Regional Collaboration:

The Key to Securing a Reliable Renewable Electric Grid

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Executive Summary

In November 2023, Michigan Governor Gretchen Whitmer signed into law several amendments to the Clean and Renewable Energy and Energy Waste Reduction Act. Among these amendments was a Renewable Portfolio Standard (RPS) for all utilities selling electricity in the State of Michigan of 50 percent by 2030 and 60 percent by 2035 (1).

In 2022, 63 percent of Michigan's electricity still came from fossil fuels such as coal and natural gas. Only about 12 percent came from renewable resources (2). There is a long way to go to reach these new goals.

8%	2%	1%	<1%
Wind	Biomass	Hydro	Solar

Michigan Renewable Energy Percentages, 2022, Energy Information Administration, *State Profile and Energy Estimates: Michigan* (2)

Even as the state is making progress, though, transmission infrastructure is aging and proving inadequate for renewable generation. Michigan does not have the regulatory power to make the needed investments in this infrastructure on its own and there is a severe lack of collaboration amongst states to decarbonize the grid. If Michigan wishes to reach its renewable energy goals, then it must promote and invest in regional collaboration to address these barriers.

The State of the Grid

The grid consists of the generation, long-range transmission, and short-range distribution of electricity. Michigan has made great strides towards overcoming barriers that exist in the generation and distribution sectors of the grid. Its 2023 legislation, for example, set

electricity storage targets for utilities, preempted local laws that prohibit the development of renewable energy on private property, and set the aforementioned RPS goals (1).

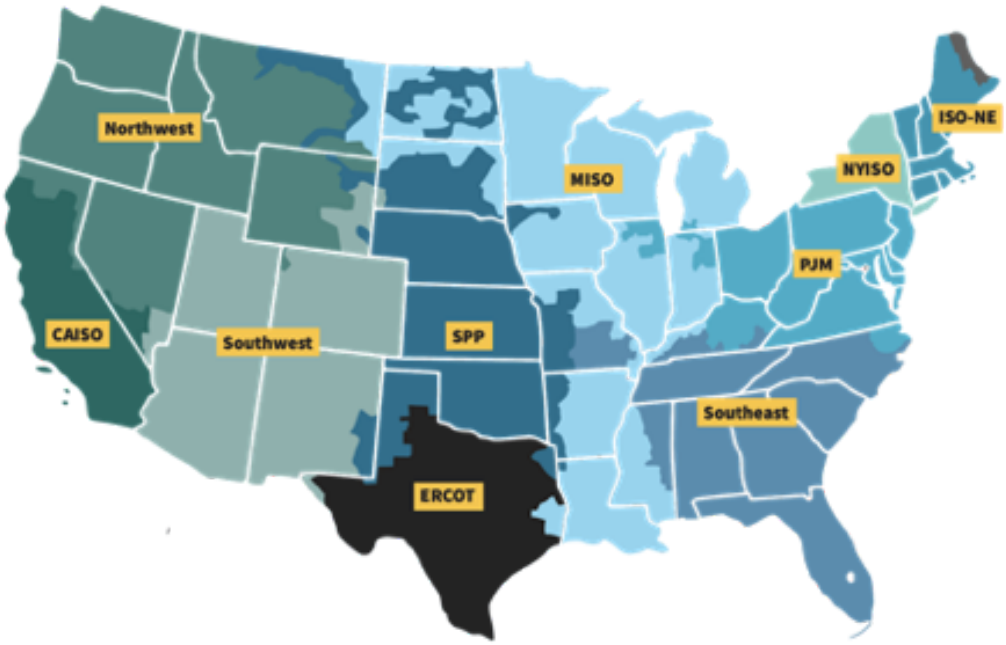
Transmission poses a major barrier to the implementation of renewable energy, however (4). Electricity generation plants have historically been built near population centers, limiting the amount of transmission infrastructure that is needed. This has been possible because fossil fuels, such as coal and natural gas, can be imported from far distances. Fossil fuel plants can also generate a large quantity of electricity per square foot.

Renewable energy generating facilities have very different requirements, however. Sunshine and wind cannot be exported, so these facilities have to be built where those resources are most readily available. This is often far away from population centers. Further, they require a lot more square footage to generate comparable amounts of electricity to their predecessors.

The need to spread out generators and the lack of flexibility in where they must be built means that new, and more, transmission infrastructure is needed to carry renewable electricity to end users. Michigan has not taken steps towards addressing these transmission barriers like it has taken towards addressing generation and distribution barriers -- largely because it doesn't have the regulatory authority to do so.

The Grid is Not a State Entity - it's Regional

In 1999, the Federal Energy Regulatory Commission (FERC) issued Order 2000, prohibiting utility companies from participating in both the electricity generation and transmission markets. The Order did not mandate how this separation must be accomplished, but strongly encouraged the development of Regional Transmission Organizations (RTOs) to oversee transmission within a certain geographic scope (5).



Regional Electrical Grids Across the Continental US, Federal Energy Regulatory Commission, *RTOs and ISOs* (6)

In December 2001, the first RTO was approved by FERC – the Midcontinent Independent System Operator (MISO). Today, MISO operates in 15 states in the Central US, though its jurisdiction does not follow state borders. The vast majority of Michigan's electricity is managed by MISO.

As an RTO, MISO is in charge of balancing the real time flow of electricity across the entire region and managing a wholesale market exchange (7). This means if one utility can't generate enough electricity to meet demand, MISO will coordinate the sale and transmission of energy from a different generator to that utility's customers. These functions help keep the lights on for all MISO customers, even in the face of maintenance or malfunction at a generating plant and regardless of state boundaries. Ultimately, this means that the grid is interconnected across the entire MISO region.

The Implications of Ambiguous Authority

> *"This fractured authority over grid planning is threatening to leave us all in the dark."*

Given the interconnectedness of the electrical grid, it makes sense that MISO is formally tasked with planning its future for the whole region (7). It does this by conducting research and running models to identify infrastructure upgrades that are needed. When running these models, however, MISO defers to the states to determine their own renewable energy allocation (8).

Nine of the states that MISO operates in have published their own climate action plans in the last 15 years (Appendix A). Not all of these plans contain explicit renewable energy implementation goals, but they all have decarbonization goals and strategies, often including grid decarbonization, specific to their own state.

When conducting its research, MISO forces its model to produce results that will allow these independent state goals to be met. Thus the plans it proposes inherently help these states implement more renewable energy. In addition, those states can alter the grid under their own authority within their own state borders. This is usually done through the states' Public Service Commissions (PSCs).

Even if MISO ran a more flexible model, it cannot mandate that states participate in transmission expansion plans. MISO is not a federal entity -- it is a nonprofit. It doesn't own any transmission infrastructure, either, so MISO can't build these expansions itself (7).

Running a model that accounts for independently selected state goals and leaving power with the state PSCs certainly helps those states reach their goals, but the problem with decarbonizing the grid in this way is that climate change is a global problem, not a state

problem. Michigan decarbonizing its own electricity generation won't save it from the impacts of climate change because it won't be enough to mitigate the worst impacts of climate change on its own.

Ultimately, the US has a national resource contributing to a global problem that is being regionally governed, but whose growth and development is being led by several independent state plans. This fractured authority over grid planning is threatening to leave us all in the dark.

What True Regional Collaboration Looks Like

> *...we have to reframe grid decarbonization as a cooperative effort, not a competition.*

In order to mitigate the worst impacts of climate change, we have to reframe grid decarbonization as a cooperative effort, not a competition. As such, I have a series of recommendations spanning many of the key stakeholders in this issue. These recommendations present specific ways for MISO and the states it operates in to work together to more efficiently and effectively transition to a renewable energy grid. They are, however, adaptable to all RTOs and similar organizations across the country.

True coordination on the planning and development of a renewable grid recognizes that states have different renewable energy potentials. It not only allows states to purchase renewable energy from each other but relies on the states with the highest potentials for wind and solar energy to produce electricity for the whole region. Considering the benefits to an entire region may also illuminate the existence of economies of scale and allow for more cost-effective planning. As such, **MISO should run a regional model that predicts the most efficient allocation of renewable resources across the region, regardless of existing state level goals**.

After this independent assessment is completed and the most efficient allocation of renewable generators is determined, **states should collaborate to enact their own renewable energy legislation based on the results of the model**. MISO's model might reveal that Louisiana has the capacity to produce excess solar energy in the winter months that could be used by Michiganders, for example. Louisiana currently has a goal of generating 80 percent of its electricity from renewable sources by 2050 (9). This model might show that solar is even more profitable than originally predicted in the state and encourage it to strengthen that goal. Michigan currently has a goal of 2,500MW of grid-scale storage capacity by 2030. If the model shows that it can rely on Louisiana sunshine in the winter months, it might be able to reduce this target and save money and resources for more efficient use elsewhere.

All of these state laws should incentivize the development of renewable energy where it is most efficient. These incentives might look like friendly zoning laws in high renewable potential areas, fast-tracked PSC proceedings, or renewable potential related stipulations when leveraging public funds. **MISO should also incentivize the development of renewable energy where it is most efficient**. It can do so by prioritizing connection requests in line with the model and facilitating further state collaboration.

MISO must also continue and expand its regional pricing scheme for "Multi-Value Projects". Currently, MISO divvies up the costs for wide spanning infrastructure expansion and improvement projects based on benefits to individual states. An extended model means more benefits can be identified and leveraged and MISO's pricing scheme should stay in line with these new benefit calculations.

RTOs don't actually operate in a vacuum either. What happens in one RTO can affect another and they can transfer electricity between them. This poses challenges, but also provides more opportunities for coordination. As such, **policymakers must continue to research and consider the possible benefits of a nationally regulated electrical grid**.

The Need for Coordination is Urgent

> *The only way to achieve a reliable renewable electric grid is through regional coordination.*

Addressing the global problem of climate change will take a global effort. In order for the US to do its part in reducing greenhouse gas emissions, it must decarbonize the grid nationwide. Who has the authority and duty to lead this effort, however, is ambiguous and current planning strategies and regulatory structures do not support widespread decarbonization.

The progress being made by individual states is commendable, but as more renewable energy sources are sporadically added to the grid, MISO's job of maintaining a balanced load becomes increasingly complex. In its Renewable Integration Impact Assessment, MISO found that in its current state it can manage up to about 30 percent renewable energy penetration across the region. Its models indicate, however, that an inflection point exists somewhere between 30 percent and 40 percent. At this point, neither MISO's current infrastructure nor its system operations will be sufficient to maintain a reliable electricity supply for any of the states in the region (8). An unreliable electric supply means MISO customers will experience increasing instances of power outages and possibly brownouts or rolling blackouts.

We are racing against two clocks -- climate change and grid reliability. The only way to achieve a reliable renewable electric grid is through regional coordination. Action must be taken quickly; we are running out of time.

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Appendix A

There are nine sates whose grids are at least partially monitored by MISO that have published a climate action plan in the last 15 years. Of those, four have renewable energy goals. Note that these are renewable energy goals, not clean energy goals. The latter includes nonrenewable non-carbon energy sources, such as nuclear energy.

	Climate Plan Publication	RE Goal	
		Generate	By
Arkansas	October 2008		
Illinois	September 2021	40%	2030
		50%	2040
Iowa	December 2008		
Kentucky	November 2011		
Louisiana	February 2022	80%	2050
Michigan	April 2022	60%	2035
Minnesota	2022	55%	2040
Montana	August 2020		
Wisconsin	December 2020		