

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

<b>Centralized Capacity Markets in Regional</b>	)	<b>Docket No. AD13-7-000</b>
<b>Transmission Organizations and Independent</b>	)	
<b>System Operators</b>	)	
	)	
<b>Winter 2013-2014 Operations and Market</b>	)	<b>Docket No. AD14-8-000</b>
<b>Performance in Regional Transmission</b>	)	
<b>Organizations and Independent System</b>	)	
<b>Operators</b>	)	

**MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, INC.  
FUEL ASSURANCE REPORT**

The Midcontinent Independent System Operator, Inc. (“MISO”) submits the attached Fuel Assurance Report in response to the Federal Energy Regulatory Commission’s (“FERC” or “Commission”) November 20, 2014 Order on Technical Conferences<sup>1</sup> in the above-captioned proceedings. In the November 20, 2014 Order, the Commission directed each Regional Transmission Organization and Independent System Operator to file a report on the status of its efforts to address market and system performance associated with fuel assurance issues. MISO’s Fuel Assurance Report addresses the Commission’s three specific areas of inquiry: (1) Nature of fuel assurance concerns specific to the MISO region; (2) Comprehensive strategies that MISO has implemented or plans to implement to address market and system performance in light of each of its fuel assurance concerns; and (3) Specific programs and mechanisms that MISO will use to carry out its strategies.

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<sup>1</sup> Order on Technical Conferences, *Winter 2013-2014 Operations and Market Performance in Regional Transmission Organizations and Independent System Operators*, 149 FERC ¶ 61,145 (2014).

Respectfully submitted,

*/s/ Kari A.E. Bennett*

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February 18, 2015

**CERTIFICATE OF SERVICE**

I hereby certify that I have this day e-served a copy of this document upon all parties listed on the official service list compiled by the Secretary in the above-captioned proceeding, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2012).

Dated this 18<sup>th</sup> day of February, 2015 in Carmel, Indiana.

/s/ Rhiannon R. Shelley  
Rhiannon R. Shelley



# **Midcontinent Independent System Operator, Inc. Fuel Assurance Report**

**FERC Dockets AD13-7-000, AD14-8-000**

**February 18, 2015**

## Background

On November 20, 2014, the Federal Energy Regulatory Commission (Commission) issued an Order on Technical Conferences related to fuel assurance issues. The Order directed each RTO/ISO to file a report on the status of its efforts to address market and system performance associated with fuel assurance issues. This response from the Midcontinent Independent System Operator, Inc. (MISO) addresses the Commission's three specific areas of inquiry:

- I. Nature of fuel assurance concerns specific to the MISO region;
- II. Comprehensive strategies that MISO has implemented or plans to implement to address market and system performance in light of each of its fuel assurance concerns; and
- III. Specific programs and mechanisms that MISO will use to carry out its strategies.

### I. Executive Summary

Fuel assurance is an important consideration in resource adequacy and energy market operations, and a critical factor in MISO's ability to reliably meet customer's electricity needs under a wide range of operating conditions. Fuel availability issues can affect all generating units in the MISO footprint, potentially impacting their ability to perform and deliver energy.

In the MISO region, Load Serving Entities (LSEs), with oversight by the States as applicable by jurisdiction, are primarily responsible for ensuring resource adequacy. MISO's role is to support and facilitate the role of LSEs and States with market designs that incentivize fuel assurance, supply availability, and the efficient dispatching of available resources across MISO's broad, multi-State footprint to reliably meet demand. With emerging environmental regulations, evolving fuel economics, and associated lower MISO reserve margins, fuel assurance issues become increasingly prominent, requiring additional attention and action by MISO, its Market Participants and State regulators.

While there are no explicit fuel assurance requirements within MISO's Tariff-based energy markets and Resource Adequacy Requirements, a number of existing mechanisms encourage prudent fuel assurance practices. MISO is continually reviewing opportunities for increased transparency, reduced operational volatility, enhanced situational awareness, and improved market alignment to address fuel assurance concerns and needs as challenges become more prominent. For instance, last winter's "polar vortex" experience, while successfully navigated by MISO and its members, provided many valuable insights into areas for future improvement. Fuel assurance has been and will continue to be analyzed, discussed, and reported upon in MISO stakeholder forums. This may ultimately lead to future market or other Tariff changes to augment current MISO mechanisms and procedures.

Given their resource adequacy responsibilities, many of the MISO States empower their LSEs with operational and financial flexibility to better ensure fuel availability, and have procedures in place to address emergency issues related to fuel supply. Additional information on indirect MISO incentives and LSE/State efforts is provided in Sections III and IV.

This report provides the Commission an update and assessment of efforts to address fuel assurance concerns in the MISO region.

## **II. Fuel Assurance Assessment and Nature of Concerns**

MISO's level of concern about fuel assurance is currently low, overall, but is expected to increase significantly over time as natural gas reliance increases due to environmental requirements and evolving fuel economics. In the near term, prior to coal-fired generation retirements driven by the Mercury and Air Toxics Standards (MATS), fuel assurance concerns have been minimal, given MISO's resource mix and more than sufficient generation capacity, which was evident during the 2014 polar vortex. With the potential incremental retirement of approximately 10 GW of coal-fired capacity by spring 2016, reliance on natural gas-fired generation increases during the 2016-17 winter. MISO is currently analyzing this specific timeframe to assess fuel assurance risks and evaluate the need for any potential incremental mitigation measures. Longer

term, toward the end of the decade, increased demand growth and the potential for additional coal-fired capacity retirements (due to more stringent National Ambient Air Quality Standards and/or Greenhouse Gas regulation) are likely to further increase natural gas reliance and may require additional evaluation and actions related to fuel assurance.

#### **A. Fuel Assurance - Primarily a Winter Concern**

Fuel assurance in the MISO region is primarily a concern during severe winter weather when: i) natural gas and coal procurement/transportation logistic constraints and disruptions may be exacerbated; and ii) competition is highest for natural gas in other sectors (e.g., as a heating fuel).

#### **B. Historic and Current Assessment**

Historically, MISO has not faced significant fuel availability issues or impacts. MISO currently has significant estimated winter reserves of 35-45% (38-45 GW estimated reserves versus 103-111 GW of estimated peak load).<sup>1</sup> Though gas-fired capacity represents approximately 40% of MISO's total planned winter capacity<sup>2</sup> it has recently accounted for only 13% of total winter seasonal generation,<sup>3</sup> which is much less than other northern region RTOs/ISOs. Focusing on the MISO North and Central regions, where winter weather concerns are the most significant and the potential for fuel disruptions are highest, generation from gas-fired capacity currently comprises less than 5% of total winter generation.<sup>4</sup> It should be noted, however, that even though these contributions are relatively small, MISO relies on gas-fired generators to manage volatility by addressing changes in short-term load forecasts and to cover rapid changes in loads. As a result, fuel assurance initiatives had not previously been as high a priority

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<sup>1</sup> MISO 2014-15 Winter Resource Assessment (<https://www.misoenergy.org/Library/Repository/Study/Seasonal%20Assessments/2014-15%20Winter%20Resource%20Assessment.pdf>).

<sup>2</sup> Id.

<sup>3</sup> MISO 2013-2014 Winter Assessment Report (<https://www.misoenergy.org/Library/Repository/Report/Seasonal%20Market%20Assessments/2014%20Winter%20Assessment%20Report.pdf>).

<sup>4</sup> Id.

in the MISO processes. This is changing with the industry transition and experiences of the 2013-2014 winter.

### **C. MISO's 2014 Polar Vortex Experience**

MISO's system reliability during the extreme weather conditions of the 2014 polar vortex demonstrated MISO's ability to effectively manage adverse conditions. With the coldest temperatures in nearly two decades spanning much of MISO's region from Canada to the Gulf Coast, a new winter demand peak was recorded in MISO. Notably, from an operational and reliability perspective, this took place concurrent with significantly increased unplanned generator outages. Despite this, MISO was able to operate reliably during this period and, as the most severe weather slowly shifted eastward, MISO was able to export power to neighboring entities. These power exports were possible even while MISO remained under a severe weather alert and experienced one of its highest levels of winter unplanned generator outages.<sup>5</sup>

During the 2014 polar vortex, the highest level of unplanned generator outages occurred on January 7, 2014. The majority of generator outages, representing approximately three-fourths of the total, were mechanical and operating problems due to severe weather. The remaining outages were due to various gas fuel-related issues. Most of the impacts for fuel-related issues occurred in the MISO North and Central regions, where winter weather impacts are greatest.

Fuel-related issues impacted 15-20% of total planned winter gas-fired capacity in the MISO North and Central regions during the polar vortex. This contrasts with the current 2014-2015 winter, with less extreme weather in the MISO footprint, during which gas fuel-related issues impacted 5-10% of total planned winter gas-fired capacity. The fuel-related impacts during the polar vortex were amplified when combined with other significant weather-related mechanical and operating problems reported on gas-fired capacity, resulting in total impacts to approximately 30-40% of the gas-fired capacity in the MISO North/Central region.

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<sup>5</sup> Speaker materials of Richard Doying on behalf of MISO at the Winter 2013-2014 Operations and Market Performance in RTOs and ISOs Technical Conference, held April 1, 2014 under AD14-8.



Despite record winter demand and significant generator outages, MISO operated reliably and had available gas-fired capacity in the North and Central regions that was not dispatched, primarily due to the current surplus capacity conditions. The experience of the 2014 polar vortex highlighted the scale and scope of potential severe winter weather risks, and the importance of generator winterization (for gas and other fuel types), sufficient fuel assurance, and MISO's internal practices and processes. As a result, MISO identified several areas for improvement, which are described later in this report. MISO believes that these improvements, some of which speak directly to fuel assurance, will further improve future winter fuel reliability.

#### **D. The Post-MATS Period**

Looking ahead, MISO anticipates a net reduction in near-term winter reserves due to MATS. Approximately 10 GW of resources in the MISO region have either retired or are at risk of retiring before the 2016-2017 winter. During the same period, approximately 1 GW of new conventional capacity will be put into service,<sup>6</sup> 2 GW have reported plans to convert to natural gas and 1 GW plan to repower.<sup>7</sup> The overall impact of these actions would lead to a net reduction of approximately 7 GW in MISO's footprint. With these changes, MISO – particularly the MISO North and Central regions – will have fewer excess reserves and will increase its reliance on natural gas fired generation to meet winter peak demand. As stated previously, MISO is currently evaluating the need for potential additional measures to further mitigate risks to reliability.

#### **E. Looking Toward the Future**

Longer term, toward the end of the decade, increased demand and the potential for additional coal-fired generation retirements (anticipated, in large part, due to more stringent National Ambient Air Quality Standards and/or Greenhouse Gas regulations) will further increase reliance on natural gas and may require additional measures to bolster fuel assurance. MISO recently filed comments on EPA's 2014 proposed rule to

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<sup>6</sup> MISO Generator Interconnection Queue, October 2014.

<sup>7</sup> MISO 4th Quarter 2014 EPA Survey Update

(<https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/PAC/2015/20150128/20150128%20PAC%20Supplemental%202014%20Q4%20EPA%20Compliance%20Survey.pdf>).

adopt carbon emission guidelines for existing utility generator plants. In that filing, MISO explained that the proposed rule could potentially result in additional retirements of up to 14 GW, with approximately 11 GW occurring by 2020. This is well before sufficient replacement capacity can be placed into service. MISO proposed several changes to the proposed rule to address reliability concerns.<sup>8</sup>

## **F. Specific Fuel Assurance Considerations and Concerns**

### **1. Adequacy of Gas Infrastructure**

An important fuel assurance consideration, particularly as new natural gas-fired generation is likely built, is the adequacy of natural gas infrastructure serving gas-fired generators. The MISO North and Central regions are favorably located at the crossroads of pipeline corridors extending from many supply basins (Gulf Coast, Canada, Rockies, Midcontinent, Marcellus/Utica, and Bakken) with more than 20 interstate pipelines and significant gas storage resources. Further, several new pipeline projects have been recently announced to increase import capabilities into MISO from the adjacent and rapidly growing Marcellus/Utica region. This gas supply diversity, accompanied by significant gas infrastructure, contrasts to other regions of the U.S. where fuel assurance concerns are currently magnified.

Much of the MISO South region is located within the Gulf Coast gas supply basin, which has significant gas pipeline infrastructure with more than 20 major pipelines and numerous smaller systems. The region is upstream of some of the pipeline bottlenecks, and many of the major pipelines in the region, notably intrastate pipelines, do not face the degree of competition with winter heating as experienced in the MISO North and Central regions. The MISO South region also has a large concentration of flexible gas storage facilities, which helps mitigate gas transport disruptions and facilitates overall access to gas during severe conditions. While industrial growth and related gas demand is forecasted to increase in the MISO South region over the next 5 years, this growth is not expected to trigger substantial fuel assurance concerns.

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<sup>8</sup> MISO comments on U.S. EPA's Clean Power Plan, Docket ID No. EPA-HQ-OAR-2013-0602 (<https://www.misoenergy.org/Library/Repository/Communication%20Material/EPA%20Regulations/MISO%20Comments%20to%20EPA%20on%20Proposed%20CPP%2011-25-14.pdf>).

Long-term projections for the MISO footprint indicate that increasing gas reliance can be accommodated, though additional infrastructure will be needed as gas reliance grows. This need is accentuated in scenarios with persistent low gas prices and high levels of coal plant retirements. For locations that become more constrained over time, expansions of existing gas infrastructure and the development of new infrastructure will be required.<sup>9</sup> The expansion and development of gas infrastructure will require continued regulatory and statutory support by State and federal agencies, as well as adequate financial support for necessary capital improvements.

## **2. Dual Fuel Capability and/or Use of Firm Pipeline Capacity**

Back-up fuel arrangements can also be used by generators to help address reliability concerns related to gas fuel-availability issues. Following the large number of unplanned generator outages during the 2014 polar vortex, and to help prepare for the current 2014-2015 winter, MISO surveyed its generators about dual fuel practices and capabilities. Among the respondents (representing approximately 53 GW and 76% of gas-fired capacity registered in MISO's commercial model), 16 GW of gas-fired capacity reported dual fuel capability, and 10 GW reported inventories sufficient to cover over one full day of burn, or 4 days of 6 hour operation, which is a more likely peak service scenario. In addition to dual fuel capability, MISO also surveyed gas-fired generators about the use of firm pipeline capacity. Based on this information and other indications, less than half of MISO's total gas-fired capacity currently has either dual-fuel capability or some form of firm pipeline capacity.<sup>10</sup> MISO is working with asset owners on generator practices and capabilities to mitigate fuel-related risk as reliance on gas continues to grow.

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<sup>9</sup> MISO Phase III Natural Gas-Fired Electric Power Generation Infrastructure Analysis (<https://www.misoenergy.org/Library/Repository/Communication%20Material/Key%20Presentations%20and%20Whitepapers/Phase%20III%20Gas-Electric%20Infrastructure%20Report.pdf>); Eastern Interconnection Planning Collaboration (EIPC) Gas-Electric System Interface Study (June 2014).

<sup>10</sup> MISO ENGCTF Winter Generation Fuel Survey Preliminary Survey Results on Gas Fired Generation (<https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/ENGCTF/2014/201412/20141212%20ENGCTF%20Item%2005%20Winter%20Gen%20Fuel%20Survey.pdf>).

### 3. Coal Transportation and Lower Inventories

As described thus far, fuel assurance concerns are particularly focused on natural gas, but also include some coal inventory and rail delivery issues. Historically these issues have not been large or widespread in the MISO, but they have received increased focus during the last year.<sup>11</sup> MISO initially became aware of reduced coal inventories in the 2013-2014 winter. At that time, several of MISO's coal-fired generators, primarily from the northwestern areas of MISO's footprint, reported that harsh winter operating conditions, combined with slow rail deliveries, had resulted in inventory reductions, some significant.

As rail delivery issues continued throughout 2014, MISO coordinated with generators as they took steps to build, or at least maintain, inventories to prepare for the 2014-2015 winter. Some of the steps taken include limiting output at certain plants and, in a few cases, taking units off-line completely. MISO's Independent Market Monitor (IMM) estimates that over one-third of the coal-fired generation in MISO implemented some form of coal conservation measures over the last half of 2014.

MISO has not experienced reliability degradations, to date, due to generator efforts to reduce coal usage. This is due, in part, to the size of the MISO system and MISO's ability to leverage resources across the region to meet system load and reliability requirements. However, should a significant reduction in inventories coincide with an extended severe weather event in the future, it is possible MISO could see an impact to system reliability.

While MISO is not responsible for directly managing coal inventories, MISO has taken proactive steps to identify potential issues and improve situation awareness. MISO continues to evaluate conditions and coordinate with generation asset owners to minimize the likelihood of a coal inventory reliability issue. Some of these activities are further described in Section III.

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<sup>11</sup> FERC December 18, 2014 Open Meeting, Coal Delivery Panel Discussion.

#### **4. Fuel Cost Recovery**

MISO recognizes that its markets should ensure that generators are able to recover fuel costs needed for dispatch. As discussed in more detail later, MISO has taken steps for this current 2014-2015 winter and will continue the process to address this issue more holistically going forward.

#### **5. Renewable Resource Considerations**

Lastly, MISO recognizes fuel assurance considerations associated with renewable resources. This includes wind's higher seasonal contribution during the winter and potential impacts to hydro resources during drought conditions. Though MISO's concerns are lower, overall, about these risks due to their small impact, they are taken into account as part of MISO's fuel assurance assessment.

### **III. 2014 Polar Vortex Experience/Next Steps**

As described earlier in Section II, fuel assurance is primarily a concern during severe winter weather. The severe weather experienced during the polar vortex and the subsequent weather events in 2014 reinforced and brought to the surface several areas for improvement. MISO is leveraging its experiences from this event to implement several new operating procedures, improve fuel issue transparency, and evaluate potential market enhancements with stakeholders

#### **A. Uncertainty in Unit Performance**

Much of the generation that was unavailable during the polar vortex suffered mechanical failures due to the unusually cold temperatures. These types of forced outages are not uncommon during extreme weather events.

In addition to mechanical problems, other generating facilities in MISO's footprint were forced offline because they were not able to obtain fuel. For example, at least one power plant in MISO's footprint that has coal delivered via barge experienced problems due to iced-over rivers and lakes. However, the generation facilities that were most

heavily impacted by the severe weather conditions were natural gas-fired plants that are served by pipelines.

Extreme conditions also caused a sharp uptick in the spot natural gas prices, imposing significantly higher costs on gas-fired generators. This was especially true for generators having to make purchases in the market area, where spot prices in some locations were significantly higher than those in gas producing regions. Generators without back-up fuel capability (and inventories) or firm long-haul pipeline capacity from the producing areas were especially impacted, as there were notable limitations on interruptible pipeline capacity. Some gas-fired units in MISO's footprint were unable to obtain gas at any price during the polar vortex, while others chose not to purchase gas for economic reasons.

#### **B. Lack of Specificity of Unit Outage and De-Rate Cause Types**

Generator operators submit outage and de-rate information through the MISO outage scheduling system. This reporting tool, however, previously lacked sufficient granularity regarding the reasons for an outage occurrence. This caused challenges for MISO staff to conduct timely investigation and post-event analysis, particularly following the polar vortex. More specificity to outage cause types, especially related to fuel issues, has been added to the outage scheduler system to help MISO better execute unit commitment and conduct a more detailed post-event analysis.

#### **C. Continued and Improved Coordination between Electric and Natural Gas Industries**

MISO also determined that increased situational awareness associated with the gas industry was necessary. Prior to the polar vortex, MISO had minimal visibility and awareness of how the pipeline industry interfaced with generation. Consequently, operational flow orders or other abnormal system activities in the pipeline industry did not raise appropriate situational awareness for generation capacity.

Direct communication took place between MISO and several natural gas pipeline companies that supply fuel to plants in MISO's footprint. These communications, which

have little historical precedent, were the result of a MISO initiative launched in October 2013 called the “Electric/Gas Coordination Field Trial.” Two gas pipeline companies — Northern Natural Gas and ANR Pipeline Company — participated in the Electric/Gas Coordination Field Trial. This field trial highlighted the benefits of open communication between the industries, particularly during severe events such as the polar vortex. While the Electric/Gas Coordination Field Trial and communications to date provide a positive first step, MISO continues to work through its stakeholder processes to improve electric and natural gas communication going forward.

#### **D. Market Pricing Improvements to Ensure Market Signals are Reflective of Actual System Operating Conditions**

Based upon its experiences with the polar vortex, MISO is working to better incentivize resources to supply electricity or provide demand response as needed for the reliability of the MISO system. The alignment of market price signals with energy supply needs is an important element in maintaining reliable grid operations.

While market prices were generally reflective of the tight operating system conditions during the polar vortex, MISO is developing enhancements to ensure that prices better reflect emergency conditions and that deployment of emergency resources and demand response do not depress prices during emergencies. The need for this enhancement was evidenced by price trend during a Maximum Generation Emergency Event on March 4, 2014. Energy prices dropped sharply after MISO declared the Maximum Generation Emergency Event and remained low during the event. Subsequently, prices depressed significantly as a result of several emergency actions taken by MISO (e.g., curtailment of non-firm exports and commitment of emergency-only resources). These reduced price levels did not provide an efficient signal to the market, and resulted in the elevated uplift payments. MISO’s work to address this issue is described in section IV.B.4. of this report.

To ensure that generation resource are available to supply power even during extremely volatile and high natural gas prices, MISO also requested, and received FERC acceptance of, a waiver allowing generators to recover actual, verifiable costs in excess

of MISO's \$1,000 energy offer cap during the current 2014-2015 winter. MISO will continue working with its stakeholders and neighboring RTOs/ISOs to determine whether its energy offer cap should be increased, and will address this issue in its response to the Commission's request for additional comments in the price formation proceedings (Docket No. AD14-14-000).

#### **E. Demand Response and Behind the Meter Generation Availability**

Substantial seasonal variation in Load Modifying Resource (LMR) availability was observed during the polar vortex. LMR availability on winter peak days was lower than summer peak days. Reductions in LMR availability were actively reported by Market Participants; however, reasons for this LMR unavailability are currently not provided in real-time. MISO is working with stakeholders to continue enhancing processes and procedures to manage LMRs.

Voluntary load management actions were not transparent during the 2013-2014 winter but are being reported by Market Participants this 2014-2015 winter. MISO has and is continuing to enhance its LMR reporting tool to improve the situational awareness of LMR availability and voluntary load reduction.

MISO is reviewing opportunities to expand on this current design to allow increased demand response to meet winter peak demand needs. The differences in seasonal availability of demand response can materially affect resource adequacy. Efforts related to resource adequacy and planning will be discussed in section IV.B.3. of this report.

#### **IV. MISO Efforts to Address Fuel Assurance**

MISO and its various groups of stakeholders, including State regulators, each have unique roles regarding fuel assurance, and these roles continue to evolve as part of collaborative efforts to address emerging fuel assurance concerns.

Within the MISO region, direct decisions regarding fuel assurance – such as firm fuel procurement, dual fuel capability, and prudent fuel risk management processes – generally are the outcome of LSEs' traditional State regulatory planning processes, rate cases and oversight. State regulated utilities make up the vast majority of the MISO



footprint. These LSEs, with oversight by applicable State and local authorities, bear the primary responsibility for resource adequacy planning, which generally includes fuel assurance considerations. MISO's energy markets also inform and create incentives for many of those decisions as regulators work with utilities to ensure reliable electricity service at just and reasonable rates.

#### **A. State and LSE Roles and Efforts in Fuel Assurance**

The composition of the LSEs in MISO<sup>12</sup> – primarily state-regulated utilities – reduces the direct need for a specific MISO role relative to fuel assurance issues. This is a significant difference that distinguishes MISO from other RTOs such as PJM, NYISO, or ISO-NE where State regulation over resource adequacy is limited. While the primary resource adequacy and fuel assurance responsibilities lie with the LSEs working with the States, MISO supports and facilitates their work through efficient dispatch price signals and by providing critical information.

As fuel assurance issues emerge with the fleet transition driven by new fuel economics and environmental regulations, State regulators in the MISO region are positioned to handle these challenges. MISO plays the critical role of informing State regulator and LSE decisions relating to regional fuel assurance issues. This support is enabled by MISO's regional view encompassing all States and resources within the footprint. As discussed later in this report, MISO provides this important information to support States and their LSEs in their determination of fuel assurance needs.

In addition, MISO, through its energy and ancillary services markets, ensures that day-ahead and real-time incentives support the reliable operation of the regional grid. Energy market incentives align State jurisdictional procurement processes and practices with the operational reliability needs of the MISO system. These markets also complement and operationalize the generation and demand response resources made available through the resource adequacy and LSE planning processes.

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<sup>12</sup> The MISO footprint is comprised of a mixture of States with traditionally rate-regulated utilities and retail choice; 91% of MISO load is under traditionally rate-regulated utilities with 4% under retail choice and local jurisdictions.

State agencies and regulatory commissions have a variety of tools to obtain information about fuel availability and to establish incentives (and remove disincentives) to reduce the risk in fuel procurement practices. The specific processes vary by State but include formal integrated resource planning proceedings, traditional rate cases which include cost recovery provisions, and fuel security reporting to ensure the State regulators are aware of fuel related risks. MISO has worked with the Organization of MISO States (OMS) to identify some examples of these practices, which include:

- Many States have fuel adjustment clauses in statute or administrative rule that provide for recovery of fuel related expenses.
- The Wisconsin Public Service Commission was in close contact with regional utilities monitoring the status of coal inventories at major coal-fired electric generation plants as service issues began emerging. The Wisconsin Commission developed reports and analysis that facilitated planning and potential risk mitigation measures in the event of significant rail service deterioration.
- The Illinois Commerce Commission solicited MISO analysis on fuel diversity and planning issues relating to potential nuclear retirements. The analysis enabled evaluation of State fuel policies going forward.

MISO anticipates that the OMS will provide additional details on State authority and practices in comments it provides in this docket. MISO will continue looking for additional measures to further support the resource adequacy and fuel assurance efforts of LSEs and States.

## **B. MISO Led Efforts**

In addition to the steps taken following the 2014 polar vortex, MISO continues working with its stakeholders to identify and implement operational improvements to address the challenges facing the MISO system as the industry evolves.

## 1. **Electric Natural Gas Coordination Task Force (ENGCTF)**

The purpose of the ENGCTF is to facilitate coordination between the Electric and Natural Gas Industries, and other interested stakeholders to:

- Identify challenges related to an expectation of increasing reliance upon natural gas while ensuring reliability of the electric system.
- Develop an approach to resolving identified challenges.
- Develop recommendations for ongoing operations, market impacts, and compliance for regulatory deadlines.

The task force leverages MISO stakeholder experience and perspectives to discuss topics such as the hours and other market parameters of the gas/electric day, extreme weather events, etc. Stakeholder input focuses on the interdependency between the electricity and natural gas industries.

## 2. **Operations**

### *a) Expansion of Coordination with Gas Pipeline Industry and Visibility into Pipeline Operations*

Two gas pipeline companies — Northern Natural Gas and ANR Pipeline Company — participated in the Electric/Gas Coordination Field Trial that was implemented during the 2014 polar vortex. MISO is working to establish formal communications protocols with all of the 70-plus gas pipeline operators serving gas-fired power plants in MISO's 15-State footprint. Similarly, MISO will build on other planning and coordination procedures that are already in place with various Market Participants and other stakeholders. New tools have been developed that will help MISO gain visibility into gas pipeline events and notifications. These methods include a new control room display of the pipeline infrastructure and a consolidated gas pipeline critical notice webpage. These efforts will make MISO better equipped to deal with future extreme weather events.

### *b) Coal Transportation*

MISO's operations team has been focusing on maintaining situational awareness of coal inventory levels. To that end, MISO has begun to identify potential issues, and recently surveyed generation owners for information relating to their confidence in fuel deliveries and inventories. MISO also has improved situational awareness through discussions with the MISO Independent Market Monitor (IMM). MISO Market Participants facing coal delivery issues often work with the IMM to adjust their energy offers upward as part of their conservation efforts. Through these discussions with Market Participants and other analysis, the IMM estimates that over 1/3 of the coal fired generation in MISO has implemented some form of coal conservation measures over the past 6 months.

To improve operational planning, MISO has been, and will continue to be, supportive of efforts to restore coal inventories to planned levels as soon as can be managed.

### *c) Communications/Procedures*

As part of the continuous enhancement process and in reflecting on the lessons learned from the 2014 polar vortex, MISO also recognizes the need to examine and enhance emergency procedures and tool performance. MISO has coordinated with our neighbors to further refine Emergency Operating Procedures. We have also evaluated tool performance (e.g., Look Ahead Commitment) in an effort to maximize all resources available.

## **3. Resource Adequacy and Planning**

MISO, in collaboration with stakeholders, is reviewing seasonal risks associated with achieving resource adequacy. This review includes an evaluation of the need for seasonal requirements and MISO's role in incentivizing resource performance, which in part is driven by fuel availability. In addition to this ongoing review, MISO uses a number of tools to provide increased transparency to resource adequacy issues that are impacted by fuel assurance.

One such tool is the MISO Generator Winter Fuel Survey. This voluntary survey of Generation Owners enables MISO to aggregate information on a footprint-wide basis with respect to the firm transportation and dual fuel capability of many of the generators in its footprint. This regional perspective on fuel availability provides additional information for MISO and stakeholders to use in decision and policy making processes that impact the fleet's fuel availability.

Another topic related to fuel assurance is reserve margins. Reserve margins directly affect the impact that an individual resource's ability to secure fuel has on the capability of the fleet to reliability serve load. As reserve margins decrease, the impact of an individual resource's ability to secure fuel increases. That is, there is an increased level of importance put on the remaining resources to secure fuel in order for demand to be reliability served. The resource assessment survey performed in conjunction with the Organization of MISO States provides detailed information on a zonal and regional basis as to what reserve margins are projected to be and provides additional information that can be incorporated into the fuel assurance assessments.

#### **4. Markets**

MISO aligns market incentives with the reliable operation of the MISO system, which would include incentives relative to fuel assurance and availability. MISO understands the critical importance of energy and operating reserves markets to be designed properly, to provide incentives to ensure generation resources are available to the system when needed. The markets should encourage the appropriate short and long-term fuel procurement decisions.

MISO has been working to continually improve the price signals in its energy and operating reserves markets that appropriately align the market incentives to the reliability needs of the MISO system. Current efforts are described below.

##### ***a) Adoption of Extended Locational Marginal Price (ELMP)***

ELMP is an approach that allows prices to better reflect total operational costs when MISO commits a fast-start resource to meet requirements, including block-loaded

combustion turbines, units at Economic Minimum (the minimum dispatch level), and emergency demand response. ELMP reflects the cost of the next action that MISO would take to alleviate transient shortage or transmission violations. ELMPs can be viewed as being calculated so as to minimize the uplift paid for the dispatch. The ELMP determination takes into account all bids and offers made into the unit commitment and dispatch, including those of generators or loads that are not committed or dispatched.

There are several reasons for this approach. It provides prices that reflect costs if resources must be committed to manage a constraint but the constraint is no longer binding in the dispatch after the resources have been committed. It also provides prices that take into account the dispatch of units, such as gas turbines, that are operating at their economic minimum or maximum, and also interruptible load, demand resources and emergency demand response. It eliminates the impact of sub-optimal unit commitment, whether due to forecast error, operator error or model limitations on ELMPs.

Similar to locational marginal pricing, incremental energy offer costs of committed resources are considered in price setting. Under ELMP, startup and no load costs of fast start resources also participate in setting prices. Likewise, fast start resources can be dispatched below their minimum limit all the way to 0 MW, extending the incremental energy offer cost range. Under scarcity situations and transmission violation, available offline fast start units can participate in price setting. The ELMP approach is aligned with the objectives of efficient market design.

#### *b) Design of Pricing under Emergency Conditions*

When MISO calls upon emergency capacity resources, market prices can be depressed. Such price depression is inappropriate because it conflicts with the objectives of emergency actions in real time, and Market Participant actions have the potential to endanger reliable operation. ELMP partially addresses this issue by allowing block loaded emergency capacity resources such as Emergency Demand Response (EDR) to set price, but will not help when the emergency capacity resources are offered free or cheaper than the marginal resource dispatched prior to invoking emergency. The

emergency pricing logic is designed for maximum generation events. MISO has three objectives for emergency pricing. The first is to prevent uneconomic price suppression during an emergency and appropriately value emergency resources acknowledging MISO's emergency operating procedures. The second objective is to incent efficient Market Participant behavior including the development of adequate supply resources and demand-response capability. Finally, emergency pricing can be used to promote Market Participants' competitive offers and MISO's optimization-based and cost-efficient operation.

### *c) Evaluation of Offer Cap*

Offer Caps are one tool for mitigation of potential exposure to market power manipulation. Offer Caps that are too low are in conflict with a few of the objectives stated above. Generators that are not on-line may be unwilling to make themselves available during situations when the system is under significant stress if offer caps inhibit cost recovery. Similarly, loads might also not have the proper incentives to reduce consumption at such times if subject to low offer caps. As noted above, the Commission recently accepted MISO's request for a waiver of its current \$1,000 energy offer cap for the current 2014-2015 winter to allow generators to recover their actual, verifiable costs of operating, pursuant to MISO's direction, at costs in excess of the offer cap. MISO will continue to work with its stakeholders, its IMM, and neighboring RTOs/ISOs to evaluate the need for increasing its offer cap.

### *d) Evaluation of Value of Lost Load (VOLL) Pricing*

VOLL establishes the LMP price cap in MISO markets. If established too low, generators may be unwilling to follow dispatch, may be unwilling to make themselves available during emergency situations, and most importantly, may provide a disincentive for generation or demand response to be built.

## **V. Mechanisms for addressing concerns**

MISO has a stakeholder governance process that honors our commitment that major policy issues will be introduced to the stakeholders with sufficient time for discussion

prior to decision and implementation. With the exception of individual sector meetings and meetings discussing confidential or proprietary information, MISO stakeholder meetings are open to all interested parties.

As mentioned earlier in this report, the Electric Natural Gas Coordination Task Force (ENGCTF) is specifically a forum for addressing and discussing topics at the gas-electric interface. Other stakeholder committees and working groups are also utilized to communicate debate and carry out strategies. Some of the stakeholder groups that are currently discussing topics related to fuel assurance include:

- **Supply Adequacy Working Group (SAWG)**

The SAWG is chartered with developing recommendations regarding mechanisms to ensure adequate Planning Resources within the MISO for the long-term planning horizon. In 2015, the SAWG will be considering issues impacting generating capacity due to future industry changes and recent operational events, including topics like establishing seasonal resource adequacy requirements.

- **Demand Response Working Group (DRWG)**

One focus of the DRWG is how demand-type resources (which can include behind-the-meter-generation) can or cannot participate in the various markets that MISO administers. MISO administers these markets to support reliable grid operation. Fuel assurance concerns impact efforts by MISO to support reliable grid operation. To the extent gas-fired generators cannot deliver electricity in certain time periods because of fuel or delivery uncertainties, demand resources will be utilized more by MISO under emergency conditions to meet the energy balance. It is critical that MISO have confidence in the ability of these demand resources to deliver what was promised. In addition, behind-the-meter generation can have fuel assurance uncertainties.

- **Advisory Committee (AC)**



The Advisory Committee includes a “Hot Topic” conversation six times a year. During these conversations, our stakeholders have the opportunity to provide their perspective on important issues through pre-submitted responses to topical questions, as well as a round-table conversation in front of MISO’s Board of Directors. Later this year, the Hot Topic will be electric and gas coordination, and fuel assurance will be addressed during this conversation.

## **VI. Conclusion**

MISO recognizes that fuel assurance is an important emerging issue in the reliable operation of the transmission grid and its markets. MISO continues assess challenges and address with stakeholders any changes needed to accommodate the industry infrastructure transition due to new and proposed environmental regulations and changing fuel economics. Increased transparency to and from Market Participants, improved operating procedures, new market enhancements, and continued forward planning are all critical tools MISO is leveraging to address fuel assurance concerns in the MISO region.

Document Content(s)

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