State Regulatory Sector Response
September 2019 AC Hot Topic
Market Development

INTRODUCTION

MISO's core mission is delivering safe, cost-effective electric power to its members.[1] To carry out this core mission, MISO is required to operate its bulk power transmission system in a reliable nondiscriminatory manner. In order to provide cost effective electric power, MISO, in collaboration with its stakeholders, evaluates challenges when they arise and creates solutions as necessary. MISO should continually ensure and express how any future solutions are related to its core mission. To guide this discussion, MISO has identified demarginalization, decentralization and digitalization (the 3Ds) as three trends that may impact the electric industry in the future.

Some areas of MISO are facing rapid fleet change and fuel source mix changes due to changing economics, state and federal policy, technology, and fuel source availability. The increasing penetration of low marginal cost resources, the low price of natural gas, and utility business and environmental goals are increasing the pace of decarbonization throughout the footprint. These trends combined with technological innovation, encourage demarginalization, and decentralization.

The 3Ds are proceeding in the different MISO sub-regions, states, and even sub-divisions within a state differently. MISO and stakeholders should be mindful of these differences. Some states are facing fast fleet-wide resource changes or adoption of Distributed Energy Resources (DERs), while others are either just beginning to see higher levels of DER penetration or are not yet facing the challenges associated with decentralization. Regardless, because of the integrated regional grid, the effects of policies pursued by individual states and communities are not isolated to those areas and can have broader impacts to zones and the region as a whole.

The following examples highlight how pervasive these trends are throughout the footprint and some of the actions our sector has taken to begin to address them. In New Orleans, there is a high penetration of DERs, and the City Council recently announced a massive increase in renewable energy capacity and the construction of a grid-scale solar power plant in New Orleans East.[2] Mississippi has created a formal long-term integrated planning process to give utilities flexibility while "providing a level of transparency that furthers the public policy goals" of the State and its Public Service Commission.[3] Arkansas has initiated a series of public workshops to study the impact of DERs in the state and relevant policy changes.[4] Minnesota has more than 500 MW of operational community solar, and Illinois and other states have begun or are establishing community solar or solar garden programs.

While these trends are evolving, decreasing reserve margins and increases in maximum generation events in MISO and other regions underscore the need to focus on reliability. There is continued concern regarding decreasing levels of synchronous generation and the loss of reliability benefits it provides. The OMS will continue engaging and working with MISO to examine and develop

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1 "[(MISO)] is an independent, not-for-profit organization that delivers safe, cost-effective electric power across 15 U.S. states and the Canadian province of Manitoba. MISO is committed to reliable, nondiscriminatory operation of the bulk power transmission system and collaborating with all stakeholders to create cost-effective and innovative solutions for our changing industry. MISO operates one of the world's largest energy markets with more than $29 billion in annual gross market energy transactions" https://www.misoenergy.org/about/.

2 https://council.nola.gov/news/july-2019/council-announces-massive-increase-in-renewable-en/

3 https://www.psc.state.ms.us/InSiteConnect/InSiteView.aspx?model=INSITE_CONNECT&queue=CTS_ARCHIV_EQ&docid=637701

4 http://www.apscservices.info/EFilings/Docket_Search_Documents.asp?Docket=16-028-U&DocNumVal=136

appropriate market mechanisms, if necessary, to accommodate a changing generation mix in a way that properly values and compensates resources for attributes they contribute to grid management and operations.

MISO should keep its core mission in mind so that this discussion remains focused on how MISO carries this out given the diversity of challenges within its footprint.

QUESTIONS

1. **Industry trends: Three broad change-driving trends are discussed in MISO Forward—Demarginalization, Decentralization and Digitalization. How are these trends shaping your sector and business models?**

The rate at which each of these trends advance may affect the rate of the other two, however, each trend is advancing independently as well. For example, the faster generation becomes decentralized, the faster the electrical system may need to digitize in order to ensure reasonable levels of visibility, controllability, and system coordination. A faster increase in demarginalization on the bulk system could decrease the adoption of DERs (i.e., slow the pace of decentralization). More specifically, low LMPs could deter distributed solar in some regions. However, the decentralization trend is affected by more than just the increase in zero marginal-cost resources. The low price of natural gas, the trend towards smaller units, and decreased technology costs also encourages decentralization as it is easier to place these units in more areas. These scenarios, however, are greatly affected by their location within the footprint.

Where the 3Ds are accelerating, some states are establishing (or re-establishing) comprehensive resource planning and analysis (including distribution system planning). For example, when comparing the system impacts from distributed solar and utility solar, planners have to account for a multitude of factors not previously considered and analyze a much larger set of options or alternatives as potential least-cost resources (combined DR, DER, EE, etc.).

Some of the impacts from these trends are expected to be addressed by ongoing MISO processes such as RAN and other market improvements. However, as we have seen in the recent LMR rule modifications[5], MISO's tariff changes need to work in conjunction with state tariffs and resource planning efforts. Concerning demarginalization, the Forward Report states that one associated trend could be that the value of flexible resources could increase while market revenues decrease. For example, the current high level of self-commitment practices is becoming a cause for concern for some. Minnesota[6] and Missouri[7] have investigations pending on this topic, and regulators are becoming increasingly aware of how market behavior can impact to consumers.

The shift from large central station power plants to more dispersed, often low-voltage distribution or behind the meter networks, impacts the regulatory sector in a variety of ways. Most obviously, decentralization impacts states' siting processes. More communities are inherently involved as decentralization increases, which can increase the complexity of approval processes and cost recovery efforts. Individual states have different DER adoption practices based on their unique circumstances, and many are evolving. For an example, Minnesota has an open docket to update standards for distributed energy resource interconnection.[8] As noted above, states are seeing more cost

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5 Midcontinent Independent System Operator, Inc., 166 FERC ¶ 61,235 (2019).

6 Order Accepting 2016-2017 Reports And Setting Additional Requirements https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={E05 BC968-0000-CE39-9DAB-10D78F49CA5D}&documentTitle=20192-150080-02.

7 PSC Opens Electric Working Docket. https://psc.mo.gov/Electric/PSC_Opens_Electric_Working_Docket.

8 State of Minnesota -- Distributed Energy Resources Interconnection Process.

recovery requests for investments in utility systems to manage DERs and increase the level of grid digitalization.

Digitalization is impacting our sector in several major ways. For example, many commissions are dealing with cyber security, advanced metering infrastructure (AMI), other grid modernization infrastructure installations, and cost recovery of cloud-based computing. Many of the issues associated with digitalization are relatively new to the work of utility commissions which often require staffing adaptations as entirely new work streams develop. In addition, cyber-security related issues have increased the number of parties that regulators need to coordinate with at the local, state, regional, and federal levels. The increase in digitalization of the utility systems may change the expectations of regulators with regard to utility planning and system optimization due to utilities' ability to have greater visibility and control and their increased ability to make more targeted investments.

Are there additional trends that should be incorporated into the discussion?

Geographic variability, the unevenness with which these trends may appear, and the speed at which each of these trends may progress across the footprint should be incorporated into the discussion. The changes vary between different utilities, states, regions/zones, and based on population density. Studying this variability could provide valuable lessons for the industry as a whole.

Regulators are also monitoring and engaging in innovation in rate design within the footprint and across the country and the ways in which load shifting could affect long term planning. State regulators are keenly aware of their jurisdiction over the distribution system and their authority to manage the integration of electric vehicles by setting time of use rates, for example. Retail planning and bulk system planning changes will affect each other. Regulators and MISO have separate but complementary roles in managing these trends.

2. Future Risks, Needs, and Value: For each of the trends of Demarginalization, Decentralization, and Digitalization, discuss the following:
a. How they might affect or change the risks the region faces?

Demarginalization: The rate of demarginalization will impact the variety of alternatives in the planning process, especially the portion of low-marginal resources that are seasonal or variable and the way in which these two issues could affect load shift across all hours of the year. Regulators will need to consider a larger group of risks and inputs that affect the use of transmission and distribution, how this may create stranded costs, and how this may affect the application of fixed costs. Regulators will need to consider other ways to price energy besides location marginal pricing, and this could affect states in many different ways.

Demarginalization leaves open how some costs could be recognized and recovered. It will be up to the states and market participants to manage how these low-marginal cost resources, and other resources that experience persistently low LMPs, recover their costs.[9] As these costs will not be recovered through MISO's capacity construct, they will have to be recovered through retail rates, bilateral contracts, or MISO's energy and ancillary services markets. MISO may need to revise its energy offer cap as the IMM has suggested in order to alleviate the risk of resources receiving inefficient or incorrect price signals. For example, the current offer cap cannot create scarcity pricing that would reflect the true cost of energy in a market with a high penetration of zero-marginal cost resources.

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https://mn.gov/puc/assets/Minnesota%20Distributed%20Energy%20Resource%20Interconnection%20Process%2 0and%20Agreement%20%28MN%20DIP%20and%20DIA%29_tcm14-381183.pdf.

[9] Since the Illinois Commerce Commission has no direct authority over generating unit cost recovery, Illinois notes that this statement does not apply to Illinois.

Decentralization: Since 2017, the OMS has prioritized ensuring that increased quantities of DERs do not decrease the reliability or efficiency of the bulk electric system. OMS has identified a few issues to consider when assessing risk from decentralization: potential for flow from distribution feeders onto the transmission system, forecasting accuracy, resource variability, ramping, reactive power support, system protection effects, visibility and control, and aggregated blocks of DERs. OMS has also been increasing its knowledge on issues involving DER performance during contingencies including low voltage and frequency ride-through, frequency support, and islanding.

OMS has also identified a list of possible planning issues: modeling of DERs for transmission system planning and operations, load and generation forecasting, impacts of interconnection requirements, and the use of DERs as potential non-transmission alternatives.

Decentralization expands the geographic scope of resource locations, which can provide reliability benefits and smooth out variability associated with localized issues. Simply said, this trend could serve to reduce the risks associated with events that could impact a large, central-station generator.

A recent NARUC report highlighted the increased complexity decentralization creates when planning for reliability and resilience. [10] Several industry groups are actively working to establish standards or guidance to ensure DERs do not affect system reliability and/or are planned for in a reasonable manner.[11]

Digitalization: Regulators will have to monitor how digitalization affects their jurisdictional utilities' ability to manage their systems. An increase in data, and digitally-controlled grid services, could decrease risks to the region, however, risk may increase during the implementation period or upon implementation if controls are not managed properly.

Additionally, regulators will have to manage how digitalization affects or creates privacy or security risks, including how customer and grid data should or shouldn't be made available considering statutes, regulations, and policies. These policies are expected to evolve with the on-coming challenges faced by the increase of system data.

The question of who manages access and protects these sources of data could create tension between RTOs, states, and utilities. Ensuring the right entities have the appropriate and necessary level of data will be challenging. Although more data could be useful in some instances, it could also become unnecessary and burdensome for those involved. Lastly, centralization or standardization of data requirements could stifle experimentation with new technologies for a wide variety of reasons not related to the bulk system or wholesale markets.

b. The services, tools, and functions, e.g. markets, operations and transmission planning that you envision needing from MISO in the future? Which will be most critical?

For all 3Ds, it is expected that more established frameworks may be needed regarding what products are purchased on the market, who is at risk for not delivering or taking, and how to value flexibility. Stakeholders will need to assess whether new MISO market products are needed or if price refinement (and improvement) of MISO's core service offerings would suffice. Some of these needs cannot be known until stakeholders at the state and local level provide clarity as to what tools are in

[10] "The Value of Resilience for Distributed Energy Resources: An Overview of Current Analytical Practices," April 2019, pg. 4.

[11] NERC's System Planning Impacts for Distributed Energy Resources, National Institute on Standards and Technologies Interoperability group, Smart Electric Power Alliance working groups, Department of Energy's DSPx efforts, Institute for Electrical and Electronics Engineers (multiple), among others.

place at the distribution system level. After these stakeholders gain experience, MISO and stakeholders will be able to decide how these tools can be accounted for at the bulk-system level. That said, the state regulatory sector will work with MISO as issues or problems are defined to evaluate whether we need new services, tools, and functions.

c. How will the services, tools, and functions identified in question 2b create value for the region?

A comprehensive review of market structure and design will guide and clarify the roles MISO, regulators, market participants, and individual generators play. This process could maximize the value created for the region by ensuring there are not redundancies or inefficiencies throughout the market structure while recognizing the various market structures that exist at the retail level. The market design as a whole will need to provide appropriate price signals.

Demarginalization: If the markets properly set prices reflective of the value and scarcity of the services offered in MISO, the markets will be efficient. MISO can help achieve reliability of the bulk electric system by creating a functioning energy market for the bulk system that is complementary and responsive to states' efforts. Helping stakeholders understand pricing trends as the markets continue to evolve will be necessary to ensure continued value.

Decentralization: To an increasing degree in the future, MISO's Transmission Planning process will need to be able to assess solutions based on economics and other factors. However, the need for any changes will need to reflect the diversity with which these three trends affect different parts of the footprint as discussed above. MISO will also need to address declining synchronous generation to ensure continued grid reliability. This will require coordination and planning with stakeholders to ensure grid reliability, economic efficiency, and competitive markets.

Our sector has been focused on the need to better understand the proper level of information sharing that should occur between entities, including the distribution and transmission system, as decentralization increases. This will certainly lead to involvement from MISO and consideration of jurisdictional boundaries between the transmission and distribution systems. The state regulatory sector has prioritized exploring information sharing through an upcoming DER workshop.

At the very least, MISO will need to evaluate system-wide impacts this trend could create to help inform both decisions made at the state and local level as well as the identification of potential impacts within MISO's purview. With increased variability in generation output and load, it will be important for MISO to have an accurate understanding of the capability to import and export energy to and from neighboring regions and to share that information in a transparent manner. MISO's ability to import and export energy over its seams should be utilized to create value for MISO's members.

Digitalization: Communication systems beyond the Inter-Control Center Communications Protocol will be needed to cost-effectively dispatch and settle demand response or other small generation units. Although it is not yet clear which system or systems will be needed, it is clear that MISO could provide value by providing services that would otherwise have been cost prohibitive.

In conclusion, the State Regulatory Section acknowledges that system and technological changes are currently underway and are projected to continue. Active, and continued, coordination and discussion between stakeholders and MISO is necessary to address declining levels of synchronous generation, ensure reliable cost-effective markets, maintain system operation, and provide quality transmission services. The OMS looks forward to continue working with all stakeholders to address the issues that may arise regarding planning and market rules.

APPENDIX

De-marginalization refers to the modified set of resources that can provide the next needed, or "marginal," increment of energy at zero additional costs (e.g., renewables), or very low additional costs (e.g., highly efficient gas-fired generation).

Decentralization - involves the shift away from large, central-station power plants to smaller, often variable resources that are located on local, low-voltage electricity distribution networks, or "behind the meter" at homes and businesses.

Digitalization - refers to the revolution in information and communication technologies and platforms that will continue to disrupt nearly everything in our economy, including energy services.