



# Indiana Winter Preparedness

Winter 2024-2025

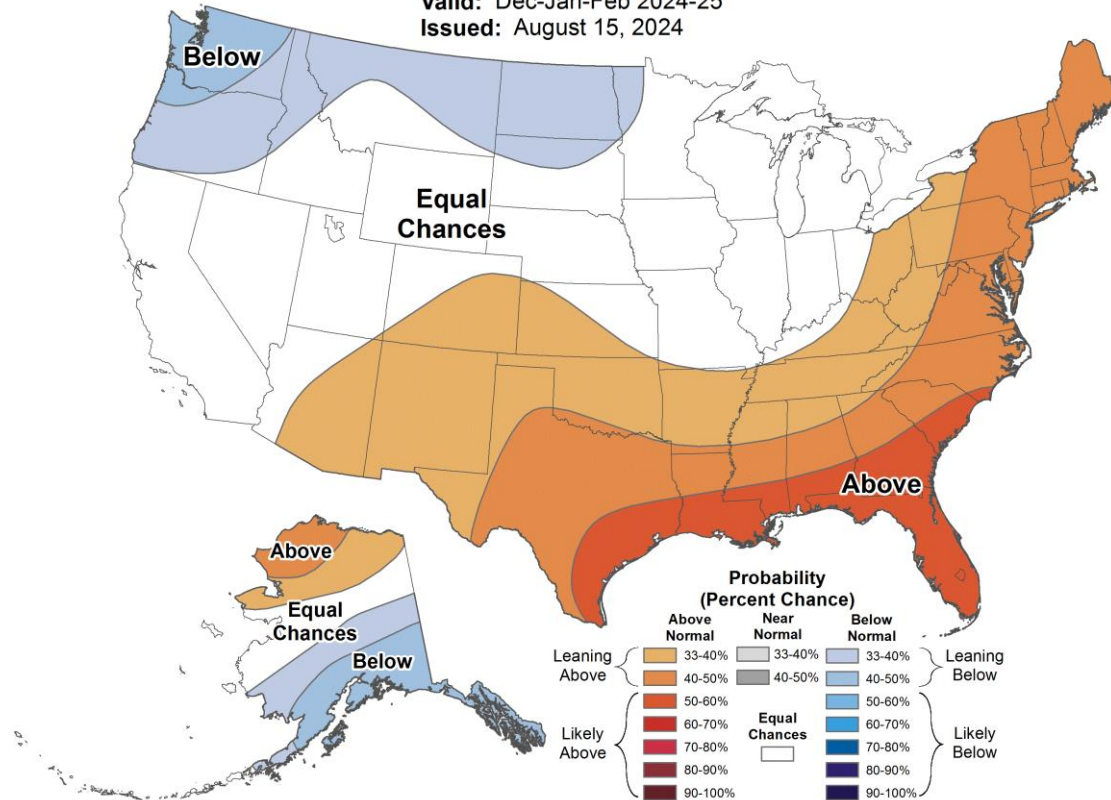


# Seasonal Temperature Outlook



Valid: Dec-Jan-Feb 2024-25

Issued: August 15, 2024



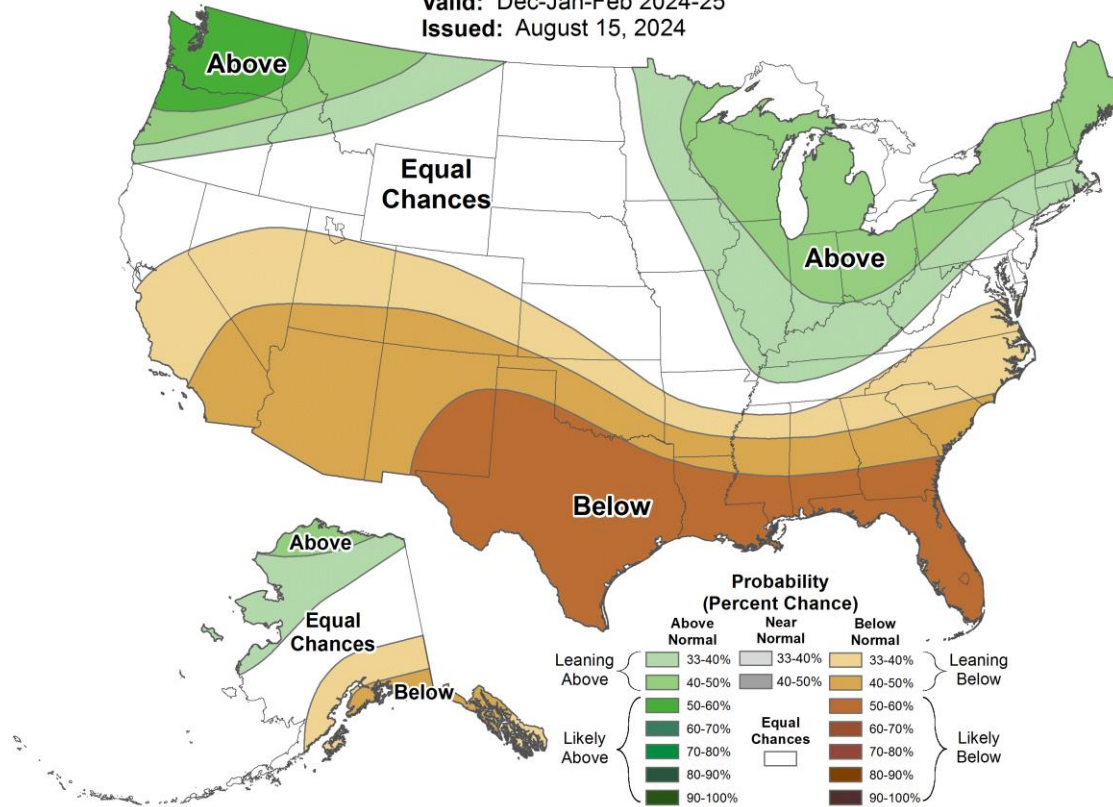


# Seasonal Precipitation Outlook



Valid: Dec-Jan-Feb 2024-25

Issued: August 15, 2024



# Average wind generation and normal to above normal solar generation forecasted.

December 2024 to February 2025 Wind Anomalies



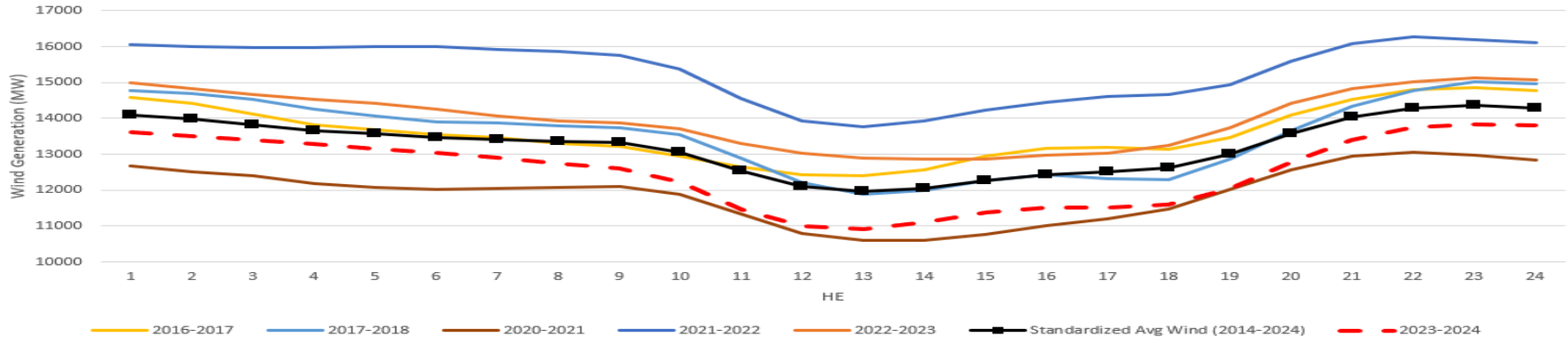
Valid for: DEC-FEB Forecast Wind Anomalies (m/s) DTN<sup>®</sup>

December 2024 to February 2025 Solar Anomalies



Valid for: DEC-FEB Forecast Avg Daily Solar Anomalies (W/m<sup>2</sup>) DTN<sup>®</sup>

MISO Winter (Dec-Feb) Hourly Standardized Wind Generation (2024 Pmax Base)

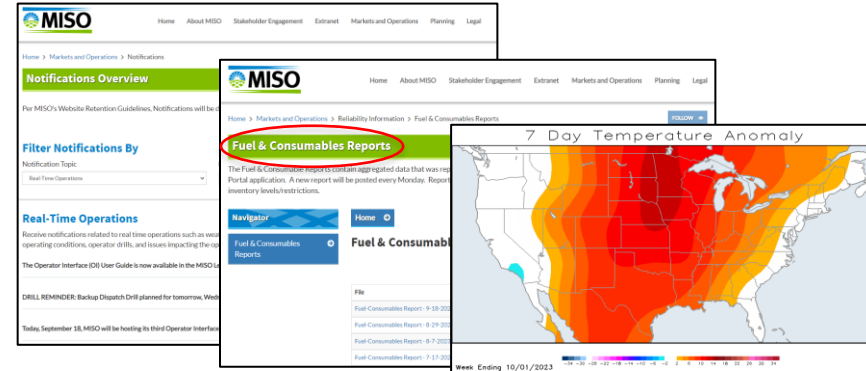


# Analytical assessments and additional data sources help measure uncertainty and pre-position the system for those risks

MISO uses its normal Multi-Day Forward Reliability Assessment and Commitment processes to pre-position commitments for extreme weather or other types of extreme events. Analytical assessments are performed to measure uncertainty and ensure adequate capacity for the footprint.

Additional sources of data are used to inform and help assess commitment decisions, such as:

- Gas pipeline bulletin boards
- Weather forecasts
- Weekly fuel & consumables data
- Annual winterization survey

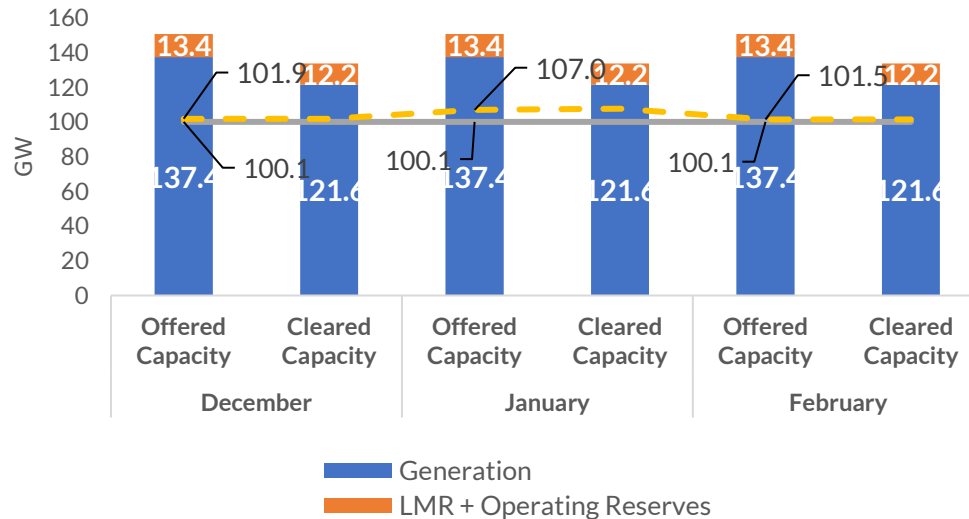


# MISO projects sufficient capacity to cover both a Coincident and Non-Coincident Peak Forecast

Coincident Peak Forecast is submitted by MISO LSEs relative to the MISO seasonal peak. Calculated on a seasonal basis

Non-Coincident Peak Forecast is the peak load submitted by each LSE per month

Winter 2024-2025 Resource Adequacy Projections - Systemwide\*



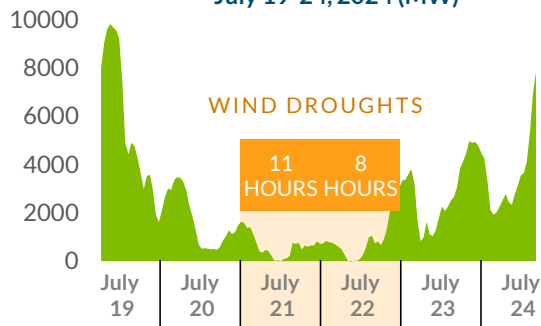
\*Based on the 2024 Planning Resource Auction data

LMR: Load Modifying Resource LSE: Load Serving Entity

# The transition to primarily weather-dependent resources is creating new and changing operational risks and challenges

## LONG-DURATION OUTAGES

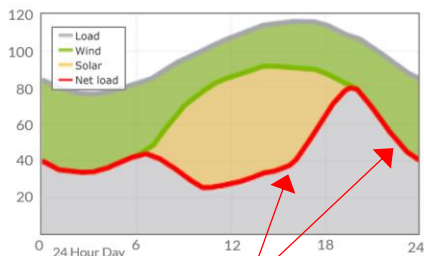
MISO Hourly Wind Output  
July 19-24, 2024 (MW)



~19 hours of essentially zero wind

## SHIFTING NET-LOAD SHAPES

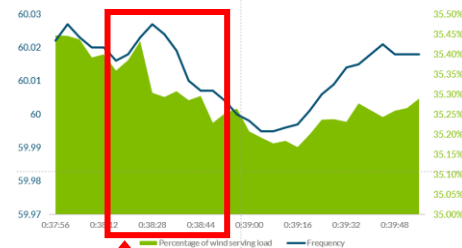
Future System Net Load  
Average Summer Day - 2032 (GW)



High ramp up need in early evening and high ramp down need middle of the night

## SYSTEM STABILITY

Frequency & High-Wind Output  
March 3, 2024



Wind is one of several factors that MISO has linked to increased frequency fluctuations

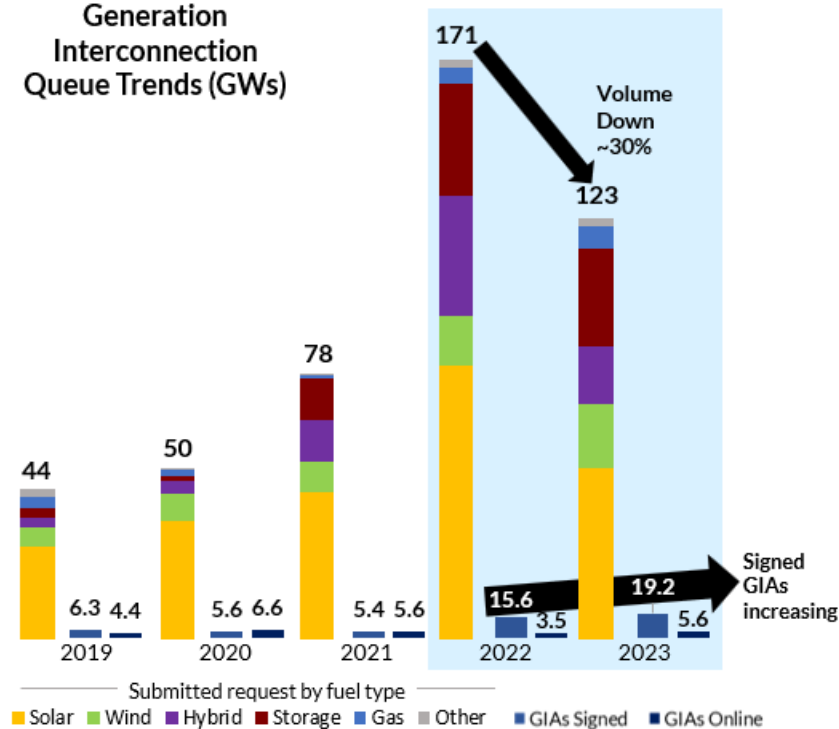
*Enabling the right system attributes – energy adequacy, generation flexibility and system stability – is vital as operational challenges from the energy transition are here, and will only continue grow in complexity, frequency and impact*

# System Reforms & Improvements



# MISO reforms and FERC Order 2023 measures to improve project readiness appear to be effective as the 2023 Queue volume decreased by ~30%

Generation Interconnection Queue Trends (GWs)



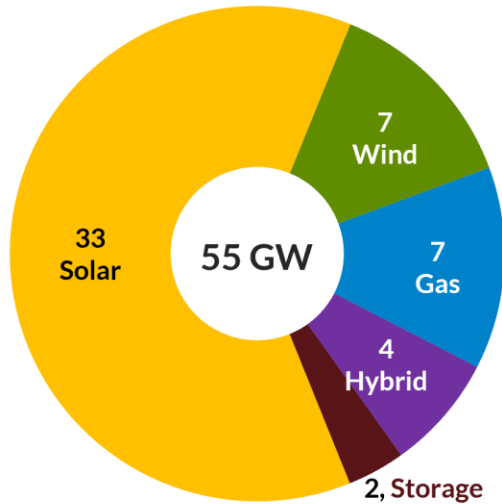
Generator Interconnection Requests

| GI Requests | 2023 New* | Active Queue** |
|-------------|-----------|----------------|
| Size        | 123 GW    | 349 GW         |
| Solar       | 41%       | 49%            |
| Storage     | 23%       | 21%            |
| Hybrid      | 14%       | 16%            |
| Wind        | 15%       | 11%            |
| Gas         | 5%        | 2.5%           |
| Other       | 2%        | 0.5%           |

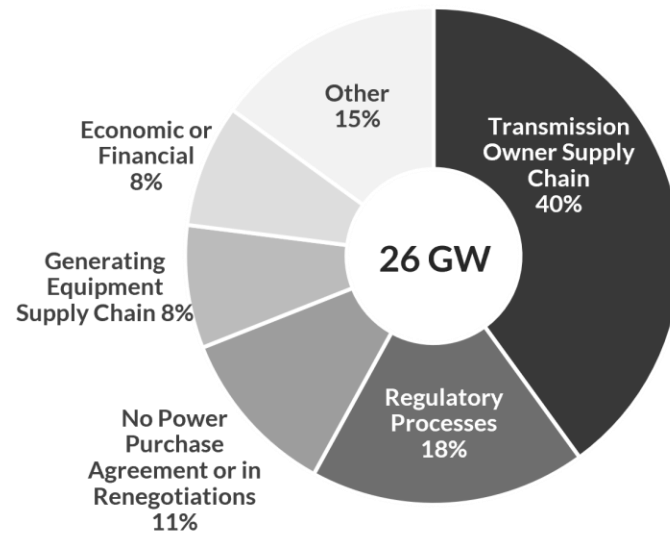
- Reforms included withdrawal penalties and improvement to site control rules
- Construction delays continue, with an average of ~5 GW per year of nameplate capacity coming online annually

# While we are approving more new resources, approximately half continue to experience delays in getting online

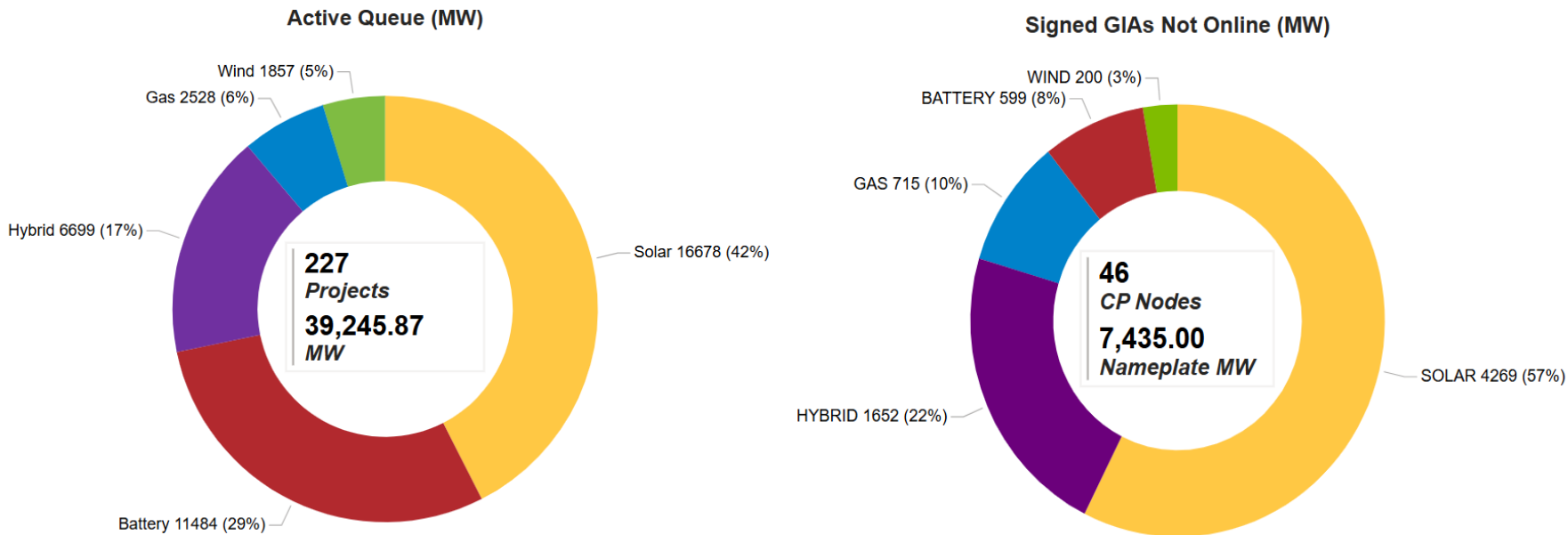
Approved Generator Interconnection Requests (GW)\*



Approximately Half the Projects Report Development Delays\*\*



# Interconnection efforts in the Indiana footprint reflect those of the broader region



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



- The pace of change is *faster* than predicted
- The magnitude and complexity of change is *greater* than expected
- Urgent and coordinated action is needed to address these challenges

## 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

## 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

## 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

## System Enhancements

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

# Real-Time Market and Operations Display is available via the MISO website and the Mobile App

www.misoenergy.org

**Markets and Operations**

- ARR and FTR Market
- Independent Market Monitor
- Market System
- Reliability
- RT AND MARKET DATA
- Markets Displays
- Operations Displays
- Market Reports
- Market Report Archives
- Credit Requirements
- Market Participant Registration

**RELIABILITY INFORMATION**

- Fuel and Consumables Reports
- Reliability Operating Procedures
- Winterization

**SETTLEMENTS**

- Market Settlements
- Transmission Owner Rate Data
- Transmission Settlements and Pricing

**NOTIFICATIONS**

- Notifications
- Gas Pipeline

**CURRENT SNAPSHOT**  
10/11/2024 1:43:00 PM EST

- \$22.18** MARGINAL ENERGY COST (\$/MWH)
- 79,654** FORECASTED PEAK DEMAND (MW)
- 77,160** CURRENT DEMAND (MW)
- 2,992** SCHEDULED IMPORTS (-) / EXPORTS (+) (MW)

|           | MCC   | MLC   |       |
|-----------|-------|-------|-------|
| MINN HUB  | 21.57 | 0.00  | -0.67 |
| MS HUB    | 21.70 | 0.00  | -0.54 |
| SWPP      | 22.65 | 0.00  | 0.41  |
| TEXAS HUB | 22.30 | 0.00  | 0.06  |
|           | 21.18 | -1.08 | 0.02  |
|           | 22.31 | 0.23  | -0.16 |
|           | 21.71 | 0.00  | -0.53 |
|           | 22.29 | 0.73  | -0.68 |
|           | 21.59 | 0.00  | -0.65 |

**LMP Contour Map**  
11-Oct-2024 - 12:40 EST

MINN HUB 21.90  
ILLINOIS HUB 21.65  
INDIANA HUB 22.59  
ARKANSAS HUB 21.50  
MS HUB 21.68

MISO App

**Grid Status**

Grid Conditions

- Advisories/Warnings
- Some risk that demand could exceed supply
- Emergency power and/or reduced demand necessary
- Power interruption imminent or happening

Grid Conditions Normal  
Needle moves when alerts/warnings/events are active

Supply & Demand

- Committed Capacity
- Demand
- Available Capacity
- Committed Capacity Forecast
- Demand Forecast
- Time Interval

Price: **\$30.92** per MWh hour

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# THANK YOU & QUESTIONS

