



National Academies of Sciences, Engineering, and Medicine

- Committee on Modernizing
the U.S. Electrical System -

May 13, 2019

MISO recently published “MISO Forward” that looks at industry trends creating opportunities and challenges...and informing MISO needs for the future

Three Identified Key Needs



<https://www.misoenergy.org/forward/>

Gas-fired generators play a key role in future MISO needs

MISO NEEDS

AVAILABILITY

The ability of transmission and energy resources to meet requirements at all hours

FLEXIBILITY

The ability to anticipate and adapt to frequent and significant changes in resource output and demand, including the enabling of new sources of flexibility

VISIBILITY

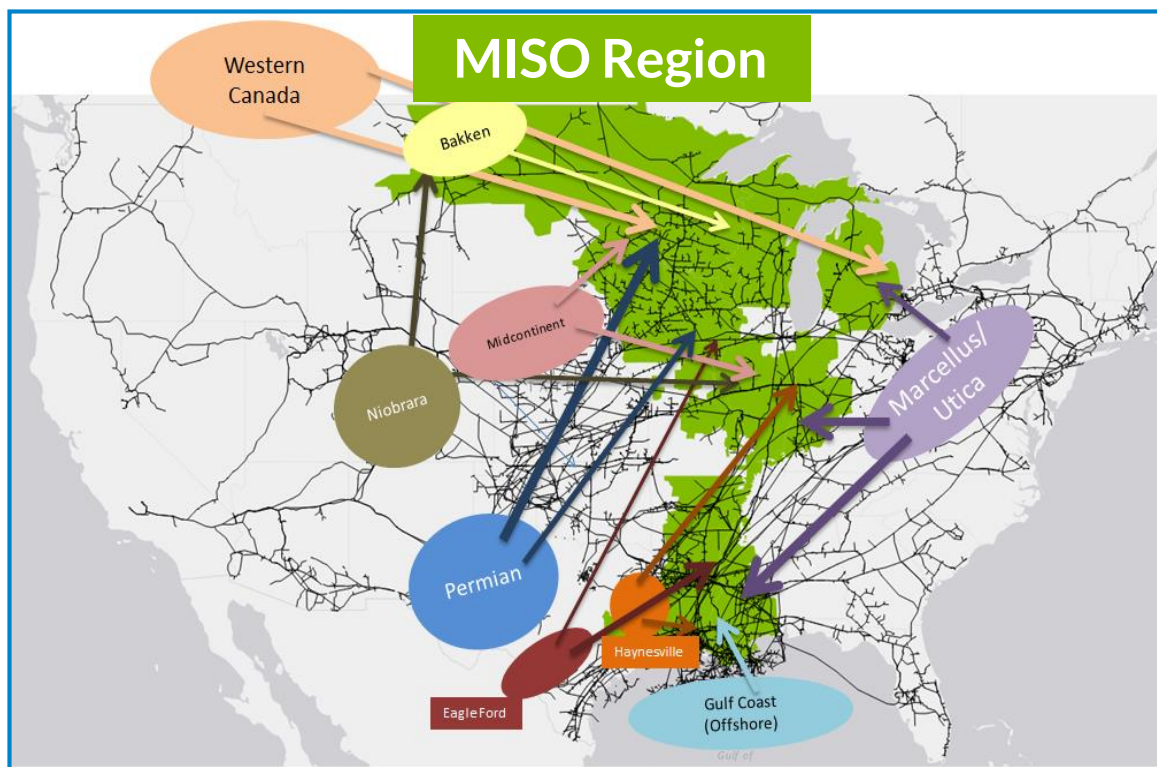
The ability to see and coordinate relevant resource, demand, and power flow attributes in operating and planning horizons

Fuel Assurance Touchpoints:

Disruptive Gas Events

- Fuel assurance in severe winter weather
- Should month availability
- Increased ramp rates
- Short-notice starts; multiple starts
- Planning assumptions
- Situational awareness
- Tools and coordination

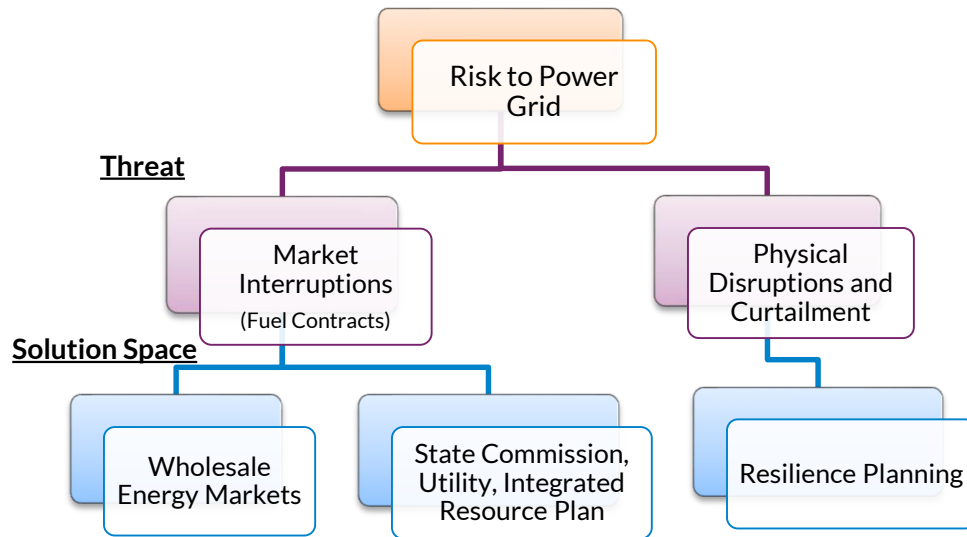
Looking forward...how to best harness MISO's 70 GW of gas-fired resources and also assess/mitigate risk?



- Gas at 25% of annual generation and headed to 30-40%
- Key attributes - Availability and Flexibility
- Fuel assurance factors
 - Topology
 - Concentration
 - Timing
 - Duration
 - Generator and grid alternatives
- Gas role in broader MISO fleet

MISO is favorably positioned relative to U.S. gas supply and infrastructure with access to all major gas supply basins, 30+ interstate pipelines, 20+ gas utilities and over 50% of total US gas storage capacity

Fuel risk has different components...with different solution spaces



MISO Historical Fuel Assurance Focus:

- Operations
 - Situational awareness and communications (pipeline notice website, control room displays of pipelines, generator surveys, daily “at risk” report, outage code changes, post event analysis, pipeline communications, etc.)
- Planning
 - 30+ gas contingencies evaluated annually
 - 2018 study on past gas system events and impacts
 - Changing fleet and exposures
- Markets - design, products, alignment
- Policy/Outreach
 - OMS, NERC, Industry, NAESB

Future Focus:

- Better align MISO planning, resource adequacy, and markets with needs of the future grid
- Advance risk assessments in analytics, metrics, and mitigation
- Harness regional strengths (collaboration with states, gas-side capability)