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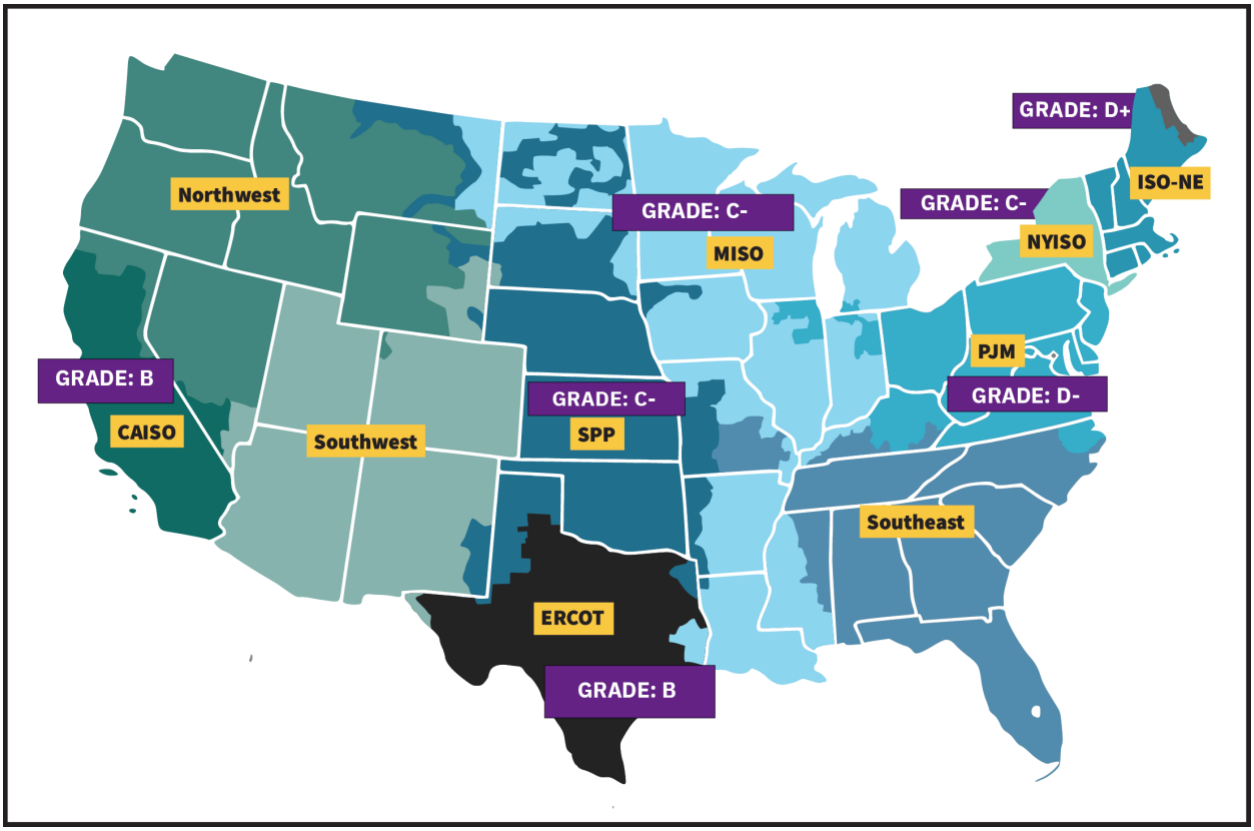
MISO's Interconnection Process Evaluation

In a recent scorecard released by Advanced Energy United with analysis by Grid Strategies and The Brattle Group, the Midcontinent Independent System Operator (MISO) received an overall "C-" grade for its interconnection procedures and outcomes, tied for third with SPP and NYISO among the seven U.S. wholesale markets. The report offers a look-back analysis, providing a baseline against which to evaluate ongoing reforms, including in response to FERC Order 2023. Full analysis available at: AdvancedEnergyUnited.org/Scorecard.

Category	Description	Score
Interconnection process results	Success rate and speed, cost reasonableness and uncertainty	C
Pre-queue information	Availability and quality of useful information and access to transmission provider to answer questions prior to queue entry	C+
Interconnection study process design	Interconnection process structure, transparency, staffing, and modeling resources, and timeliness and management of construction of network upgrades	D+
Study assumptions, criteria, replicability	Transparency and reasonableness of criteria and assumptions, consistency of modeling, consideration of grid-enhancing technologies, and coordination with neighboring systems and distribution studies	D
Usefulness of interconnection alternatives	Attractiveness and availability of alternatives to the traditional interconnection process	B-
Using regional transmission planning	Regional transmission planning leverages findings and incorporates upgrades from interconnection studies, and vice-versa	B
Overall Grade	**Weighted evaluation giving highest weight to process results**	C-

Projects currently in the MISO interconnection queue:

Over 334 GW, including nearly 247 GW of clean generation resources (solar, land-based, and offshore wind generation) and more than 74 GW of storage.[1]



[1] Lawrence Berkeley National Laboratory, *Queued Up,* available at https://emp.lbl.gov/maps-projects-region-state-and-county (accessed February 22, 2024).

What is the generator interconnection?

The interconnection process is an evaluation of reliability impacts and transmission system upgrades and costs that must be undertaken before a new generation project can start to deliver electricity to the grid. While necessary, it is a complex, multi-step, multi-year journey that many projects don't make it through.

For projects seeking to connect to the transmission (high voltage) grid, the interconnection process is overseen by the relevant transmission provider; in much of the Midwest, that role is filled by the Midcontinent Independent System Operator or MISO. The MISO interconnection process is overseen by the Federal Energy Regulatory Commission (FERC), which recently finalized a major rulemaking, Order No. 2023, requiring all transmission providers to enact a series of reforms. Projects seeking to connect to the distribution grid undergo a separate state process, not evaluated by this report.

More information about the interconnection process is available from this guide by Advanced Energy United: https://blog.advancedenergyunited.org/reports/interconnection_process_guide_2023.

About the Interconnection Process Scorecard

The scorecard evaluated a series of quantitative and qualitative metrics (listed above) and relied on a mix of publicly available queue data, interviews with interconnection customers (project developers with experience navigating interconnection processes), the expertise of the research team, and other publicly available research and analysis to evaluate each RTO/ISO. The scorecard is a look-back assessment, serving as a benchmark against which reform efforts (including compliance with FERC Order No. 2023) can be evaluated.

MISO Findings

The report found that while MISO's strength lies in its regional and interregional transmission planning, the overall interconnection process is slow and marred with unpredictable costs. The gap in its planning studies has left the system with limited available capacity and there are concerns over recent changes that raise impact criteria for new projects. Findings with respect to individual categories are described below.

Interconnection Process Results: C

Interconnection process results scores reflect the time, cost, and cost certainty that projects moving through the interconnection process experience. Although MISO aims for the process to take one year, as the queue size has increased, customers have reported interconnection lasting 2-4 years. MISO's schedule estimates have inaccurately reflected these delays. This is also challenging for customers, who then have a 15-day window to perform their own modeling and determine whether or not to stay in the queue. Despite some study enhancements, the process is still much slower than intended.

Pre-queue Information: C+

Availability of pre-queue information is important to improve interconnection applications and reduce the number of unviable projects entering interconnection queues, and it is an area where MISO performed the strongest out of all the ranked RTOs/ISOs, although its pre-queue information was still found to be insufficient. MISO has both a generator interconnection queue map and contour map available for customers, but the contour map is out of date and the resolution is poor. They also provide a Point of Interconnection Tool to help with pre-screening, but it is not publicly available. While FERC Order No. 2023 will require some additional pre-queue information, there is skepticism about how useful this will be in reality.

Interconnection Study Process Design: D+

The report's evaluation of the interconnection study process included an assessment of the process structure, transparency, and adequacy of staffing and modeling resources—in other words, how the process is structured as well as how it plays out in practice. MISO's interconnection process was found to be generally structured well; it progressively moves towards increased certainty, with some transparency. However, the interconnection study process is undermined by inconsistent penalty applications for withdrawals. Study results may also result in many contingent upgrades, but with variable penalties, some projects may defer exit from the queue to see if costs improve. Recent reforms related to withdrawal penalties and milestone payments may address these concerns. Customers are also concerned with projects in the long-range transmission plan that are not being developed in coordination with network upgrades, which may result in additional delays.

Study Assumptions, Criteria, Replicability: D

This category evaluated the transparency and reasonableness of study criteria and assumptions, as well as consideration of grid-enhancing technologies and alignment and coordination of studies of distribution interconnection, neighboring systems, and transmission providers. MISO has faced criticism for lowering its "DFAX threshold" (which is used to determine whether a particular project will be responsible for sharing the costs of a needed

upgrade), which has resulted in interconnection studies identifying the need for additional and distant network upgrades further from the point of interconnection and beyond those identified in MISO's impact studies. There are also concerns that more stringent local planning criteria may result in excessive network upgrade costs. Although MISO provides customers with its full model results, the process for gaining access can be slow.

Usefulness of Interconnection Alternatives: B-

In addition to the standard interconnection process, the report also evaluated the availability and usefulness of other approaches to bring projects online, including the use of Energy Resource Interconnection Service (ERIS, which requires more limited network upgrades because it only provides for use of the transmission system on an as-available basis), opportunities to use operational approaches to avoid network upgrades, and opportunities to share and transfer existing points of interconnection. The report counterintuitively found that costs in MISO to interconnect ERIS projects may be double the cost for NRIS projects. There is also a process for transferring existing interconnection rights from old generation to new generation that customers describe as "functional." Available alternatives and the associated costs depend on transmission providers, with some being less costly and easier to develop than others. Transmission providers also have a role in the use of remedial action schemes (RAS) or other alternative mitigation strategies.

Using Regional Transmission Planning: B

Finally, the scorecard evaluated the extent to which the regional transmission planning process is effective at supporting the interconnection of new generation. MISO has had a successful transmission development process in the past through its Multi-Value Projects (MVP) study in 2011 and the more recent Long-Range Transmission Planning (LRTP) process. However, the 10-year gap between these efforts has increased the stress on the interconnection process to identify necessary upgrades and reduce the congestion on the MISO system. Customers view the more recent LRTP Tranche 1 results favorably and believe it has been effective at building transmission while considering regional upgrades. However, there are concerns around renewable projects being ahead of the planning process for Tranches 3 and 4, particularly in MISO-South.

Reform Needs

Efforts to comply with FERC Order No. 2023, already well underway, will help to address some of the shortcomings identified in the report – but only if MISO submits an ambitious compliance proposal and the Commission holds the ISO accountable for addressing all compliance requirements. The report shows how MISO's strengths in its interconnection process include its recent commitment to transmission expansion both within its system and

in coordination with SPP along the seams of the two systems, as well as availability of some interconnection alternatives outside of the queue. Still, its process is unreliable and slow with unpredictable costs. Further reforms beyond Order No. 2023 will also be needed to make the interconnection process in MISO more predictable, affordable, and efficient. Stakeholders in MISO—including developers, transmission owners, states, and RTO staff—will need to continue to work together to improve the process and its implementation.