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Executive Summary

- ***Drivers for a Transitioning Resource Mix:*** Existing and proposed environmental regulations for the electric energy industry, in combination with sustained competitive natural gas prices, are causing a shift in the generation resource mix in the Midwest towards an increased reliance on natural gas resources.
- ***Latest Quarterly Survey Results:*** The most recent MISO Quarterly Survey of asset owners identified almost 50,000 MW (247 units) of coal capacity affected by the Mercury and Air Toxics Standards (MATS) and other EPA regulations – or about 37% of the total generation capacity in the MISO Market Footprint. This includes just under 40,000 MW (144 units) requiring installation of emissions control equipment.
- ***Reliability Impact – During Compliance Period:*** MISO has historically been long in capacity but coal unit environmental compliance outages, regular maintenance outages, and retirements will significantly tighten reserves during the upgrade cycle and beyond.
- ***Reliability Impact – Post Compliance Period:*** MISO currently lacks the forward visibility to fully assess resource adequacy in the 2016 timeframe. Work is underway with regulators and load serving entities to improve that visibility and enable full assessment.
- ***Gas-Electric Coordination:*** The region’s increased reliance on natural gas required improved coordination between the two industries. In October of 2012, MISO and its Stakeholders established the Electric and Natural Gas Coordination Task Force as a forum for collaboration between the gas and electric industries. Current Task Force initiatives address issues of fuel supply uncertainty, misalignment between the Gas Day and the Electric Day, and coordinated operations.
- ***Capacity Deliverability:*** Optimizing capacity deliverability with neighboring RTOs enables the reliable delivery of the lowest-cost capacity and energy to consumers by maximizing the use of the existing transmission system, providing flexibility of resource choices and promoting efficient and timely resource additions.
- ***Conclusion:*** MISO continues to work with its Stakeholders, state regulatory bodies and with the natural gas industry on a multi-faceted approach to ensure adequate resources and reliable operations during and beyond this transitional period. However, challenges and uncertainties remain.

Chairman and Commissioners, thank you for the opportunity to speak to you today. I am John Lawhorn, Senior Director of Policy and Economic Studies at the Midcontinent Independent Transmission System Operator, Inc. (MISO). MISO is a not-for-profit, independent organization serving customers in all or parts of 15 states and one Canadian province, from eastern Michigan to eastern Montana and Louisiana to Manitoba. Today, MISO facilitates reliable operation of the electric grid, administers a market for electricity producers and users on a wholesale level, and performs a regional planning function for the members in its footprint

Drivers for a Transitioning Resource Mix

Households and businesses in the MISO footprint rely heavily on power plants fueled by coal to supply their electric energy needs. Approximately half of the roughly 132,000 MW of generation capacity in MISO's Market footprint is coal-fired, a fuel type that has historically accounted for between 70 and 80 percent of the electricity produced. Gas-fired generators, on the other hand, have traditionally been used to cover periods of peak or intermediate demand. This trend is changing, however - over the past four years, MISO has seen an increase in the contribution to energy served by gas generators from 3% to 9%. Competitive natural gas prices in combination with the coming retirement or retrofit of a large amount of coal capacity are transforming natural gas into an economical fuel for electric power generation. This shift presents new challenges in fulfilling our obligation to maintain reliability.

Latest Quarterly Survey Results

The next few years will be a transitional period as a large portion of the coal fleet in the MISO footprint must comply with proposed and existing Environmental Protection Agency (EPA) rules, namely the Mercury and Air Toxics Standards (MATS) rule. To better understand the

impacts of environmental regulations on these coal units and the overall generation fleet, we solicit information through on-going quarterly surveys of asset owners regarding their plans to comply. 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. Over 39,000 MW (114 units) will require some type of environmental upgrade during the compliance period. Another 6,200 MW (83 units) have decided to retire or replace their capacity. Finally, 3,600 MW are still determining their path forward – MISO’s expectation is that these units will retire. Figure 1 in the appendix provides a graphical representation of these survey results.

Reliability Impacts

It is clear that plant retirements and retrofits will cause challenges that the region has not faced before. The MISO region has historically been long in capacity but unit outages and retirements over the next few years will remove excess system reserves. During the main compliance upgrade period, 2014 – 2015, a significantly higher than normal number of outages will be required to meet upgrade needs coupled with typical maintenance outages. The coordination of these outages will be critical to ensuring adequate resources remain available to meet demand.

MISO is currently addressing these challenges through the development of a methodology for determining a manageable level of generation outages. Additionally, we recently worked with the Federal Energy Regulatory Commission (FERC) and our Stakeholders to revise and update our retirement analysis process to better accommodate asset owner needs in the context of a changing marketplace.

In the post-compliance period, MISO's current visibility indicates a resource adequacy shortfall. Under a moderate load forecast and assuming currently scheduled new resource additions, MISO projects potential shortfalls of 2,000 MW and 6,000 MW during the winter and summer periods of 2016, respectively. Appendix - Figure 2 illustrates these shortfalls.

MISO is working with the region's state regulators and load-serving entities to improve the visibility into their plans to meet resource adequacy requirements during this period. One example of that collaboration is the joint OMS / MISO development of a robust forward-looking resource adequacy assessment tool to better understand the load and resource forecasts of individual companies in the region. Improved access to that information allows the OMS and MISO to better understand the regional picture going forward and to jointly ensure we have the right resources in place to meet customer needs without overinvesting in new resources. MISO is looking forward to the results of this collaborative effort that is designed to meet the unique needs of our region. This is an on-going process and we will keep you informed as it progresses.

Gas-Electric Coordination

As growing numbers of coal power plants retire, gas-fired resources will increasingly be relied upon to meet energy demand. As the portion of demand served by gas-fired generators grows, so does the interdependency of the electric power system and natural gas infrastructure. We appreciate the Commission's recent leadership in this area to identify and solve potential problems. To help address the implications of this cause-and-effect in our region, MISO and its Stakeholder established the Electric and Natural Gas Coordination Task Force (ENGCTF). This group serves as a forum for collaboration between the gas and electric industries and has been tasked with identifying and investigating issues around gas-electric interdependency. Current

Task Force initiatives address fuel supply uncertainty, misalignment between the Gas Day and the Electric Day, coordinated operations, and cross-industry education.

Fuel Supply Uncertainty

The discussion has focused on ways to better capture fuel supply uncertainty within MISO planning models and processes. The ENGCTF passed a motion in April to scope a Loss of Load Expectation (LOLE) study that takes into account the probability that a generator will be able to get fuel when it needs it. MISO subject matter experts are currently working with Task Force members and the natural gas industry to determine the best way to fulfill the motion's directive. The target date for completion of this study is the first quarter of 2014.

Additionally, the Task Force has recently highlighted concerns surrounding the level of granularity of event reports to NERC's Generator Availability Data System (GADS). The significance of GADS data is its role in MISO's resource adequacy calculations.

Recommendations on improvements, if needed, will be discussed in the upcoming months.

Misalignment of the Gas Day and the Electric Day

The Task Force will finalize an Issue Paper on this topic in mid-July and forward it on to MISO's Market's Subcommittee for action. The document details potential impacts of moving up the posting of MISO Day Ahead awards, as well as the implications of shifting the Gas and/or Electric Days. MISO's stance on the former is that it warrants additional investigation, but that the latter does not, given expectations that costs would outweigh benefits.

Coordinated Operations

Given the interrelated nature of the gas and electric industries, MISO sees tremendous value in collaborating with both the natural gas industry and Stakeholders to determine how the planning and operations functions of the two can become integrated. This topic is slated for discussion in coming months at the ENGCTF.

Cross-industry Education

The Task Force continues to serve as a forum for information exchange between the electric and natural gas industry. Numerous topics have been covered by industry and MISO subject matter experts including gas price trends, gas and electric industry regulatory and planning constructs, and various MISO protocols and processes. Additionally, the group has worked to keep members up-to-date on planned and recently published, major gas-electric coordination studies.

As part of our effort to better understand the natural gas infrastructure in the MISO footprint, MISO has commissioned analyses of natural gas supply, storage, and pipeline capacity. The third phase of the study is targeted for completion in mid-August and results will inform discussions at the ENGCTF going forward.

Capacity Deliverability

Finally, MISO is engaged in collaborative efforts with neighboring Regional Transmission Organizations (RTOs) to ensure that capacity resources can be delivered from one RTO to the other, within physical system constraints. Optimizing capacity deliverability with neighboring RTOs enables the reliable delivery of the lowest-cost energy to consumers by providing flexibility and promoting efficient and timely resource additions.

Conclusion

The shift in the resource mix over the next few years presents new challenges in fulfilling our obligation to maintain reliability. MISO is responding to these planning and system operations challenges by investigating potential impacts and working with our Stakeholders, State Regulators and the natural gas industry to develop effective and innovative solutions. Thank you very much for this opportunity to speak to you today. I look forward to your questions.

Appendix

Figure 1 MISO 2013 Q2 Survey Results

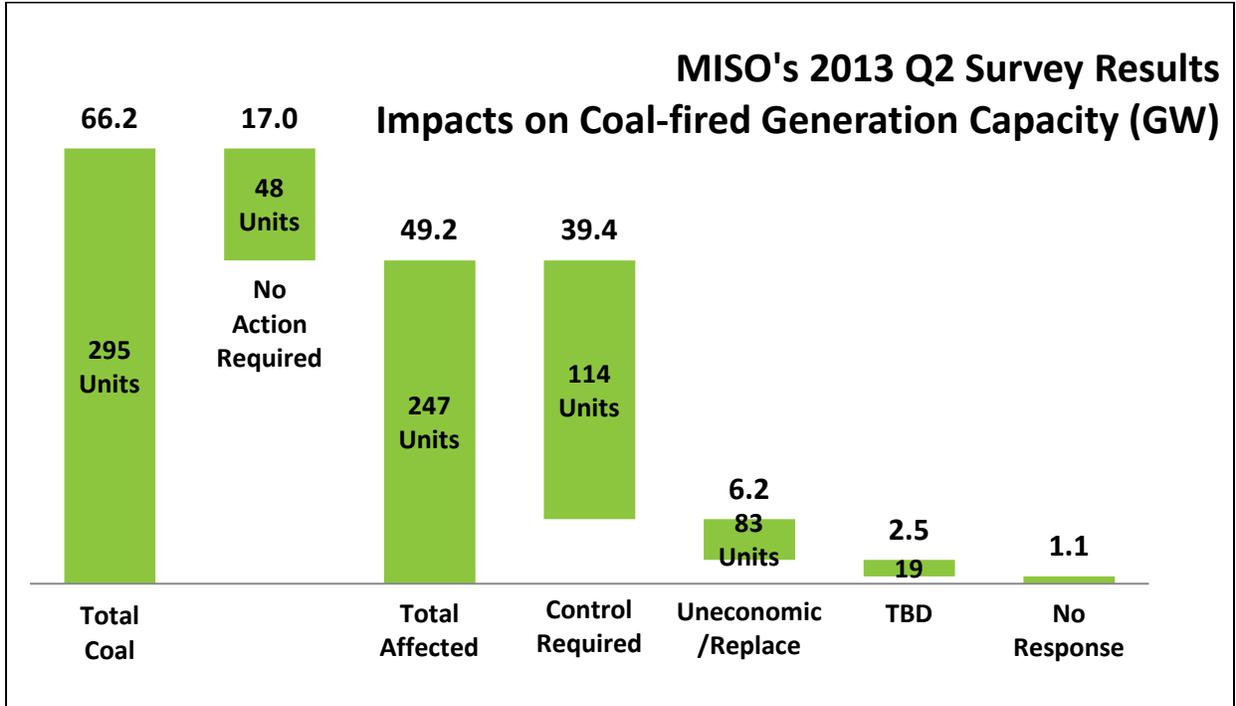


Figure 2 Resource Adequacy Under Moderate Load Forecast for 2016

