



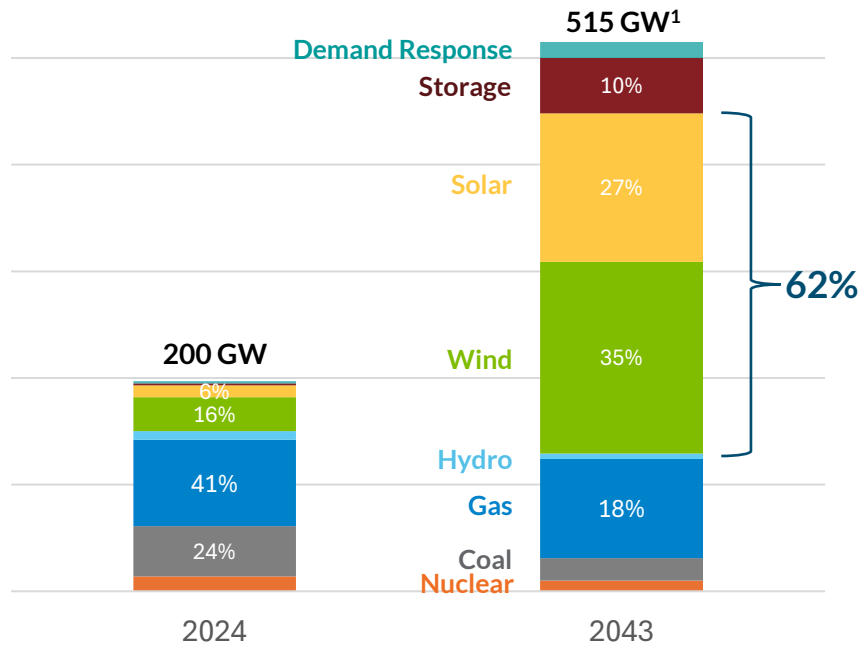
Strategy Update: Reliability Imperative

Board of Directors

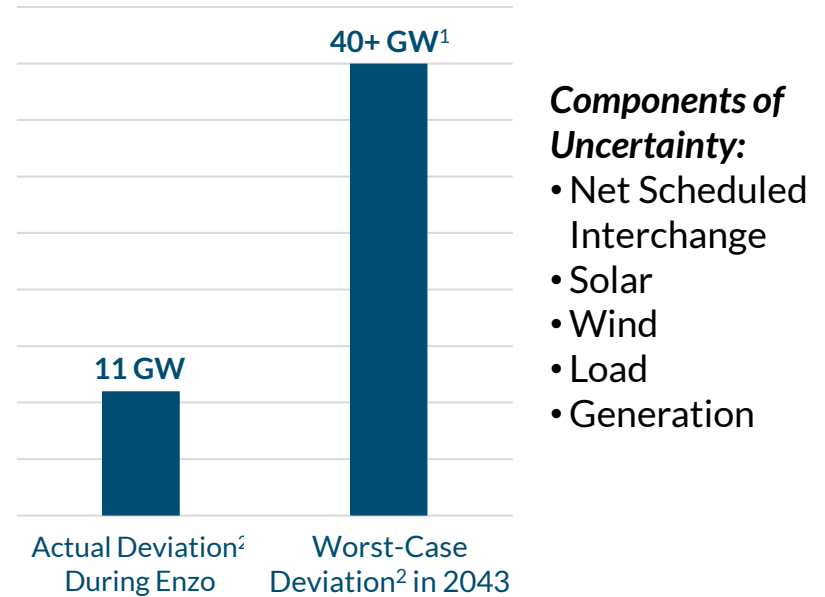
March 12, 2025

Winter Storm Enzo in January 2025 was an example of the challenges that will increase with further penetration of weather-dependent resources

Growing proportion of weather-dependent resources



Increasing uncertainty



MISO IS MEETING THIS EVOLVING NEED BY:

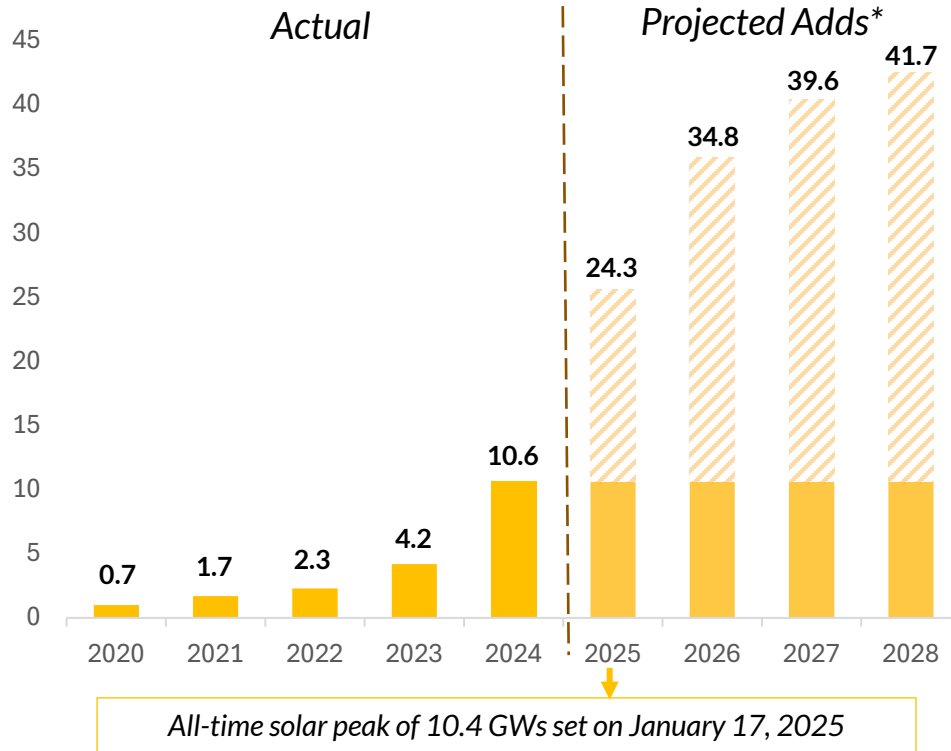
- Enhancing forecasting systems through improved data and models
- Dynamically determining regulation and ramp capability needs
- Fully automating the Uncertainty Platform

1. Source: 2024 MISO Regional Resource Assessment Report

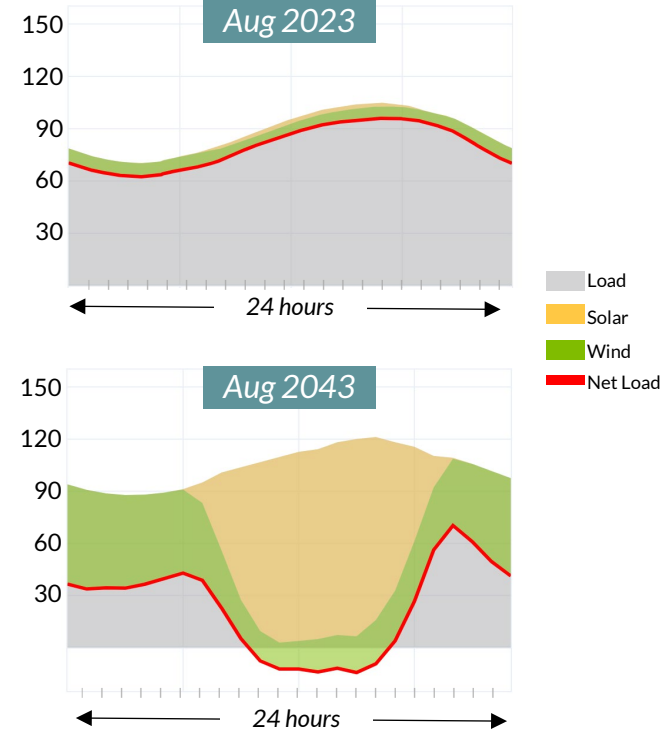
2. Deviation is the difference between plan (expected) and actual conditions

The solar growth trend will result in increasing net load ramps, potentially exceeding 100 GW by 2043

Installed Solar Capacity (GW)



System Net Load (GW)

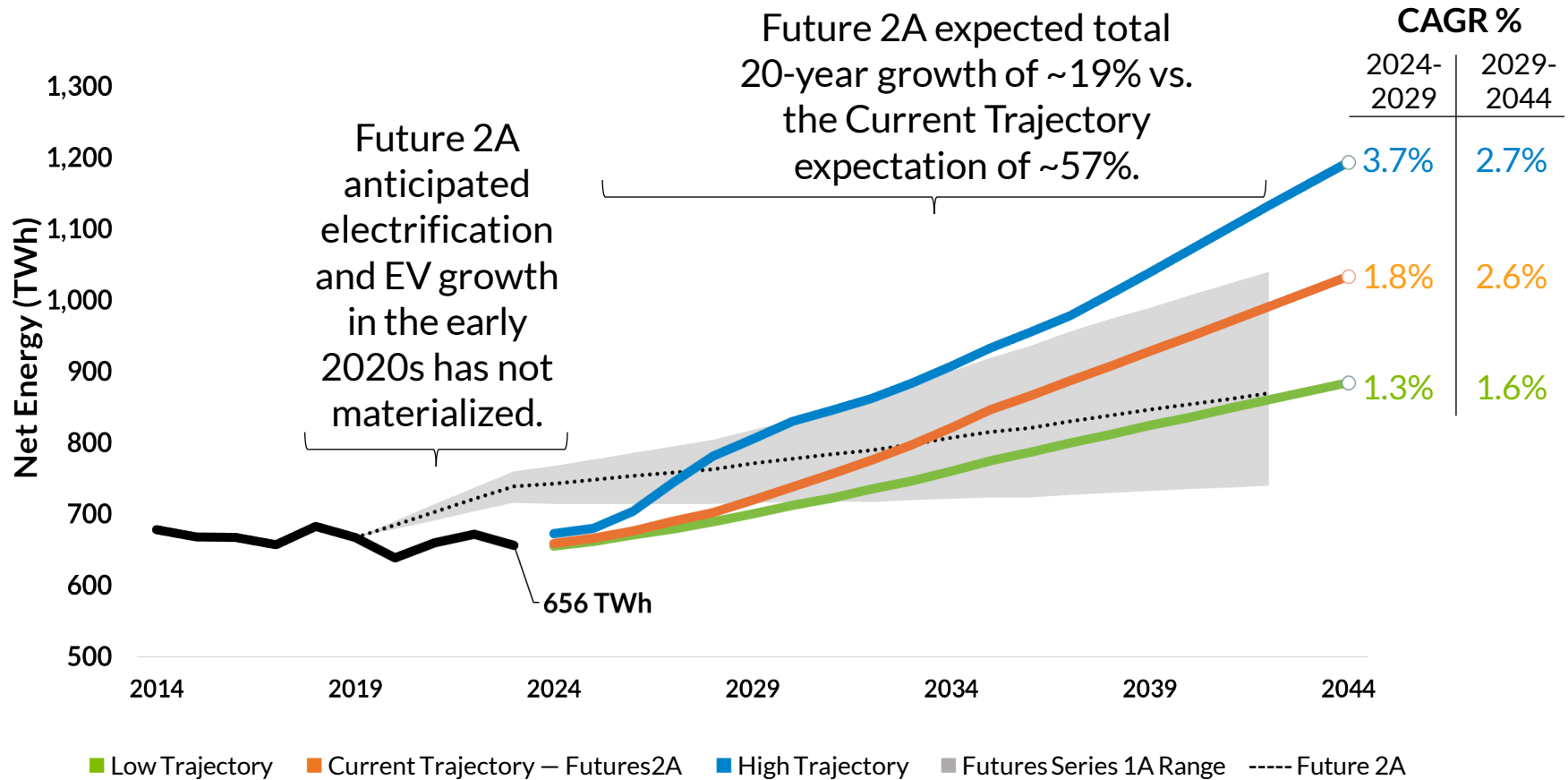


MISO IS MEETING THIS EVOLVING NEED BY:

- Dynamically determining ramp capability reserve needs
- Enhancing how we commit and dispatch generation
- Evaluating need for market products to manage longer-term ramp

* Signed Generator Interconnection Agreements Only

Higher load growth indicated by our probabilistic load forecast scenarios will exacerbate operational and resource adequacy risks



Source: MISO Long-Term Load Forecast White Paper

We have completed a number of foundational initiatives

MARKET REDEFINITION

Completed

- ✓ Attributes Roadmap published
- ✓ Seasonal Resource Auctions (2024-25 PRA)
- ✓ Accreditation - Direct Loss of Load (2028-29 PRA)
- ✓ Reliability Based Demand Curve (2025-26 PRA)
- ✓ Value of Loss Load FERC Filing
- ✓ Shortage Pricing FERC Filing
- *Demand Response and Emergency Response (DRER) reform (~March 2025)**

SYSTEM ENHANCEMENTS

Completed

- ✓ Protective Security Controls
- ✓ Data Governance
- ✓ Data & Analytics Platform
- ✓ Machine Learning Tool
- ✓ New Day-Ahead Market Clearing Engine



TRANSMISSION EVOLUTION

Completed

- ✓ MVP Revised Cost Allocation
- ✓ LRTP Tranche 1 Portfolio
- ✓ Joint Targeted Interconnection Queue
- ✓ LRTP Tranche 2.1 Portfolio
- *Expedited Resource Addition Study (ERAS) Process filing (March 2025)**

OPERATIONS OF THE FUTURE

Completed

- ✓ Operator Training and Development Program
- ✓ Uncertainty Management – Wind & Solar Modeling with Risk Integration
- ✓ Predictive Outage & Congestion Management

**Ongoing*

MARKET REDEFINITION

Progress continues on several key priorities designed to inform member and state resource retirement and investment decisions...

Reliability-Based Demand Curve

- FERC-approved
- Design and systems work complete
- Stakeholder engagement to maximize awareness underway

Planning Resource Auction in April will be first executed with RBDC

Non-Emergency Resource Accreditation

- FERC-approved
- Three-year transition before implementation for 2028/29 Planning Year

Establishing process to share accreditation data and insights with stakeholders annually beginning in 2025

Shortage Pricing

- Proposal filed at FERC
- Target implementation of September 30

Anticipating FERC decision by April 1 requested date

Demand Response and Emergency Resource Reforms*

- Significant extension of schedule in response to stakeholder requests for more discussion
- Updated white paper with proposal details published in January
- Additional discussion at January and February RASC meetings, and January Workshop

FERC filing to occur in late Q1

* Previously referred to as Load Modifying Resource (LMR) Reforms

MARKET REDEFINITION

...and we are advancing other key initiatives that will positively impact reliability and system efficiency

Reliability Metrics

- Published a roadmap in December to consider the effectiveness of the current 1-day-in-10-year loss of load resource adequacy criteria and explore potential alternatives

We will publish additional metrics and information during 2025 and collaborate with OMS on their potential use

Ambient Adjusted Line Ratings (Order 881)

- MISO has developed a Weather Information Interface to provide Transmission Owners the weather data needed to calculate ratings
 - Testing is progressing well
- Vendor constraints impacting us and members

We will be requesting an extension of the compliance deadline to December 2028

Distributed Energy Resources (Order 2222)

- FERC accepted the implementation timeline and proposed limit to area DERs can be aggregated over in our second compliance filing
- FERC did not accept early DRR Type 1 participation option as it found we did not adequately explain how the size limitation complies with original Order

We have up to six months to determine our path forward and advise FERC

TRANSMISSION EVOLUTION

Given the rapidly changing landscape, we have initiated an update of the Futures to ensure we are planning towards appropriate scenarios



The process will involve several workshops to engage stakeholders



Load Growth



Grid Reliability & Resilience



Policy Goals



Economic Development

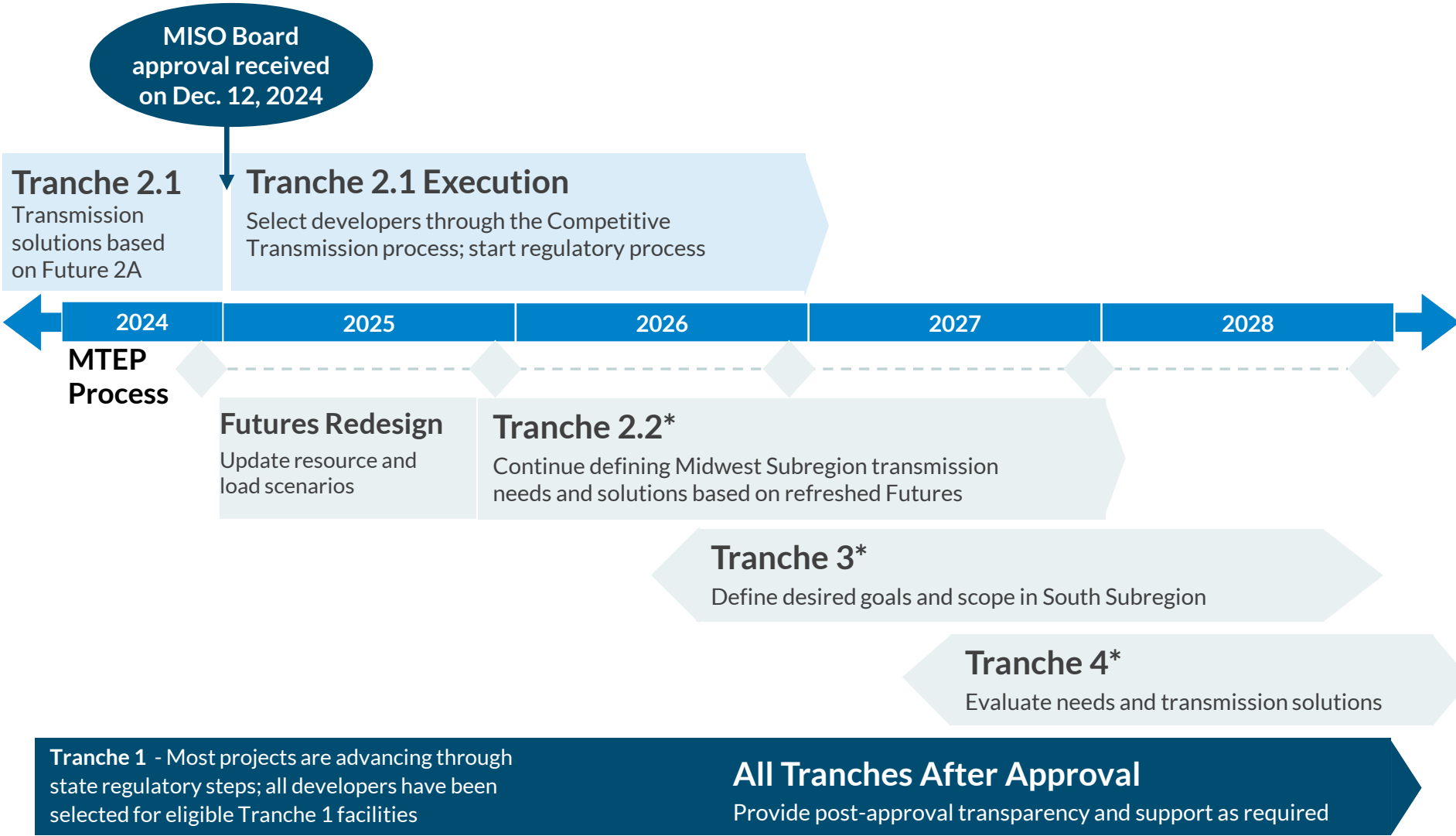


Energy Costs



Resource Adequacy

MISO Transmission Planning Outlook



◆ Annual MISO Transmission Expansion Plan (MTEP) Report Publication
 * Exact timing has not been determined and could vary from this representation



TRANSMISSION EVOLUTION

We are nearing implementation of interconnection queue reforms designed to reduce study cycle time to one year...

Generator Interconnection Request Cap

- Approved by FERC in January 2025
- Requests capped at 50% of each region's non-coincident peak load
- First-in, first-selected; projects over cap become first in line for next cycle
- More manageable number of request will yield improved study efficiency and effectiveness

Interconnection Process Improvements

- New automation* developed
 - With MISO internalizing study components, early benchmarking shows significant time reduction for preliminary studies
- New application portal to be available in June
 - Improved customer interface and experience, and data quality

Cap and process improvements / automation will be implemented with the study cycle beginning in May

* Implementing SUGAR (Suite of Unified Grid Analyses with Renewables) software

TRANSMISSION EVOLUTION

...and we are finalizing our proposed Expedited Resource Addition Study (ERAS) process to support the timely approval of needed new resources in the interim



Addresses resource additions or adequacy needs that must be resolved within the next five years



Projects would be evaluated individually instead of in clusters, allowing GIA execution within months versus years



Provides a temporary solution, sunsetting in 2028 after the Queue process has improved to a near one-year timeframe



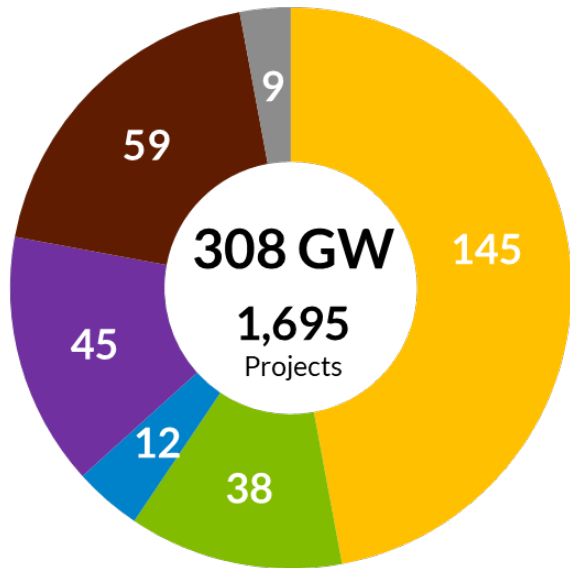
Available for new projects and some existing projects already in the Queue

GIA = Generator Interconnection Agreement

TRANSMISSION EVOLUTION

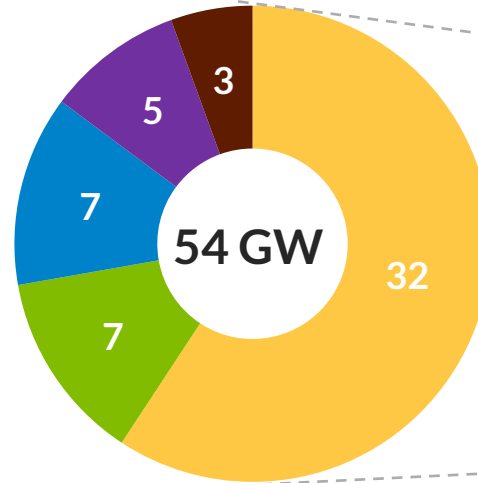
The long-duration, flexible, firm, and controllable resources needed to balance the system and support new large loads are not being prioritized, and many resources are delayed

Active Queue*
Nameplate Capacity (GW)

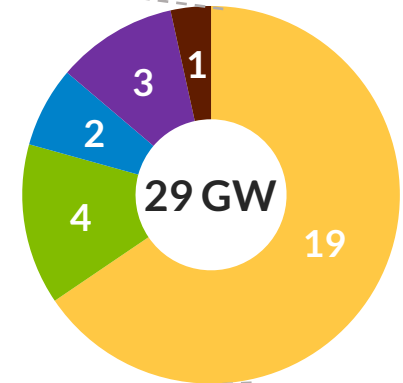


Approved, but Not Online**
Nameplate Capacity

Waiting Projects
Signed GIA but not yet online



Delayed Projects
Subset of Waiting Projects, some will not make GIA schedule terms



■ Solar ■ Wind ■ Storage ■ Hybrid ■ Gas ■ Other

Energy storage, the topic of the afternoon discussion, can help but requires technological advances to provide all these needs

*Queue data as of 2/6/2025. Data does not reflect additional nameplate capacity from repowering existing generating facilities.

** Approved data as of 1/21/2025

GIA = Generator Interconnection Agreement

The work outlined here is just a subset of the many Reliability Imperative priorities designed to reliably enable member and state plans and goals

MARKET REDEFINITION

Improve Market Signals & Resource Adequacy

- Demand Response and Emergency Resource Reforms
- Provide Accreditation Data
- Implement Shortage Pricing Across Time Horizons
- Execute Planning Resource Auction with Sloped Demand Curve
- Illustrate Energy Adequacy Risks Across Time Horizons and Locations
- Revise and Communicate Risk Metrics
- Implement Dynamic Locational Reserve Products Including Flexibility & Ramping

TRANSMISSION EVOLUTION

Enable Resource Fleet & Needed Transmission

- Reform Interconnection Queue to Achieve one year cycle time
- Enable Expedited Resource Additions Through New Study Process (ERAS)
- Revise MISO Futures
- Develop Probabilistic Load Forecast



SYSTEM ENHANCEMENTS

Digital & Data Transformation

- Implement Real-Time Market Clearing Engine
- Enhance Systems to Accommodate New Rules (e.g., Order 881)
- Expand Data & Analytics Modeling Capabilities
- Apply Advanced National Institute of Standards and Technology Cybersecurity Framework

OPERATIONS OF THE FUTURE

Grid Management & Control Room Readiness

- Advance Platform to Improve Risk Assessment & Evaluation
- Probabilistic Forecasting to Capture Growing Uncertainty and Complexity
- Evolve Operator Training and Development
- Enhanced Scenario Manager for Operations Simulator

Results of the 2024 Value Proposition study highlight the growing benefit of a regional approach, as well as grid and market adaptations to support an evolving fleet



2024 Analysis

Annual benefits grew from \$4.9 billion in 2023 to:

\$5.1 billion

Cumulative benefits since 2007 are over:

\$50 billion

Benefit-to-cost ratio steady with 2023:

15:1