



Transmission and Planning in the MISO Footprint

Clean Grid Alliance

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Clean Grid Alliance overview

- Regional non-profit advocacy organization focused on renewable energy policy, technical/engineering issues, project implementation, primarily for utility-scale resources
 - Members include environmental/clean energy NGOs, wind/solar/storage developers, turbine manufacturers, businesses that provide goods/services to the industries (construction, legal, supply chain)
 - 9 state footprint: ND, SD, MN, IA, WI, MO, MI, IL, IN
 - Extensive participation in the MISO stakeholder process including in MVP transmission portfolio
 - 18-year track record of success
 - Work extensively with electric utilities, including on Integrated Resource Planning

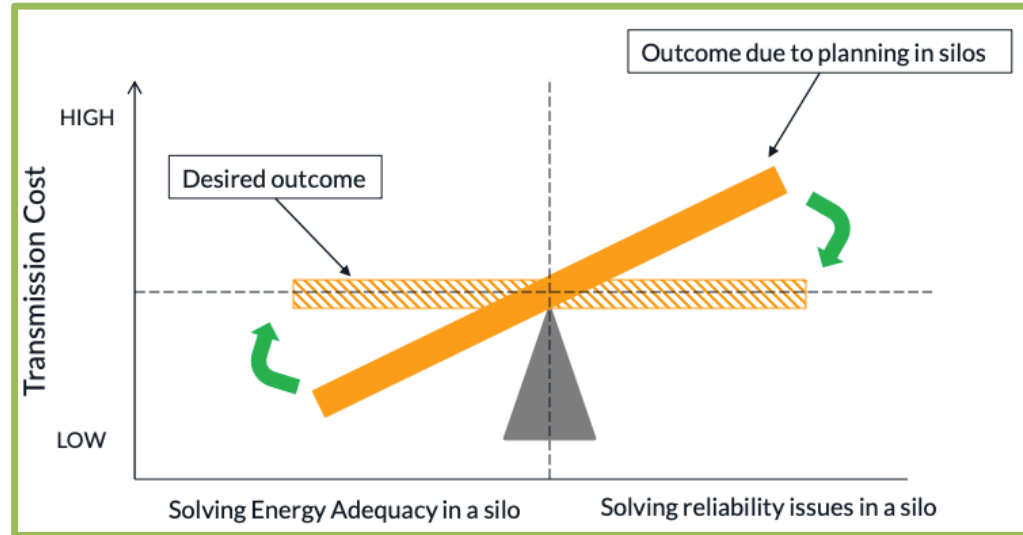
Planning for a Changing Resource Mix

Planning is key to being ready for the future:

- MISO Transmission Expansion Planning (MTEP) – Transmission planning processes to meet reliability needs, reduce costly congestion, and integrate new resources
- Resource Availability and Need (RAN) - Ensuring resource sufficiency in all hours
- Renewable Integration Impact Assessment (RIIA) – forward looking study to identify future needs relative to changing resource mix
- Additional State and Subregional Efforts – Such as CapX

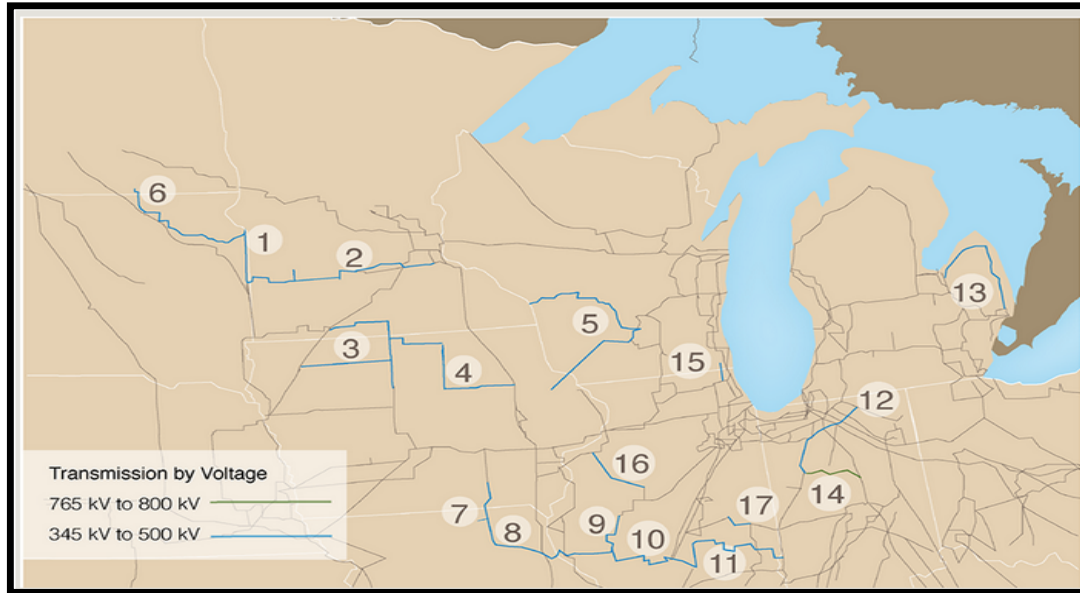
Transmission Is a Long Lead Time Resource

- Optimize use of the existing system
 - Dynamic Line Rating
 - Identify areas of the grid that can accept new resources now
 - Where do retirements free up capacity for new generators?
- Efficient planning
 - Consider needs 10-20 years into the future as well as upgrades needed in the next few years
 - Plan for all needs at the same time to take advantage of synergies and cost efficiencies

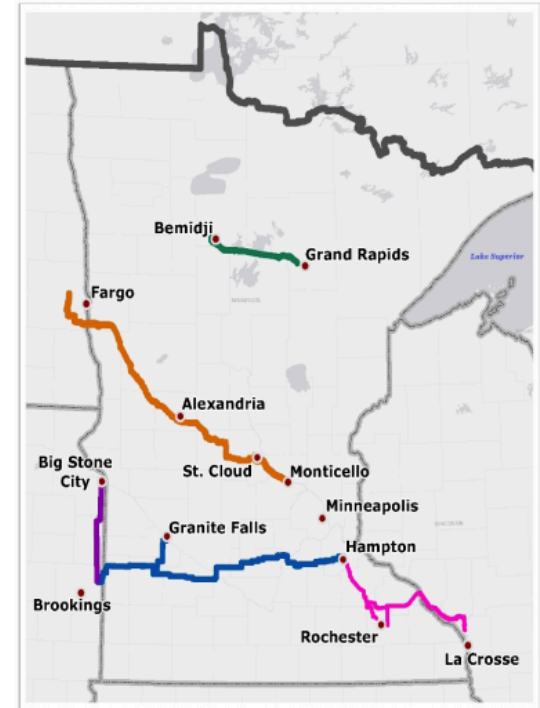


MISO MVP Portfolio and CapX2020

Examples of Comprehensive Planning to Benefit Consumers



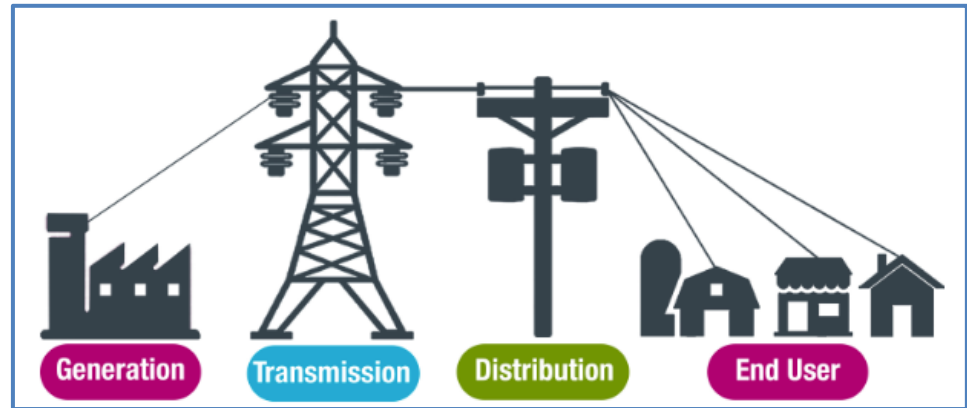
Source: MISO MTEP17 MVP Triennial Review



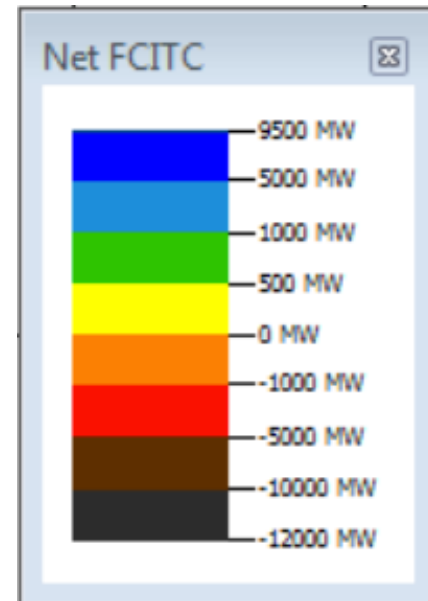
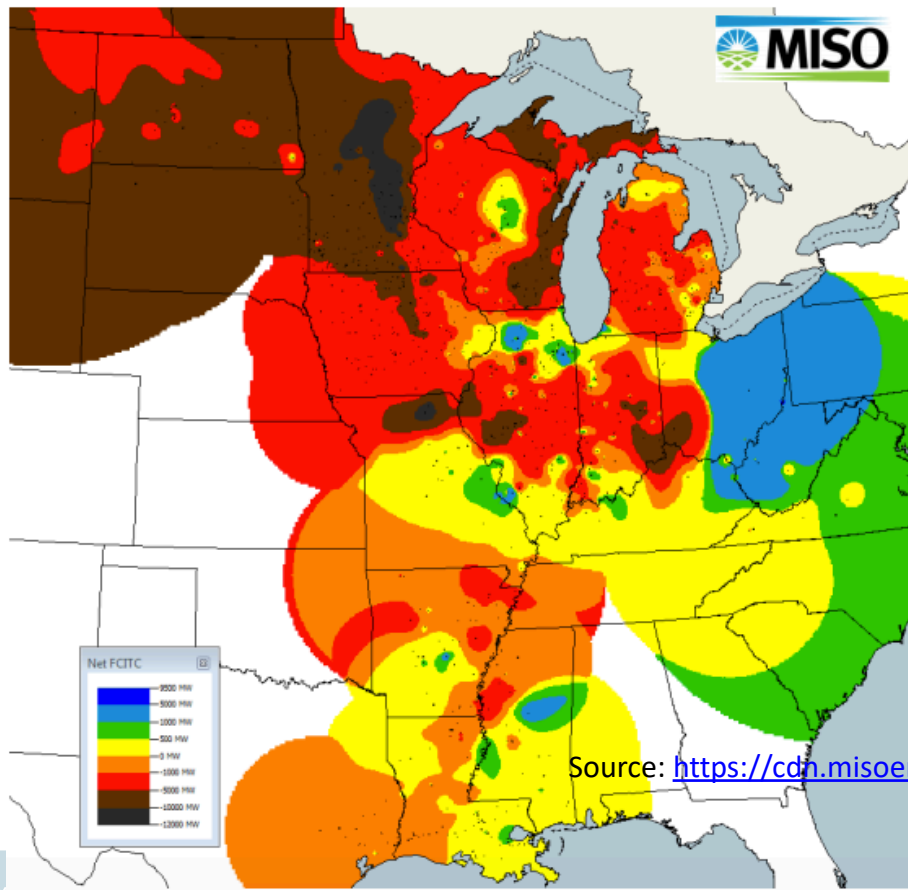
Source: www.CapX2020.com

Interconnection Queue Process

- New resource connections to the grid must be studied before developers can participate in utility procurement processes.
- Studies ensure that connection of a new resources is done reliably and may allow for electricity delivery.
- Cost and timing results are key information for resource development and utility decisions.
- MISO's process is 500+ days.
- Transmission capacity available for new resource connection is limited in MISO west.



Interconnection Capacity Becoming More Limited



Source: https://cdn.misoenergy.org/GI-Contour_Map108143.pdf

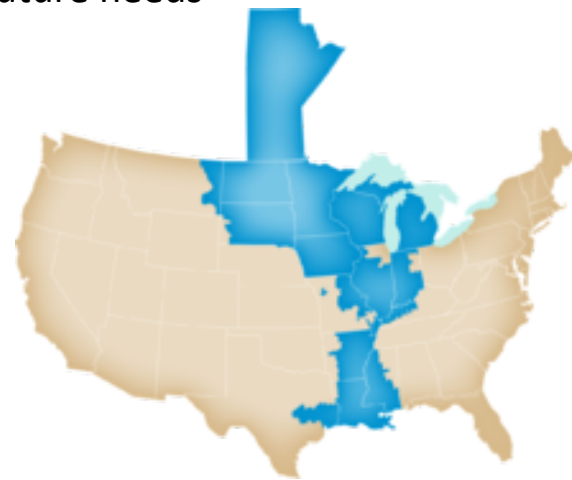
As of July 2018

Interconnection Queue Challenges

- Recent interconnection study of a cluster of projects in MN resulted in all but two projects dropping out. Those two are still uncertain.
- The costs for interconnection upgrades for this cluster were on the order of \$1.5 million/MW of generation capacity (similar to the total capital cost of projects).
- These identified large upgrades would bring reliability and economic benefits to consumers, in addition to allowing generators to connect to the grid.

Comprehensive Transmission Planning

- Additional transmission is needed to meet state policies, utility integrated resource plans, and corporate commitments in MISO.
- A robust transmission system serves all needs.
 - public policy, reliability/load serving, congestion relief, resilience
 - utility access to cost effective energy supply, optionality for future needs
- CGA supports MISO and CapX utilities engaging in comprehensive near-term and long-range transmission planning.
- Planning today means utilities can meet their goals in the future and consumers will benefit from increased reliability and low cost resources.



THANK YOU



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