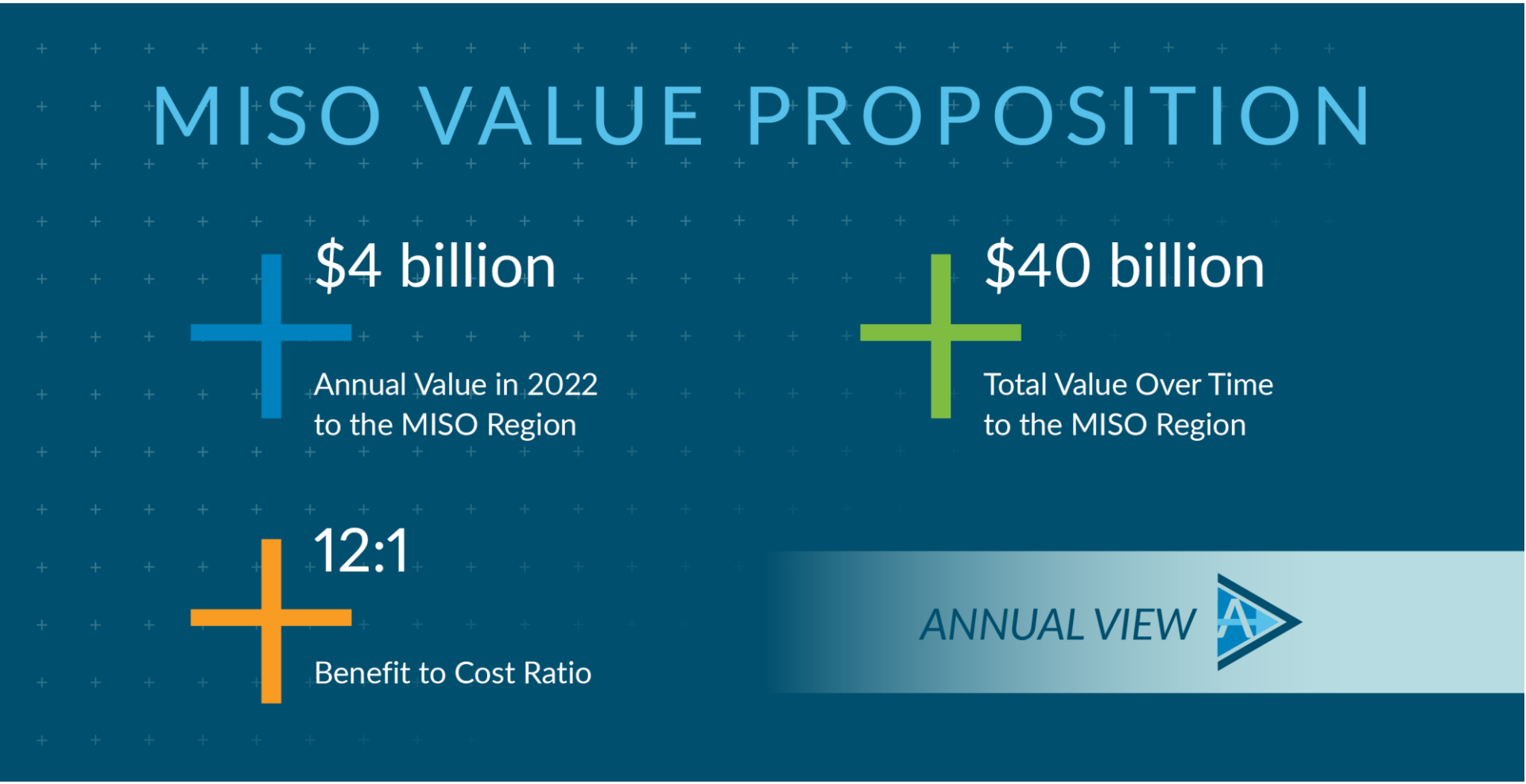
MISO is an independent, not-for-profit, member-based organization responsible for keeping the power flowing across the region reliably and cost-effectively

MISO's reliability footprint and regional control center locations

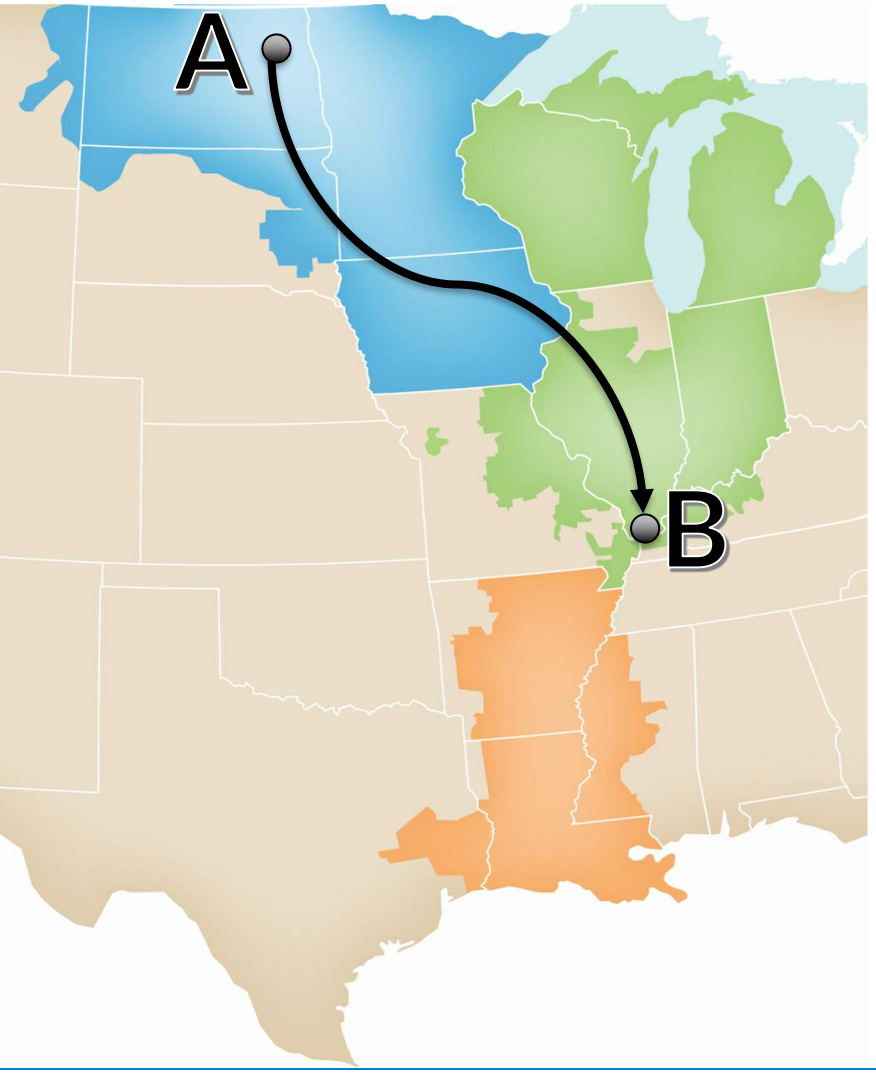
MISO KEY FACTS

Area Served	15 U.S. States and Manitoba, Canada
Population Served	45 Million
Market Participants	+500
Members	57 Transmission Owners
	135 Non-transmission Owners
Market Size	$40 billion annual transactions

Since 2007, MISO has documented over $40 billion in benefits by reserve sharing and other benefits



Managing the electric grid is like controlling air traffic



AIR TRAFFIC CONTROL

- Moves *people* from point A to point B safely and reliably 24/7/375
- Don't own the plans, runways or airways

MISO CONTROL CENTER

- Moves the *electricity* from point A to point B safely and reliably 24/7/375
- Doesn't own the generators, transmission lines or electric grid
- Ensures the *right amount* of electricity is moved at the *lowest possible* cost

MISO manages flows on the transmission system by directing generator usage

MISO

COORDINATES TRANSMISSION USAGE AND TRANSMISSION-CONNECTED GENERATION

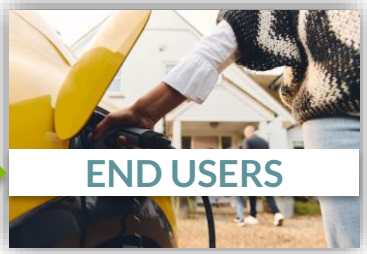
MEMBER UTILITIES

OPERATE DISTRIBUTION SYSTEMS AND SERVE END USERS

Power is generated from many fuel sources. MISO distributes power over the bulk electric grid

MISO's member transmission lines & towers support 75,000 miles of electricity flow

Utilities move energy from transmission lines closer to the end user, ensuring reliability & power quality



Smaller power lines are used to reach industrial, business and residential customers

Regulated by the Federal Energy Regulatory Commission (FERC)

Managed by local utilities and under state jurisdiction

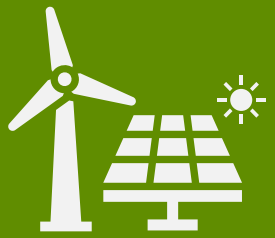
The industry is changing, and to mitigate significantly higher future complexity, we must collectively think about and approach issues differently

- Aggressive decarbonization goals and policies are driving rapid portfolio change, resulting in increasing variability and diminishing reliability attributes
- Enhanced reliability risk evaluation and management tools are needed to handle the uncertainty rising from increased variability and more extreme weather
- Promising new technologies are far from commercial maturity, requiring reliance on transition resources as reliability insurance
- Our shared Reliability Imperative requires a comprehensive transition plan to balance reliability, affordability and sustainability, including:
  - Risk evaluation
  - Resource accreditation, including fuel assurance
  - Attribute requirements
  - Pricing and incentives (wholesale and retail)
  - System planning (e.g., Long Range Transmission Planning)

Transformation is progressing at an astonishing pace and will speed up over the next several years

Fleet Changes

MISO members and states have set ambitious goals to partially or fully decarbonize



Fuel Assurance

Availability of resources may be challenged by economic, supply chain or other issues

Extreme Weather

Severe weather events are becoming more extreme and occurring more frequently

Electrification

Demand for electricity will grow as electric vehicles increase, industry sectors trend towards renewables

MISO's Reliability Imperative guides the transformation needed to maintain reliability for the grid of the future

RELIABILITY IMPERATIVE

Market Redefinition

Develops significant market enhancements and optimizations to ensure continued reliability and value in anticipation of the changing resource mix, more frequent extreme weather events, and increasing electrification

Transmission Evolution

Assesses the region's future transmission needs and associated cost allocation holistically, including transmission to support utility and state plans for existing and future generation resources

Operations of the Future

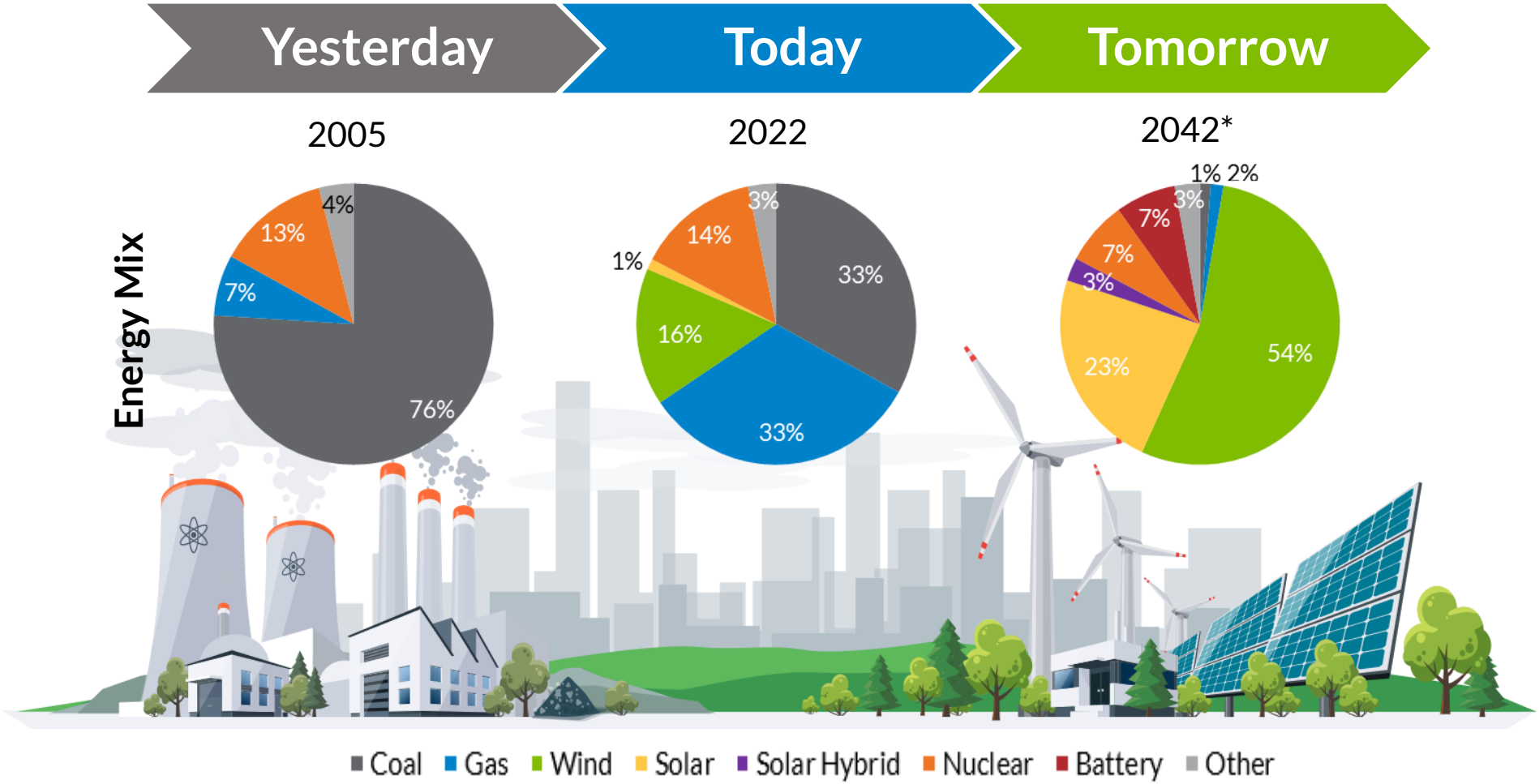
Focuses on the skills, processes and technologies needed to ensure MISO can effectively manage the grid of the future under increased complexity

System Enhancements

Creates flexible, upgradeable, and secure systems that integrate advanced technologies to process increasingly complex information and evolve with the industry

MISO Reliability Imperative (misoenergy.org)

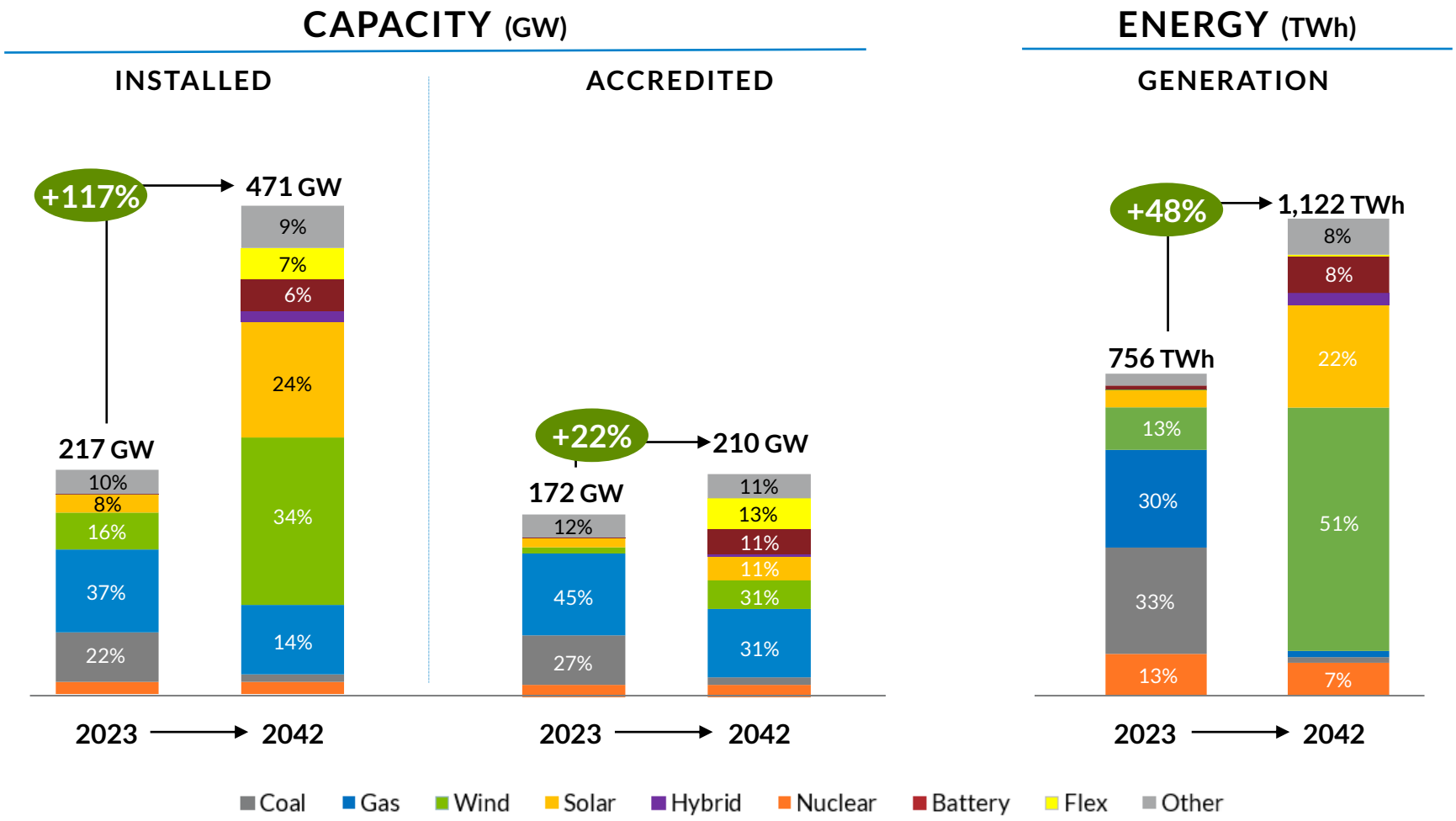
The energy industry is shifting toward sustainable resources, driven by factors like climate change and technological advancements, creating a complex system that is less predictable to plan and operate



*2042 data is from the preliminary MISO Future 2A; Other includes demand response, hydro, and geothermal

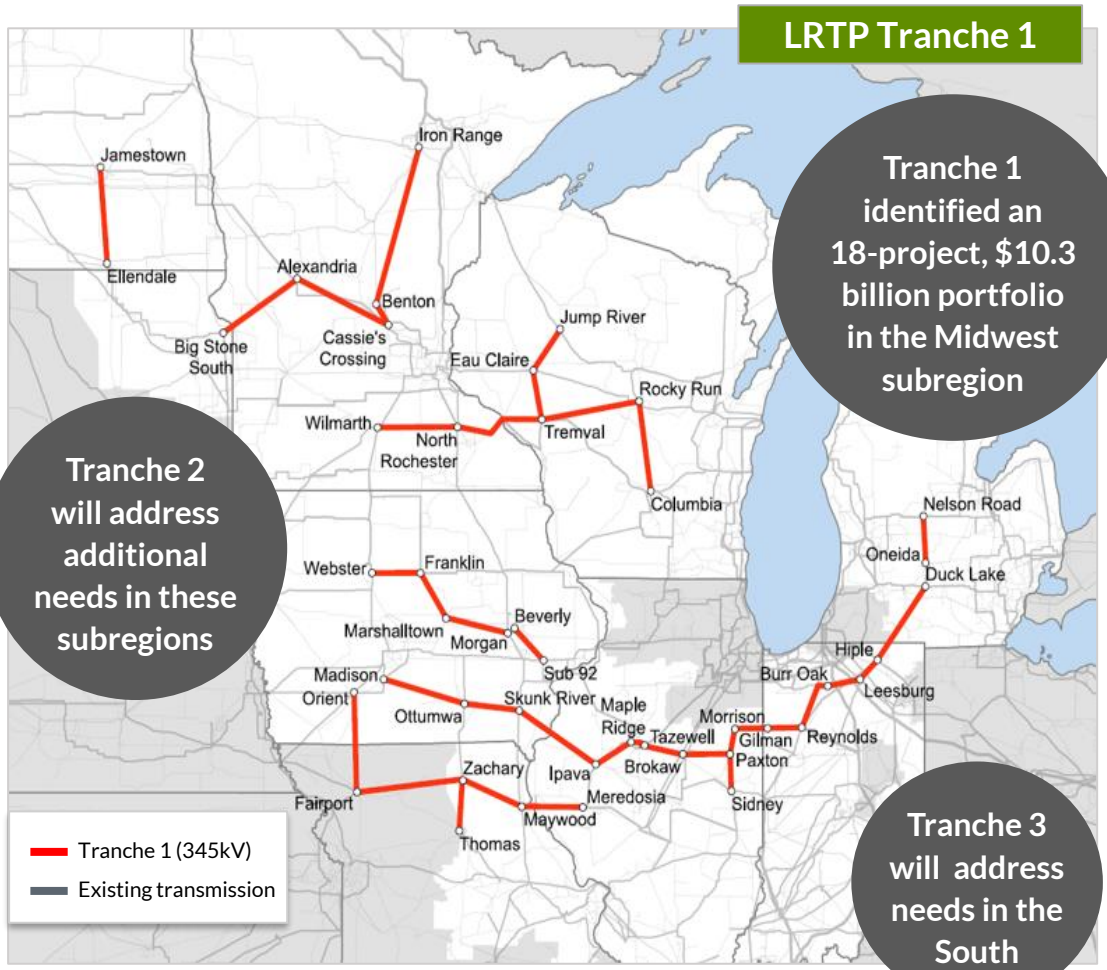
Accreditation Percentages - Hydro and Demand Response: 100%, Nuclear: 95%, Coal, Gas, Gas Other, and Geothermal: 90%, Battery: 87%, Solar Hybrid: 44%, Solar: 34%, Wind: 17%

MISO's Analysis anticipates significant resource additions and retirements along with energy production growth trending toward increasing renewables



Futures do not account for all operational-level reliability needs and attributes that may require different levels of resources. Resource additions may be subject to adjustment based on new accreditation rules. "Other" includes biomass, geothermal, hydro, oil, pumped hydro, demand response, and non-PV distributed generation (and energy efficiency for installed capacity).

MISO's Long Range Transmission Plan (LRTP) and the SPP-MISO Joint Targeted Interconnection Queue (JTIQ) Portfolio are helping address Transmission Evolution



Higher variability and complexity have significant implications for reliability and energy adequacy in the region

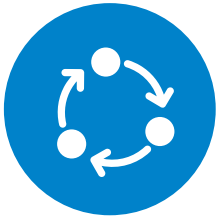
	PAST	PRESENT	FUTURE
RISK EVALUATION	• Capacity planned for single peak hour using 1-in-10 standard	• Seasonal resource adequacy • Energy adequacy in all hours • Extreme weather	• Expected unserved energy; days/ weeks • Adequacy of key reliability attributes
MARKET EVOLUTION	• Energy • Capacity • Ancillary services	• Seasonal accreditation • Pricing/incentive • Attribute definition • Seams coordination	• Hourly energy adequacy • Accreditation of attributes • Fuel assurance • Seams optimization
TOOL ENHANCEMENT FOCUS	• Regional load and weather forecasting • System efficiency	• Extend visibility horizon • Variable generation and weather forecasting • Coordination with fuel suppliers and neighbors	• Uncertainty management; artificial intelligence • Granular weather forecasting • Retail/wholesale coordination

Continued collaboration is needed to address the Reliability Imperative

TAKEAWAYS

Capacity Market Improvements
Support for improving pricing in MISO's capacity market

Attributes Development
Support and awareness of wholesale market changes for resource attributes (may affect state and utility resource planning)



Interconnection Queue Reform
Support for efficient queue studies and readiness considerations

Resource Accreditation Reform
Ensuring resources are valued based on availability when needed

Future Outlooks
Collaborating on surveys, auctions, assessments and "futures" work

Transmission Permitting and Construction
Timely permitting and development

Effectively managing the energy transition requires all of us to work together

Thank you

Chad Allen
MISO Principle Advisor
Organization of MISO States