

MTEP24

TRANSMISSION PORTFOLIO

Local

Regional

JTIQ

MTEP24 Report

Highlights

- The combination of local, Tranche 2.1 and JTIQ portfolios drove the largest investment in MISO history with 488 new projects totaling \$30 billion
- 24 Tranche 2.1 projects in the MISO Midwest provide a benefit-to-cost ratio between 1.8 and 3.5 and help ensure a reliable and resilient future grid
- The five-project JTIQ portfolio provides value to interconnection customers and load along the SPP-MISP seam, enabling approximately 28 GW of generation to interconnect



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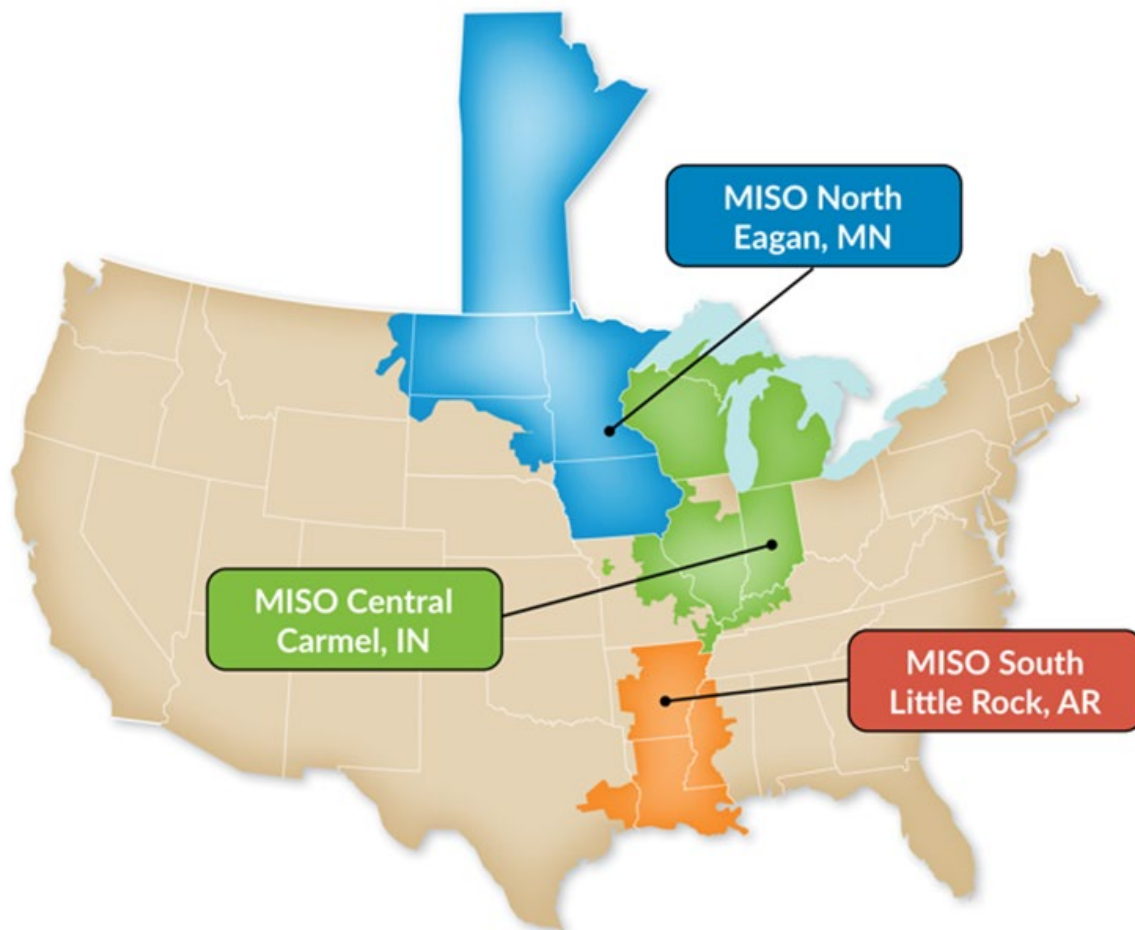
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About MISO

Midcontinent Independent System Operator (MISO) is an independent, 501(c)(4) not-for-profit, member-based organization, approved as a Regional Transmission Organization (RTO) by FERC in 2001, with responsibility for keeping the power flowing across its region reliably and cost effectively. The system MISO manages is the largest in North America based on geographical scope, with 471 market participants serving approximately 45 million people across all or part of 15 states and one Canadian province. The MISO energy markets are also among the largest in the world, with more than \$40 billion in annual gross market charges.

MISO Reliability Footprint and Regional Control Center Locations

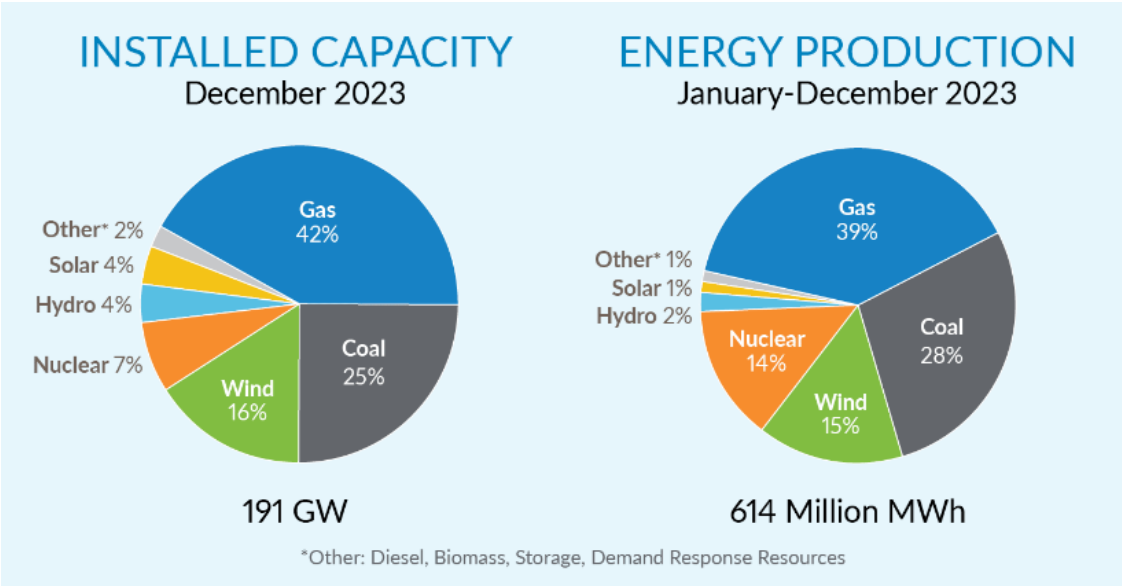




Currently, the MISO region contains nearly 77,000 miles of high-voltage transmission, as well as roughly 190,000 megawatts of electricity generating capacity. MISO does not own any of these assets. Instead, with the consent of our asset-owning members and in accordance with our FERC-approved tariff, MISO exercises functional control over the region’s transmission and generation resources with the aim of managing them in the most reliable and cost-effective manner possible. The MISO region is predominantly comprised of traditionally structured, state-regulated utilities.

KEY FACTS

Area Served	15 U.S. States and Manitoba, Canada
Population Served	45 Million
Transmission Line	77,000 Miles
Generating Units	2,956
Record Demand	127.1 GW 7/20/2011
Wind Peak	25.6 GW 1/12/2024
Solar Peak	6.2 GW 6/14/2024
Members	54 Transmission Owners 143 Non-transmission Owners
Market Participants	500+
Carbon Reduction	Approximately 32% since 2014



[Corporate data](#) as of September 2024



CHAPTER 1: TRANSMISSION PLANNING OVERVIEW

1.1 Transmission Evolution

The complex challenges of the electric system have been steadily materializing throughout the U.S. in recent years. Urgent and complex challenges in the MISO region and other areas of the country are driving the need for change in the way system operators plan and operate the grid. Widespread retirements of dispatchable resources, increasing load demand, lower reserve margins, more frequent and severe weather events and increased reliance on weather-dependent renewables and emergency-only resources have altered the region's historic risk profile, creating risks in non-summer months and other times that rarely posed challenges in the past. This combination of economic, technological, policy-related and extreme weather factors are explained in MISO's Reliability Imperative Report. Drivers that significantly impact Transmission Evolution and Long Range Transmission Planning (LRTP) include the following:

Rapid and significant fleet change: Many utilities and states in the MISO region have adopted policies and goals to decarbonize their resource fleets and have made remarkable progress toward these efforts. Currently, about 75% of the region's total load is served by utilities that have ambitious decarbonization and/or renewable energy goals. Carbon emissions in MISO have already declined more than 32% since 2014, and far greater reductions are expected going forward.

Surging large load additions: Large spot power demand is growing rapidly because of significant growth in data centers and other energy-intensive facilities to support today's economy and the future of technologies like artificial intelligence, electrification and the resurgence of manufacturing in the United States. MISO has been calling these 'large load additions' in contrast to 'incremental load growth' as described below. The uncertainty about where and how many large load additions will be developed complicates MISO's ability to project long-term growth in planning.

Incremental load growth: While electricity demand has been flat for many years, it is expected to increase due to the electrification of other sectors of the economy. Electric vehicles are growing in popularity, and the residential and commercial sectors are increasingly using electricity for heating and cooling. These trends will accelerate more due to the electrification tax credits in the 2022 Inflation Reduction Act for electric vehicles, rooftop solar systems and electric appliances. Electrification could transform the region's grid from a summer-peaking to a winter-peaking system and uncontrolled vehicle charging and daily heating and cooling load could result in two daily power peaks in nearly all months of the year.

Retirement of traditional resources: Economic conditions, state mandates and federal policies from authorities like the Environmental Protection Agency are quickly driving concerning amounts of dispatchable energy resources with critical reliability attributes into retirement, while also adding significant uncertainty to investment decisions in new resources — even when they're critically needed for reliability purposes.

Supply chain and permitting issues: Many projects that have been fully approved through MISO's Generator Interconnection Queue process are not going into service on schedule. The build out of renewable energy is being delayed and slowed due to supply chain (transmission and generation assets) and



permitting challenges that are global and outside of the control of MISO and utilities. A significant amount of approved resources signal delays to commercial operation as long as nearly two years.

Extreme weather events: While extreme weather has always been commonplace in the MISO region, severe weather events that impact electric reliability have been increasing. The Electric Power Research Institute (EPRI) found that hurricanes are increasing in intensity and duration, heat events are increasing in frequency and intensity and cold weather events are increasing in frequency.

Fuel assurance: The combination of declining dispatchable thermal resources, fuel insecurity, and growing intermittent resources create significant challenges to resource adequacy.

MISO, its members and states have a shared responsibility to address these challenges and ensure continued reliability. MISO is addressing this Reliability Imperative – the term it uses to describe this shared responsibility – through several interconnected and sequenced initiatives that are grouped into four key initiatives or pillars:

- **Market Redefinition:** Adapt our markets to ensure we are incenting the needed resources and attributes, appropriately valuing or accrediting those resources, and that prices reflect actual conditions at all times and incent availability.
- **System Enhancements:** The ongoing work to transform our Market System to meet increasingly complex requirements also falls under the Reliability Imperative.
- **Operations of the Future:** Examining needs across skills, processes, and technologies to ensure effective grid management in the face of that growing complexity.
- **Transmission Evolution:** Enhance planning process and identify solutions through long-term and interregional transmission planning that allow us to efficiently address both near and long-term system needs, including the optimal locations for generation to minimize the total cost between generation and transmission investment.

1.2 Planning Process

MISO as the FERC-approved regional transmission planner uses the MISO Transmission Expansion Plan (MTEP) to identify and support the development of cost-effective transmission infrastructure that is sufficiently robust to meet reliability needs, enable a competitive energy market, support policy goals and allow for competition among transmission developers in the assignment of transmission projects. MTEP is created through an inclusive, open process which provides opportunities for stakeholder participation and input. MISO also works with its stakeholders and Board of Directors to adopt MISO's Planning Guiding Principles (Figure 1.2-1), which are shaped by state and federal policy, stakeholder needs and cost efficiency goals.



Figure 1.2-1: MISO’s Planning Guiding Principles.

Comprehensive Planning

These principles are enacted through MISO’s value-based planning approach (Figure 1.2-2), which ensures local needs are integrated with regional requirements. Its processes consider a range of issues and viewpoints:

- For **local planning**, review and provide transparency on member plans, evaluate system against reliability standards, consider alternatives and verify needs as applicable.
- The long-term, broader system needs through MISO’s **regional planning** processes, including its Long Range Transmission Planning efforts.
- The impact of policies on the transmission system and resource mix in **policy assessment**.
- System changes needed to accommodate new resources in **resource integration**.
- Planning issues shared with MISO neighbors in **interregional planning**.

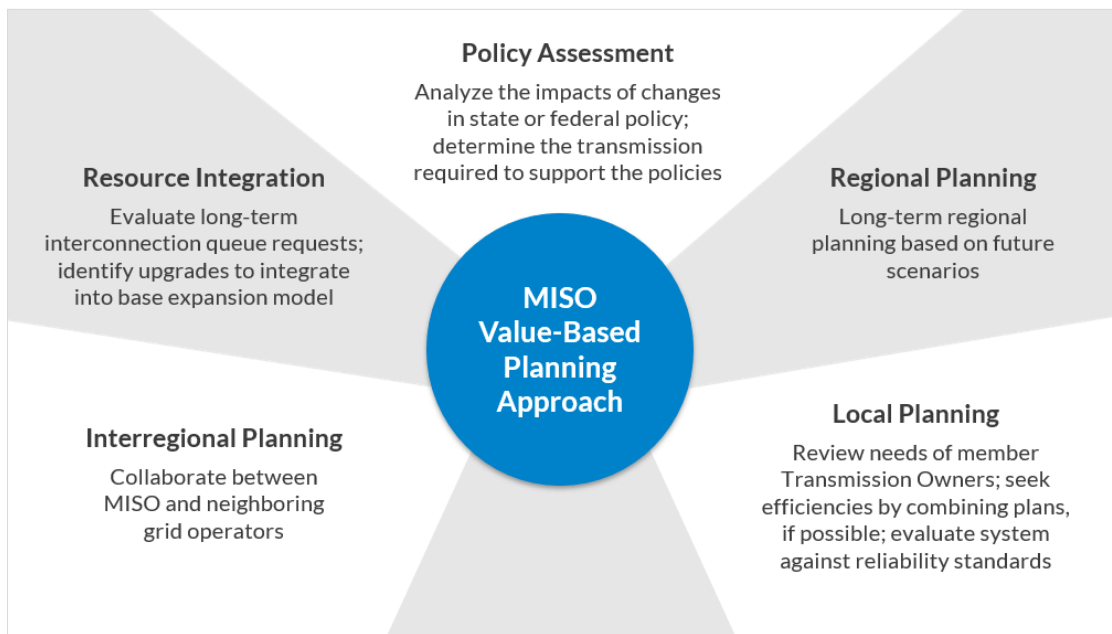


Figure 1.2-2: MISO’s Value-Based Planning Approach.

MISO’s various planning approaches cannot operate independently of each other. The goal of the transmission planning process is to identify a least-regrets outcome that meets its member plans, provides reliable power delivery, and appropriately balances local versus regional solutions to ensure a cost-effective outcome for customers. MISO’s comprehensive planning process spans short- to long-term horizons depending on study objectives and need drivers. The process encompasses multiple planning functions that address different timelines and aspects of transmission and resource planning. Each process informs the others to cover the entire planning horizon.

Using this comprehensive planning approach, the MTEP Report is structured into three main planning areas: local, regional and interregional. Local reliability planning, sometimes referred to as near-term planning, is highlighted in Chapter 4. Regional, or long range transmission planning, is covered in Chapter 2 and primarily focuses on the Long Range Transmission Planning (LRTP) Tranche 2.1. Finally, interregional planning is highlighted in Chapter 3 and is mainly focused on the Joint Targeted Interconnection Queue (JTIQ) study.

Transmission Planning & Coordinated Process

MISO develops MTEP based on expected use patterns and analysis of the performance of the transmission system in meeting both reliability needs and the needs of the competitive bulk power market, under a wide variety of contingency conditions. MISO uses both a near-term and long-term planning horizon in its processes with the near-term planning horizon (i.e., less than 10 years) mainly focused on local reliability planning, while the long-term planning horizon (i.e., up to 20 years) is focused on broader regional planning. This recommended plan is then subjected to stakeholder scrutiny and feedback to refine it further before it is eventually presented to the MISO Board of Directors (“MISO Board”) for review and approval.

MISO strategically set up our local planning processes to assume FERC Order 890 transparency requirements for Transmission Owner submissions, with MISO’s role ranging from alternative assessment,



need validation, no-harm tests and/or transparency depending on the project submissions. MISO’s transmission planning rules are set forth in Attachment FF of the Tariff, which contains MISO’s transmission expansion planning protocol, and Appendix B of the MISO Agreement, which contains MISO’s planning framework. In addition, MISO maintains a Business Practices Manual (“BPM”) that covers the transmission expansion planning processes, which is known as BPM-020, including the study approaches applied by MISO. Finally, some of MISO’s local planning approach is driven by North American Electric Reliability Corporation (NERC) reliability standards and reliability standards adopted by Regional Reliability Organizations integrated as part of MISO’s role as a Planning Coordinator.

Project Input and Stakeholder Coordination

The planning process, in conjunction with an inclusive, transparent stakeholder process, must identify and support development of a sufficiently robust transmission infrastructure to meet local and regional reliability standards as well as enable competition among wholesale capacity and energy suppliers. Each planning cycle commences with developing models (see Figure 1.2-3 for MISO footprint planning regions) followed by identifying potential expansions from the local planning processes of the Transmission Owners; transmission issues driven by reliability (e.g., NERC criteria), economic, and public policy requirements; and potential expansions (from stakeholders or MISO) that address transmission issues. Each cycle concludes with recommendations of solutions to the MISO Board of Directors.

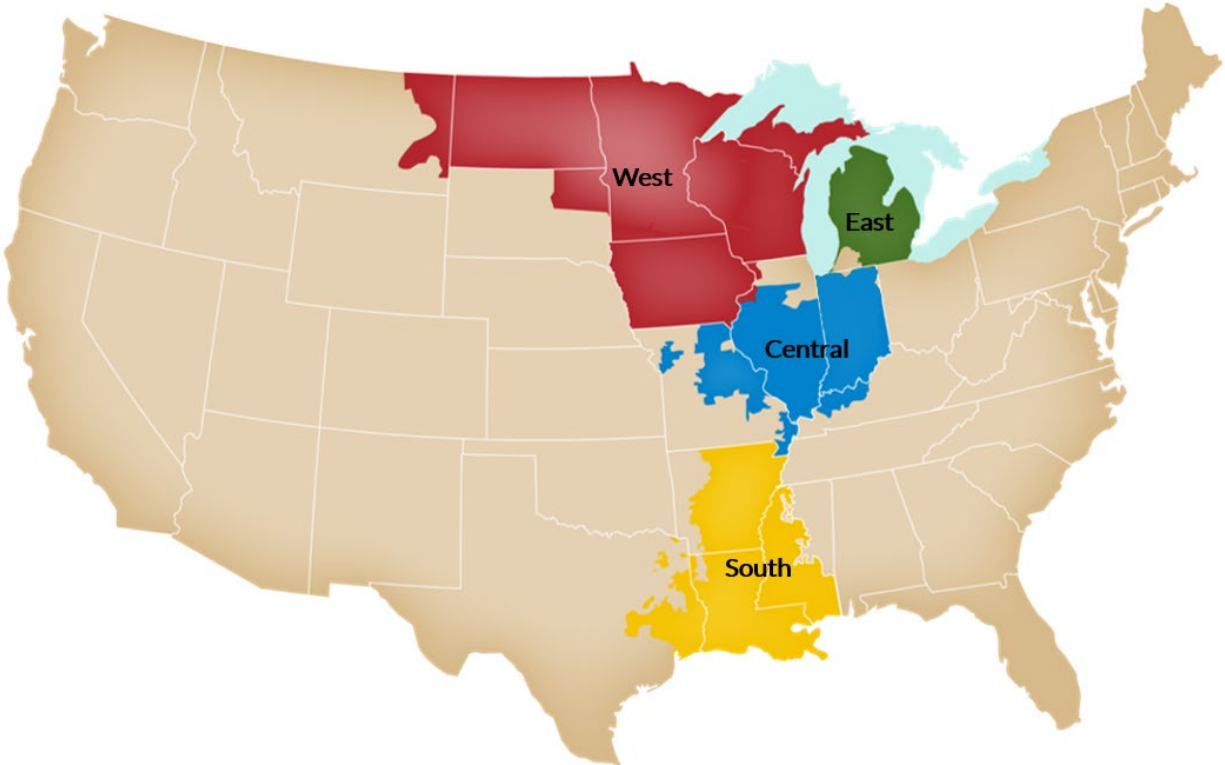


Figure 1.2-3: MISO footprint planning regions.

Transmission Owner plans developed through local planning processes are included in the beginning of each regional planning cycle as potential solutions to local transmission issues identified by the Transmission Owners to meet the FERC Order 890 transparency requirements.



MISO’s regional planning process makes evaluations – with stakeholder input from Subregional Planning Meetings, the Planning Subcommittee and the Planning Advisory Committee – throughout the cycle to develop expansion plans to meet the needs of the system. This collaborative process allows analysis of all projects with regional and interregional impact for their combined effects on the Transmission System. Moreover, the design of this collaborative process ensures that the MTEP addresses transmission issues within the applicable planning horizon in an efficient and cost-effective manner, while considering the input of stakeholders.

These various planning functions occur at different times and begin the year before an MTEP report is finalized (see Figure 1.2-4). For example, assessments of generator interconnection and retirements occur on a continuous basis. Others repeat on a regular cycle, but the actual MTEP report is produced once every 12 months. Each MTEP cycle’s scope definition actually begins in the summer of the prior year. The months of in-depth research and analysis, combined with many interactions between various work streams and stakeholders culminates in Appendix A.

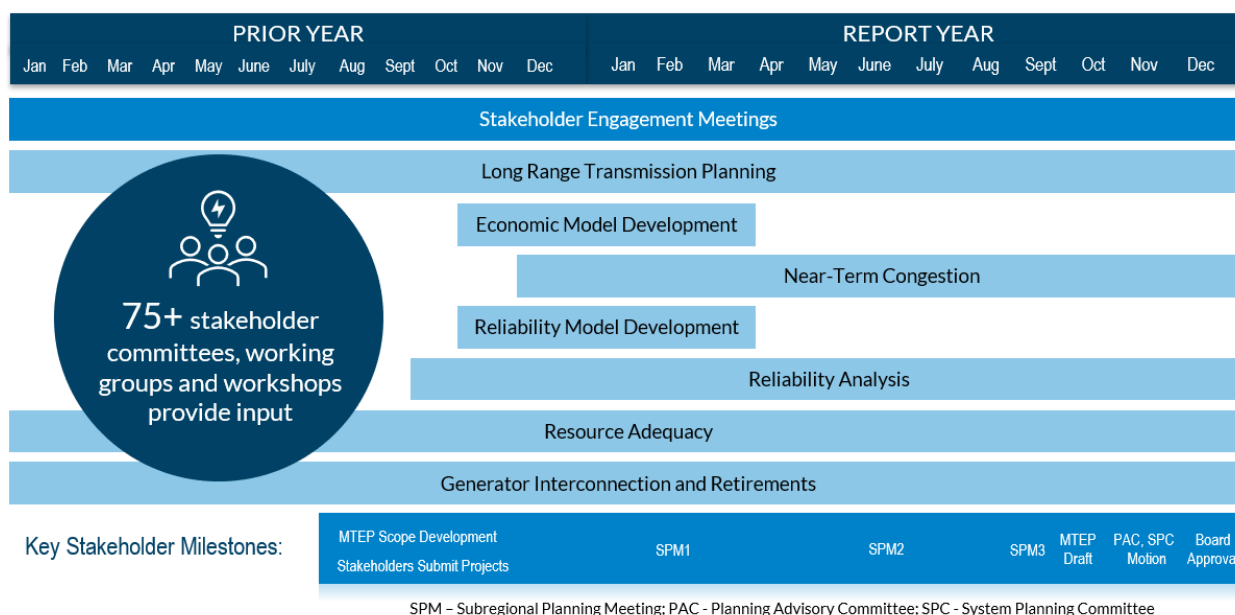


Figure 1.2-4: Typical MTEP cycle is developed in overlapping cycles and delivered annually.

Planning Analysis Methods

Planning analyses performed by MISO test the transmission system under a wide variety of conditions using standard industry applications to model key items, such as steady state power flow, voltage stability, and economic parameters, as determined appropriate by MISO to be compliant with applicable criteria and the Tariff. MISO collaborates with Transmission Owners, other transmission providers, transmission customers, and other stakeholders to develop appropriate planning models that reflect expected system conditions for the planning horizon. The local reliability planning process relies on known and committed inputs into the process, while the long-term planning process considers projected inputs (Figure 1.2-5).



Figure. 1.2-5: Summary of inputs into reliability and long-term planning processes.

[Models](#) are available to stakeholders with security measures as provided for in the Transmission Planning Business Practices Manual. MISO provides the opportunity for stakeholders to review and comment on the posted models before commencing planning studies.

MISO's review of projects varies depending on project drivers, system needs, opportunities for alternatives, and other factors. Specific to local planning, MISO may verify the need, complete a no-harm analysis, or post information for stakeholders.

- **Verify need:** Confirmation of system need identified in project submission, including to meet compliance with applicable National Electric Reliability Organization reliability standards and reliability standards adopted by Regional Reliability Organizations, and applicable within the Transmission Provider Region. MISO must verify the need for alternatives to adequately examine their effectiveness.
- **No harm:** Ensure a submitted project does not create a system issue. Includes projects that create model changes like contingency definitions, line ratings, or line impedances.
- **Post only:** Provided for FERC Order 890 transparency provisions. May include controls equipment to communicate remotely with the facility. This information is not able to be represented with model changes.

Additionally, alternative assessments for projects may be completed by Transmission Owners prior to project submission to MISO, proposed by MISO, or proposed through stakeholder submissions. Some of the criteria to select an alternative considers cost comparisons, difficulty with local, state and federal permitting or challenges due to the terrain of the proposed transmission right of way and how reliability needs are resolved. Alternatives do not always result in one project replacing another, but instead tend to be additive to the original project, even when submitted with the thought that they would directly compete. MISO considers alternatives in multiple forms, including like-for-like replacement, regional reliability projects, the



combination of multiple local solutions, and other options identified through either MISO analysis or submitted by stakeholders.

Long Range Transmission Planning

Long Range Transmission Planning (LRTP) is an essential element of planning the regional grid to be reliable and efficient with a focus on the long-term (i.e., 20 years) planning horizon. LRTP efforts are launched periodically when needed to address significant changes to future conditions that the grid must be prepared to address. Long Range Transmission Planning results in projects that are regional backbone facilities needed to move bulk power between geographically dispersed areas within MISO. While they provide for a reliable and efficient grid based on forecasted resource developments, they are not intended to resolve all connection issues associated with precise siting of future generation or load.

Long Range Transmission Planning follows MISO's well-established seven-step value-based planning process and is part of MISO's overall MTEP process. Outlined below are the high-level descriptions of each step:

- 1 **Develop Future Scenarios** – develop scenario-based Futures with resource forecast and siting
- 2 **Develop Resource Plan and Site Future Resources** – development of planning models utilizing Futures
- 3 **Identify Transmission Issues** – identify potential transmission issues
- 4 **Integrated Transmission Development** – proposals for solutions to issues
- 5 **Transmission Solution Evaluation** – evaluate the effectiveness of various solutions
- 6 **Project Recommendation and Justification** – recommend preferred solutions for MTEP implementation
- 7 **Project Cost Allocation** – apply appropriate cost allocation

MISO is working to identify potential grid needs in support of the resource and load transformation underway and as contemplated under our members' resource plans and defined in the MISO Futures. This extensive stakeholder process includes regularly scheduled workshops and periodic discussions at the Planning Advisory Committee. Project recommendations resulting from this process will be presented for Board of Director review and approval over several MTEP cycles as analyses proceed and recommendations are developed.

Details of MISO's Long Range Transmission Planning Tranche 2.1 are summarized in Section 2.1.

Project Types and Approval

MTEP Appendix A projects are vetted by MISO through the planning process and project types are determined by criteria in MISO's Tariff. Below is an overview of Tariff-defined project types¹:

- **Baseline Reliability Project (BRP)** - Projects are Network Upgrades identified in the base case as required to ensure that the Transmission System is in compliance with applicable North American Electric

¹ Additional details on project types are in Section 2.3.1 of the Business Practice Manual.



Reliability Corporation reliability standards and reliability standards adopted by Regional Reliability Organizations, and applicable within the Transmission Provider Region. Baseline Reliability Project costs are allocated to the local Transmission Pricing Zone(s) and recovered through Attachment O by the Transmission Owner(s) developing the projects.

- **Generator Interconnection Project (GIP)** - Projects are New Transmission Access Projects that are associated with interconnection of new generation or the capacity modification of existing generation. Costs are primarily paid for by the interconnection customers with certain exceptions as specified in Attachment FF. Costs of network upgrades rated at 345 kV and above are eligible for 10 percent cost recovery from load on a system-wide basis.
- **Market Efficiency Project (MEP)** - Projects meet Attachment FF requirements for reduction in market congestion and are eligible for regional cost allocation. Projects qualify as Market Efficiency Projects based on cost and voltage thresholds and are developed to produce a benefit-to-cost ratio of 1.25 or greater. Costs are distributed to benefiting pricing zones, in accordance with Attachment FF of the Tariff.
- **Market Participant Funded Project (MPFP)** - Projects are defined as Network Upgrades fully funded by one or more market participants but owned and operated by a Transmission Owner.
- **Multi-Value Project (MVP)** - Projects meet Attachment FF requirements to provide regional or subregional public policy, economic and/or reliability benefits. Costs are shared with loads and export transactions in proportion to energy withdrawals or export schedules. One example of this type of project is the LRTP Tranche 2.1 portfolio.
- **Other** - Projects to address local reliability issues and/or provide local economic benefit, which do not qualify as Baseline Reliability Projects, New Transmission Access Projects, Targeted Market Efficiency Projects, Market Efficiency Projects, or Multi-Value Projects. Project costs are allocated to the local Transmission Pricing Zone(s) and recovered through Attachment O by the Transmission Owner(s) developing the projects.
- **Targeted Market Efficiency Project (TMEP)** - Projects are designed to alleviate historical market-to-market congestion between MISO and PJM Interconnection, while meeting certain cost and construction requirements. The costs of Targeted Market Efficiency Projects are allocated first between MISO and PJM Interconnection by the ratio of each RTO's Day-Ahead and Excess Congestion Fund congestion, offset by historical market-to-market payments. The MISO share of costs for the project is then allocated to beneficiaries using historical nodal load congestion contribution data.
- **Transmission Delivery Service Project (TDSP)** - Projects are required to satisfy a transmission service request. The costs are generally assigned to the requestor.

MISO staff formally recommends a set of projects to the MISO Board of Directors for review and approval after all projects have been posted for transparency, MISO has completed its independent review of proposed projects for need or no-harm as applicable, and staff has addressed any stakeholder feedback received. These projects make up Appendix A of the MTEP report and represent the preferred solutions to the identified transmission needs of the MISO transmission planning process.



Interregional Coordination and Planning Studies

MISO works with the neighboring transmission planning regions, Southwest Power Pool (SPP) and PJM Interconnection (PJM), to identify issues on the seams, perform studies, and jointly evaluate transmission solutions that may be more efficient or cost effective than a corresponding regional solution. While MISO has a separate Joint Operating Agreement (JOA) with both SPP and PJM that details specific processes and criteria, the high-level interregional coordination activities are similar on each seam:

- 1) Exchange modeling data and other system information.
- 2) Review identified historic issues or propose reliability, economic, or transfers analysis to determine forward-looking issues on the seam.
- 3) Evaluate whether to perform an interregional study based on historic or forward-looking issues.

MISO performs joint studies with SPP and PJM on a regular basis, in accordance with the timelines and frequencies dictated in their respective JOAs, or as needed. Studies may have a targeted scope or a more complex scope requiring a longer study period, and can include reliability, economic and/or public policy issues along with analysis of interregional transfer capability and extreme weather events. Interregional issues and study efforts are coordinated through a public Interregional Planning Stakeholder Advisory Committee (IPSAC) consisting of representatives and interested parties from each RTO community.

In addition to the joint study efforts with SPP and PJM, MISO performs studies, as needed, with neighboring entities of the Southeastern Regional Transmission Planning (SERTP) group and the Independent Electricity System Operator of Ontario (IESO). While the study process is less formal, MISO and these entities still meet regularly to review interregional issues and possible areas of collaboration.

Details on planning procedures, on-going studies and stakeholder meetings can be found on the [Interregional Coordination](#) page of the MISO public website (misoenergy.org).

MTEP Portal

In late 2023, MISO launched a new MTEP Project Portal through the Help Center. The MTEP Portal provides a robust, user-friendly experience that supports the submission and management of MTEP projects throughout their lifecycle while enabling the integration capabilities for future MISO technologies. Within the MTEP Portal, users can use interactive dashboards to view projects based on various filters (Figure 1.2-6). Because this report is simply a snapshot of project information as of August 27, 2024 (or other date as listed), the [MTEP Portal](#) has the most up-to-date project information.

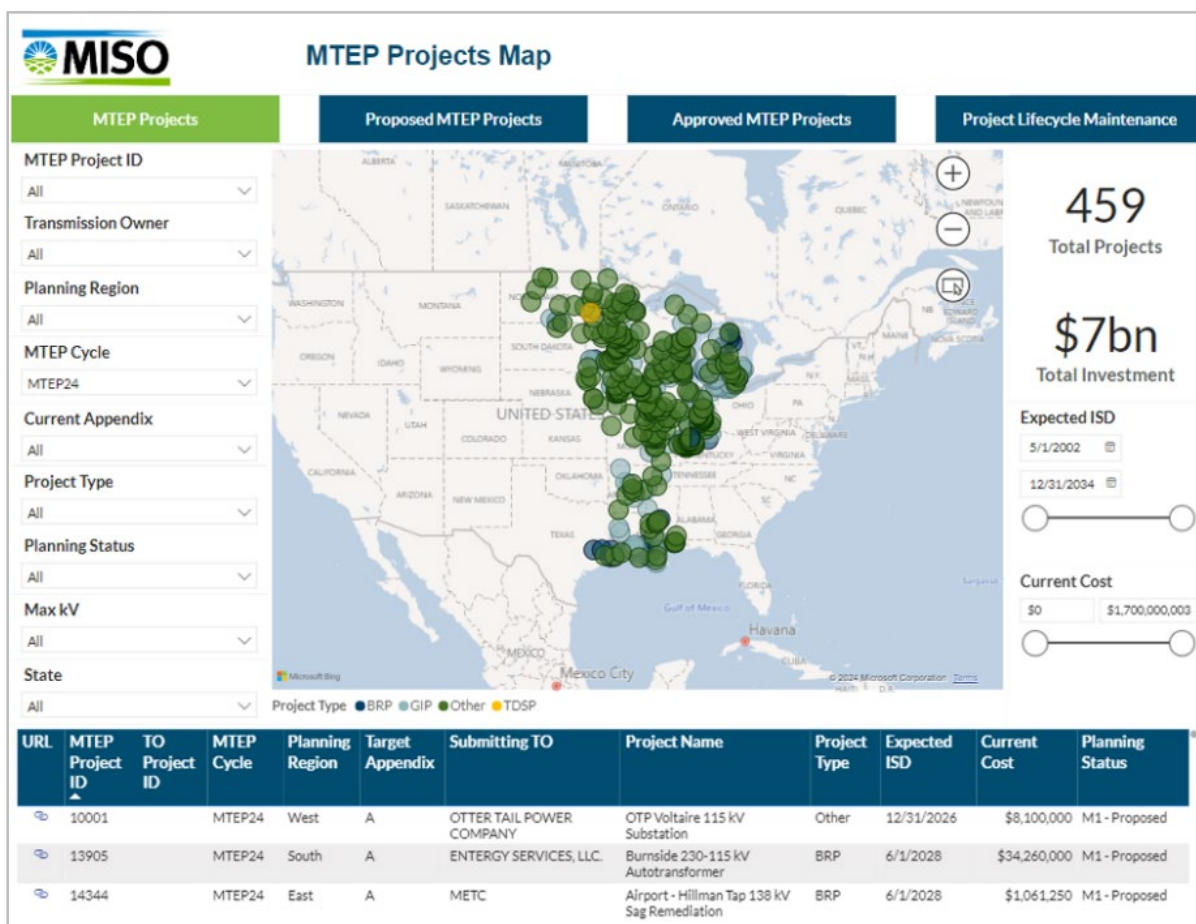


Figure. 1.2-6: Views within the MTEP Portal and the various dashboards reflecting project information.

1.3 Historical Background

MISO Transmission Infrastructure Investment

This iteration of the MTEP report highlights MISO’s transmission investment over a 20-year span totaling over \$67 billion in the United States (Figure 1.3-1). MISO’s proposed new projects for this MTEP cycle would add an additional estimated \$30 billion and are detailed in Chapters 2, 3 and 4 and included in Appendix A of this report.

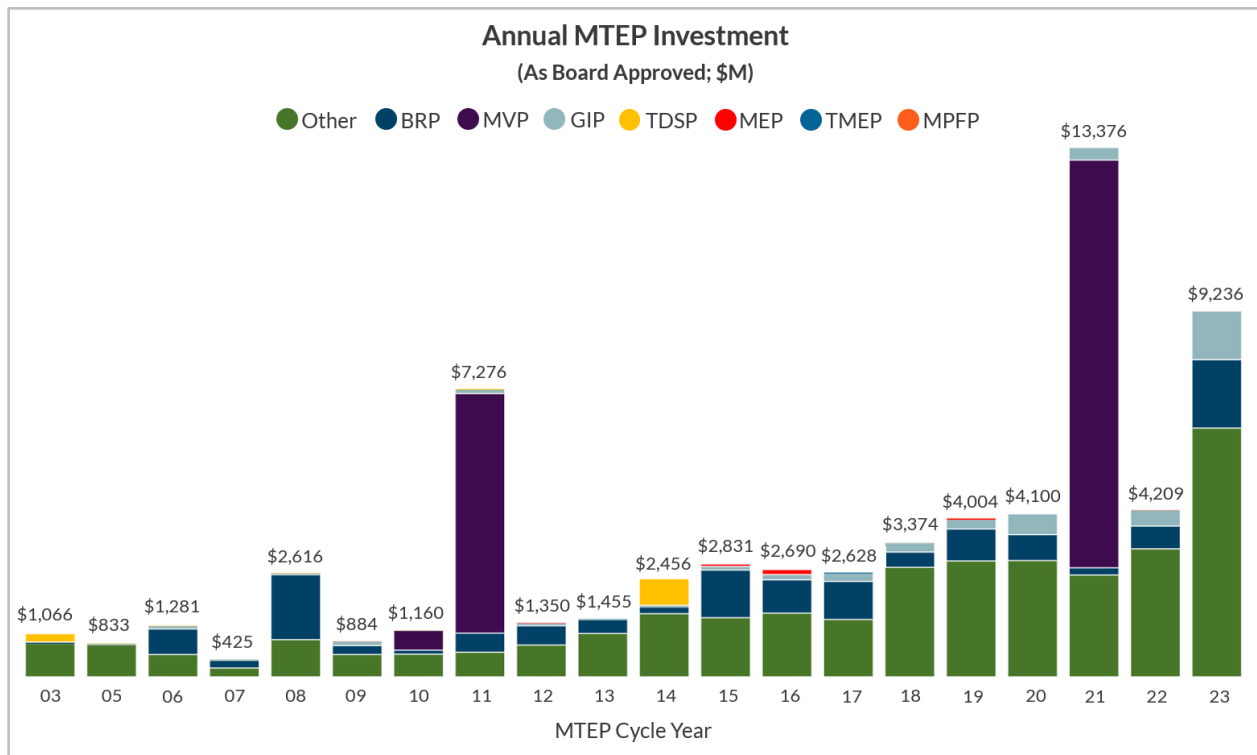


Figure 1.3-1: MTEP annual investment.

Highlights in prior MTEP cycles include:

- MTEP11 reflects the approval of the first Multi-Value Project portfolio
- MTEP14 reflects the addition of the MISO South region
- MTEP21 reflects the MTEP21 Addendum approval of the LRTP Tranche 1 portfolio, which accounts for \$10.3 billion of the total
- MTEP23 reflects the largest MTEP in MISO history by both project count and investment, excluding MTEP21 which included Multi-Value Projects/LRTP portfolio

MISO's transmission planning responsibilities include the monitoring of previously approved Appendix A projects. MISO surveys all Transmission Owners and Selected Developers every quarter to determine the progress of each project. These [status updates](#) are reported to the MISO Board of Directors and posted quarterly to the public MISO Transmission Expansion Plan website.

Full archived files of [previous MTEP Reports](#) can be accessed via the public MISO Transmission Expansion Plan website.

MTEP Approved Projects Status

Since MTEP03, over \$39 billion of investment has gone into service and over \$28 billion of approved projects are yet to be fully placed into service (Figure 1.3-2). Most notably this includes the MTEP11 MVP project that recently went into service.

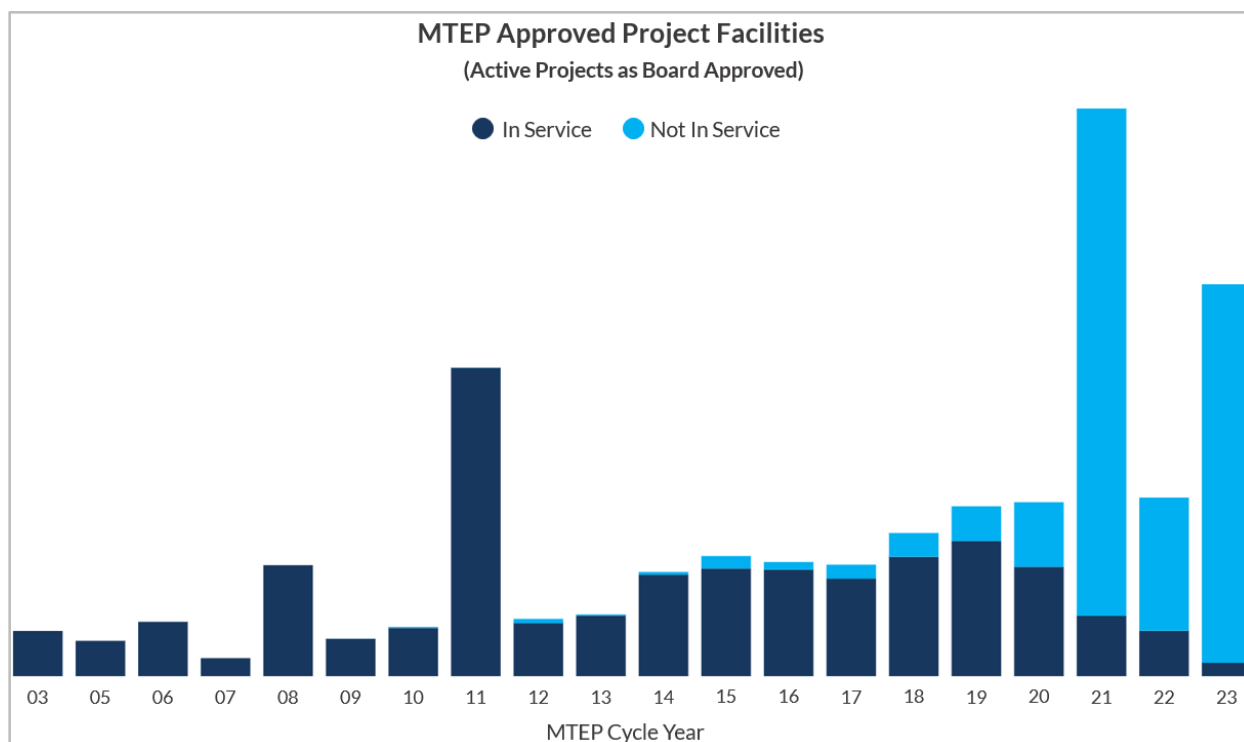


Figure 1.3-2: Appendix A project status .

L RTP Investment Update – Tranche 1

The \$13.4 billion investment in MTEP21 as shown above was the result of MISO's approval of Tranche 1 of its Long Range Transmission Planning study. The Tranche 1 portfolio, approved in July 2022, consists of 18 projects totaling \$10.3 billion which are spread across the entire MISO Midwest Subregion and benefits multiple states, MISO members and customers. Table 1.3-1 reflects those 18 approved projects as of July 2024. Planning for Tranche 1 began in 2020 with the development of new Futures that reflected policy changes and the plans of states, utilities, and members. Tranche 1 solutions addressed approximately 30% of issues that were identified. Analysis was based on Future 1 and a Multi-Value Project (MVP) cost allocation approach will spread the costs of projects pro-rata to load across the MISO North and Central regions (Midwest Subregion). A wide range of value will be provided, including congestion and fuel savings, avoided capital costs of local resources, avoided transmission investments, resource adequacy savings, avoided risk of load shedding and decarbonization.

The Tranche 1 projects are grouped by and located in five geographic focus areas: Dakotas and Western Minnesota, Minnesota – Wisconsin, Central Iowa, Northern Missouri Corridor and Central-East Corridor. With a Tariff requirement to provide benefits that are commensurate with costs, the full portfolio has a benefit-to-cost ratio of 2.6 - 3.8, which is well in excess of costs, and a benefit-to-cost ratio of at least 2.1 for every MISO zone. MISO's planning maximized the use of existing rights-of-way, which helped reduce the typical challenges in the regulatory process stemming from siting and acquisition of new rights-of-way.

As of July 2024, all projects are well into regulatory approval processes with MISO supporting developers in these efforts. Going forward, as engineering and construction plans are finalized and applicable regulatory



proceedings complete, MISO anticipates receiving more substantive quarterly project updates from the constructing Transmission Owners, including updates on project cost and in-service dates. Transmission Owners will continue to provide quarterly project updates until the project is placed into service.

LRTP Eligible Project Status dashboard									
LRTP No.	Project Name	State	Estimated in Service Date (as of 6/30/2024)		Status (as of 10/3/2024)		Cost (as of 6/30/2024)		Explanation
			MTEP Approved	Current Date	State Regulatory Status*	Construction Status	MTEP Approved (\$M)	Current Cost (\$M)	
1	Jamestown – Ellendale	ND	2028	unchanged			\$439	\$439	
2	Big Stone South – Alexandria – Big Oaks (Cassie’s Crossing)	SD/MN	2030	unchanged			\$574	\$574	
3	Iron Range – Benton County – Big Oaks (Cassie’s Crossing)	MN	2030	unchanged			\$970	\$970	
4	Wilmarth – North Rochester – Tremval	MN/WI	2028	unchanged			\$689	\$685	
5	Tremval – Eau Claire – Jump River	WI	2028	unchanged			\$505	\$505	
6	Tremval – Rocky Run – Columbia	WI	2029	unchanged			\$1,050	\$1,050	
7	Webster – Franklin – Marshalltown – Morgan Valley	IA	2028	unchanged			\$755	\$755	
8	Beverly – Sub 92	IA	2028	unchanged			\$231	\$231	
9	Orient – Denny – Fairport	IA/MO	2030	unchanged			\$390	\$318	
10	Denny – Zachary – Thomas Hill – Maywood	MO	2030	unchanged			\$769	\$511	
11	Maywood – Meredosia	MO/IL	2028	unchanged			\$301	\$301	
12	Madison – Ottumwa – Skunk River	IA	2029	unchanged			\$673	\$673	
13	Skunk River – Ipava	IA/IL	2029	unchanged			\$594	\$592	
14	Ipava – Maple Ridge – Tazewell – Brokaw – Paxton East	IL	2028	unchanged			\$572	\$572	
15	Sidney – Paxton East – Gilman South – Morrison Ditch	IL	2029	unchanged			\$454	\$516	
16	Morrison Ditch – Reynolds – Burr Oak – Leesburg – Hiple	IL/IN	2029	unchanged			\$261	\$675	Cost change under review with Variance Analysis
17	Hiple – Duck Lake	IN/MI	2030	unchanged			\$696	\$520	
18	Oneida – Nelson Rd.	MI	2029	unchanged			\$403	\$403	
Total							\$10,324	\$10,288	

State Regulatory & Construction Status Indicator Scale	State Regulatory	Construction
	Pending <input type="checkbox"/>	Not <input type="checkbox"/>
	In regulatory process or partially complete <input type="checkbox"/>	Under construction <input type="checkbox"/>
Complete or no regulatory process requirements <input type="checkbox"/>	Completed <input type="checkbox"/>	

*State Regulatory Status is for Certificate of Need Approvals

Table 1.3-1: LRTP Tranche 1 approved project status dashboard as of July 2024.

Future Line Miles Appendix A Projects

Spanning from 2024-2031, there are approximately 6,230 circuit-miles of planned new or upgraded transmission lines projected in Appendix A (Figure 1.3-3).

- 3,790 circuit-miles of upgraded transmission line on existing corridors are planned of which 58% are ≤230 kV and 42% are ≥345 kV.
- 2,440 circuit-miles of new transmission line on new corridors are planned of which 40% are ≤230 kV and 60% are ≥345 kV.

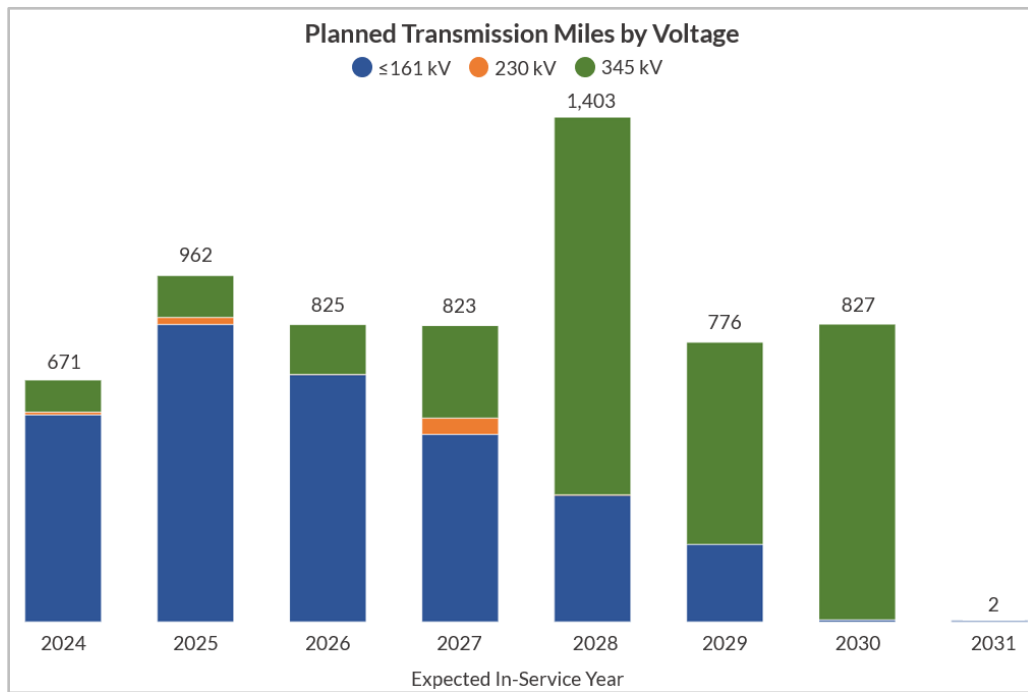


Figure 1.3-3: Active, not yet in-service, project circuit line miles by voltage and expected in-service year.

Existing Line Miles Summary

MISO has nearly 77,000 circuit-miles of transferred functional control transmission lines serving as the backbone of the footprint (Figure 1.3-4) in the United States. Currently, the West region holds 45% of total footprint line miles, the South region holds 22%, the Central region holds 21%, and the East holds 12%.

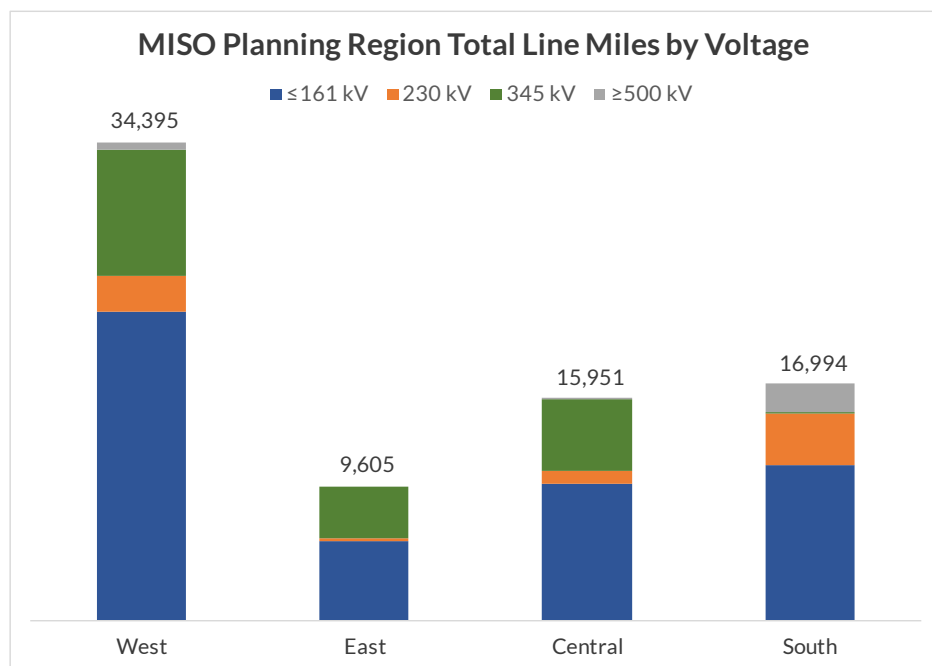


Figure 1.3-4: 2023 in-service transferred circuit miles by voltage class.



Transmission Facility Investment

In the early MTEP cycles, the predominant investment was in new line assets. There was a shift in investment in recent cycles with the leading investments being in substation. Looking back in total (MTEP03-MTEP23), Figure 1.3-5 below reflects the current asset investments with new lines at 43%, line upgrades at 29%, and substations representing 28% of the total investment.

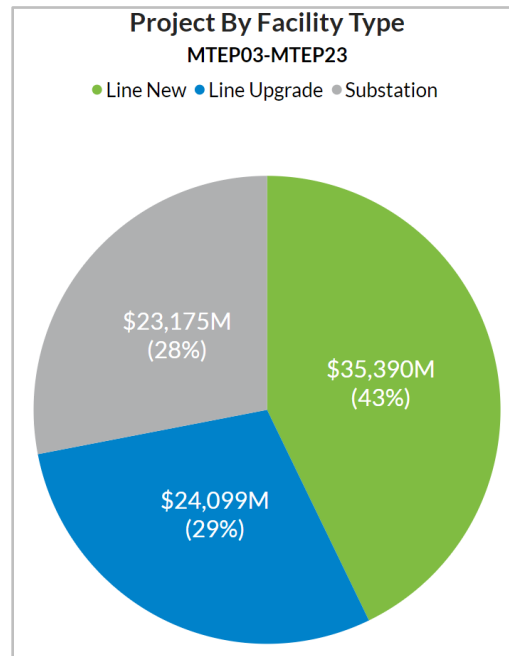


Figure 1.3-5: Appendix A project facility investment dollars in all MTEP historical cycles.

Historical MISO Queue Trend

The MISO Generator Interconnection (GI) queue provides an active and competitive mechanism to enable resource interconnections that will serve future energy and capacity needs. Projects submitted in the annual queue cycle are evaluated by MISO through an iterative study process to determine the reliability impacts and to identify transmission upgrades needed to support resource integration. Project viability is often tied to the costs of network upgrades, with the most viable candidates successfully executing a Generator Interconnection Agreement (GIA).

The Generator Interconnection queue has experienced extremely high volume over the last several years (see Figure 2.4-1). These high volumes create study cycles with more requests than MISO has load, resulting in significant delays in completing these cycles. As cycle sizes have increased, so has the time required to complete the studies. These delays can impact the ability of our utilities and states to meet their resource adequacy needs. In the 2023 Study Cycle, MISO received 600 individual project requests totaling roughly 124 GW. Solar, storage, and hybrid applications make up the bulk of the queue. Additionally, as of September 2024, the current state of the queue had 1,743 projects representing 317 GW of total capacity (see Figure 2.4-2). This rising volume of requests has resulted in MISO's need to implement a cap on the number of requests studied at one time and the need for new processes to study projects specifically identified to address resource adequacy. A cap will result in less overloads, which will result in faster processing, lower interconnection costs, and therefore less dropouts.

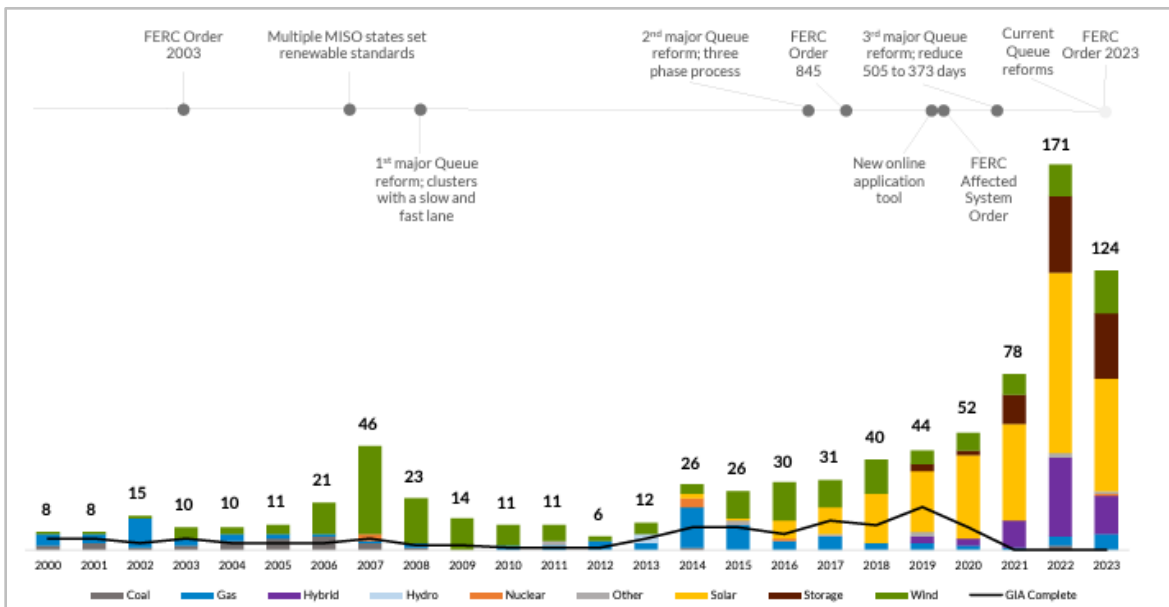


Figure 2.4-1: Historical view of MISO's Generator Interconnection Queue. Values are displayed in GW.

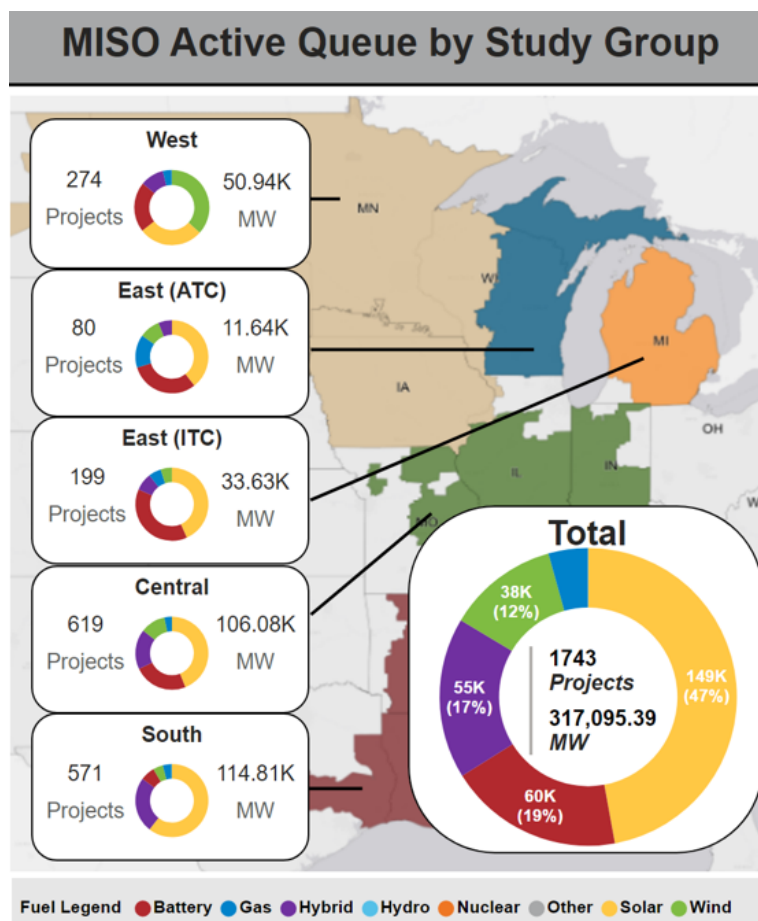


Figure 2.4-2: As of September 2024, the queue consists of 1,743 projects representing 317 GW of total capacity.