

A large, light gray sunburst graphic is positioned on the left side of the slide. It features a central white circle with rays extending outwards in a semi-circular pattern, creating a fan-like effect. The rays are composed of various geometric shapes, including triangles and trapezoids, all in shades of gray.

2016 Winter Readiness Assessment

Midcontinent ISO

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2016 MISO Winter Readiness Overview

MISO projects adequate reserves to meet the 2016-2017 winter season

2016-2017 Winter Assessment underway, final results presented at October 31st Winter Readiness Workshop

**MISO Winter Projected Reserve Margin:
28.4% to 37.5%**

Enhancements, maturation of Polar Vortex improvements, high levels of winter reserves and routine planning and preparation, favorably position MISO to meet winter needs

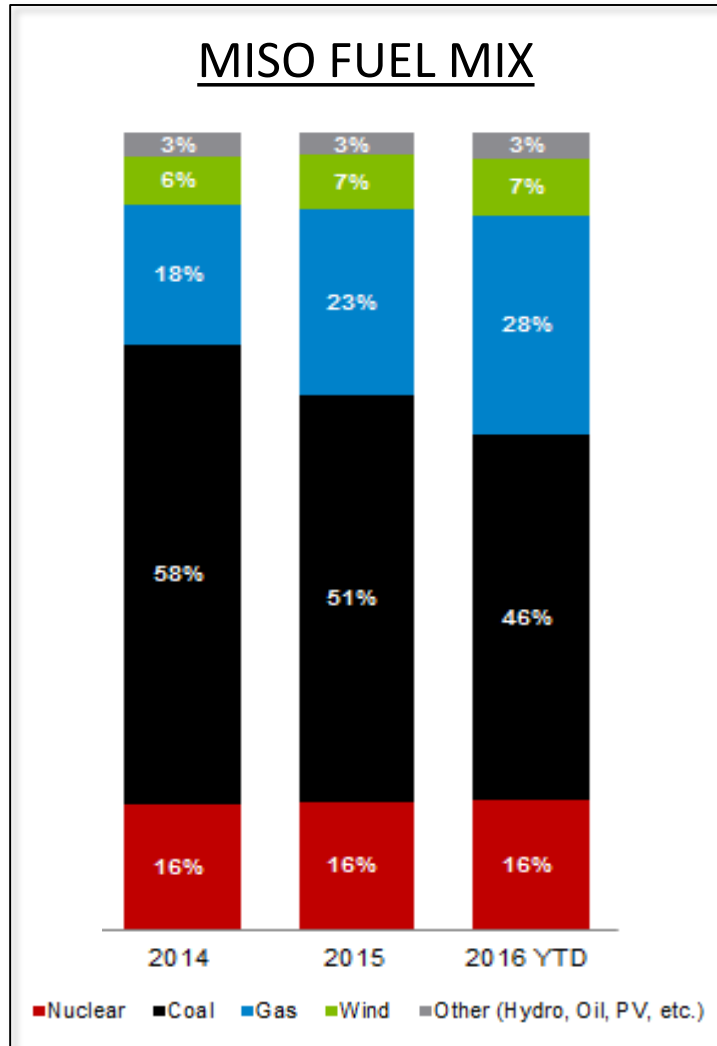


MISO Preliminary 2016 Winter Forecast

2016 Total Available Capacity= 140.8 GW

2016 Winter Coincident Peak Forecast = 104 GW
(All Time Winter Peak: 109.3 GW)

Natural Gas Coordination improvements stemming from Polar Vortex lessons learned remain important as MISO's fuel mix shifts



GAS-ELECTRIC IMPROVEMENTS

Operational Contact List for Pipelines

Winter Generator Survey

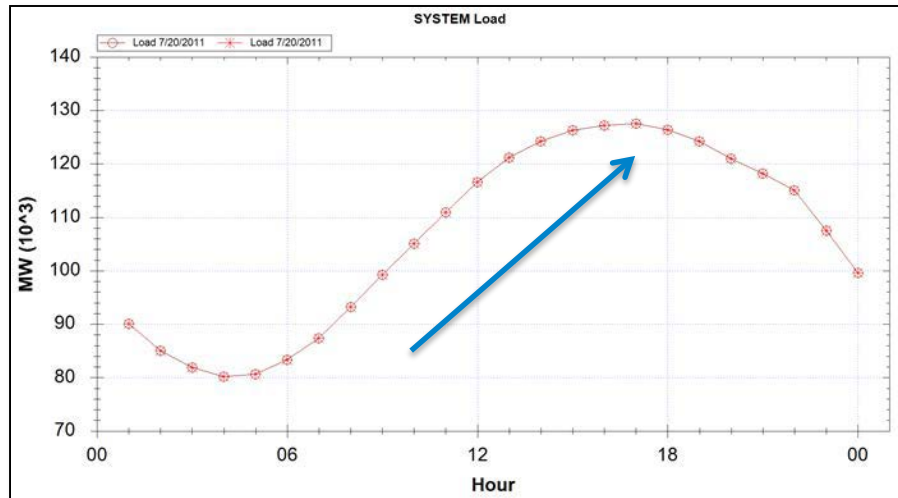
MISO Communication System expanded to include Pipelines

Expanding monthly Operations Call

Source: MISO RTO/ISO Metric Reports to FERC for years 2006 through 2014; 2015 and 2016 from MISO Data Services

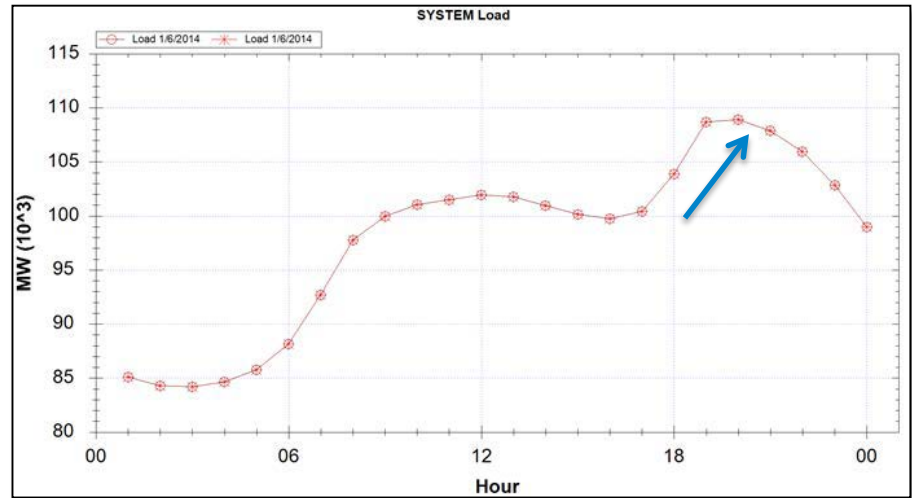
Operational challenges, including peak load pick-up patterns, vary from the summer season to the winter season

Summer Load Pattern



Gradual load increase, but weather makes load forecasting difficult

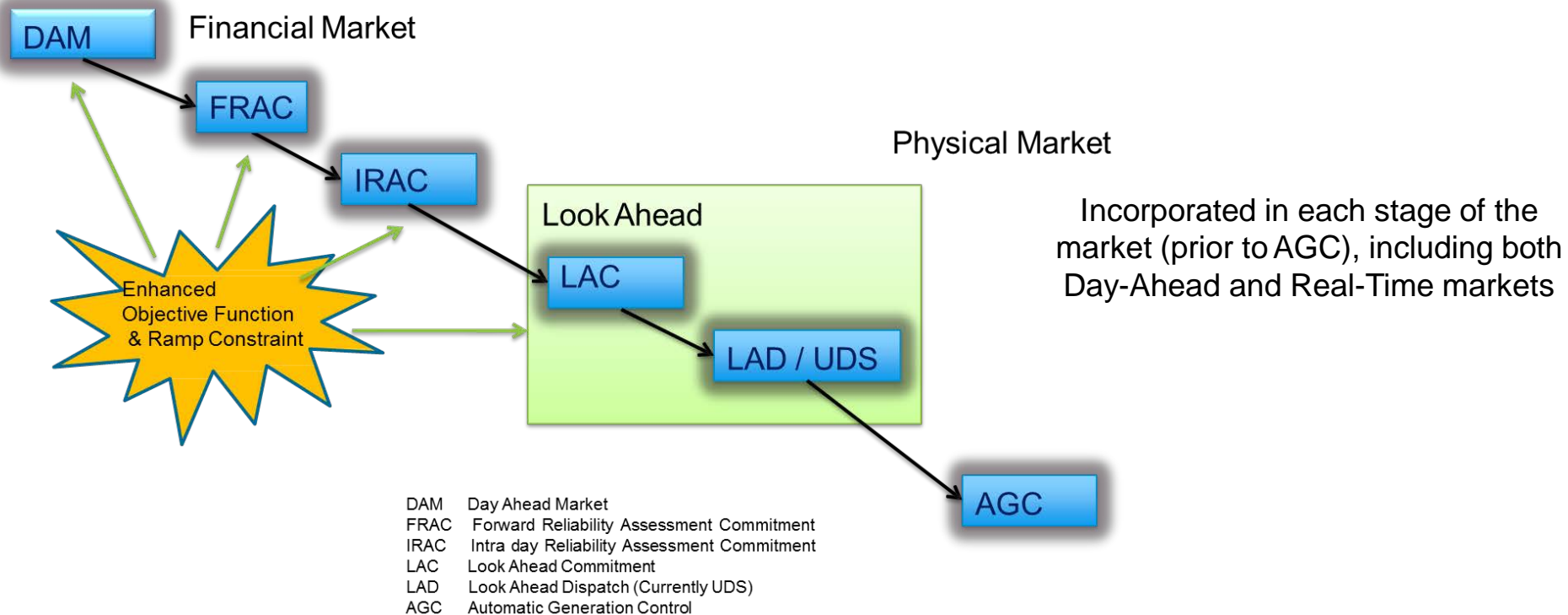
Winter Load Pattern



Steep load increase requires MISO to dispatch short lead resources

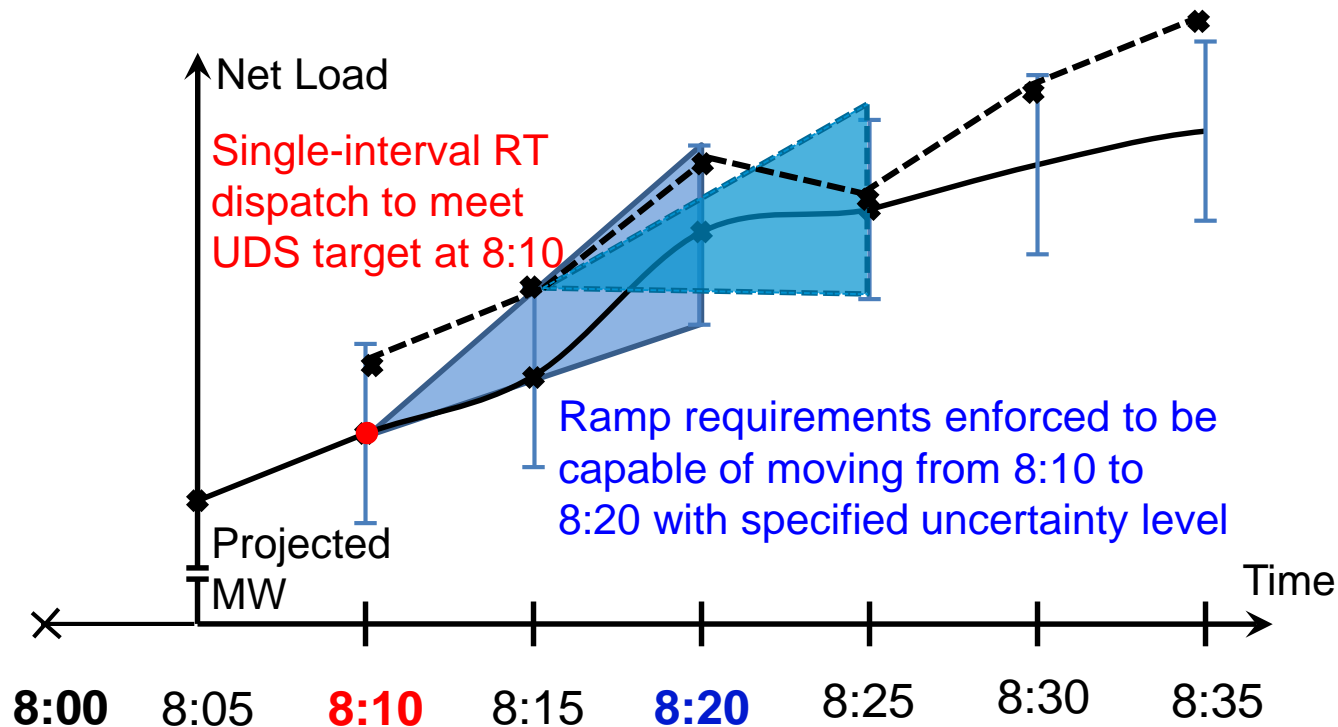
Ramp shortages are the most common cause of short-term scarcities and price spikes

Ramp Capability Product addresses the increasing system ramping needs arising from recent market evolutions



Ramp requirements are set to manage net load variations and uncertainties ten minutes beyond dispatch target

- Bi-directional: Up and down ramp requirements are enforced independently with separate quantities
- System-wide: Deliverability captured through ramp procurement post-deployment transmission constraints



Several operational and market enhancements have been implemented that improves MISO's preparedness for winter 2016

SPP Settlement

Feb 2016

- Increased transfer limits from 1000 MW bi-directionally to 3000 MW for North-to-South (N-S) flows and 2500 MW for South-to-North (S-N), increase system efficiency and diversity

Ramp Product

May 2016

- Provides transparent price signals to help manage ramp constraints that could lead to short-term reserve scarcity events

Emergency Pricing

July 2016

- Creates price signals to appropriately value emergency resources and prevent uneconomic price suppression during emergencies

FERC Order 809

Nov 2016

- MISO will implement changes to its Day Ahead Market to align with the Gas industry

Standard preparations for the winter season will position MISO to meet the needs of winter 2016

WINTER WEATHER PREPARATIONS

Planning

- Transmission Overlay and Infrastructure
- Training
- Studies

Multi-Year

- Multi Value Project Portfolio

Annual

- Readiness Workshop
- Fuel Survey
- Winterization

Monthly

- Generator Testing
- Operations Drills

Daily

- Peak Hour Planning
- Reliability Calls
- Pipeline Monitoring

Real-Time

- Abnormal/ Emergency Operations
- Declarations and Alerts

Questions??