



Long Range Transmission Planning Strategy

System Planning Committee of the
Board of Directors
March 23, 2021

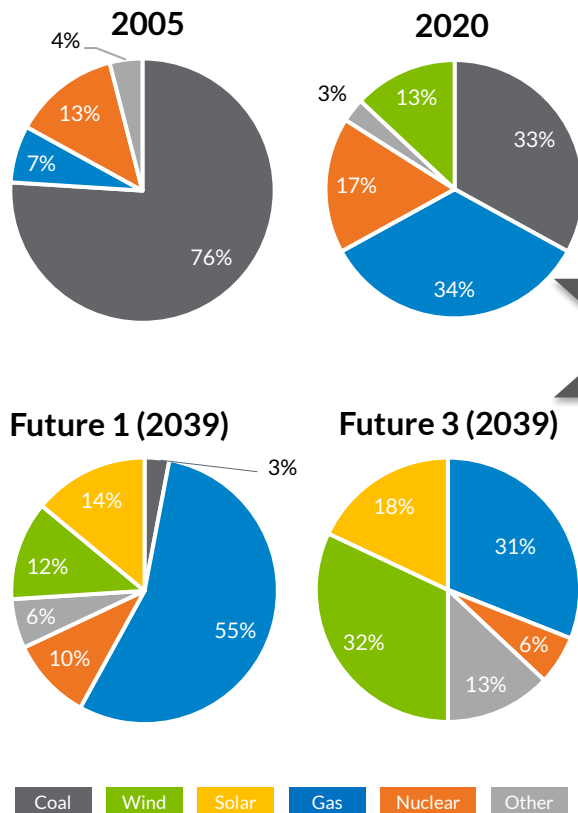
Executive Summary



- As a key part of MISO's Reliability Imperative, Long Range Transmission Planning enables the resource portfolio shift contemplated by stakeholders
- The MISO Futures are providing an initial and long-term roadmap of viable transmission solutions
- Long Range Transmission Planning may result in future MTEP Appendix A solutions

MISO's actions as part of the Reliability Imperative address emerging operational needs on the system

GENERATOR ENERGY MIX



MISO FORWARD



RELIABILITY IMPERATIVE

Market Redefinition

Long-Range
Transmission Planning

Operations of the
Future

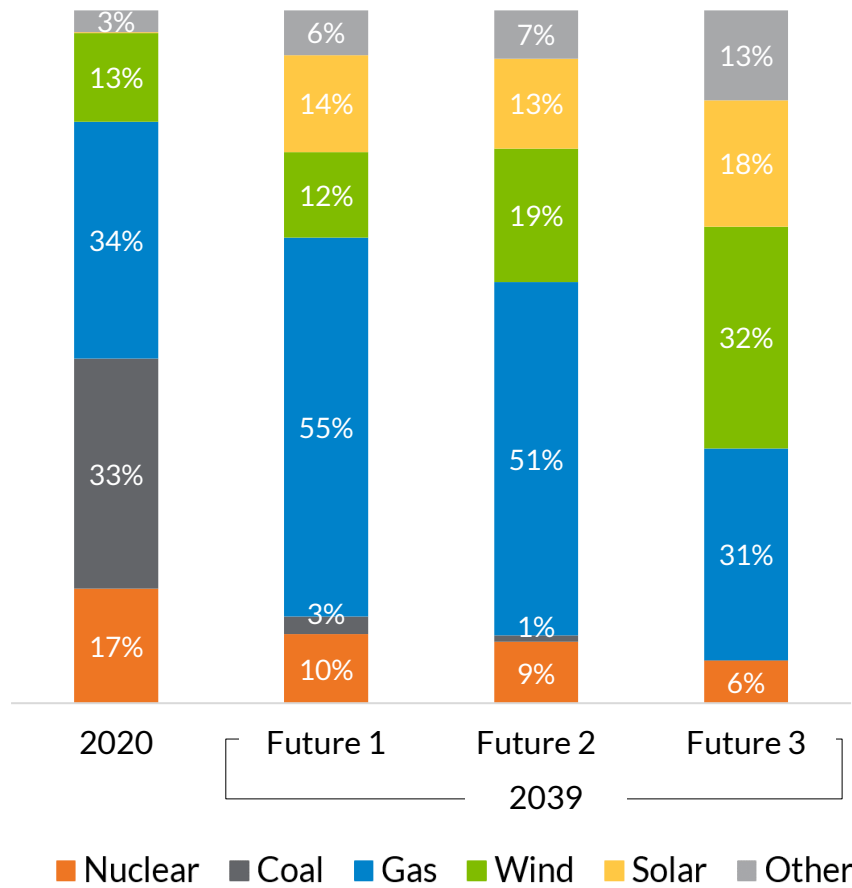
Market System
Enhancement

List is not representative of all efforts

MISO is actively pursuing multiple workstreams to ensure ongoing reliability and value creation

New Futures incorporate and build upon member plans to inform the resource transition and changing demand patterns

Generator Energy Mix



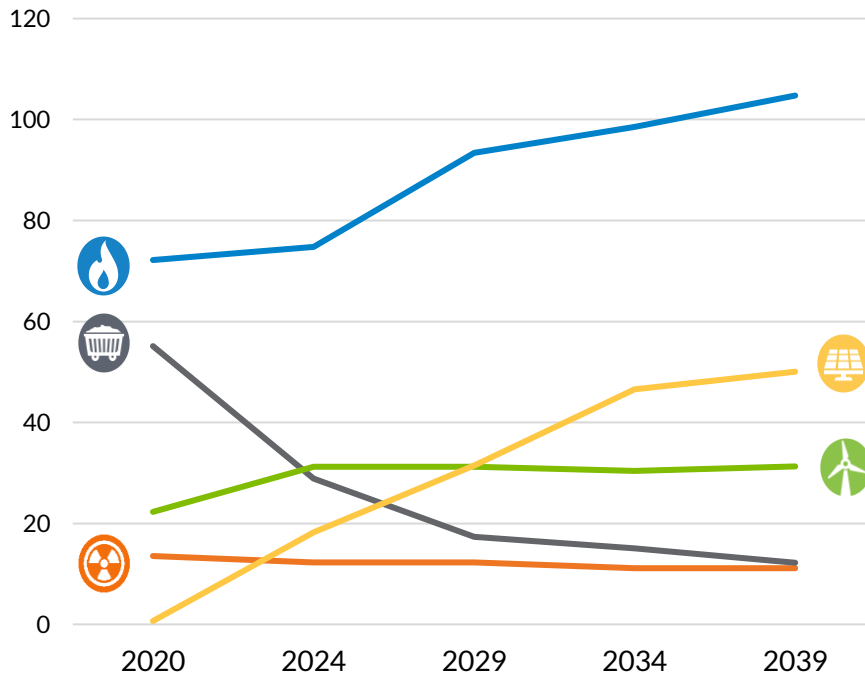
	Future 1	Future 2	Future 3
 Additions	121 GW	160 GW	330 GW
 Retirements	77 GW	80 GW	112 GW
 Net Peak Load	136 GW	148 GW	164 GW
 Emissions*	↓ 63%	↓ 64%	↓ 81%

* Based upon 2005 levels

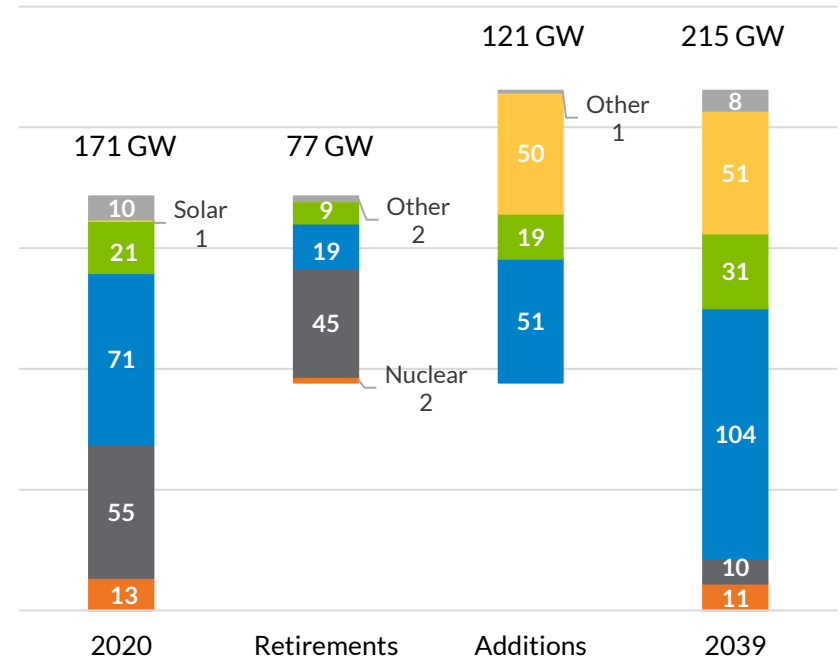
Long Range Transmission Planning activities in 2021 will focus on Future 1

MISO Resource Fleet At-a-Glance - Future 1 (GW)

Carbon-based capacity: ~57% | Carbon-free capacity: ~43%



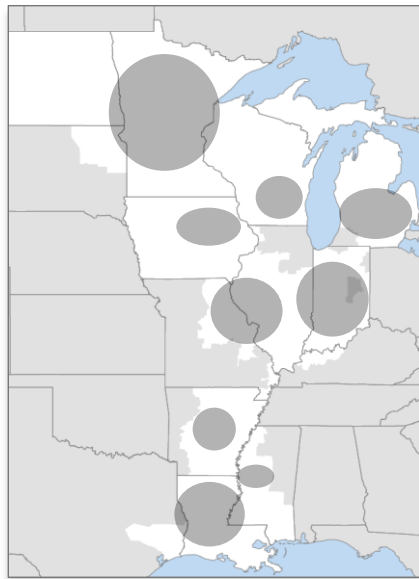
Future 1 Generator Capacity (GW)



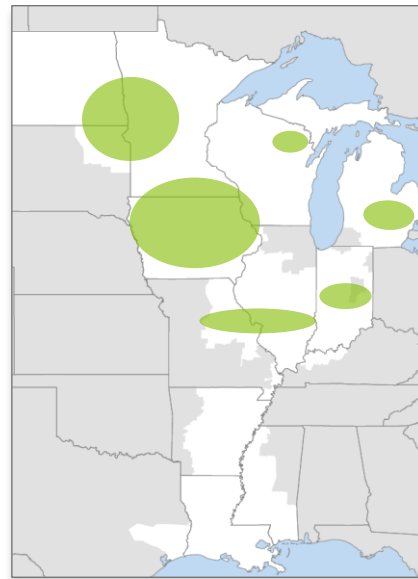
■ Nuclear ■ Coal ■ Gas ■ Wind ■ Solar ■ Other

Future 1 will have areas of wind, solar and thermal resources spread across the region with approximately three times the renewables of today

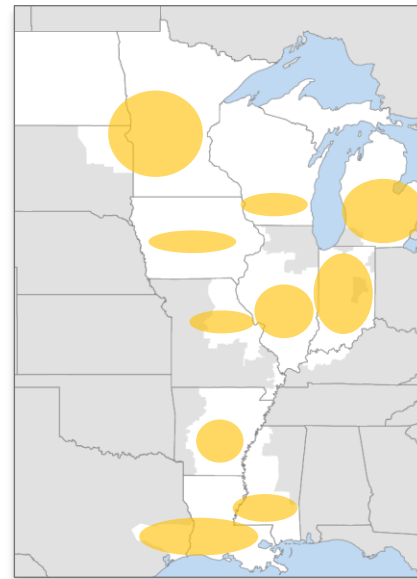
Future 1 (2039)



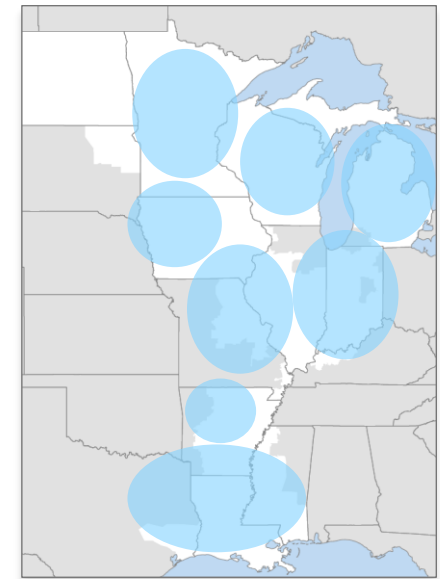
Retired
77 GW



Wind*
31 GW



Solar†
51 GW



Thermal‡
127 GW

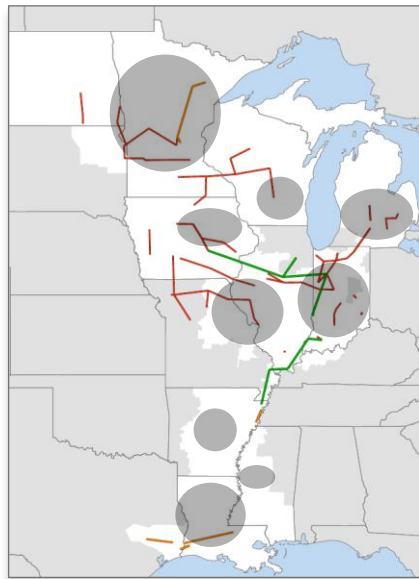
*0.2 GW in Local Resource Zone 10 (Mississippi); Hydro and Batteries not included (~5.8 GW)

† Solar = PV (Photovoltaic) + DGPV (Distributed, Grid-connected Photovoltaic) + Hybrid

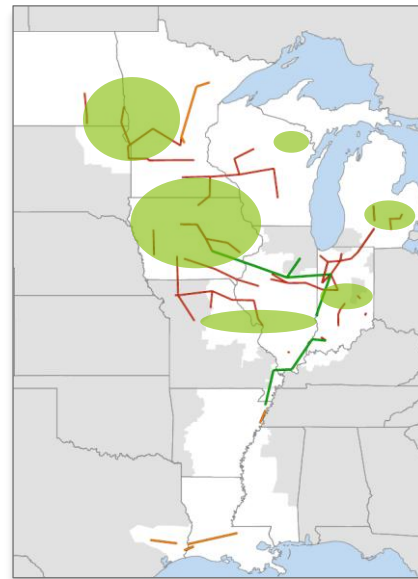
‡ Thermal = Coal + Natural Gas + Oil + Nuclear + Other

To address the types of system performance issues such as those identified in the Renewable Integration Impact Assessment (RIIA), significant new transmission capacity will be needed to connect these resource areas together and to loads

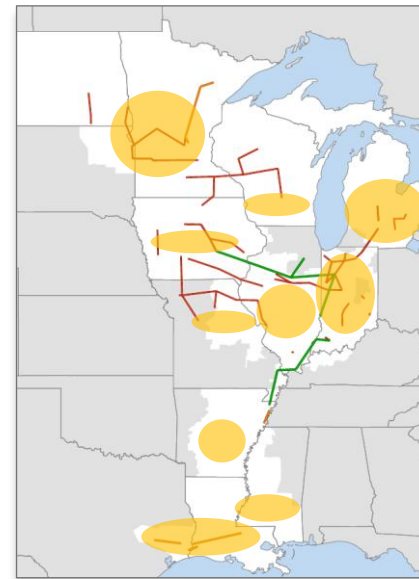
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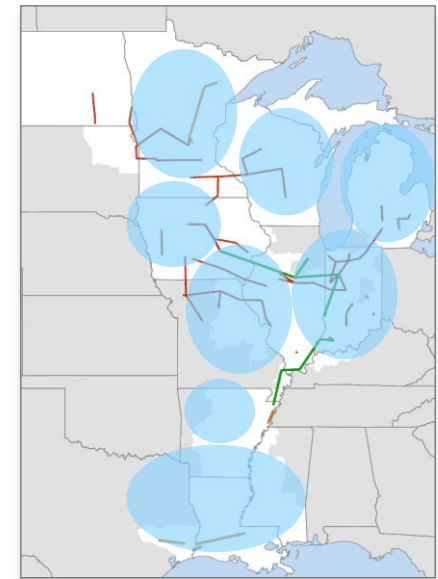
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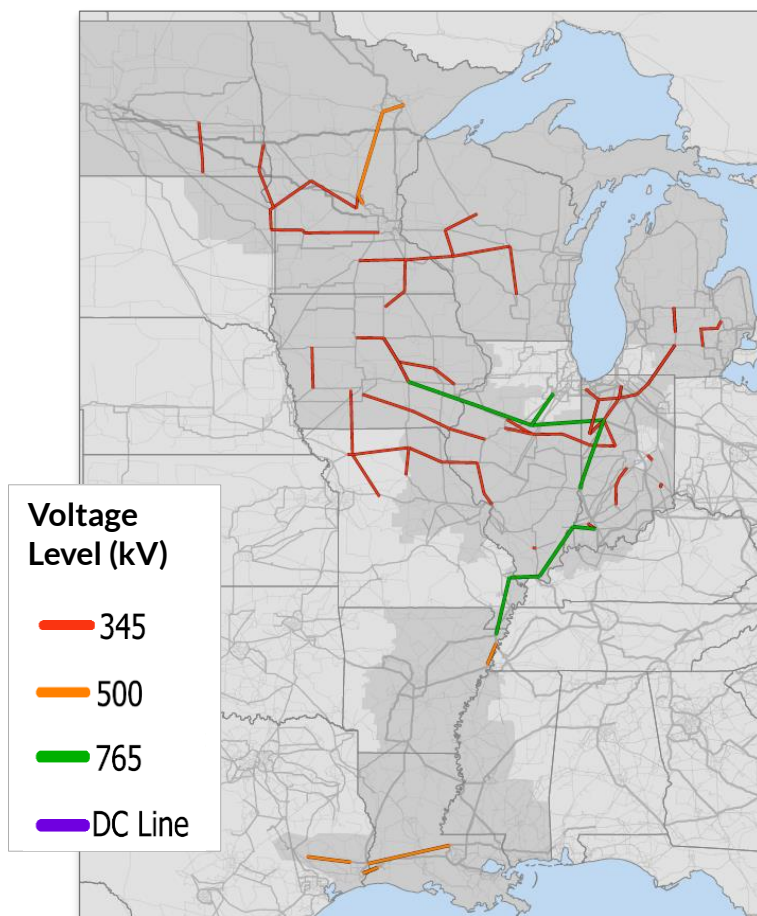
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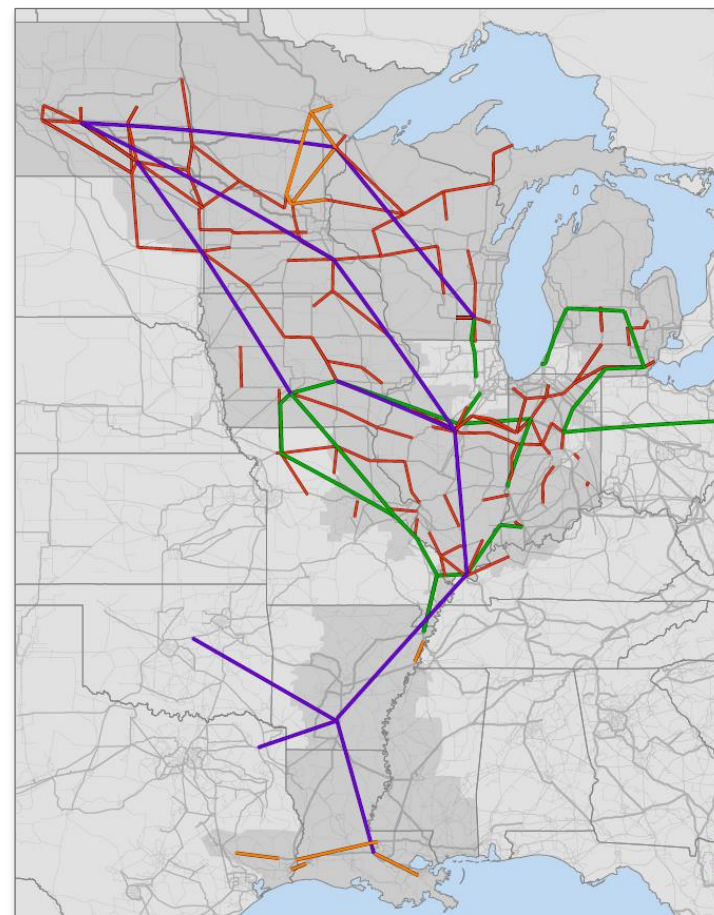
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MISO's projected scope of transmission expansion needs is reflected in the initial roadmap for Future 1; the Future 1 roadmap also serves as the starting point for the potential transmission needs in Futures 2 and 3



Future 1



Futures 1, 2, 3