

Testimony of Clair J. Moeller

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Subcommittee on Energy and Power

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Executive Summary

- **What:** Existing and proposed environmental regulations for the electric energy industry, in combination with sustained low natural gas prices, are causing a shift in the generation resource mix in the MISO footprint towards an increased reliance on natural gas.
- **Latest Survey Results:** The most recent MISO survey identified almost 50,000 MW (247 units) of coal capacity affected by MATS and other EPA regulations – or about 37% of the total generation capacity in the MISO Market footprint.
- **Reliability Impact:** MISO has historically been long in capacity but the retirements of units within the footprint will remove most, if not all, of the excess reserves on the system. Plants going on outage simultaneously to retrofit could also create challenges in meeting electricity demand. Gas-fired generation will play an instrumental role in filling these voids.
- **Gas Transportation Concerns:** MISO analyses identified that gas supply availability at the wellhead for use in power generation was not an issue; however, there were three major areas of concern: storage, pipeline capacity, and timing.
- **Economic Impacts:** The analyses put an economic value on the challenges ahead, at the expected 12,000 MW retirement level in MISO, at a cost impact associated with pipeline infrastructure development of about \$2 billion for main gas pipelines, plus \$950 million for lateral lines.
- **Conclusion:** Addressing the increasing need for gas supply will require coordination between the electric and natural gas industries to produce tangible solutions to key issues.

Good morning Chairman Upton, Chairman Emeritus Barton, Ranking Member Waxman, Subcommittee Chairman Whitfield and Ranking Member Rush, and members of the Committee; thank you for inviting me to speak to you today. I am Clair Moeller, Executive Vice President of Transmission & Technology of the Midwest Independent Transmission System Operator, Inc. (MISO). MISO is a not-for-profit, independent, member organization serving members in all or parts of 11 states and one Canadian province, from eastern Michigan to eastern Montana and Missouri to Manitoba. In 2001, we were the first Regional Transmission Organization approved by the Federal Energy Regulatory Commission. Today, MISO provides reliability to the electric grid, administers the market for electricity producers and users on a wholesale level, and performs a regional planning function for the members in its footprint

MISO's Changing Generation Resource Mix

Households and businesses in the MISO footprint rely heavily on power plants fueled by coal to supply their electric energy needs. Historically, between 70 and 80 percent of the electricity produced in the MISO region has been generated by coal-fired plants. Base demand for power in the region is met primarily by coal and nuclear generating plants. Gas-fueled power plants have historically been utilized primarily to cover peak demand periods and to address near-term energy needs. In general, less than 5 percent of electricity in the MISO footprint has been generated by gas-fired plants. But we are seeing that begin to change.

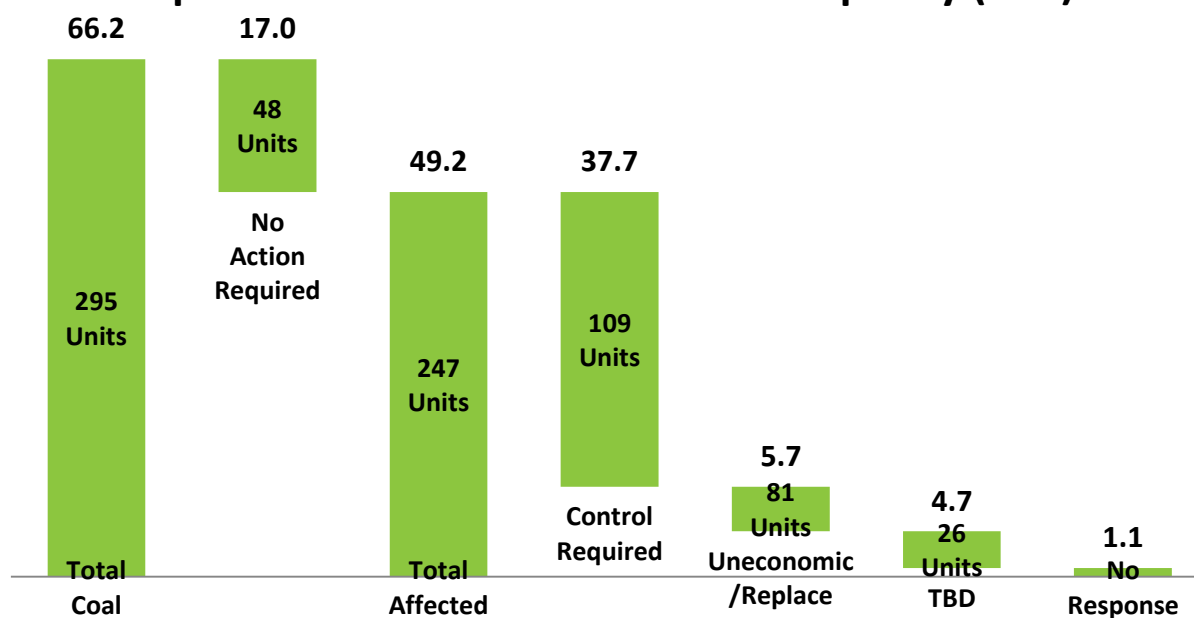
Low natural gas prices over the last couple of years have made gas generation more economical, and able to compete more effectively with coal generation, which is generally a relatively inexpensive form of power generation. This has resulted in gas generation becoming

increasingly utilized in MISO's energy market, which selects power plants based on cost, causing a shift in the generation resource mix in the MISO footprint. In 2012, approximately 65 percent of energy was generated by coal-fueled sources, with 12 percent coming from gas-fired power plants.

Going forward, we expect to see this trend continue due to the combination of low gas prices and impacts from Environmental Protection Agency (EPA) rules – primarily the Mercury and Air Toxics Standards (MATS) rule. MATS will introduce limits on emissions that will drive some coal plants to retire and force others to invest in technology that allows them to continue operating in a manner that is compliant with the environmental regulations. This will drive the shift in MISO's generation further towards gas-fired resources. This transition presents new challenges in fulfilling our obligation to maintain reliability at just and reasonable prices. MISO is responding to these planning and system operations challenges by investigating potential impacts and working with our Stakeholders and the natural gas industry to develop effective and innovative solutions.

Our Market footprint consists of roughly 132,000 MW of electric generation capacity—approximately half of which is coal-fired. In an effort to better understand the impacts of EPA regulations on these coal units and the overall generation fleet, we solicit information from the owners of those assets regarding their plans to comply through on-going quarterly surveys. The most recent survey identified almost 50,000 MW (247 units) of coal capacity affected by these regulations—or about 37% of the total generation capacity in the MISO Market footprint. The graphic below shows the magnitude of the impact to our coal-fired generating capacity and the compliance strategies that will be employed by generation owners as reported in the first quarter survey for 2013.

MISO's 2013 1st Quarter Survey: Impacts on Coal-fired Generation Capacity (GW)



While we await decisions from some generation owners on the actions they plan to take, it is clear that plant retirements and retrofits will cause challenges that we have not faced before. The compliance deadline for the MATS will mean that large numbers of coal plants will be looking to take outages to retrofit at the same time. The coordination of those outages will be critical to ensuring adequate resources remain available to meet electricity demand. In addition, while MISO historically has had adequate capacity, announced and projected retirements of units within the footprint will remove most, if not all, of the excess reserves on the system. We are currently addressing these challenges by creating or enhancing processes that better position us to ensure adequate resources are available to maintain reliability of the system. This includes the development of a process for determining the level of generation outages that could be accommodated at a given time while still meeting demand. Also, we recently worked with the Federal Energy Regulatory Commission (FERC) and our Stakeholders to revise and update our retirement analysis process to effectively meet the current needs of the marketplace.

Coordination Between Natural Gas and Electric Industries

This shift in MISO's generation mix, to one of increasing reliance on gas-fired resources, has introduced the need to further and improve the coordination between the gas and electric industries. Taken in the context of a system that is already seeing increased contributions from gas-fired generation due to economics, coal unit outages and retirements put additional pressure on gas resources in the MISO footprint to meet demand. Currently, MISO has 39,000 MW of gas generation in the region, 19,000 MW of which is without oil backup or a firm gas supply. Last year, MISO performed analyses of natural gas supply, storage, and pipeline infrastructure in the Midwest. These analyses identified potential insufficiencies in pipeline capacity for peak levels of operation of gas-fired units in the MISO footprint. Other findings of note include the abundance of gas supply availability at the wellhead for use in power generation and the importance of timing of natural gas infrastructure expansion. MISO's study indicated that regulatory approval, design, and construction for pipeline development takes three to five years to complete once a defined plan exists. As gas-fired generation begins to serve more of the demand within the MISO footprint, construction of new gas-fired generation, and increased demands upon the current gas infrastructure in the Midwest, will follow. As we've learned through conversations with pipeline companies in our footprint, there is flexibility in the capability of natural gas pipelines to deliver gas through varied contractual and physical arrangements. However, to keep pace with demand, system expansion will be needed—and needed relatively soon. In our most recent survey, we learned that approximately 18 GW of coal units will apply for or have already been approved for one-year extensions of compliance windows with EPA regulations. Even taking this number into account, the next few years are going to be a crucial transitory period for MISO and natural gas pipelines alike.

MISO's gas infrastructure analyses led to the creation of the Electric and Natural Gas Coordination Task Force (Task Force), which serves as a forum for cross-industry education and for identifying and working towards tangible solutions to key issues. These key issues, as ranked by the Task Force, include the misalignment of the Electric Day and the Gas Day, the need for coordinated emergency operations, and the challenge of ensuring we have adequate resources to meet demand (Resource Adequacy).

The first issue highlights the misalignment of the schedules for the Electric Day and the Gas Day and its impact on the ability of generators to get the fuel they need in time for operation. The focus is on the gap between when gas-fired units schedule pipeline capacity for the next day and when MISO posts its Day Ahead Market schedules. Discussions with our Stakeholders have yielded the suggestion of moving up the posting of the Day Ahead Market schedules to allow generators more advance notice for procuring the fuel they need to operate in real time.

The issue of coordinated emergency operations has evolved into a conversation on whether information and data can and should flow between gas pipelines and MISO. These exchanges may take the form of short-term data alerts on system conditions or longer-term planning information to aid in outage coordination, for example.

The third topic gets back to the issue of uncertainty—will there be enough resources to meet demand on peak days in our footprint? Inherent in these issues are the questions of how firm individual plant fuel supply needs to be to ensure reliable system operation and whether the current MISO market constructs incentivize the type of generator behavior (e.g. securing firm fuel supplies, having a backup fuel option on-site, etc.) that supports system reliability.

Other issues raised in the Task Force include the need for more education for MISO's Stakeholders on gas pipeline tariff products, operations and planning, as well as for getting state and federal regulators involved in the conversation, and finally, various issues surrounding the physical impacts of increased gas-fired generation on both gas and electric infrastructure.

Peak Day Event: Jan. 22nd, 2013

A recent event highlights the growing need for gas-electric coordination and better understanding of the risk on our system. On January 18th, MISO declared a Cold Weather Alert effective from 1/21/13 to 1/22/13, in anticipation of forecasted sub-zero temperatures. This declaration, in accordance with MISO's Conservative System Operations Procedure (RTO-OP-018), expressed concerns about potential fuel restrictions. In this same timeframe, natural gas pipelines in the region were implementing System Overrun Limitations, which is essentially an alert issued by the pipeline telling its customers there is some system condition that is going to limit operations, e.g. extremely cold weather. Several days later (Jan. 22nd), the extreme forecast was realized, with the coldest day of 2013 recorded in the MISO footprint and the highest load of the year, of 74,403 MW at 6:57PM.

In the early morning hours on the 22nd, MISO received notification from several Market Participants that generation resources were having "gas supply" issues. We've since learned that these problems were due to a number of factors, including mechanical failures at several dual-fuel (units that can switch between burning oil and burning gas) units, potentially caused by the extreme cold. Another issue that played into the event on the 22nd is the nature of the gas pipeline contracts held by certain gas-fired units. Some gas-fired and dual-fuel units in the MISO footprint hold firm gas transportation contracts to operate only for a portion of the day. Others

contract for interruptible service, which is likely to be available during warm weather but not during extreme cold temperatures. If MISO needs to call up units to meet unexpected demand, as was the case on the 22nd, it may need to ask gas-fired units to run. If the gas unit has an interruptible fuel contract and no backup fuel, it may not be able to respond to the call—especially on a very cold day. While the majority of units scheduled to run on the 22nd in MISO’s Day Ahead process operated as planned, certain significant units could not arrange for gas to accommodate MISO’s call for additional generation.

MISO has an obligation to meet demand in real time and commits generation resources to ensure enough capacity is online to maintain reliability. Though the event on the 22nd was localized, it illustrates the unpredictability in system conditions, i.e. mechanical failures of individual units and extreme cold temperatures, and the importance of reliable fuel supply. One of MISO’s main concerns surrounding the shift in our footprint from coal to gas is that the gas-fired generation we need on very cold winter days will not be able to get fuel, and in turn, generation may not be able to meet demand. In order to better prepare for these peak days, we are working to understand and prevent events like those that occurred on the 22nd.

In Conclusion

Existing and proposed environmental regulations for the electric industry, in combination with sustained low natural gas prices, are causing a shift in the generation resource mix in the MISO footprint from coal to gas-fired generation. Taken in the context of a system that is already seeing increased contributions from gas-fired generation due to economics, coal unit outages and retirements from these regulations put additional pressure on gas resources in the MISO footprint to meet demand. Addressing the increasing need for gas supply will require coordination

between the electric and natural gas industries to produce tangible solutions to key issues. MISO has an obligation to maintain reliability at just and reasonable prices and we intend to continue to work together with our Stakeholders and the natural gas industry to ensure reliable and efficient system operations in the face of a changing resource mix. Thank you very much for this opportunity to speak to you today. I look forward to your questions.