Winter Readiness Technical Conference

Missouri Public Service Commission

December 17, 2025

Bob Kuzman, Executive Director, External Affairs – Central Region
Laura Rauch, Executive Director, Transmission Planning
Maison Bleam, Regional Director, External Affairs – Central Region

MISO Overview

MISO is an independent, not-for-profit, member-based organization responsible for keeping the power flowing across 15 U.S. states and Manitoba reliably and cost-effectively.

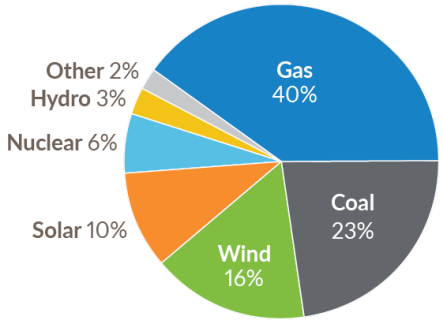
MISO's reliability footprint and regional control center locations

MISO STATISTICS

Population Served	45 Million
Transmission Line	79,000 Miles
Generating Units	1,460
Members	56 Transmission Owners
	174 Non-transmission Owners
Market Participants	> 550
Market Transactions	> $33 billion in 2024
Carbon Reduction	Approximately 32% since 2014

INSTALLED CAPACITY

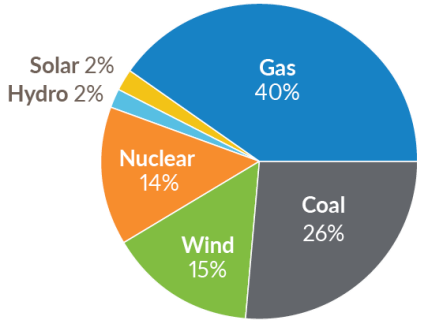
September 2025



207 GW

ENERGY PRODUCTION

January-December 2024



638 Million MWh

*Other: Diesel, Biomass, Storage, Demand Response Resources

Data as of September 30, 2025

Winter Readiness

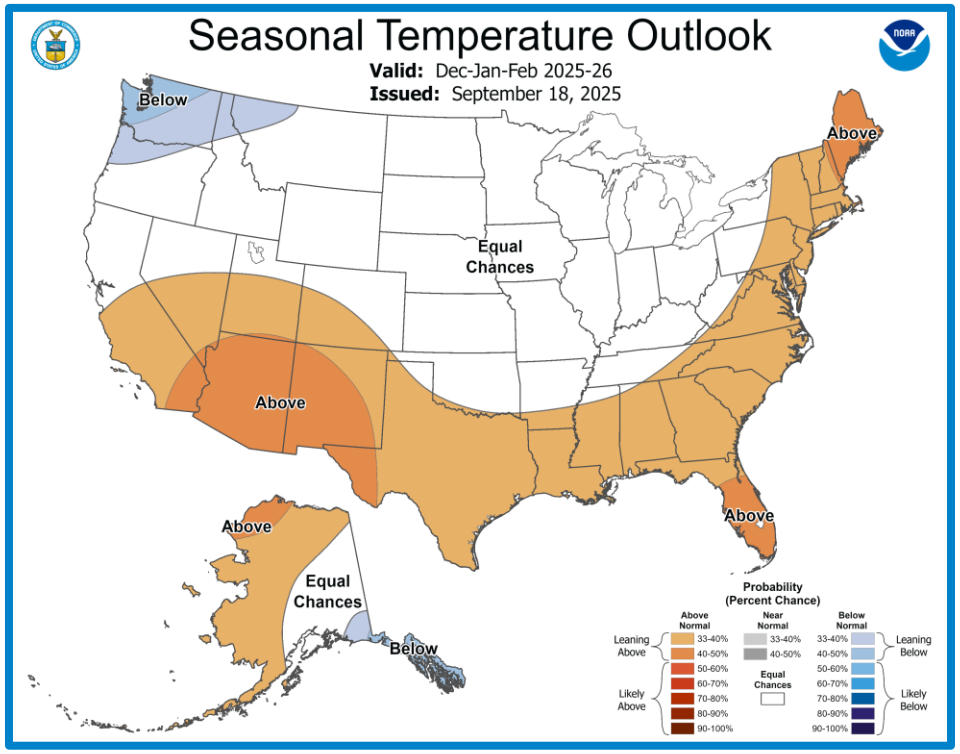
Maison Bleam, Regional Director, External Affairs – Central Region

Executive Summary

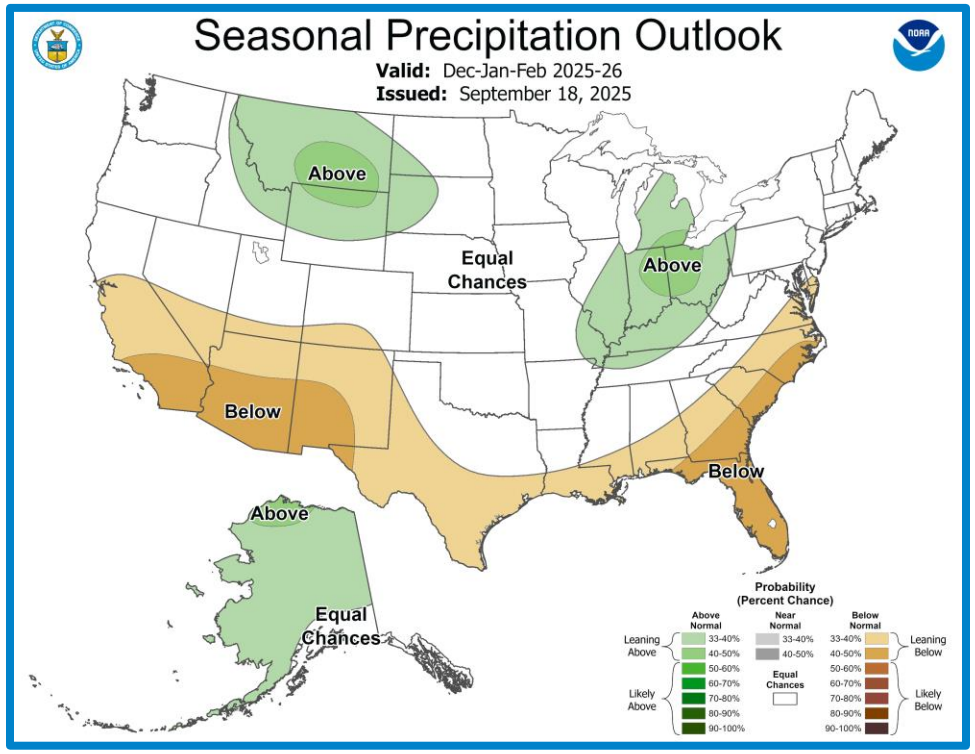
- North and Central Region temperatures expected to be normal to slightly below normal. Above normal temperatures are expected in the South Region on average
- An active storm pattern expected with above normal precipitation across the Great Lakes
- Precipitation is expected to be elevated in MISO's North/Central region which can increase icing and snowfall creating more renewable forecast difficulties
- MISO is well positioned to handle unplanned events for the upcoming Winter season

MISO forecasts show more variability and an increased chance of more frequent winter storms

Winter 2025-2026 Weather Projections



More variability in temperature is expected in the North and Central regions, while the South is anticipated to be above average.



Above-normal precipitation is forecast for the Great Lakes region and dryer along the Gulf Coast.

Seasonal outlook maps source: National Oceanic and Atmospheric Administration

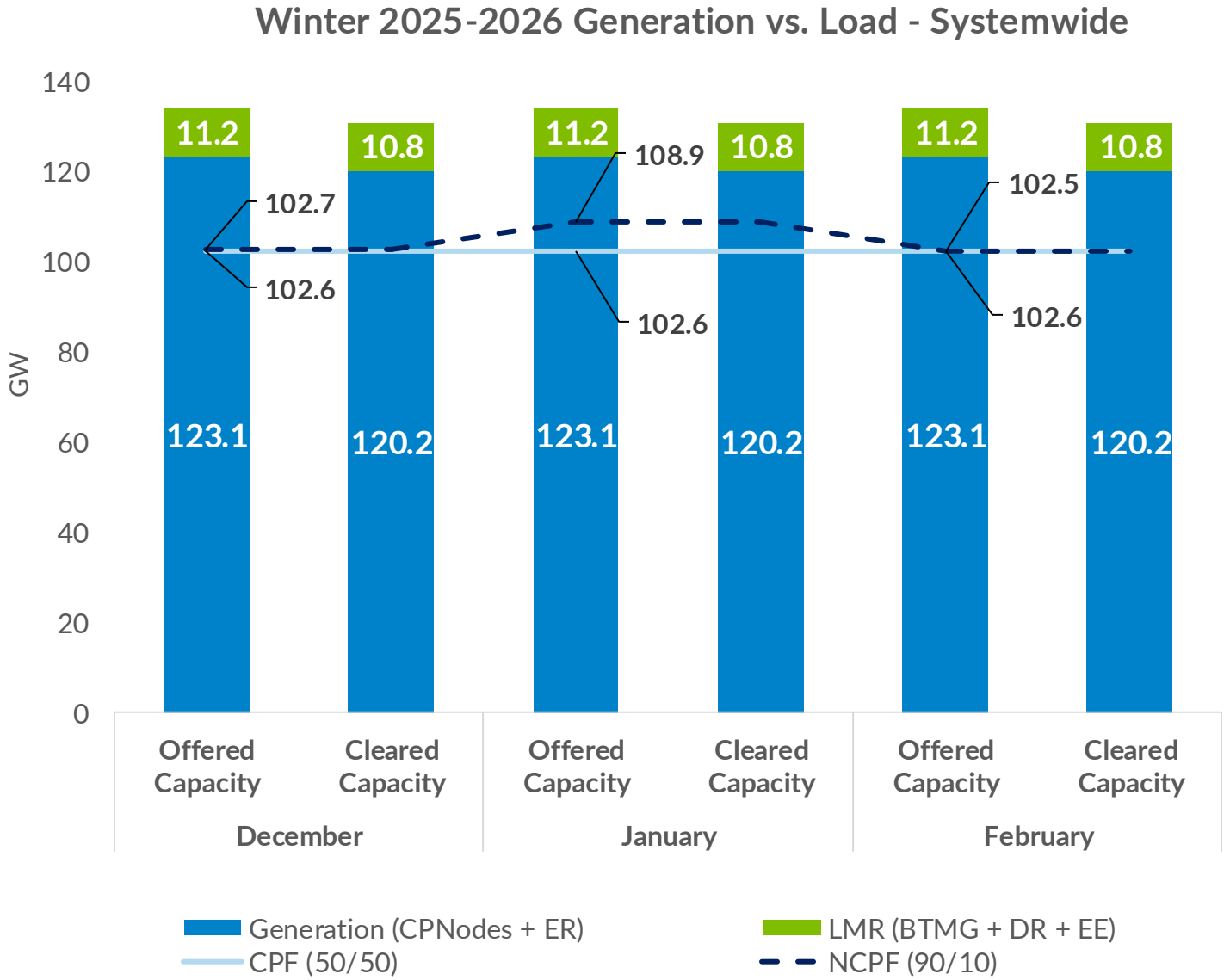
MISO projects sufficient capacity to cover both Coincident and Non-Coincident peak forecast load

Projected Winter Peak – 103 GW

Coincident Peak Forecast values are submitted by MISO Load Serving Entities, relative to MISO Seasonal peak.

High Demand Projected Peak – 109 GW

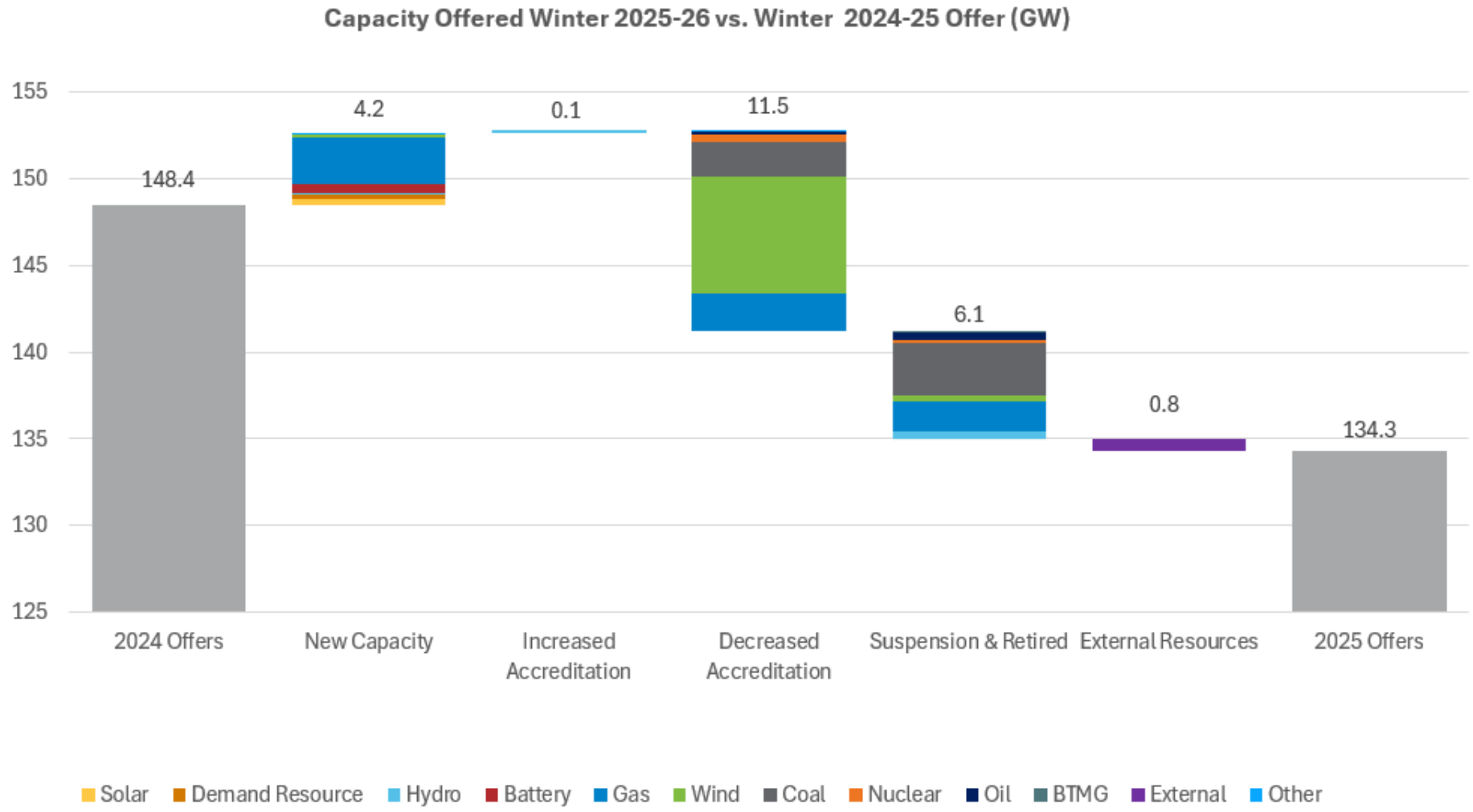
Non-Coincident Peak Forecast values are submitted by MISO Load Serving Entities, relative to each entity's monthly peak.



Source for CPF and NCPF data for Winter 2025-2026 is MISO PRA and load forecast submission process based on MISO Tariff, Module E-1.

LMR: Load Modifying Resource CPNodes: Commercial Pricing Nodes ER: External Resource BTMG: Behind the Meter Generation
DR: Demand Resource EE: Energy Efficiency CPF: Coincident Peak Forecast NCPF: Non-Coincident Peak Forecast

The Winter 2025/26 Planning Resource Auction (PRA) resulted in a decrease in surplus ZRCs in comparison with the Winter 2024-2025 PRA



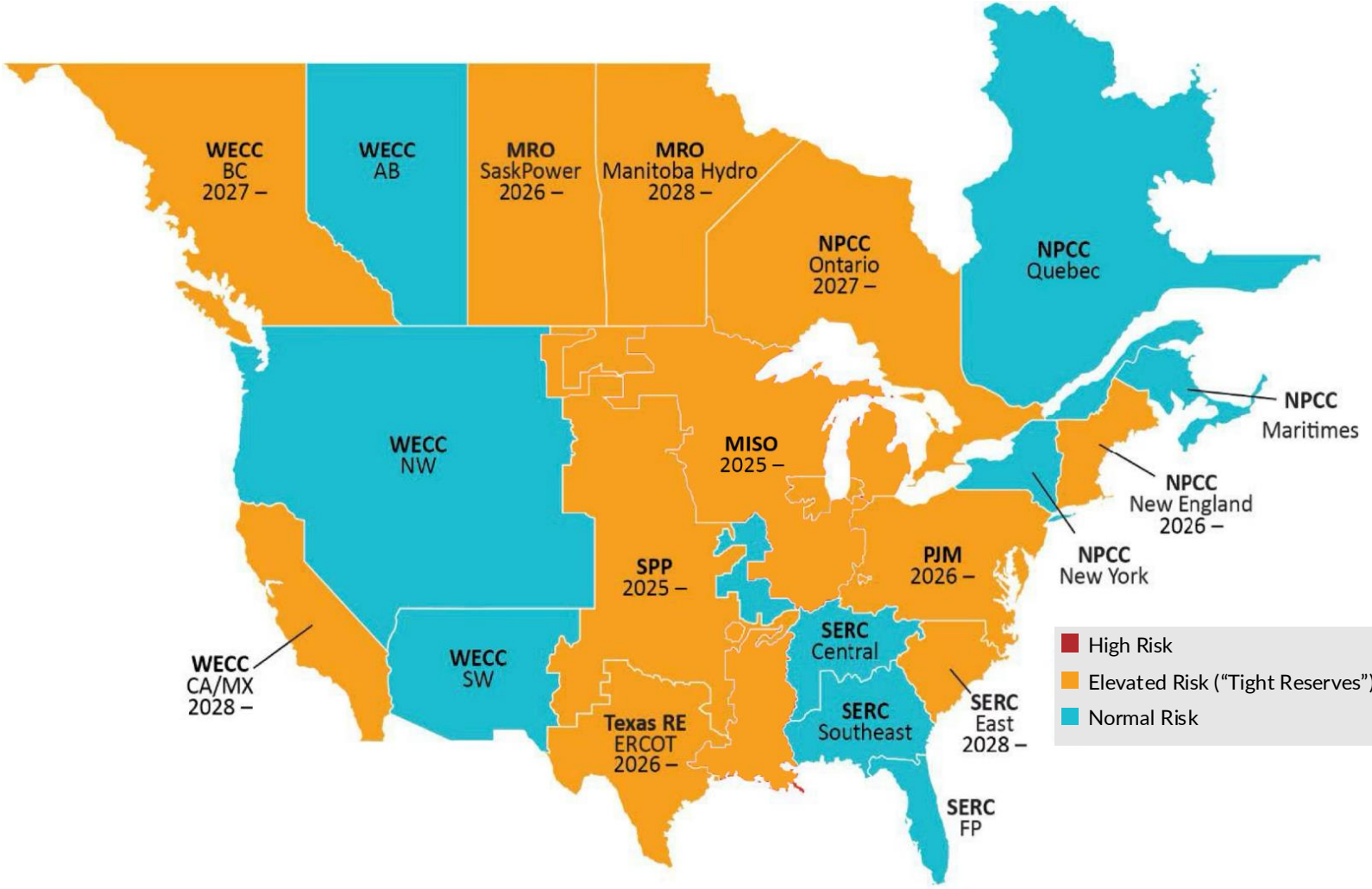
Business Update

Bob Kuzman, Executive Director, External Affairs – Central Region

A NEW NORMAL

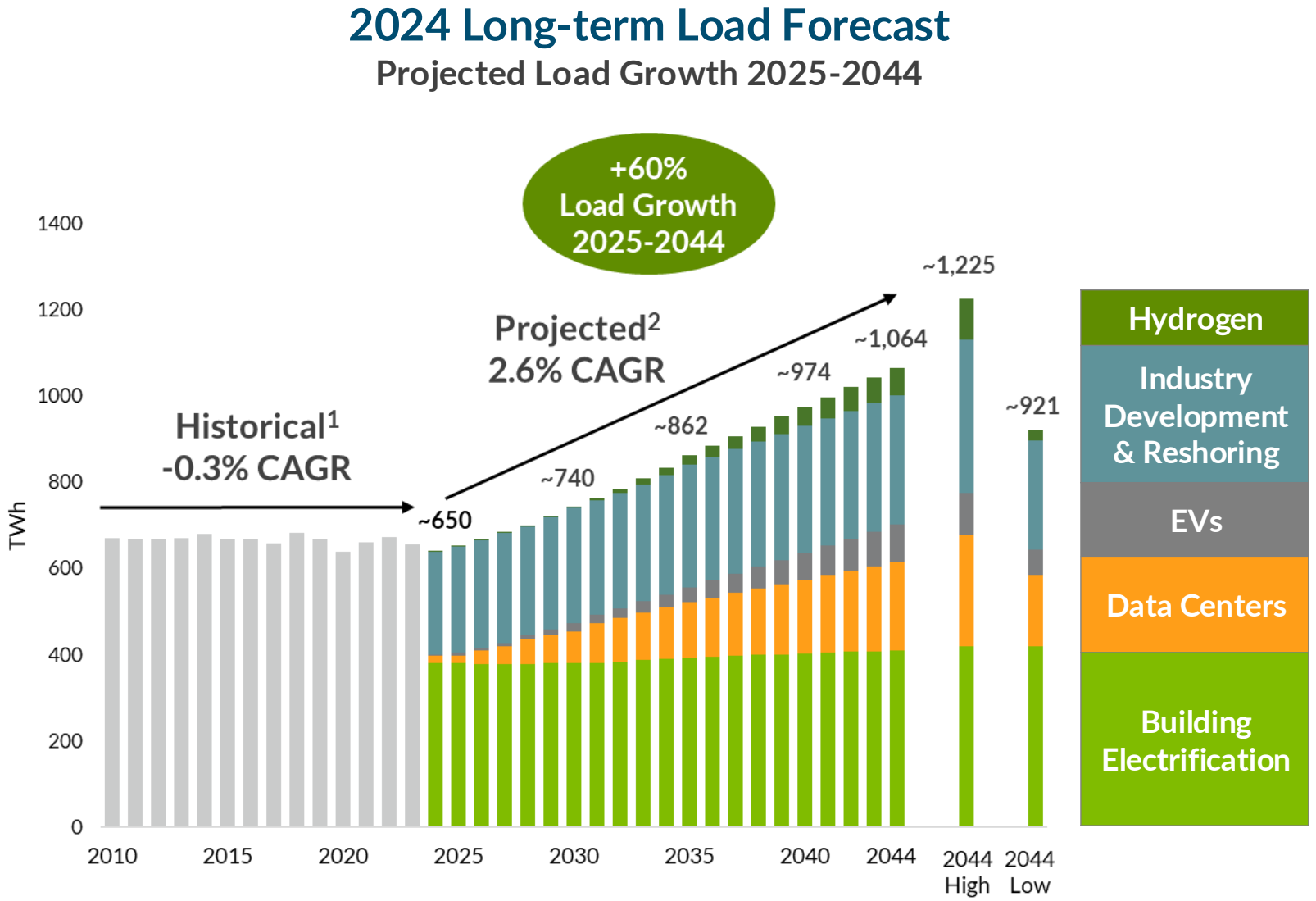
MISO expects tight generation reserve margins will continue; reflecting an efficient investment level and allowing members to meet their plans at a lower cost

2024 NERC Long-Term Reliability Assessment



LOAD FORECAST TRENDS HIGHER

Long-term probabilistic load projections and member data consistently show increasing demand



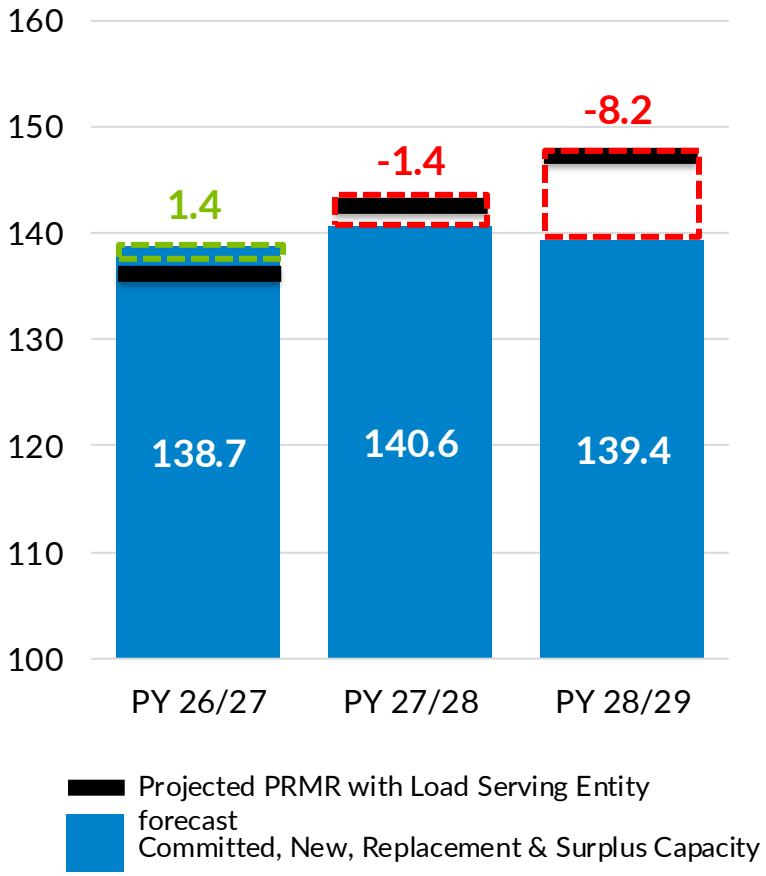
OUTPACING HISTORY

The OMS-MISO Survey indicates that tight margins will persist, making an accelerated and sustained pace for new generation additions essential to meet load forecasts

Resource Adequacy Accredited Capacity Projections - Summer

June 2025 OMS-MISO Historical View[1]

4.7 GW/yr Average Additions



Since June

Incremental load growth to 2030 has increased from 18 GW to 23 GW[2]

Trailing 3-year historical supply additions increased from 4.7 GW to 6.7 GW[3]

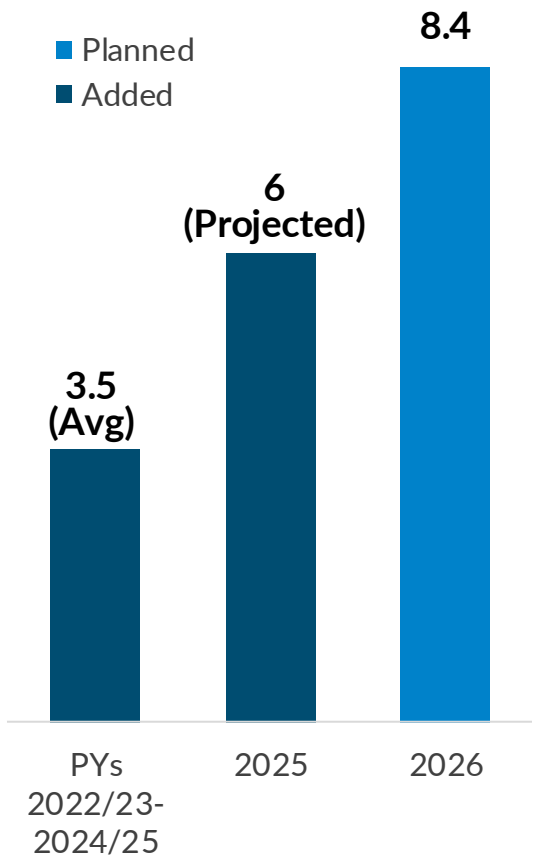
Members will need to keep increasing supply additions to keep pace with load growth

1. Historical assumes 50% replacement/surplus
2. 18 GW reflects the 25/26 OMS MISO survey. 23 reflects the high-end of the December 2024 MISO LTLF.
3. 6.7 GW reflects current expectation for PY 23/24 – PY 25/26 new supply + 50% replacement/surplus

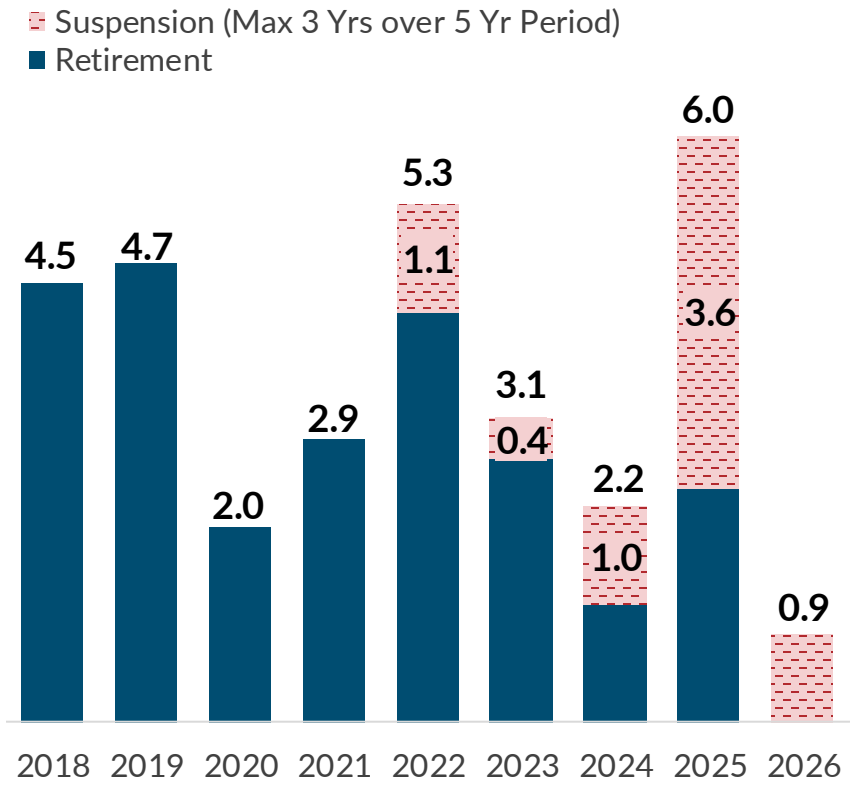
MOMENTUM

MISO's data and insights, evolving policy, and load growth needs have supported member led improvements in the generation build rate and declining retirements

Added Generation
(Accredited, GW)



Approved Retirements & Suspensions
(Accredited, GW)



Attachment Y Requests as of Nov. 12, 2025

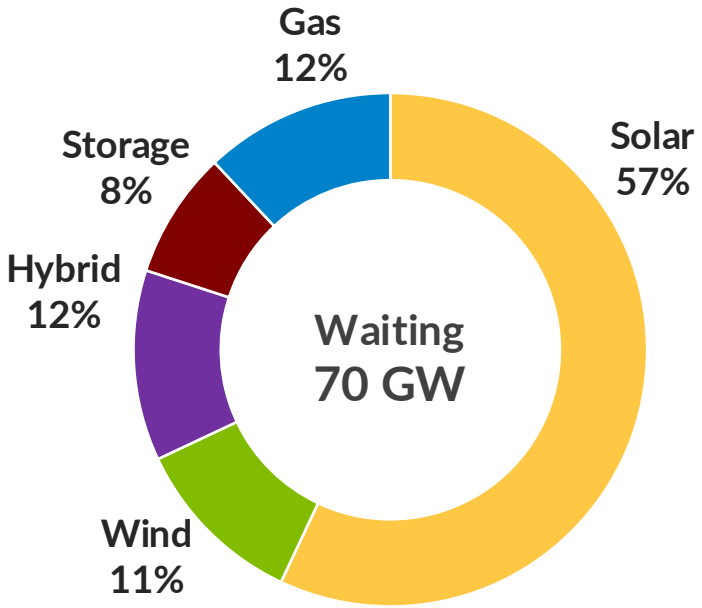
IMPEDIMENTS REMAIN

Delayed projects make up nearly 50% of overall approved generator interconnection agreements; more can be done to prepare for network upgrades, supply chain, siting delays

Waiting Generation

Nameplate GW

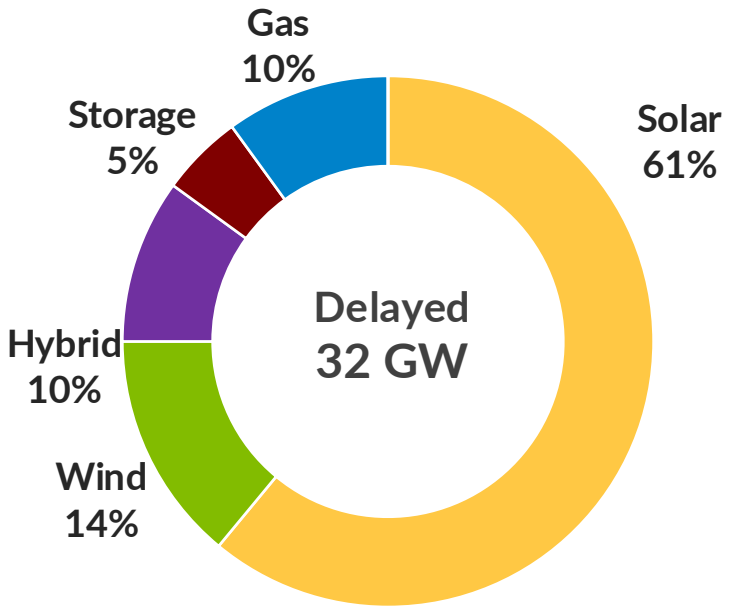
Projects with an approved Generator Interconnection Agreement that have not been built



Delayed Generation

Nameplate GW

Projects with an approved Generator Interconnection Agreement that have reported a delay in expected Commercial Operations Date

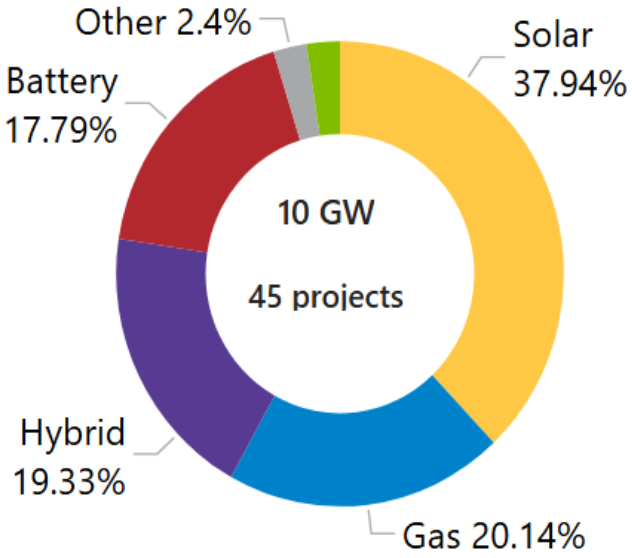


Data as of 11/4/2025

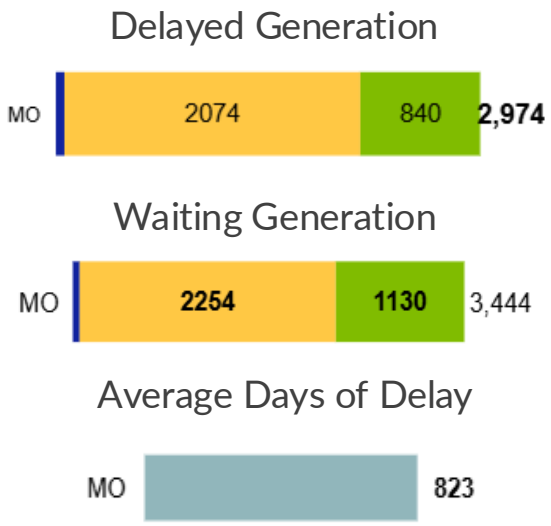
GENERATION INTERCONNECTION QUEUE - MISSOURI

Generation is being added in Missouri and across the footprint, but delays driven by non-queue factors persist

Active Queue for Missouri Projects
Nameplate Capacity (GW)



Waiting and Delayed Generation with Signed Generator Interconnection Agreements



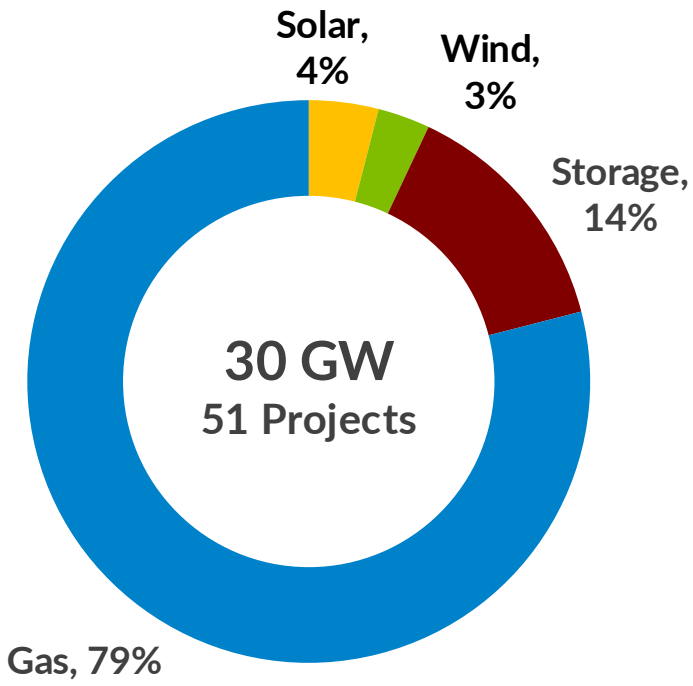
Gas Wind Solar Hybrid Storage Other

Data as of 11/13/2025

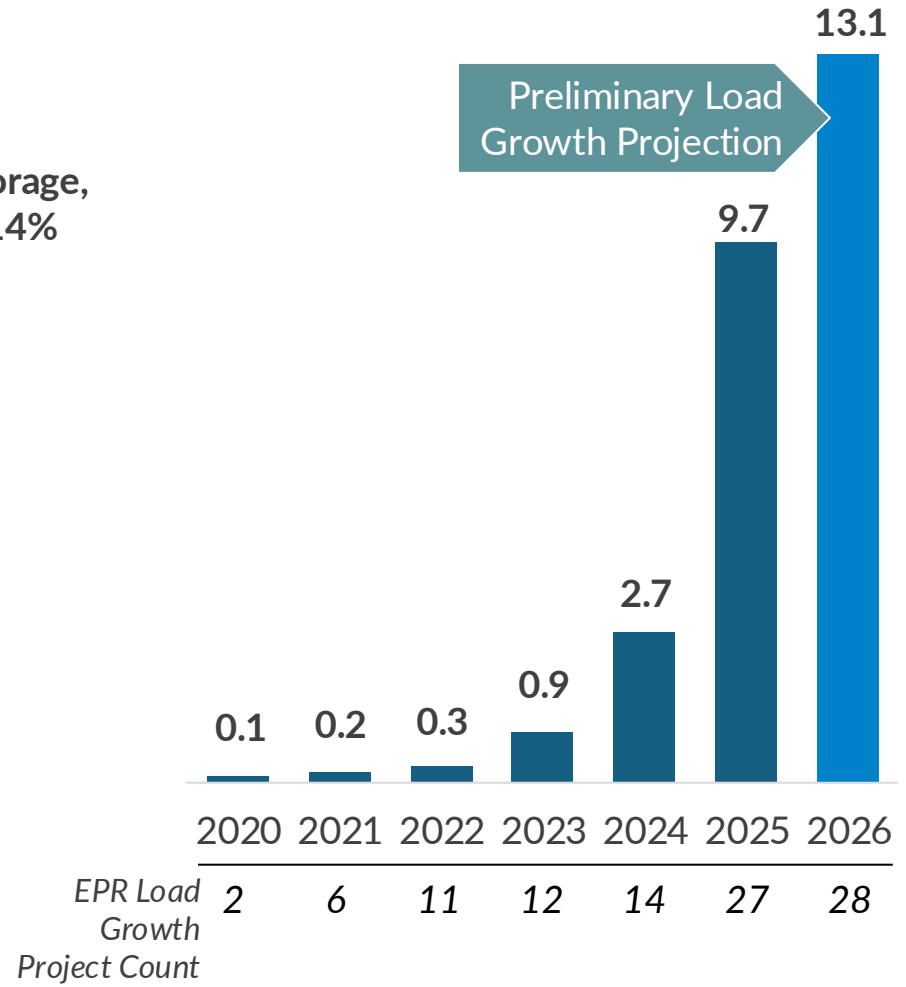
SPEED ENABLEMENT

MISO's processes provide a 150-day path to generation interconnection while large loads can be studied in 120 days

Total ERAS Queue (GW)



Expedited Project Requests (GW)



ERAS: Expedited Resource Addition Study
EPR information as of August 20, 2025

DIFFERENTIATING MISO

Speed

Plan Enablement

Reliability

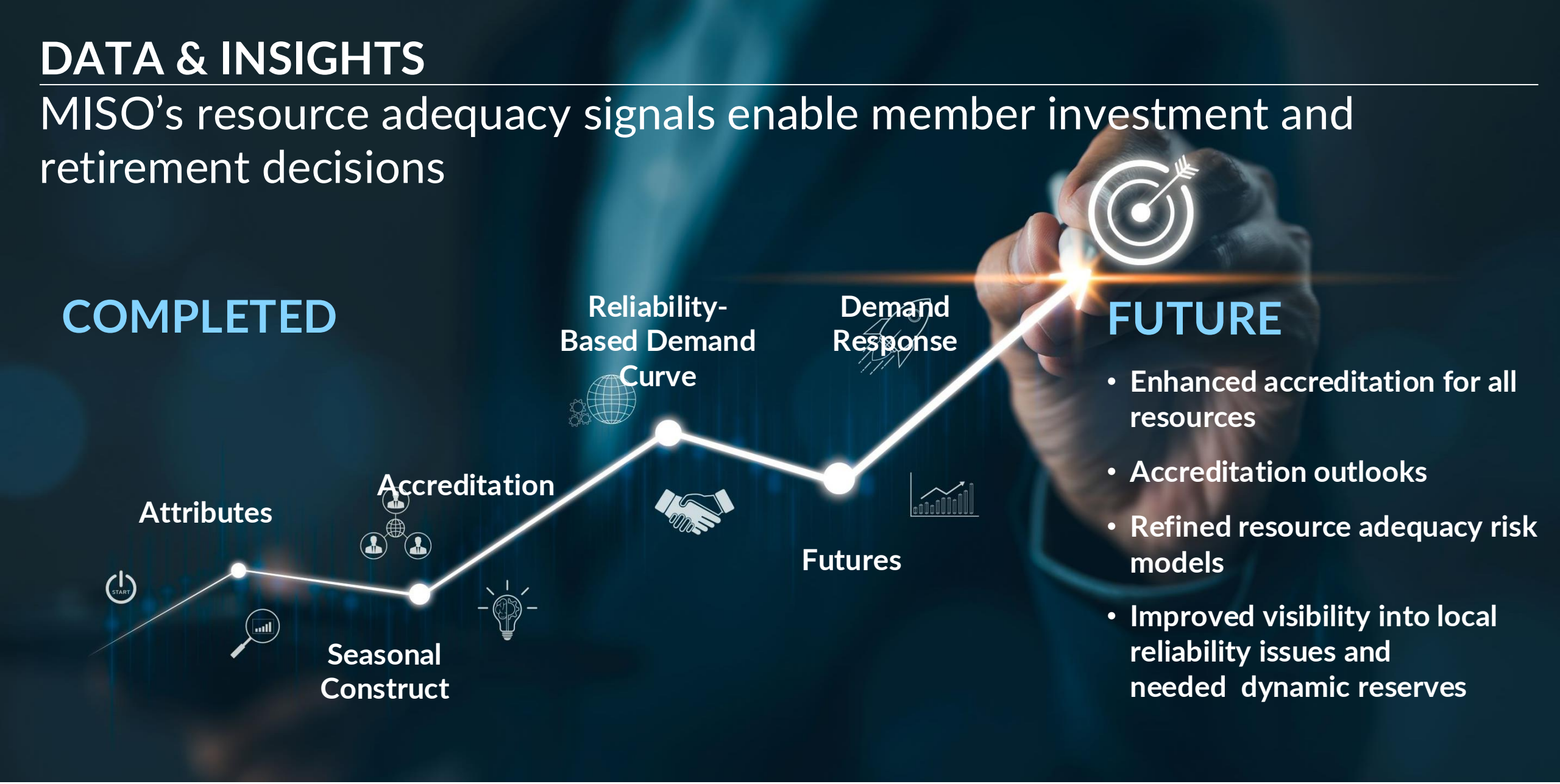
MORE SPEED

MISO has materially improved the speed of interconnection approvals, helping members move faster, but more acceleration is needed

- [x] Expedited Resource Addition Study (ERAS)
- [x] MTEP Expedited Project Review (EPR)
- [ ] Phase 2 Queue Automation
- [ ] Improve Coordination Between MTEP & GIQ Planning
- [ ] Complete 25 Generation Interconnections per quarter in 2026/27

DATA & INSIGHTS

MISO's resource adequacy signals enable member investment and retirement decisions



OPTIMIZING MEMBER PLANS

Transmission solutions are the backbone for large load growth and new resource additions

Long Range Transmission Planning

Tranche 1

Miles: 2,000

Net Benefits: $23-52B

Tranche 2.1

Miles: 3,600

Net Benefits: $23-72B

JTIQ

Projects: 5

New Generation Enabled: 28 GW

Future Focus South

- Load Growth
- Load Pockets/Reliability

Future Focus Midwest

- State and Member Goals
- Load Growth
- Sub-regional Transfers

CORE RELIABILITY FOCUS

Operating complexity has increased, and we are planning to meet emerging threats to reliability head-on

Managing High Risk Days

- Outages
- Imports
- Weather

Emerging Operating Risks

- Long-Duration Outages
- System Stability
- Load Pocket Adequacy
- Ramp / Net-Load Shape
- Large Loads

2026-2027 PRIORITIZED INITIATIVES

Member Actions:

- Accelerate pace of resource additions
- Assess retirement plans
- Improve resource performance
- Provide insights & feedback

MISO & Members

- Improve resource adequacy models
- Improve visibility into local reliability issues and dynamic reserves
- Evolve storage participation
- Enable large loads
- Improve the queue to 373 days
- Plan transmission for reliability and load growth needs
- Coordinate LRTP outages

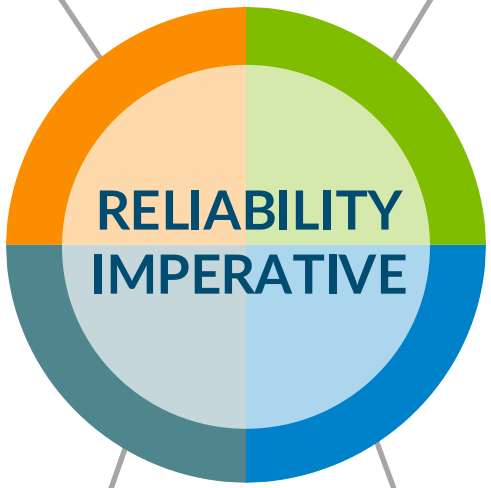
MISO and stakeholders are prioritizing Reliability Imperative initiatives

MARKET REDEFINITION

- Forecast risks & provide market signals to address reliability needs
- Incentivize reliable supply & its performance
- Reflect evolving resource adequacy assessments & outlooks

TRANSMISSION EVOLUTION

- Design a transmission system to meet future demand and resource mix
- Enhance the generation interconnections to meet member needs
- Prepare for integration of very large loads on the grid



SYSTEM ENHANCEMENTS

- Harness advanced analytics to elevate customer experience and improve business outcomes
- Leverage adaptable technology to accelerate solution delivery and drive product innovation
- Minimize cybersecurity and physical security risks to business continuity

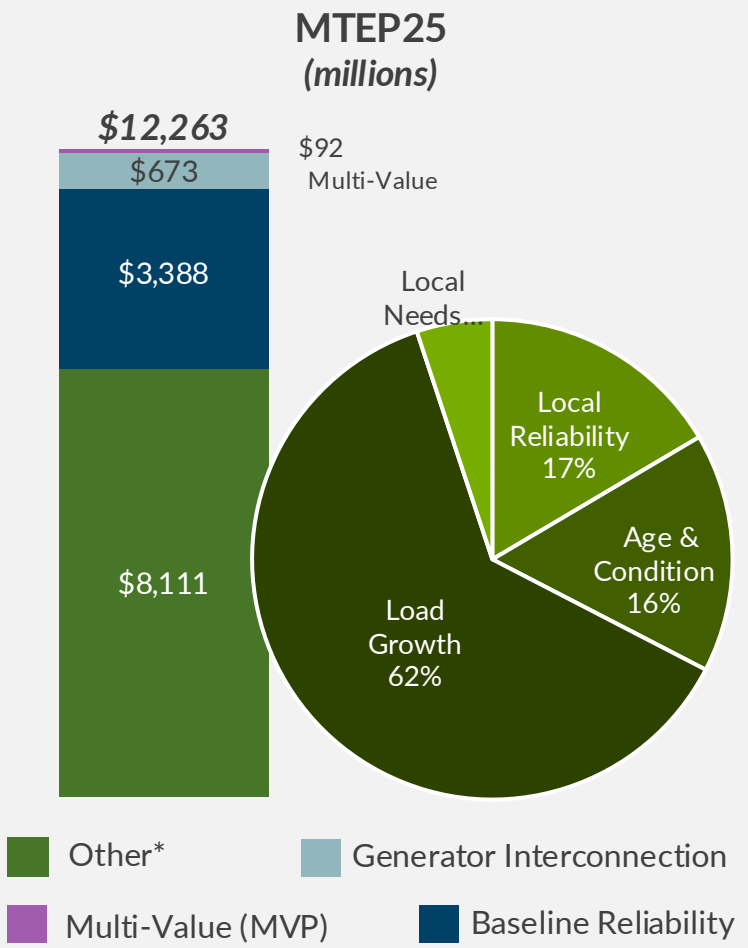
OPERATIONS OF THE FUTURE

- Build operator capabilities, tools & automation
- Manage reliability risk in grid operations
- Strengthen emergency preparedness, tabletops and simulation

Transmission Planning

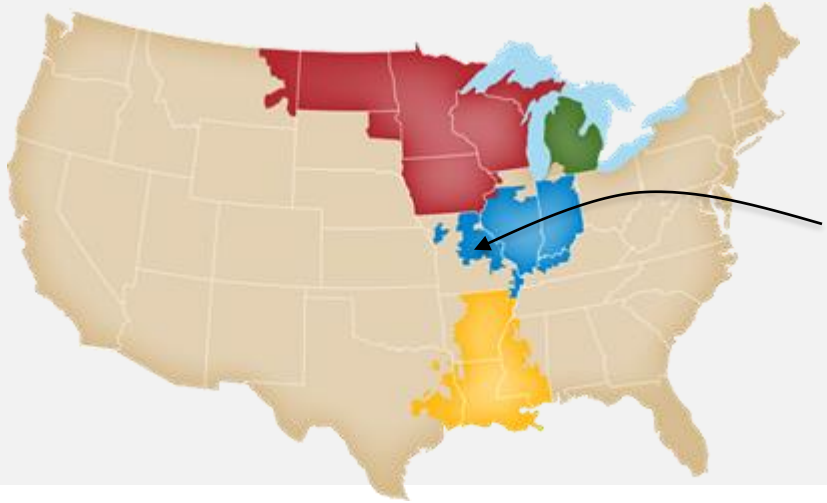
Laura Rauch, Executive Director, Transmission Planning

MTEP25, approved by the MISO Board of Directors December 11, 2025, includes of 432 projects, enabling new load, continued reliability and generation interconnection



Subregional Project Breakdown

	West	East	Central	South	Total
Line miles	849	137	546	370	1,901
Large load additions (MW)	2,376	20	4,329	4,924	11.6 GW
Expedited projects	10	1	24	14	49



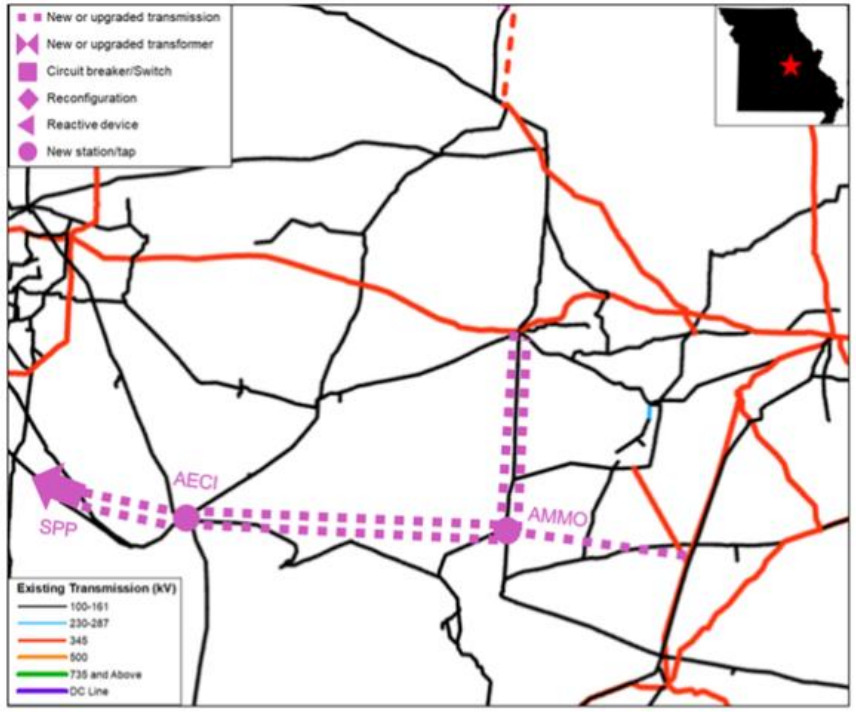
25 Projects in Missouri:

- 6 Generator Interconnection
- 19 Other
  - 5 of these are EPRs to address load growth

Project information as of October 24, 2025
*Other: Projects based on local needs including reliability, economics, equipment age and condition, environmental, etc.
EPR: Expedited Project Request

One key project is the MoMENT project; the Ameren components of the line were included in MTEP25's approved project list

50631 - Missouri Multi-Entity New Transmission (MoMENT) Project (Primary)



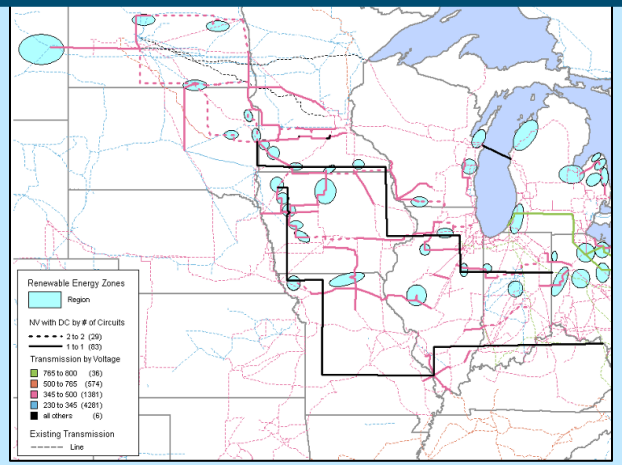
Submitting TO	AMEREN TRANSMISSION COMPANY OF ILLINOIS
Project #	50631
Project Name	Missouri Multi-Entity New Transmission (MoMENT) Project (Primary)
Project Type	Other
Project Description	New 40 mile 345 kV line from Loose Creek to Barnett. New 345/161 kV substation at Barnett. New 38 mile 345 and 161 kV double circuit line from Overton to Barnett. New 65 mile double circuit 345 kV line from Barnett to Clinton. New Clinton substation. New 50 mile double circuit 345 kV line from Clinton to LaCygne.
System Need	This program is the result of a joint effort between ATXI, AECI and Evergy to identify a portfolio of projects which would increase reliability to all customers across the Central and Western Missouri region. Benefits include Increased transfer capability between regions and increased reliability to multiple substations. Future benefits include potential interconnection points for generators and load customers.
Current Cost	$604M
Expected ISD	12/1/2030
Target Appendix	A

Figure 4.3.4-1: P50631 Geographic transmission map of project area and MTEP Portal project details.

Moving into 2026, the Midwest LRTP analysis will build on an extensive foundation of prior studies and stakeholder engagement

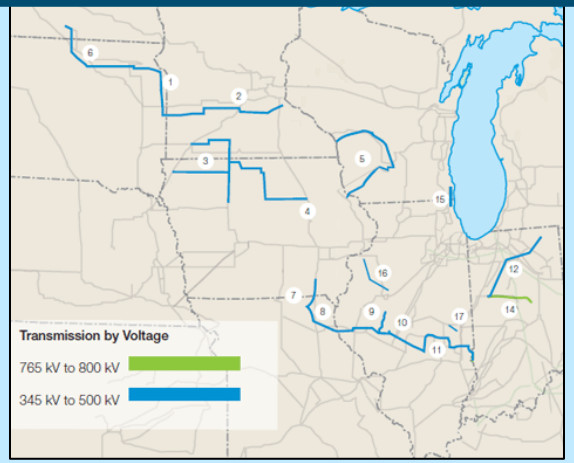
Midwest Studies

2008–2010



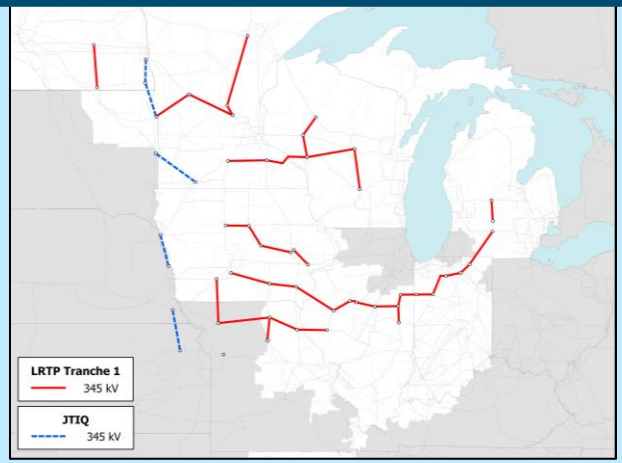
Regional Generation Outlet Study

2011



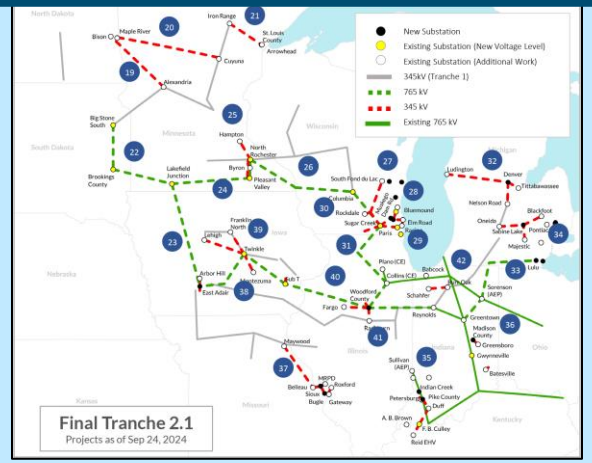
Multi-Value Project Portfolio (MTEP11)

2020–2022



Tranche 1 (MTEP21)

2022–2024



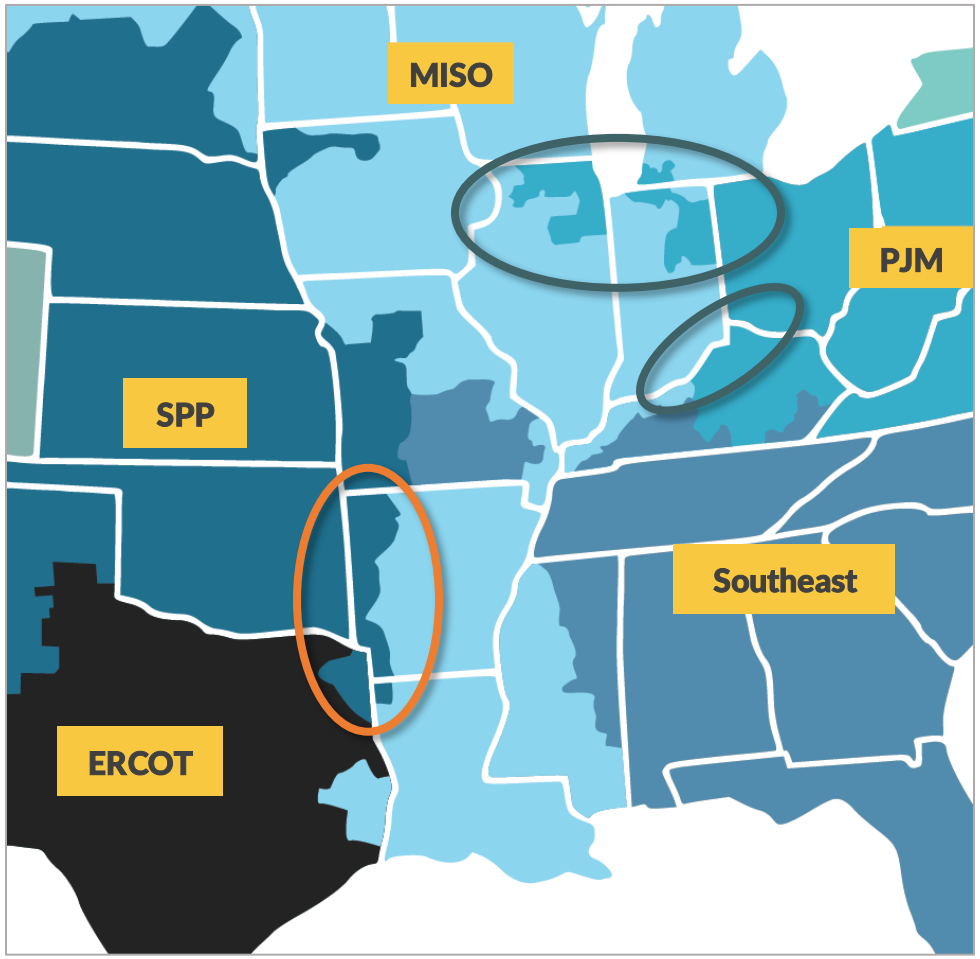
Tranche 2.1 (MTEP24)

Midwest LRTP

Needs	Support subregional transfers, state and member goals, and load growth
Process	Evaluate system reliability and economics using models defined by the updated Futures
Outcome	Solutions for identified issues (subsequent MTEP cycles)

Numbered "tranche" nomenclature is retiring as LRTP continues to progress

Separate studies with SPP and PJM are progressing with a more comprehensive and forward-looking approach than prior Coordinated System Planning collaborations



PJM – MISO Address reliability, transfer and economic needs

✓	Q1 2024	Study kick-off
✓	Nov 2024	Study update to stakeholders
✓	March 2025	Share initial results
✓	May 2025	Solicit and develop solutions options
✓	June 2025	Present potential solutions
	Q4 2025/Q1 2026	Joint stakeholder discussions on next steps

SPP – MISO Address reliability, transfer and economic needs

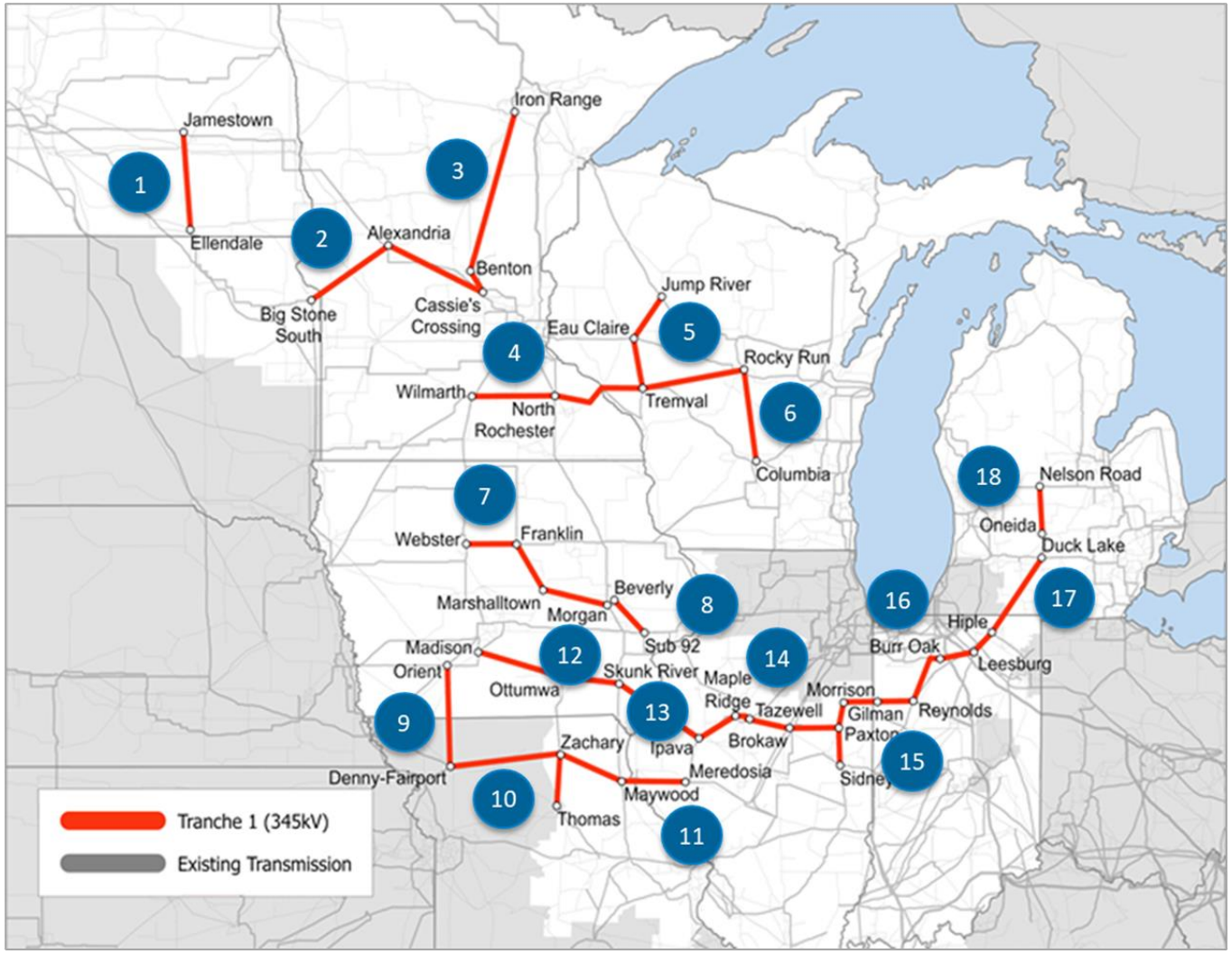
✓	Dec 2024	Final scope review
✓	May 2025	Finalize blended models
✓	Q3 2025	Share initial results and stakeholder feedback request
	Q4 2025	Evaluate potential solutions and determine business case metrics
	Q4 2025/2026	Joint stakeholder discussions on final solutions

MISO and SPP are considering a FERC filing to amend the JOA and allow projects with multiple benefits

JOA: Joint Operating Agreement

MISO Board of Directors approved Tranche 1 in July of 2022 which included a 345kV portfolio across the footprint with widespread benefits

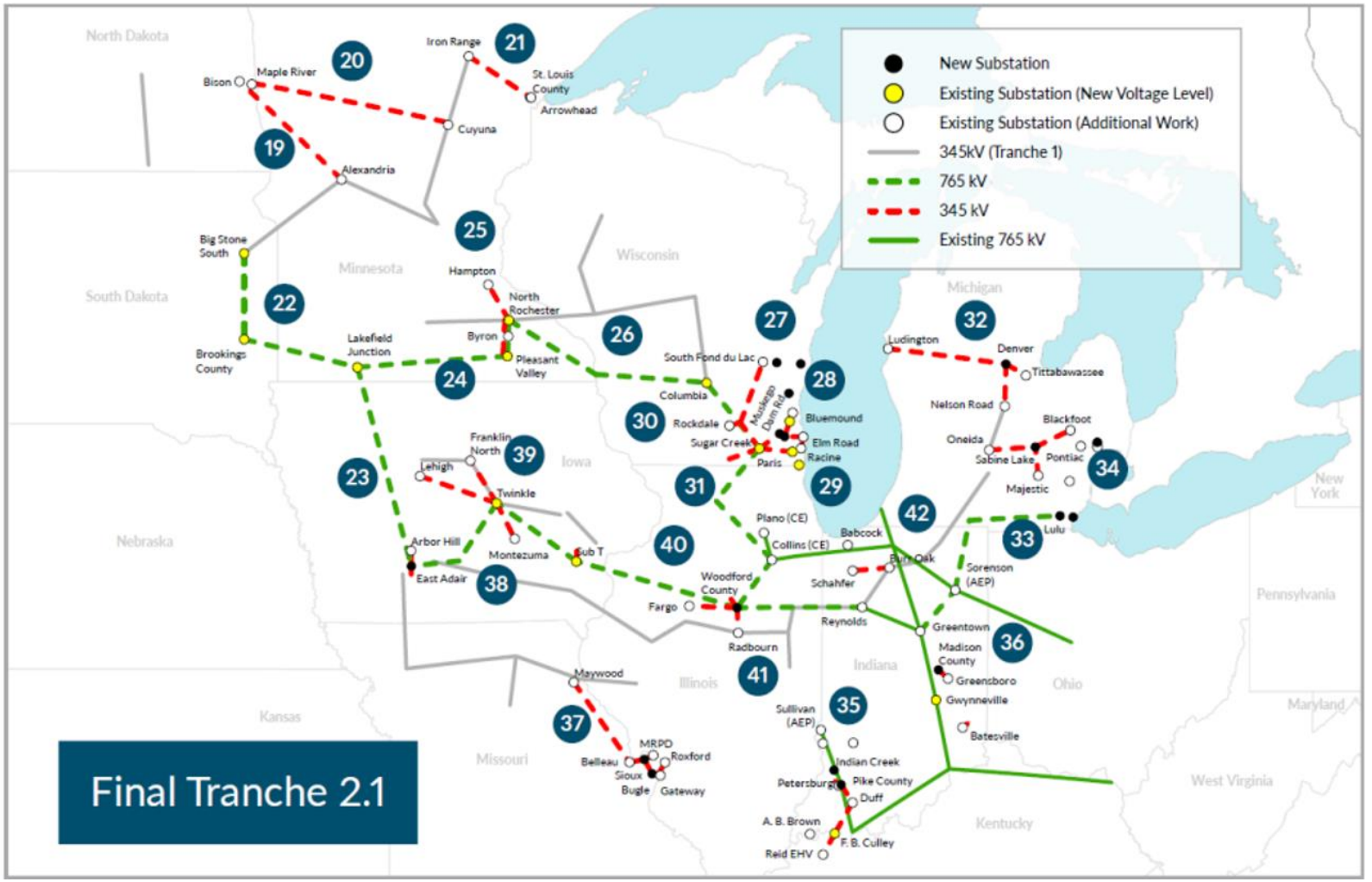
- *18-projects, $10.3 billion Midwest portfolio with a 2.6-3.8 Benefit/Cost ratio spread across the region*
- *Over 2,000 miles new transmission*
- *More than 200 formal meetings*



MISO's Long Range Transmission Planning: misoenergy.org/planning/transmission-planning/long-range-transmission-planning

MISO Board of Directors approved Tranche 2.1 in December 2024 which included a region-wide 765kV backbone with widespread benefits

- *24-projects, $21.9 billion Midwest portfolio with a 1.8-3.5 Benefit/Cost ratio spread across the region*
- *Over 3,600 miles new transmission*
- *More than 300 formal meetings*



MISO's Long Range Transmission Planning: misoenergy.org/planning/transmission-planning/long-range-transmission-planning

Transmission projects are vetted by MISO through the planning processes; project type determines cost allocation

MTEP Projects

Project Category	Multi-Value Projects (LRTP)	Market Efficiency Projects	Generator Interconnection Projects	Baseline Reliability Projects	Transmission Deliverability Service Projects	Other Projects	Market Participant Funded Projects
Needs Addressed	Provide regional public policy, economic and/or reliability benefits	Address market transmission congestion	Needed to reliably connect new generation to the transmission grid	Required to meet standards for both NERC and regional reliability	Enable power delivery	Address local reliability issues and/or provide local economic benefit	Funded by project requestor (often not a Transmission Owner)
Planning Horizon	Long-term 20+ years	Near- & long-term 15+ years	Near-term 5 years	Near-term 10 years			
Cost Allocation	Regional/subregional	Cost allocation zones	Generator, with provision to include load for projects 345 kV+	Local transmission pricing zones	The requesting load-serving entities	Local transmission pricing zone	Market Participants

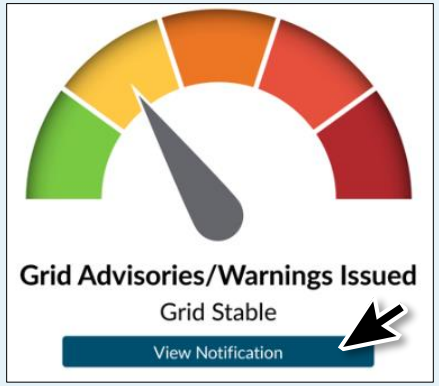
Stakeholder Input and Consideration

MISO

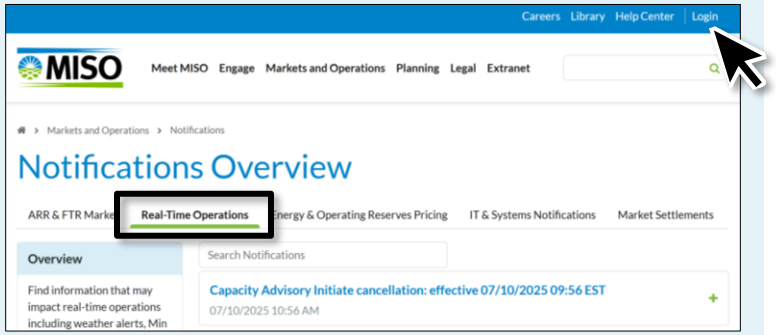
Appendix – Winter Readiness

Several ways to view MISO's real-time grid status and subscribe to notifications

Website

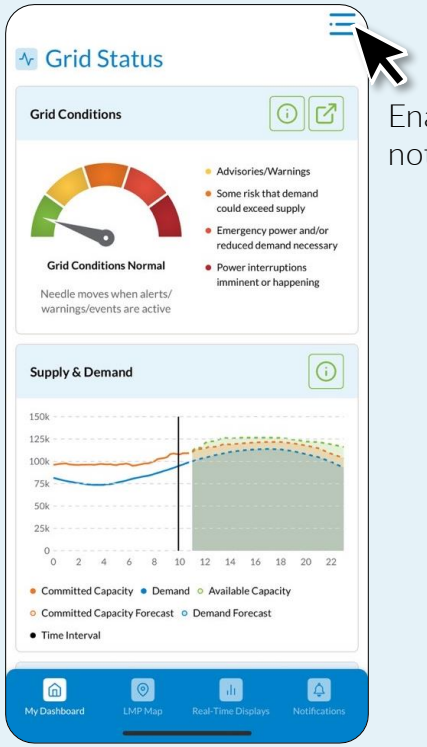


Grid Conditions Guage
(Homepage)



Real-Time Operations Notifications
(Markets and Operations > Notifications > Real-Time Operations)
Login to subscribe to email notifications

MISO App



Enable notifications

Grid Conditions Gauge
(My Dashboard)

Real-Time Operations Notifications
(Notifications > Real-Time Operations)

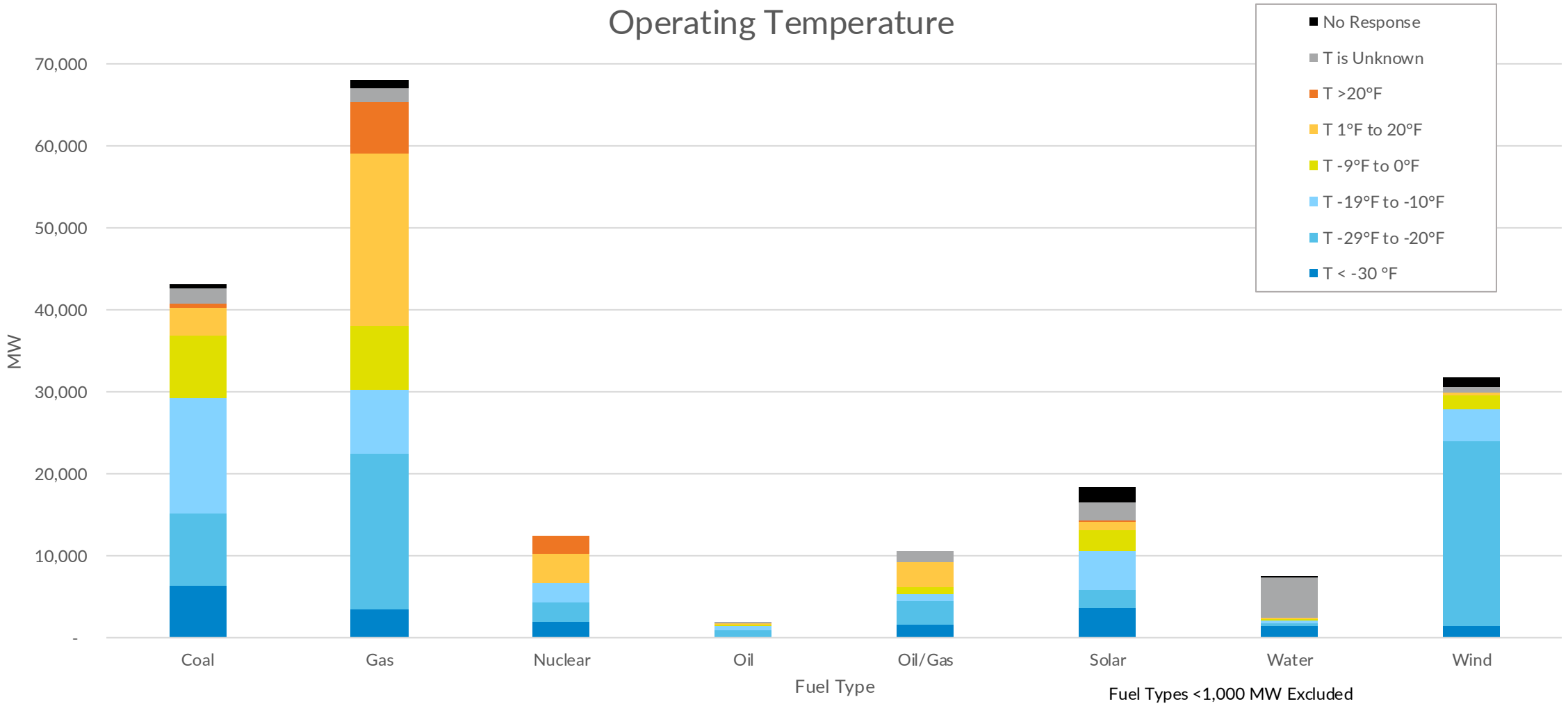
Social Media

Follow us:

@MISO-energy on X

Midcontinent Independent System Operator (MISO) on LinkedIn

Cold Weather Operating Capability by Fuel Type



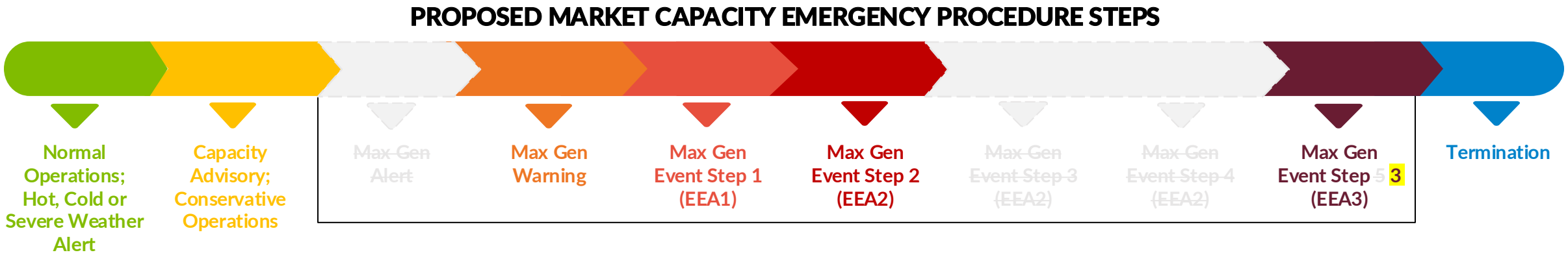
The grid conditions gauge on MISO's website reflects active market capacity conditions for members and the public

Green	Yellow	Orange	Dark Orange	Red
Grid is stable and conditions are normal	*Grid is stable and advisories or warnings are issued*	*Grid is stable and power demand could exceed supply available*	*Grid is stable and emergency power and/or reduced demand is needed*	*Power interruptions imminent or happening*
Hot Weather Alert	**Capacity Advisory**	**NERC Energy Emergency Alert 1 (EEA1)**	**NERC Energy Emergency Alert 2 (EEA2)**	**NERC Energy Emergency Alert 3 (EEA3)**
Cold Weather Alert	**Conservative Operations**			
Severe Weather Alert	**Maximum Generation Alert**			
	Maximum Generation Warning			

Grid Conditions Gauge vs. Capacity Emergency Notifications

The gauge needle moves when an alert, advisory, warning, event or termination *takes effect*, not when a notification is sent. Notifications take precedence over what is seen on the gauge.

Proposed changes for spring 2026: Maximum Generation procedures simplify to align with NERC EEA steps



PROPOSED CHANGES

Currently in the MISO stakeholder process

- Eliminates Maximum Generation Alert
- Moves procedure Step 1a (commitment of emergency-only resources) from Step 1 to Maximum Generation Warning
- Maximum Generation Steps 3 and 4 merge with Step 2
- Maximum Generation Event Step 5 renamed to Event Step 3

Definitions

Contingency Reserves	A type of operating reserve that is held to address the loss of a significant generating unit or transmission line. At MISO, this is the sum of supplemental and spinning reserves.
Emergency Demand Response (EDR)	Load reductions, behind the meter generation, and other demand resources that are available to reduce demand or increase generation in exchange for guaranteed recovery of costs associated with the response in accordance with Schedule 30 (EDR Provisions) of the Tariff. EDRs are operated outside the Operator Interface (OI) by the shift manager by using the EDR Tool.
Energy Emergency Alert Level 1 (EEA1)	A NERC-mandated alert when all available generation resources are in use. It means MISO is experiencing conditions where all available generation resources are committed to meet firm load, firm transactions, and reserve commitments and is concerned about sustaining its required contingency reserves. Non-firm wholesale energy sales (other than those that are recallable to meet reserve requirements) have been curtailed.
Energy Emergency Alert Level 2 (EEA2)	A NERC-mandated alert when load management procedures are in effect. It means MISO is no longer able to provide its expected energy requirements and is an energy deficient. MISO has implemented its operating plans to mitigate emergencies and is still able to maintain minimum contingency reserve requirements.
Energy Emergency Alert Level 3 (EEA3)	A NERC-mandated alert when firm load interruption is imminent or in progress. It means MISO is unable to meet minimum contingency reserve requirements.
Interconnection Reliability Operation Limit (IROL)	A NERC System Operating Limit that, if violated, could lead to instability, uncontrolled separation, or cascading outages that adversely impact the reliability of the Bulk Electric System.

Load Management Measures (LMM) Stage 1	Load management actions that can be taken to reduce demand to preserve or maintain operating reserves that are NOT included in EDRs or LMRs.
Load Management Measures (LMM) Stage 2	Load management actions that can be taken to reduce demand including voltage reductions and reducing loads that, by contract, can NOT be interrupted until reserves are being or are expected to be depleted and energy from emergency offers by market participants are being or are expected to be depleted. These do NOT include EDRs or LMRs.
Load Modifying Resource (LMR)	These are either demand resources or behind-the-meter generation that have an obligation to reduce demand or increase generation during declared system emergencies
Reserve Margin	The difference between total operating reserves and the operating reserve requirement. MISO is required to keep a certain reserve margin to ensure there is enough capacity to meet peak demand, plus a buffer.
Short-Term Reserve (STR)	A 30-minute rampable generation capacity product. It's designed to address short-term needs for managing system reliability.
Spinning Reserves	Reserves held that are synchronized to the system and available immediately.
Supplemental Reserves	Reserves for abnormal supply deficiencies that must be ready within 10 minutes.
System Operating Limit (SOL)	The NERC value (such as MW, Mvar, amperes, frequency or volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria. System Operating Limits are based upon certain operating criteria.
Value of Lost Load (VOLL) Pricing	The price at which MISO values the cost of unserved energy; essentially, what customers would be willing to pay to avoid an outage.

Acronyms

ACP: Auction Clearing Price

ARC: Aggregator of Retail Customers

BTMG: Behind the Meter Generator

CIL: Capacity Import Limit

CEL: Capacity Export Limit

CONE: Cost of New Entry

CPF: Coincident Peak Forecast

DLOL: Direct Loss-of-Load

DR: Demand Resource

ELCC: Effective Load Carrying Capability

EE: Energy Efficiency

ER: External Resource

ERAS: Expedited Resource Adequacy Study

ERZ: External Resource Zones

FRAP: Fixed Resource Adequacy Plan

ICAP: Installed Capacity

IMM: Independent Market Monitor

LBA: Load Balancing Authority

LCR: Local Clearing Requirement

LOLE: Loss of Load Expectation

LMR: Load Modifying Resource

LRR: Local Reliability Requirement

LRZ: Local Resource Zone

LSE: Load Serving Entity

OMS: Organization of MISO States

PO: Planned Outage

PRA: Planning Resource Auction

PRM: Planning Reserve Margin

PRMR: Planning Reserve Margin Requirement

RASC: Resource Adequacy Sub-Committee

RBDC: Reliability-Based Demand Curve

SAC: Seasonal Accredited Capacity

SREC: Sub-Regional Export Constraint

SRIC: Sub-Regional Import Constraint

SRPBC: Sub-Regional Power Balance Constraint

SS: Self Schedule

UCAP: Unforced Capacity

ZIA: Zonal Import Ability

ZRC: Zonal Resource Credit

Appendix – Transmission Planning

Transmission solutions are the backbone for large load growth and new resource additions

Long Range Transmission Planning

Tranche 1

Miles: 2,000

Net Benefits: $23-52B

Tranche 2.1

Miles: 3,600

Net Benefits: $23-72B

JTIQ

Projects: 5

New Generation Enabled: 28 GW

Future Focus South

- Load Growth
- Load Pockets/Reliability

Future Focus Midwest

- State and Member Goals
- Load Growth
- Subregional Transfers