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# CHAPTER 4: LOCAL RELIABILITY PLANNING

## 4.1 Local MTEP24 Investment Summary

The local MTEP24 portfolio consists of 459 new Appendix A projects (Figure 4.1-1) and represents over \$6.7 billion in transmission infrastructure investment for the MISO region. Of these projects, 310 are classified as Other projects, 111 Generator Interconnection Projects, 36 Baseline Reliability Projects, and two Transmission Delivery Service Projects. The two large Transmission Delivery Service Projects are aimed at modernizing HVDC converter stations and upgrading the capacity of a HVDC transmission line within Minnesota Power territory.

Of the over \$4.0 billion investment in Other projects, 39% are driven by age and condition issues, 37% by load growth, and 20% by local reliability issues. The majority of Other projects address localized reliability issues that are due to load serving needs and aging transmission infrastructure.

### Local MTEP24 Appendix A Project Investment Summary

(Data as of August 27, 2024; \$M, % of total investment dollars)

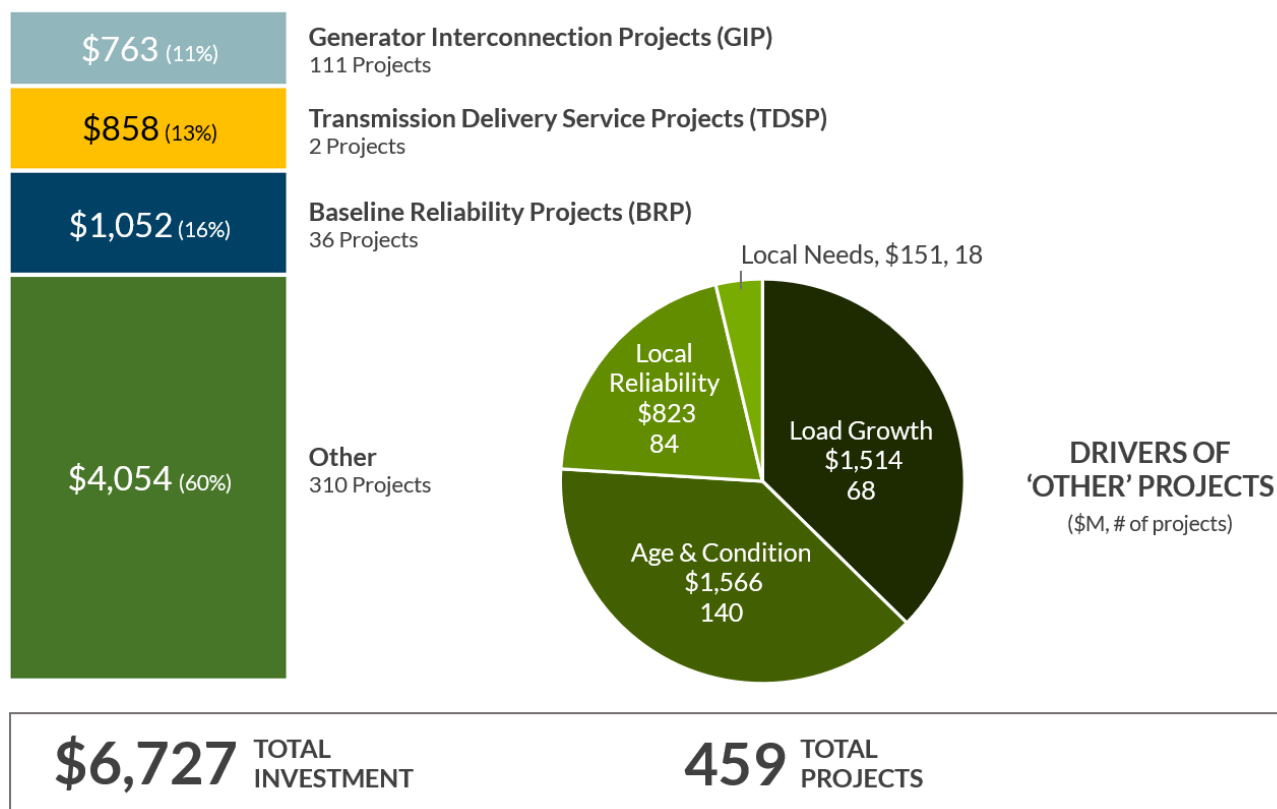


Figure 4.1-1: Local Appendix A project investment summary (data as of 8-27-2024).



Table 4.1-1 summarizes local MTEP24 projects by planning regions, project categories, and number of projects within each region.

### Local MTEP24 Appendix A Project Investment Summary

(Data as of August 27, 2024; \$M, number of projects, and % of total investment dollars)

Planning Region	Baseline Reliability Project (BRP)	Generator Interconnection Project (GIP)	Other Project	Transmission Delivery Service Project (TDSP)	Total	# of Projects
Central	\$77	\$190	\$1,149		\$1,416	127
East	\$155	\$178	\$438		\$771	77
South	\$737	\$232	\$903		\$1,872	63
West	\$83	\$162	\$1,563	\$858	\$2,667	192
Total	\$1,052	\$763	\$4,054	\$858	\$6,727	459

Table 4.1-1: Local Appendix A project investment summary (data as of 8-27-2024).

The local MTEP24 projects are distributed across MISO’s entire footprint (Figure 4.1-2). Because of the two large Transmission Delivery Service Projects, 40% of the total investment is dedicated to projects in the West subregion. The rest of the total investment is shared between the remaining three subregions: 28% for the South, 21% for the Central and 11% for the East.

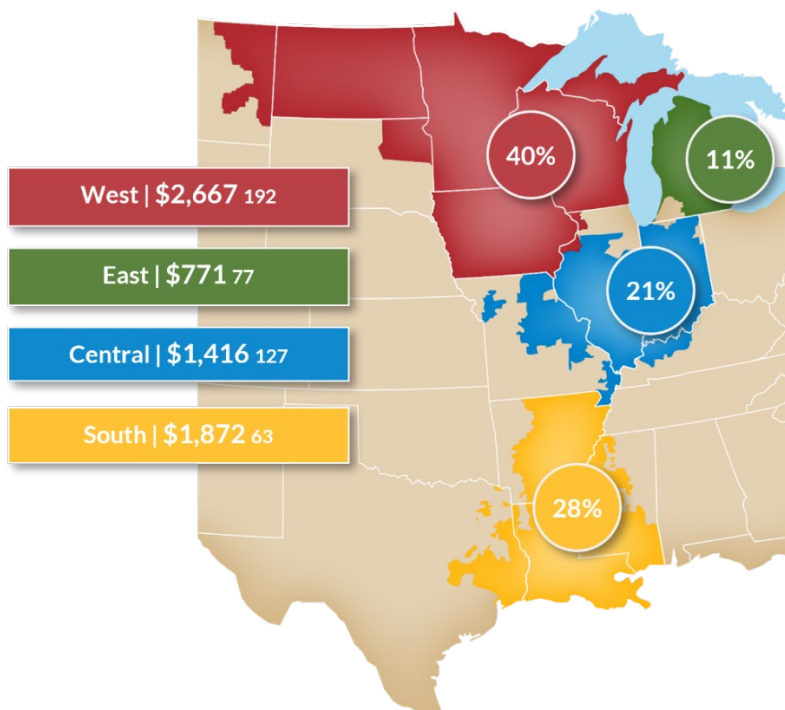


Figure 4.1-2: Local Appendix A project investment summary (data as of 8-27-2024).



Within the local MTEP24 projects, the top ten projects represent roughly 31%, or \$2.1 billion of the total \$6.7 billion investment and are in three of the four planning regions (Figure 4.1-3). Out of the top ten projects, 60% are Other – Load Growth projects, 60% were submitted through the Expedited Project Review process and 60% are in the South.

### Top 10 Local MTEP24 Appendix A Projects

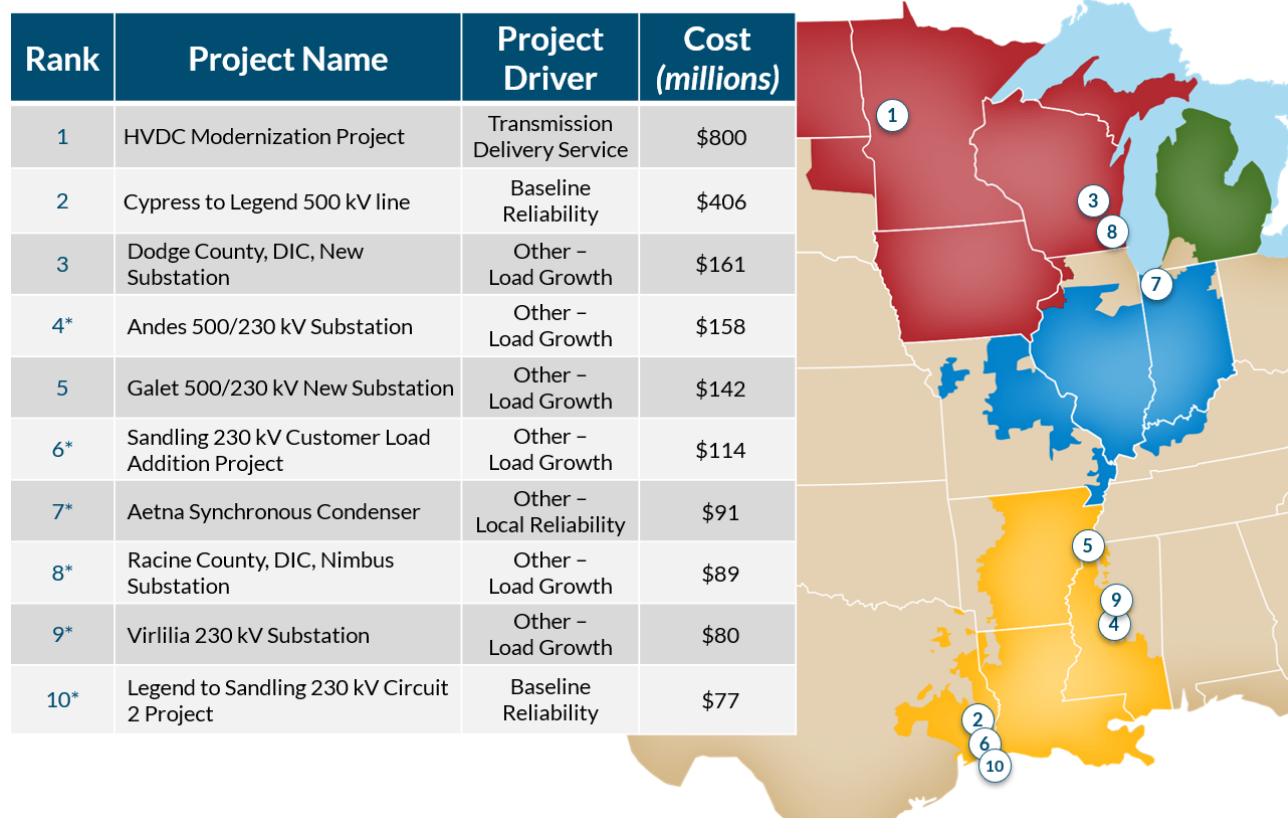


Figure 4.1-3: List of top ten local MTEP24 projects as of August 27, 2024, blanket renewal projects excluded from ranking, and \* represents projects studied through Expedited Project Review (EPR) process.

Of the total projects for the local component of MTEP24, 83% percent are projected to go into service within the next three years (Figure 4.1-4).



## Local MTEP24 Projects by Estimated In-Service Year

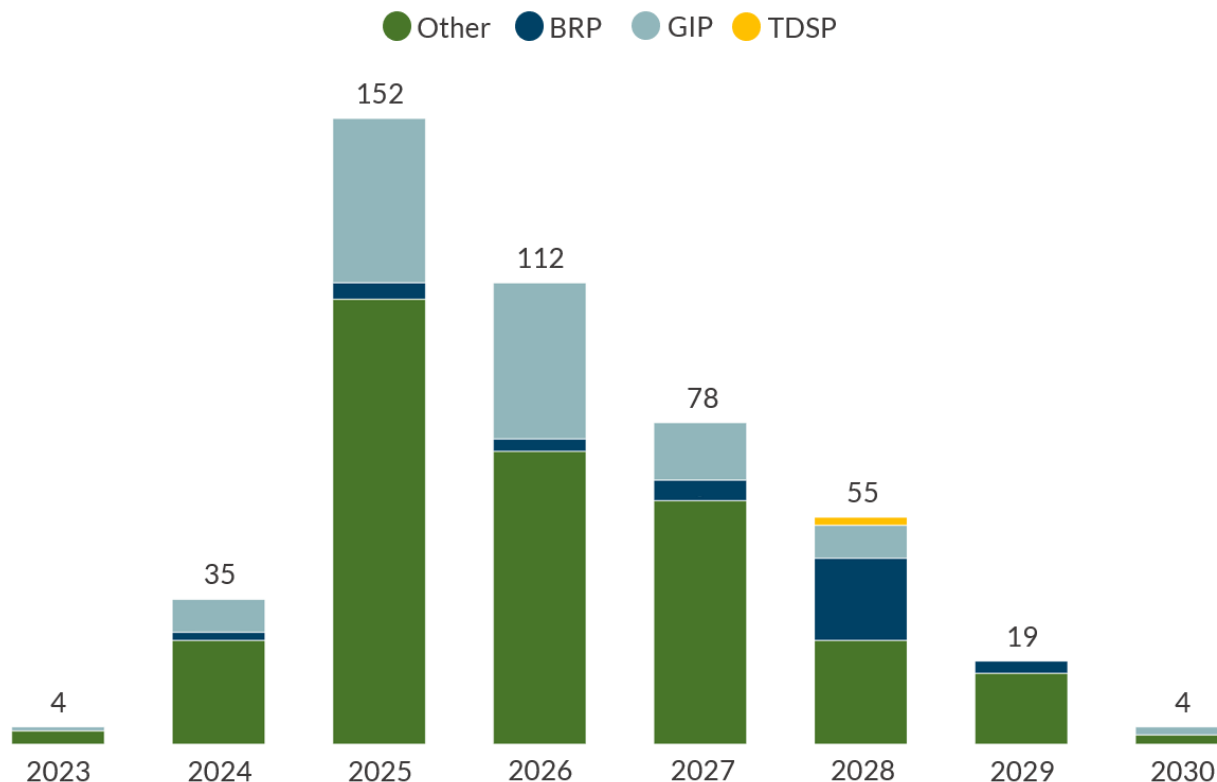


Figure 4.1-4: Number of local MTEP24 Projects by In-Service Year (data as of 8-27-24).

### Facility Type

Each MTEP project is composed of one or more facilities, where each facility represents an individual element of the project. Examples of facilities include substations, transformers, voltage devices, circuit breakers or various types of transmission lines (Figure 4.1-5).

The largest share (43%) of facility investment in the local MTEP24 cycle is dedicated to substation or switching station related construction and maintenance. This includes completely new substations as well as terminal equipment work, circuit breaker additions and replacements. Twenty-four percent is dedicated to line upgrades which includes rebuilds, conversions, and relocations. Fourteen percent is dedicated to new lines on new right-of-way in MISO. The remaining 19% of facility costs are dedicated between voltage devices, transformers, and miscellaneous categories.



## Local MTEP24 Transmission Investment by Facility Type

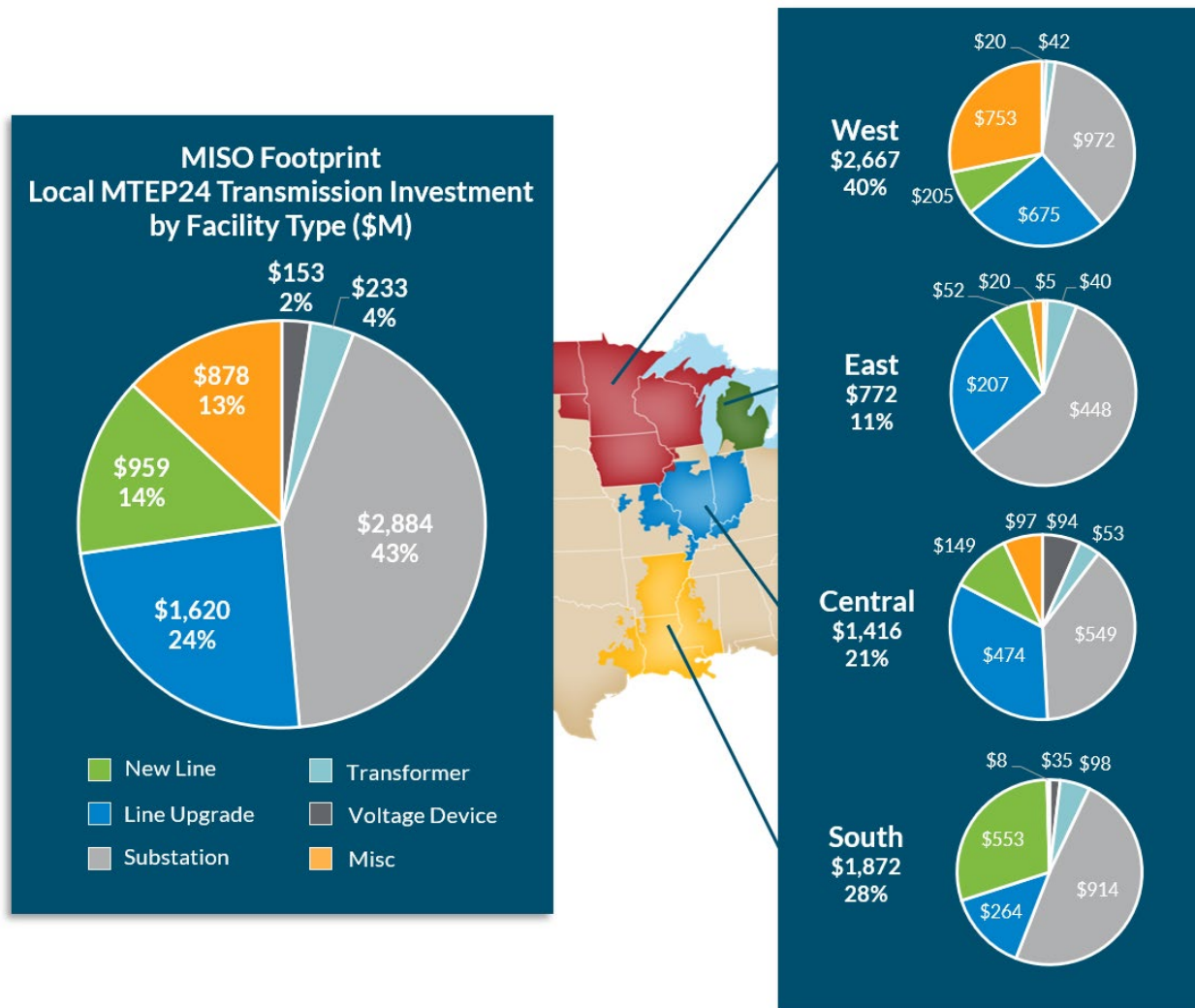


Figure 4.1-5: Facility type investment for new local MTEP24 Appendix A projects by planning region (as of 8-27-24).



New local Appendix A projects can be broken down at a facility level and are spread over 14 states (Figure 4.1-6). These geographic trends vary greatly year to year depending on local needs due to varying asset renewal programs or as existing transmission capacity is consumed and new build becomes necessary. This year truly shows the investment at a facility level spanning between all subregions.

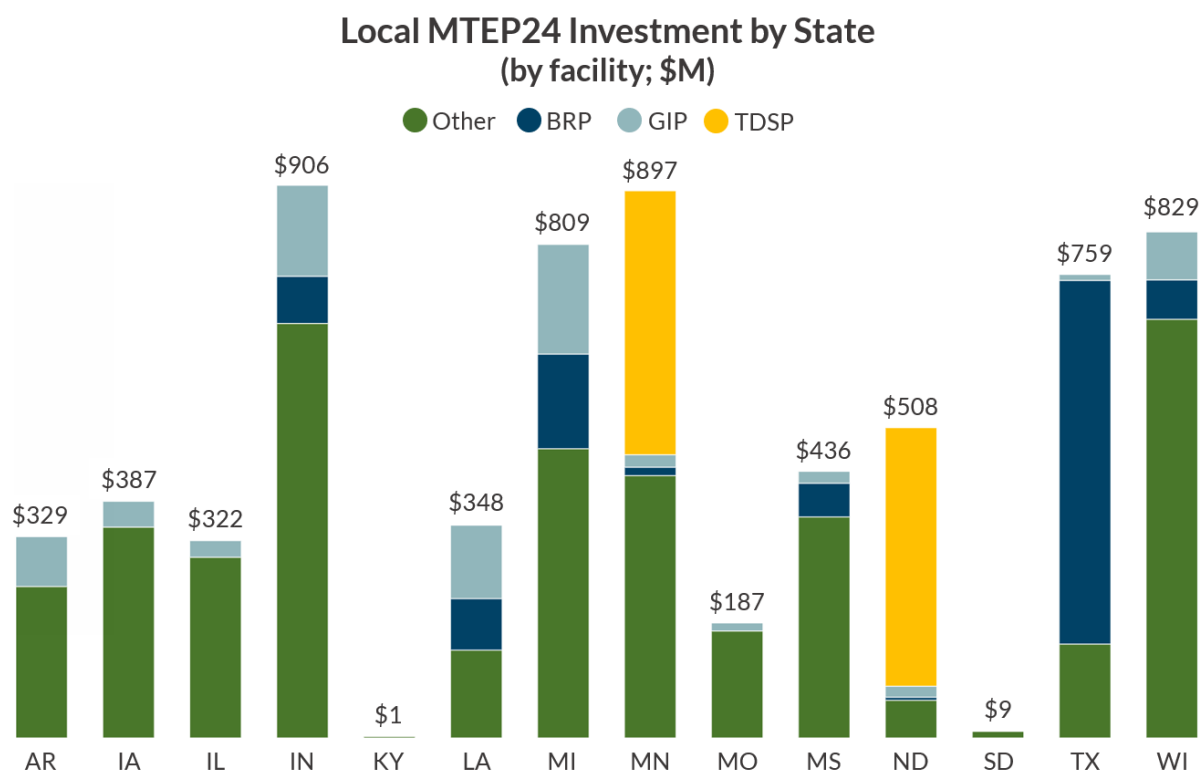
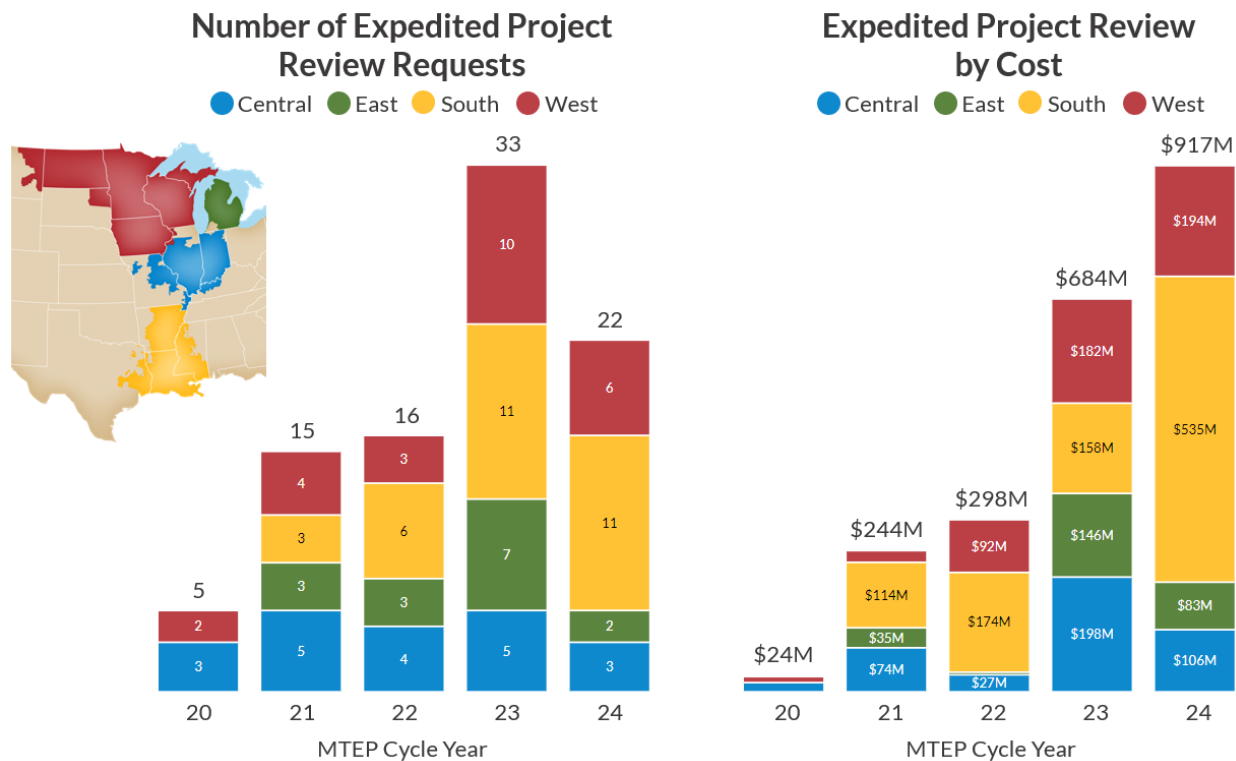


Figure 4.1-6: Local MTEP24 Appendix A investment categorized at a facility-level by state (as of 8-27-24).

Out of the 459 local MTEP24 projects submitted in this cycle, MISO Planning Engineers received and evaluated 22 Expedited Project Review (EPR) requests (Figure 4.1-7). These projects are approved in a quicker approval process because of immediate system needs. More information on these projects is included in Section 4.2. The volume of EPRs continue to be driven by the accelerating new load growth trends seen in previous MTEP cycles.



### Expedited Project Review Drivers

DOT Project Load Reliability Retirement  
(Department of Transportation)

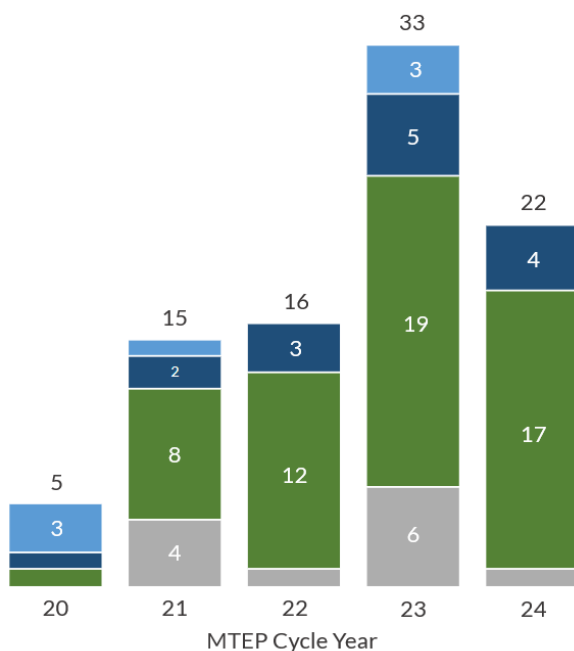


Figure 4.1-7: History on projects studied through the Expedited Project Review (EPR) process.



## Local MTEP24 New and Upgraded Line Miles

The local MTEP24 Appendix A projects total approximately 932 miles of new or upgraded lines (shown in Figure 4.1-8). Of the total, forty-two percent of new or upgraded line miles will go into service within the next three years, or 90% within five years. There are 775 line miles, or 83% of the total line miles, that are 161 kV or below. There are 157 line miles are projected at 230 kV or above.

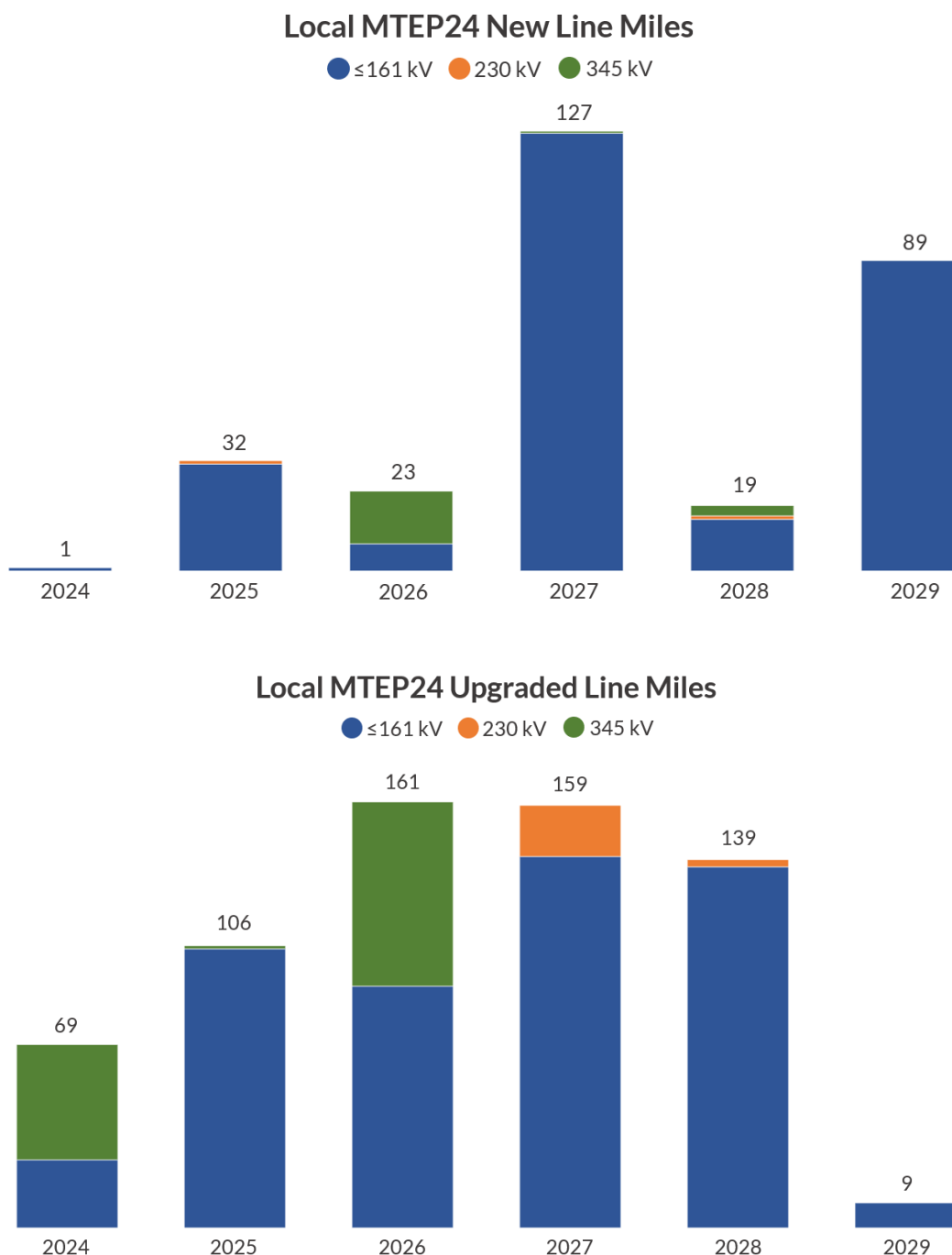


Figure 4.1-8: New and upgraded line miles in local MTEP24 Appendix A projects (as of 8-27-24).



## Allocation of Costs

The local MTEP24 projects includes a total of 35 new cost-share eligible Generator Interconnection Projects (GIPs) for Appendix A. GIP costs are primarily paid for by the interconnecting customer (generator), however, a portion of the costs for certain network upgrades are eligible for regional cost allocation under Attachment FF of the MISO Tariff. Detailed allocations by pricing zone are provided in Appendix A1.

Indicative rates related to past MTEP cost-shared projects are calculated on an annual basis. Please refer to the reports ([indicative forecasts of annual charges](#)) posted on the MISO public website<sup>1</sup>.

## MTEP Appendix B

MTEP Appendix B contains all projects that have been validated by MISO as the preferred solution to address an identified system need based on current information and forecasts, but where it is prudent to defer the final recommendation of a solution to a subsequent MTEP cycle.

This generally occurs when the preferred project does not yet need a commitment based on anticipated lead-time and there is still some uncertainty as to the prudence of selecting this project over an alternative project given potential changes in projected future conditions. MTEP Appendix B is limited to Baseline Reliability Projects and Other Projects and will be reviewed by MISO in subsequent cycles.

## 4.2 Reliability Assessment and Compliance

MISO, in collaboration with its transmission-owning members and stakeholders, performs annual reliability assessments to identify transmission infrastructure upgrades needed to ensure the continued system reliability in compliance with applicable local and regional reliability standards. The reliability assessment process for local MTEP24 projects (shown in Figure 4.1-1) began with a roll-up of issues and potential solutions from the NERC assessment of the prior MTEP cycle and from the local planning processes of Transmission Owners (TOs). Following this step, MISO conducted an independent reliability assessment to evaluate and integrate the TO local planning information into the development of the overall MTEP.

MISO closely coordinates the annual reliability assessment with other planning efforts to ensure the transmission expansion plan is identified in an efficient and cost-effective manner. A variety of factors are considered as part of MISO's transmission expansion plan development, including but not limited to, urgency of needs, cost effectiveness of solutions, system performance of solution alternatives to address identified transmission issues, and other considerations such as lead time to develop a project, right-of-way (ROW) or substation impacts, expandability, operational flexibility, etc.

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<sup>1</sup> Cost Allocation updates web address: <https://www.misoenergy.org/planning/planning/schedule-26-and-26a-indicative-reports/>

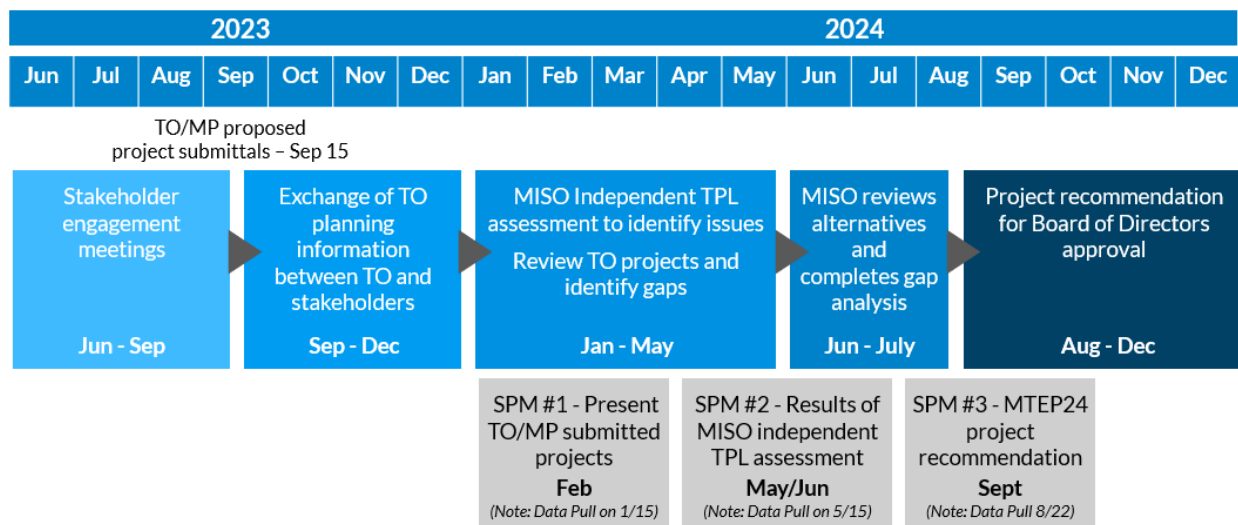


Figure 4.2-1: Local MTEP24 reliability assessment process.

In conjunction with the MTEP planning process, an inclusive, transparent stakeholder process is utilized to facilitate open discussions and allow stakeholders to provide early and meaningful inputs into the development of transmission solutions in each planning cycle. The results of MISO’s independent reliability assessments, along with proposed solution alternatives, are presented to stakeholders through a series of public Sub-regional Planning Meetings (SPM), and additional Technical Study Task Force (TSTF) meetings as needed, for each of the four MISO planning sub-regions: Central, East, South, and West.

MISO strategically set up our local planning processes to assume FERC Order 890 transparency requirements for Transmission Owner submissions resulting in different study approaches based on the types of projects submitted by Transmission Owners.

- **Verify need:** Confirmation of system need identified in project submission including to meet compliance with applicable National Electric Reliability Organization (NERC) 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.

Alternatives for projects may be completed prior to submission to MISO by the Transmission Owners, proposed by MISO, or proposed by stakeholders. Alternative criteria considers cost comparisons, feasibility to construct and how reliability needs are resolved. Alternatives do not always result in one project replacing another, instead they 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.



After MISO completes its independent review of all proposed projects and associated alternatives and addresses stakeholder feedback received through SPM discussions, MISO staff formally recommends a set of projects to the MISO Board of Directors for review and approval. These projects make up Appendix A of the MTEP report and represent the preferred solutions to the identified transmission needs of the MISO reliability assessments. Proposed transmission upgrades with sufficient lead times are included in Appendix B for further review in future planning cycles.

The complete results of local MTEP24 reliability assessments are detailed in Appendices D3-D10 of the MTEP24 report, which are available on the [MISO ShareFile site](#) and subject to Critical Energy Infrastructure Information (CEII) and non-disclosure agreements. These results serve as compliance evidence for a variety of NERC planning standards listed on the [MISO public website](#).

As appropriate, an executive summary of results for the appendix will be available on the MISO website.

Appendix	Title	Insights
D3	Steady State CEII	MISO ran N-1, N-1-1, spare equipment, planned outages, adjacent, and extreme event contingency analysis to identify any voltage and thermal violations in the MISO area. For local MTEP24 projects, over 400,000 issues were identified, and all valid results contain a corrective action plan to mitigate the violation.
D4	Voltage Stability CEII	MISO studied seven interfaces for voltage stability. The results have been reviewed with impacted parties.
D5	Transient Stability CEII	MISO is currently running over 4,000 dynamic disturbances to identify any violations on the system and will post issues for stakeholder comments after MISO reviews the results.
D6	Generator Deliverability CEII	MISO conducts the Annual MTEP Deliverability Analysis to ensure the ongoing deliverability of existing Network Resources (NRs). Affected stakeholders have reviewed the preliminary results for MTEP24, which are currently in progress.
D7	Contingency Coverage CEII	MISO received 247,718 steady state contingencies from 39 Transmission Owners to be used in MTEP24 contingency analysis. There were an additional 11,951 contingencies added by MISO to ensure full coverage.
D8	Nuclear Plant Interface Coordination CEII	MISO incorporated NPIRs into the MTEP24 analyses, adhering to Nuclear Plant Operating Agreements. MISO monitored steady state analysis, transient stability, and extreme events for nuclear plants in the MISO footprint and addressed any constraints by implementing mitigations necessary to adhere to NPIRs.
D9	Planning Horizon Transfer Capability CEII	MISO performed an Interregional Transfer Capability Study in collaboration with NERC ITCSI. In the MTEP24 Transfer Capability study the transfer limit of Illinois import interface has been identified.
D10	Short Circuit Analysis CEII	For local MTEP24, TO transmission planners have performed a short-circuit analysis to determine whether their circuit breakers have the expected interrupting capability for faults. If the short-circuit current interrupting duty on a circuit breaker exceeds the equipment rating, the TO transmission planner has provided MISO a corrective action plan to mitigate the violation.



## Local MTEP24 project recommendations

The local MTEP24 portfolio consists of 459 projects totaling over \$6.7 billion in investment from 37 Transmission Owners across MISO’s footprint. Table 4.2-1 provides a quick glance into local MTEP24 Appendix A project investment summarized by category and planning region. Table 4.2-2 provides a quick summary of each Transmission Owner’s number of projects and estimated investment totals being considered. Project justification details of the recommended local Appendix A projects are summarized in the following subsections for each of the four MISO planning subregions. All project details are available on the [MTEP Portal](#) on MISO’s public website and were pulled as of August 27, 2024.

### Local MTEP24 Appendix A Project Investment Summary

*(Data as of August 27, 2024; \$M, number of projects, and % of total investment dollars)*

Planning Region	Baseline Reliability Project (BRP)	Generator Interconnection Project (GIP)	Other Project	Transmission Delivery Service Project (TDSP)	Total	# of Projects
Central	\$77	\$190	\$1,149		\$1,416	127
East	\$155	\$178	\$438		\$771	77
South	\$737	\$232	\$903		\$1,872	63
West	\$83	\$162	\$1,563	\$858	\$2,667	192
Total	\$1,052	\$763	\$4,054	\$858	\$6,727	459

Table 4.2-1: Local MTEP24 Appendix A new project investment summary (as of 8-27-2024).



Transmission Owners	Baseline Reliability Projects		Generator Interconnection Projects		Other		Transmission Delivery Service Projects		Grand Total	
	#	\$M	#	\$M	#	\$M	#	\$M	#	\$M
Ameren Illinois			5	\$41	18	\$197			23	\$238
Ameren Missouri			1	\$0	10	\$105			11	\$105
Ameren Transmission Company of Illinois					2	\$5			2	\$5
American Transmission Company	1	\$65	10	\$80	31	\$650			42	\$794
Arkansas Electric Cooperative Corporation					4	\$24			4	\$24
Big Rivers Electric Corporation			2	\$0					2	\$0
Henderson, KY, Municipal Power & Light					1	\$1			1	\$1
City Water & Light Plant of Jonesboro, AR					1	\$1			1	\$1
Cleco Power LLC			5	\$65	1	\$21			6	\$86
Dairyland Power Cooperative			2	\$21					2	\$21
Duke Energy Indiana	2	\$65	7	\$96	11	\$154			20	\$316
Entergy Arkansas			7	\$82	6	\$222			13	\$304
Entergy Louisiana	6	\$85	4	\$55	5	\$121			15	\$261
Entergy Mississippi	1	\$55	1	\$20	4	\$330			6	\$405
Entergy Texas, Inc	6	\$597	1	\$10	2	\$153			9	\$759
Great River Energy					24	\$189			24	\$189
Hoosier Energy			4	\$18	2	\$93			6	\$111
Indianapolis Power & Light Company	1	\$12	1	\$3	18	\$159			20	\$174
ITC	2	\$23	14	\$57	8	\$155			24	\$235
ITC Midwest			12	\$20	16	\$198			28	\$218
Lafayette Utilities System			1	\$1					1	\$1
Michigan Electric Transmission Co.	12	\$114	27	\$121	11	\$223			50	\$459
MidAmerican Energy Co.			2	\$24	23	\$177			25	\$200
Minnesota Power Inc.	2	\$0.5			4	\$39	2	\$858	8	\$897
Minnkota Power Cooperative, Inc					3	\$15			3	\$15
Missouri River Energy Services					1	\$2			1	\$2
Montana-Dakota Utilities Co.	1	\$5	1	\$18	3	\$33			5	\$56
Northern Indiana Public Service Company			3	\$12	2	\$103			5	\$115
Northern States Power Company	1	\$13			40	\$225			41	\$238
Northwestern Wisconsin Electric Co.					1	\$1			1	\$1
Otter Tail Power Company					10	\$32			10	\$32
Prairie Power, Inc.					8	\$101			8	\$101
South Mississippi Electric Power Association					8	\$31			8	\$31
Southern Indiana Gas & Electric Co.			1	\$20	26	\$169			27	\$189
Southern Minnesota Municipal Power Agency					2	\$4			2	\$4
Wabash Valley Power Association, Inc					2	\$61			2	\$61
Wolverine Power Supply Cooperative, Inc	1	\$18			2	\$60			3	\$77
	<b>36</b>	<b>\$1,052</b>	<b>111</b>	<b>\$763</b>	<b>310</b>	<b>\$4,054</b>	<b>2</b>	<b>\$858</b>	<b>459</b>	<b>\$6,727</b>



Table 4.2-2: Local MTEP24 Appendix A new project investment and totals by Transmission Owners (as of 8-27-2024).

MISO also considered alternatives for two projects in the East region and one project in the South. As a result of the alternative analysis, MISO selected two of the original projects and one alternative. Below are the projects that were submitted and evaluated as alternatives. More details are shared about these alternatives in the following sub-sections.

	Project Name	Planning Region	MISO Recommendation
1	Rebuild Benson to Stephens 120 kV Line	East	Not selected due to not meeting Local Planning Criteria
2	Iosco-Karn 138 kV Relocation	East	Recommended for approval in MTEP24 due to cost savings
3	Hartburg to Sabine 500 kV Line (as submitted and approved in MTEP17)	South	Not selected due to better reliability performance by original project

In accordance with Attachment FF of the tariff, in the event a Transmission Owner determines that system conditions warrant the urgent development of system enhancements, an expedited review of the impacts of the project can be requested. MISO shall use a streamlined approval process for reviewing and approving projects proposed by the Transmission Owner(s) and decisions will be provided to the Transmission Owner within 30 Days of the project's submittal to MISO unless a longer review period is mutually agreed upon. Out of the 459 local MTEP24 projects submitted in this cycle, MISO Planning Engineers received and evaluated 22 Expedited Project Review (EPR) requests. New load interconnections account for over 77% of the EPR requests submitted, and 50% are located in the South planning region. The following local MTEP24 projects were submitted through the Expedited Project Review (EPR) process:

	Project ID	Project Name	Planning Region	Current Cost (\$M)
1	24958	Sandling 230 kV Customer Load Addition Project	South	\$114
2	24959	Kolbs to Port Acres 230 kV upgrade project	South	\$17
3	24960	Legend to Sandling 230 kV Circuit 2 Project	South	\$77
4	25214	Virililia 230 kV Substation	South	\$80
5	25215	Andes 500/230 kV Substation	South	\$158
6	25229	Costas 230 kV Substation	South	\$45
7	25299	Racine County, DIC, Nimbus Substation	West	\$89
8	25301	Leola load addition	West	\$4



	<b>Project ID</b>	<b>Project Name</b>	<b>Planning Region</b>	<b>Current Cost (\$M)</b>
9	25321	Winnebago City Substation Interconnection	West	\$8
10	25544	JCWL - Commerce to Ringier 69kV Rebuild	South	\$1
11	50011	Weeks Island Sub	South	\$21
12	50037	Ellendale load 2 addition	West	\$17
13	50038	Project Phoenix-Husky Substation	East	\$50
14	50086	Load addition at Montgomery 161 kV Substation	Central	\$3
15	50089	Aetna Synchronous Condenser	Central	\$91
16	50094	Northstar	South	\$7
17	50099	Lewisville West Capacity Increase	South	\$5
18	50106	Big Cedar Interconnection	West	\$64
19	50151	Sphinx 138 kV Station	East	\$33
20	50152	Ellendale load 3 addition	West	\$13
21	50164	Woodberry Load Addition	South	\$10
22	50174	New Customer X 138kV Substation	Central	\$12



## 4.3 Project Justifications – Central Region

### Central Region Overview

The MISO Central planning region spans four states (Missouri, Illinois, Indiana, and Kentucky) and consists of the following Transmission-Owning members:

American Electric Power Service Corporation (AEP)	Hoosier Energy REC Inc. (HE)
Ameren Illinois (AMIL)	Indianapolis Power & Light (IPL)
Ameren Missouri (AMMO)	Northern Indiana Public Service Co. (NIPSCO)
Ameren Transmission Company of Illinois (ATXI)	Pioneer Transmission (PTx)
Big Rivers Electric Corp. (BREC)	Prairie Power Inc. (PPI)
City of Columbia, Mo. (CWLD)	Republic Transmission (RTx)
City of Springfield, Ill. (CWLP)	Southern Indiana Gas & Electric (SIGE)
Duke Energy Corp. (DEI)	Southern Illinois Power Cooperative (SIPC)
GridLiance Heartland LLC (GLH)	Wabash Valley Power Association Inc. (WVPA)
Henderson Municipal Power & Light (HMPL)	

The Bulk Power System (BPS) within these states consists of an extensive 765 kV, 345 kV, 230 kV, 161 kV, and 138 kV networked transmission system. The 345 kV network spans Missouri, Illinois, and Indiana, both north to south and east to west. The 230 kV network spans through Indiana, both north to south and east to west. The 161 kV network spans north to south and east to west in Missouri, Illinois, and Kentucky. The 138 kV network spans both north and south, and east to west in Illinois, Indiana, and Kentucky and east in Missouri. All of Ameren, BREC, CWLD, CWLP, GLH, HMPL, PPI, and SIPC belong entirely in the SERC Region for reliability administration. All of DEI, HE, IPL, NIPSCO, PTx, RTx and SIGE belong entirely in the ReliabilityFirst Region. Wabash Valley is split between both ReliabilityFirst and SERC Regions.

Major load pockets in the MISO Central planning region are St. Louis, MO; Peoria, IL; Springfield, IL; Evansville, IN; Gary, IN; and Indianapolis, IN (shown in Figure 4.3-1).

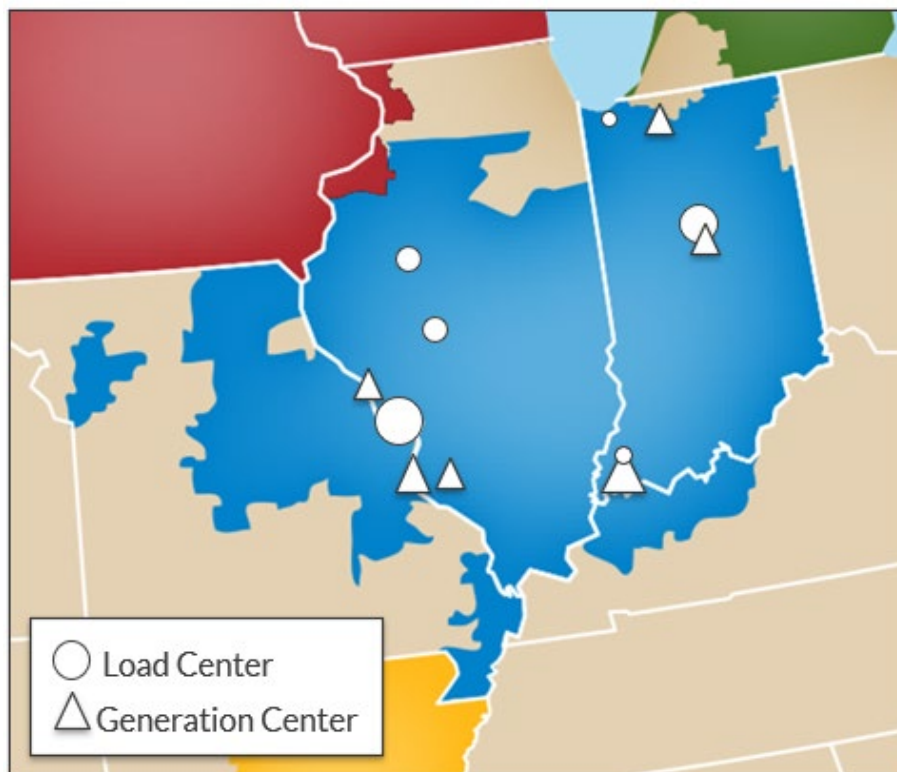
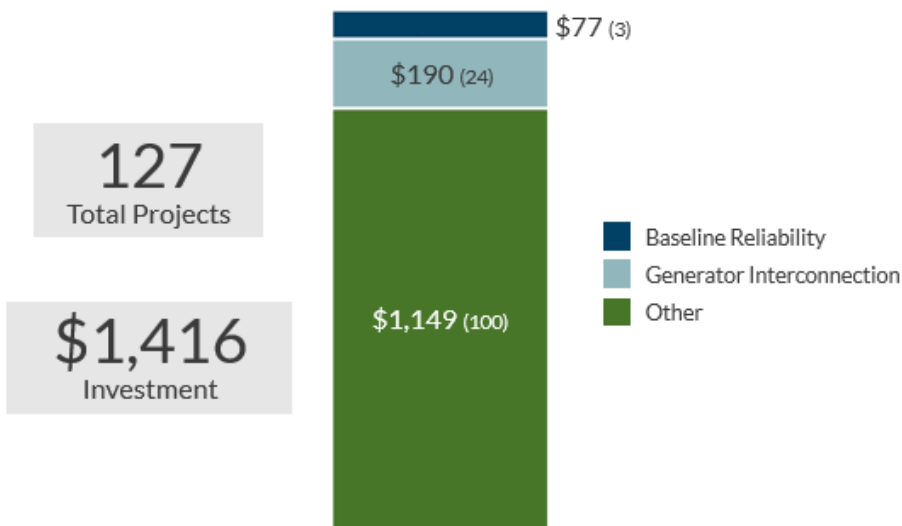


Figure 4.3-1: Generation and load centers in the Central planning region.

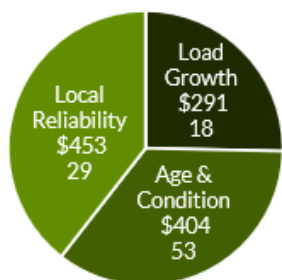


# Central Planning Region Local MTEP24 Summary

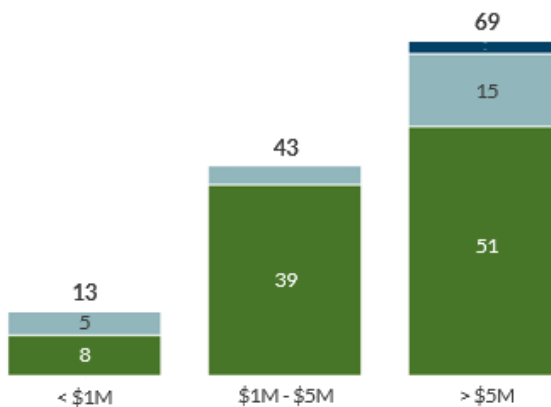
(Data as of August 27, 2024; \$M, # project count)



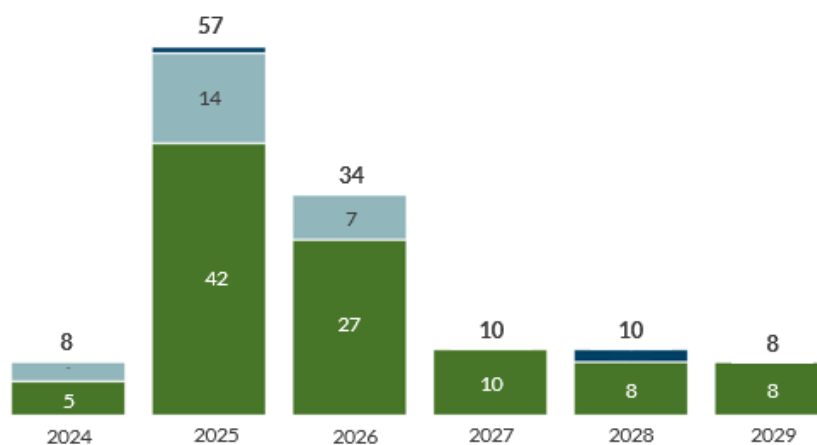
**BREAKDOWN OF OTHER PROJECTS BY COST**



**PROJECT COUNT BY COST CATEGORY**



**PROJECTS BY IN-SERVICE DATE**





The ten largest project investments in the MISO Central region represent \$540 million (38%) of the \$1.4 billion total recommended projects for the Central region in the local MTEP24 portfolio, or 8% of the \$6.7 billion total recommended in the MISO footprint. The locations of these projects are shown in Figure 4.3-2 and the investment is spread across the Central planning region. Projects that are blanket expenditures (relays, physical security, etc.) are excluded from this list.

## Central Region Top 10 Local MTEP24 Projects

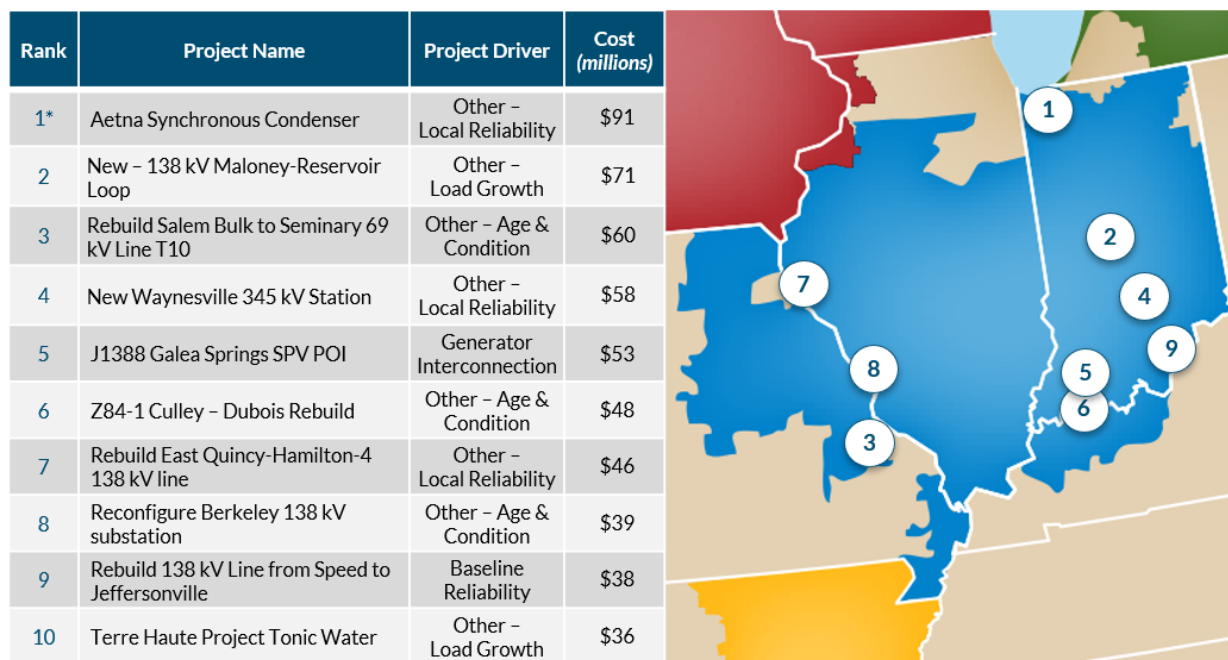


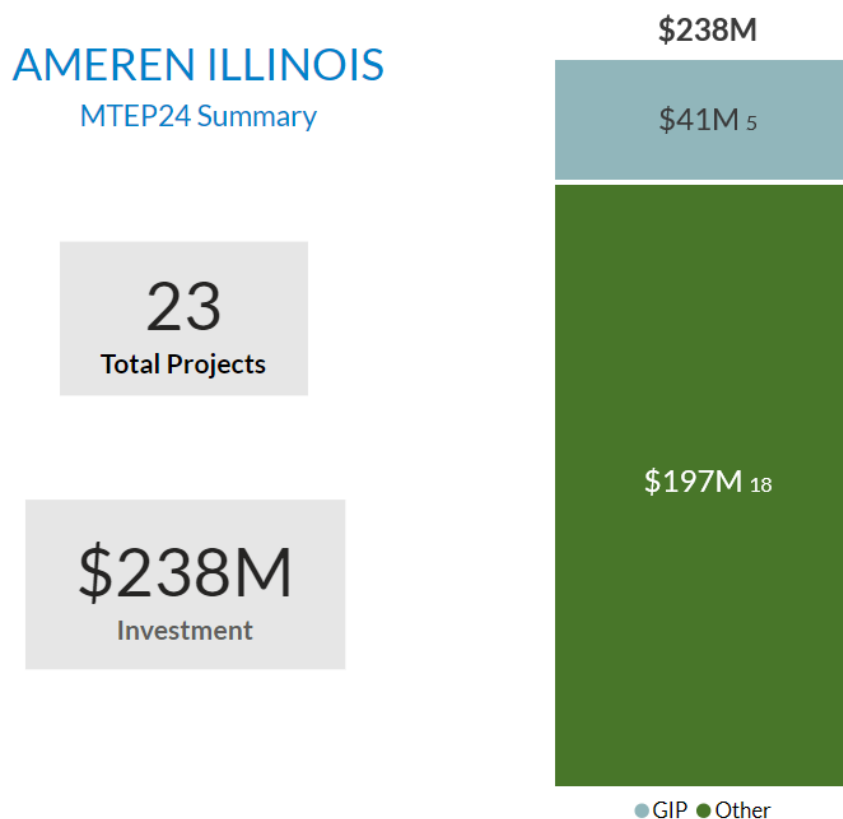
Figure 4.3-2: Central region top ten projects by cost; \* represents project studied through Expedited Project Review (EPR) process (as of 8-27-2024).

### 4.3.1 American Electric Power Service Corporation (AEP)

American Electric Power Service Corporation and MISO are not recommending any new projects for MTEP24.



### 4.3.2 Ameren Illinois (AMIL)



#### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
22872	Upgrade Macomb NE 138 kV substation	Age and Condition	12/1/2027	\$1.8
22878	Upgrade Cat Mapleton 138 kV substation	Age and Condition	6/1/2026	\$8.7
22951	Upgrade Rantoul 138 kV substation	Age and Condition	12/1/2025	\$7.1
22969	Upgrade Decatur East Main St. 138 kV substation	Age and Condition	6/1/2026	\$2.3
23151	Rebuild East Quincy-Hamilton-4 138 kV line	Local Reliability	12/1/2025	\$46.0
24034	Coffeen N. XFMR 2 Replacement	Load Growth	12/1/2026	\$6.0
24717	Rebuild Edwards-Keystone-1397 138 kV Transmission Line	Local Reliability	12/1/2025	\$5.5
24737	Rebuild Woodhall-Hallock-1570 138 kV Transmission Line	Local Reliability	12/1/2025	\$16.0
24738	Rebuild Hull-Herleman-1682 138 kV Transmission Line	Local Reliability	12/1/2025	\$24



Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
24739	Rebuild Greenback-Lanesville 138 kV Line	Local Reliability	12/1/2025	\$2.2
24921	New Steamboat 138 kV Ringbus for Babylon 138 kV Sub for PPI Connection	Local Reliability	6/1/2026	\$9.7
25091	Replace 345/138 kV Transformer 2 at Norris City North	Age and Condition	12/1/2025	\$7.0
25153	New Moyer 138 kV Ring Bus for One Earth Energy Interconnection	Load Growth	6/1/2025	\$16.7
25193	Turkey Hill - Transformer 1 Replacement	Age and Condition	12/1/2025	\$6.7
25279	Replace Pole and Insulator Program - MTEP24	Age and Condition	12/31/2026	\$20.0
25362	Replace Breakers and Relays Program - MTEP24	Age and Condition	12/31/2026	\$5.0
50044	Hull-Marion-7324 Rebuild	Age and Condition	12/1/2026	\$5.5
50045	Austin Transformer 3 Replacement	Age and Condition	12/1/2027	\$6.8

### Generator Interconnection Projects

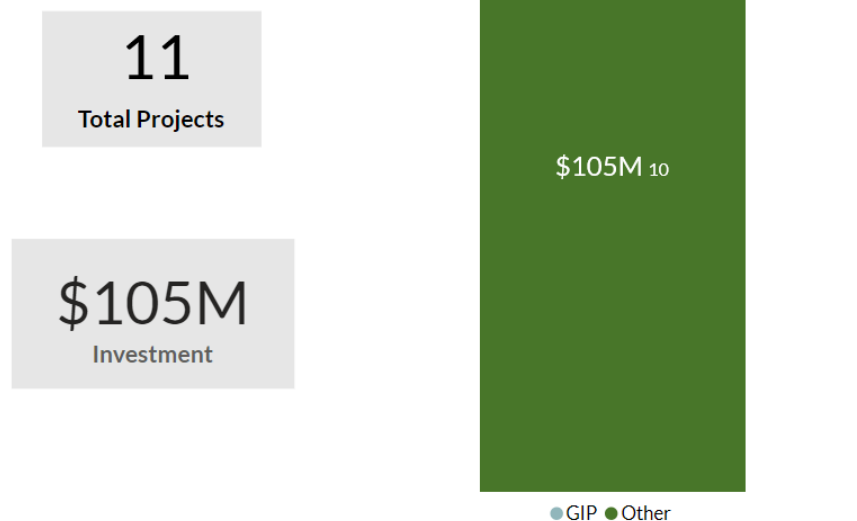
Project ID	Project Name	ISD	Estimated Cost (\$M)
24987	Mason-IL 138 kV Upgrade for Glacier Sands Wind II (J1454)	12/1/2025	\$0.1
25041	Viriden 138 kV Substation for Viriden Wind (J1408)	7/1/2026	\$8.0
25042	Supernova 345 kV Substation for Perry County Solar (J1306)	12/1/2026	\$11.0
25043	Moose 138 kV Substation for Albion PV1 (J1422)	12/1/2025	\$8.4
50148	Havana-Puro 138 kV 1422 MPFCA	12/1/2025	\$13.2



### 4.3.3 Ameren Missouri (AMMO)

#### AMEREN MISSOURI

MTEP24 Summary



#### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
22880	Zion 161 kV Substation Add High Side Interrupter	Local Reliability	6/1/2026	\$2.0
22886	Reconfigure Berkeley 138 kV substation	Age and Condition	12/1/2026	\$39.2
22949	Rebuild Stoddard 161 kV substation	Local Reliability	6/1/2026	\$15.9
22950	Upgrade Watson 161 kV substation	Age and Condition	6/1/2026	\$6.2
25225	Maurer Lake 161 Aging Infrastructure	Local Reliability	6/1/2025	\$4.0
25243	Rockwood 138 kV Aging Infrastructure and Line Breaker Addition	Local Reliability	12/1/2026	\$3.5
25276	Conway 138 kV Add Breakers and Aging Infrastructure	Local Reliability	12/1/2027	\$17.5
25349	Labadie-Montgomery 345 kV Aging Infrastructure	Local Reliability	12/1/2025	\$10.5
50057	Vessel Bulk Sub - Add 2nd 138/34 kV Transformer	Load Growth	1/1/2026	\$4.0
*50086	Load addition at Montgomery 161 kV Substation	Load Growth	3/1/2026	\$2.5

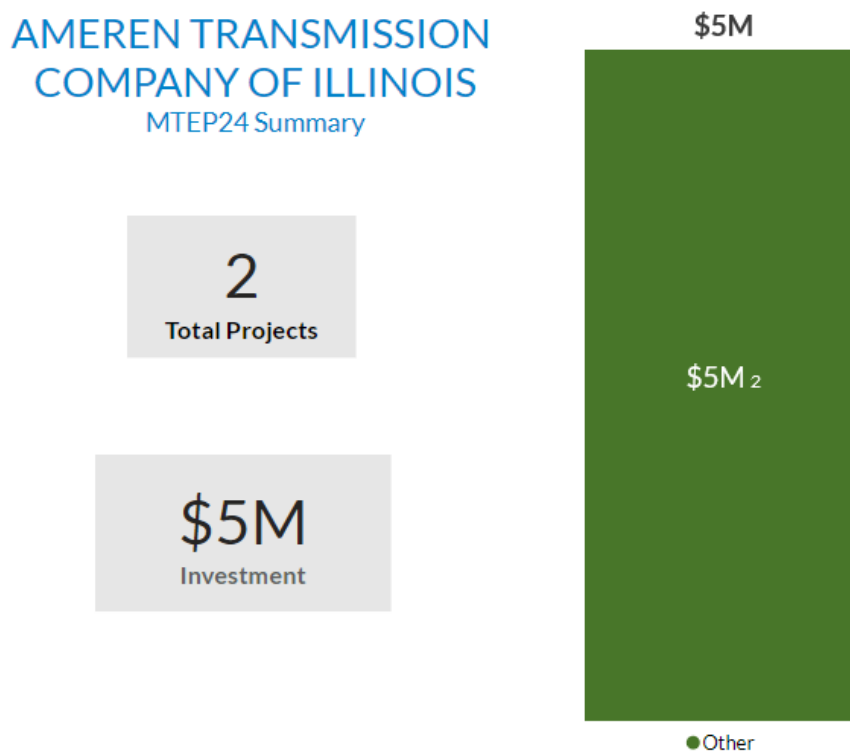
\* Project studied through Expedited Project Review (EPR) process.



## Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
25039	Taum Sauk 138 kV Upgrade for 60MW Hydro (J1213)	12/1/2025	\$0.1

### 4.3.4 Ameren Transmission Company of Illinois (ATXI)



### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25092	Zachary 161 kV BAAH Addition	Local Reliability	12/1/2025	\$3.0
25093	Zachary 161 kV Terminal Addition	Local Reliability	12/1/2025	\$1.5



### 4.3.5 Big Rivers Electric Corporation (BREC)

#### BIG RIVERS ELECTRIC CORPORATION MTEP24 Summary

2  
Total Projects

\$0M  
Investment

● GIP \$0M<sub>2</sub>

#### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
25081	J1450 Webster County Switching Station for POI	12/1/2025	\$0.0
25120	J1466 Reid EHV 161 kV Terminal Addition	12/1/2025	\$0.0

### 4.3.6 City of Columbia, MO (CWLD)

City of Columbia, MO, and MISO are not recommending any new projects for MTEP24.

### 4.3.7 City of Springfield, IL (CWLP)

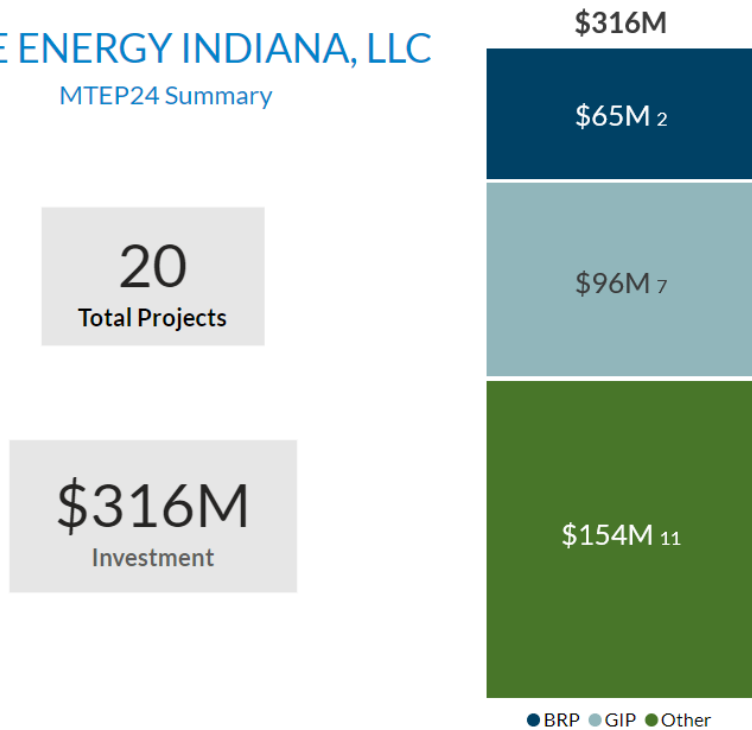
City of Springfield, IL, and MISO are not recommending any new projects for MTEP24.



### 4.3.8 Duke Energy Corporation (DEI)

#### DUKE ENERGY INDIANA, LLC

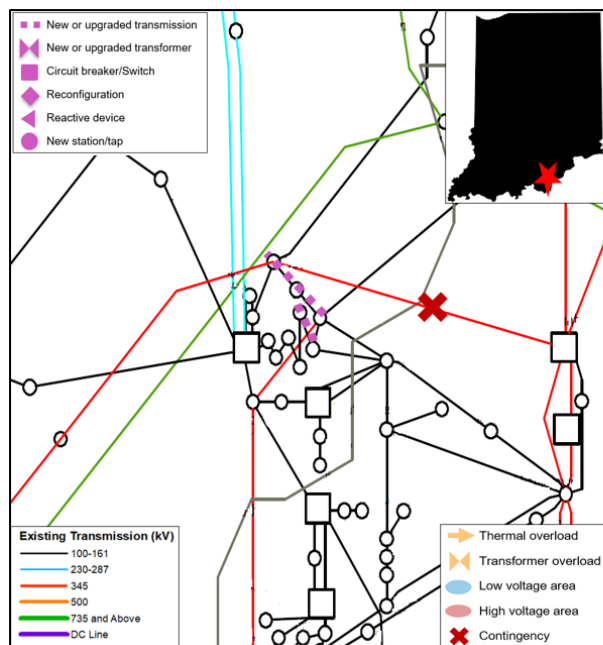
MTEP24 Summary





## Baseline Reliability Projects

### P25414 – Rebuild 138 kV Line from Speed to Jeffersonville



Project #	25414
Project Name	Rebuild 138kV Line from Speed to Jeffersonville
Project Type	BRP
Project Description	(1) Rebuild entire 13898 ckt from Speed to Jeffersonville with 954ACSS@200C; (2) upgrade very short 13882 tie with LGE at Jeffersonville to 954ACSS@200C and have LGE add ATO switches at the junction just outside Jeffersonville sub; (3) rebuild 6955 ckt where double circuited with 13898 ckt; (4) upgrade line terminals and substation buses as needed
System Needs	Fixes overload issues related to local load growth (Slugger, Gateway, etc.); OL's seen in MTEP23 - P2, P4, P5, P7, P6
Estimated Cost	\$38,300,000
Expected ISD	12/31/25
Target Appendix	A

Figure 4.3.8-1: P25414 Geographic transmission map of project area and MTEP Portal project details.

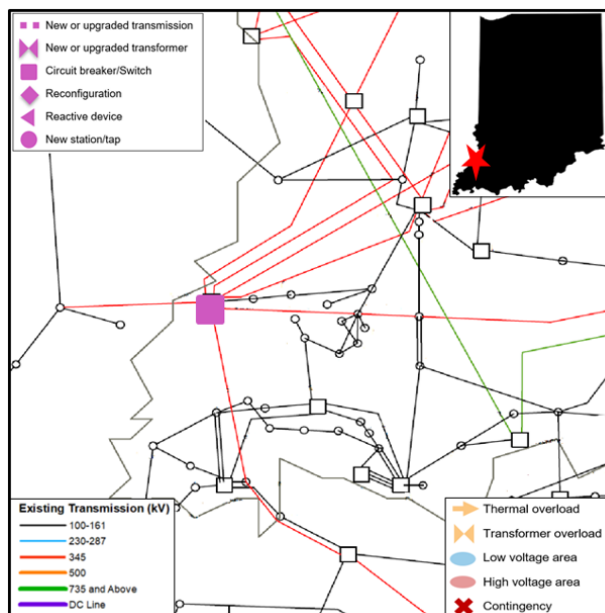
**Project Justification:** The [DEI] Clark Martime - [DEI] Jeffersonville 138 kV line becomes overloaded to one hundred eighteen (118%) percent in year 2025 for a NERC defined category P2-3 contingency event. The Rebuild [DEI] Speed – [DEI] Jeffersonville 138 kV line project will modify several ratings including an increase in the summer emergency rating of [DEI] Clark Martime - [DEI] Jeffersonville 138 kV line from 161 MVA to 480 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P2	[DEI] Clark Martime – [DEI] Jeffersonville 138 kV line	480	136	46

Table 4.3.8-1: P25414 Thermal loading drivers.



## P25458 – Gibson 345 kV Ckt Brkr Upgrades



Project #	25458
Project Name	Gibson 345kV Ckt Brkr Upgrades
Project Type	BRP
Project Description	Gibson 345 CB upgrades - TPL-001 short ckt overduty - replace (18) 345kV-63kA interrupting rated CBs with 80kA; replace breaker disconnect switches and upgrade bus conductor as needed. ALTERNATIVE: add neutral to ground fault current limiting reactors on Gibson Units 1 and 2 GSUs (6 ohms) currently under consideration.
System Needs	These CBs were identified in the 2023 short circuit study as being over-dutied during certain fault conditions. This is a NERC TPL 001 compliance requirement.
Estimated Cost	\$27,000,000
Expected ISD	12/31/28
Target Appendix	A

Figure 4.3.8-2: P25458 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** Need for project determined through short circuit analysis.

## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25331	WVPA Blacketor 69/12 kV Sub	Load Growth	12/31/2025	\$8.8
25332	WVPA Pike 69 kV Line Rebuild	Load Growth	12/31/2028	\$15.0
25333	Westfield 156th St 69/12 kV Sub	Load Growth	12/31/2026	\$3.4
25334	Kokomo Webster St Ckt Brkr Replacements	Local Reliability	12/22/2025	\$6.3
25335	Add new Thorntown 69 kV ckt and rebuild 6943 ckt	Load Growth	9/4/2025	\$31.2
25336	Greensburg Washington St. 69 kV Breaker upgrades	Local Reliability	7/24/2025	\$2.1
25347	WVPA Lebanon Industrial 69/12 kV Sub	Load Growth	10/1/2025	\$12.2
25463	Glenwood to Rushville 69 kV Line Rebuild	Age and Condition	10/31/2025	\$24.7
25525	Kokomo Project Fusion Phase 2 - 230/69 kV Sub	Load Growth	6/30/2026	\$14.0
25526	Terre Haute Project Tonic Water	Load Growth	3/1/2027	\$35.8
50068	HE Taylorsville 69/12 kV Sub	Load Growth	10/17/2025	\$0.9



## Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
25504	J1481 Emerald Green Solar POI	4/1/2026	\$8.5
25521	J992 Appleseed Solar POI	8/15/2025	\$7.3
25523	J1348 Brouilletts Creek Solar POI	6/1/2026	\$8.4
25542	J1357 Williams Power POI	9/30/2025	\$5.7
25543	J1381 Locomotive Solar POI	10/1/2026	\$6.7
25545	J1390 Lowland Solar Park POI	12/1/2025	\$6.8
25546	J1388 Galea Springs SPV POI	6/1/2026	\$52.9

### 4.3.9 GridLiance Heartland LLC (GLH)

GridLiance Heartland LLC and MISO are not recommending any new projects for MTEP24.



### 4.3.10 Henderson Municipal Power & Light (HMPL)

## Henderson Municipal Power & Light

MTEP24 Summary



### Other Projects

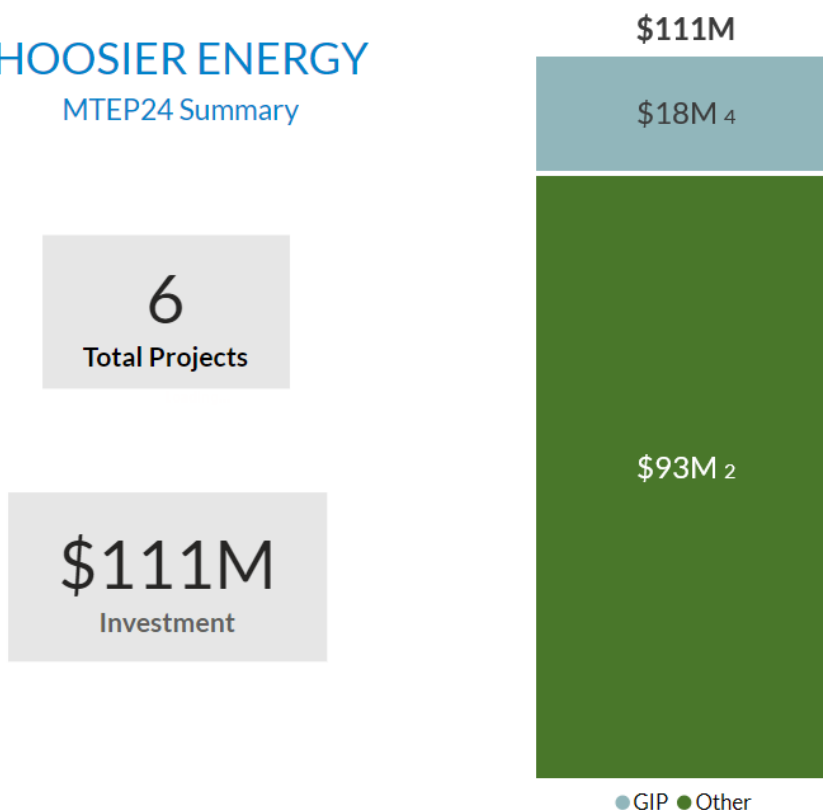
Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25499	Reconductor HMPL Sub 2 to HMPL Sub 5 69 kV line	Age and Condition	12/1/2025	\$1.0



### 4.3.11 Hoosier Energy REC, Inc. (HE)

## HOOSIER ENERGY

MTEP24 Summary



### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25350	New Waynesville 345 kV Station	Local Reliability	5/31/2028	\$58.2
25560	Centerton-Wilbur New 69 kV Line and Upgrades	Local Reliability	12/31/2027	\$34.7

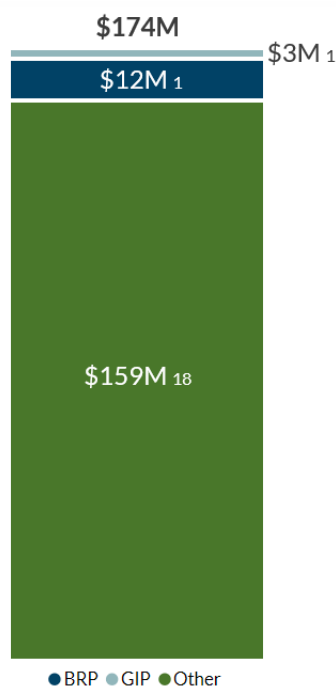
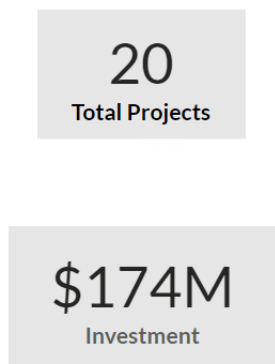
### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
25261	HE_J1028_Ratts1_Solar	9/6/2024	\$11.4
25280	HE_J1354_Decatur_Battery	11/15/2025	\$3.2
25303	HE_J1027_Ratts2_Solar	10/1/2025	\$3.6
25304	HE_J1396_Ratts_3_Solar	8/20/2024	\$0.01



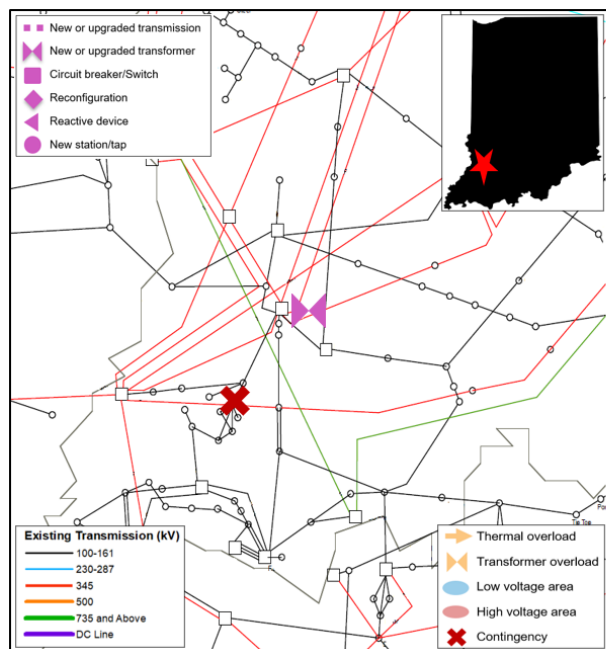
### 4.3.12 Indianapolis Power & Light Company (IPL)

#### INDIANAPOLIS POWER & LIGHT COMPANY MTEP24 Summary



#### Baseline Reliability Projects

#### P25268 – Replace 345-138 kV Petersburg East & West Autos



Project #	25268
Project Name	Replace 345-138 kV Petersburg East & West Autos
Project Type	BRP
Project Description	Replacement of the Petersburg 345/138 kV 300 MVA autotransformers with 500 MVA autotransformers.  Project scope includes adding redundant relaying to each autotransformer.
System Needs	Reliability need resulting from the annual steady-state analysis for spare equipment as required by NERC TPL-001-5 R2.1.5 & R2.7.  Outage of either autotransformer in conjunction with P23:345:DEI:GIBSON 34516, results in >120% thermal overload, violating AES Indiana's 2-hour short term emergency rating.
Estimated Cost	\$12,000,000
Expected ISD	12/31/28
Target Appendix	A

Figure 4.3.12-1: P25268 Geographic transmission map of project area and MTEP Portal project details.



**Project Justification:** The [IPL] Petersburg 345/138/34.5 kV East and West Auto transformers become overloaded to one hundred twenty-eight (128%) percent in year 2025 for a NERC defined category Spare Equipment contingency event. Replacing the [IPL] Petersburg 345/138/34.5 kV Auto transformers will increase the summer emergency rating of the transformers from 300 MVA to 500 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
Spare	[IPL] Petersburg 345/138/34.5 kV East	500	152	91
Spare	[IPL] Petersburg 345/138/34.5 kV West	500	152	91

Table 4.3.12-1: P25268 Thermal loading drivers.

## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
24274	New - 138 kV Maloney-Reservoir Loop	Load Growth	12/31/2029	\$71.4
24555	New - Waverly - 138 kV Substation	Load Growth	12/1/2029	\$6.0
25353	Replace Southwest 138 kV #1 Breaker	Age and Condition	12/5/2024	\$0.9
25354	Replace Parker 138 kV Breakers	Age and Condition	5/21/2025	\$2.7
25355	Replace Northwest 138 kV Breakers	Age and Condition	5/21/2025	\$3.6
25367	New 138 kV Hawthorne Substation	Load Growth	6/25/2025	\$15.0
25372	New 345-138 kV Monrovia Substation	Load Growth	6/30/2029	\$35.3
25383	Replace South 138 kV Breakers	Age and Condition	4/28/2025	\$2.7
25384	Replace East 138 kV Breakers	Age and Condition	4/29/2025	\$4.5
25385	Replace Petersburg 345 kV Breakers	Age and Condition	9/11/2025	\$5.4
25386	Replace North 138 kV Breakers	Age and Condition	12/22/2025	\$1.8
25387	Replace Prospect 138 kV #2 Breaker	Age and Condition	12/22/2025	\$0.9
25389	Replace Northeast 138 kV Breakers	Age and Condition	12/22/2025	\$1.8
25390	Replace Brookwood 138 kV Breakers	Age and Condition	12/22/2025	\$1.8
25401	New 138-34.5 kV Northwest Transformer	Local Reliability	6/30/2025	\$4.0



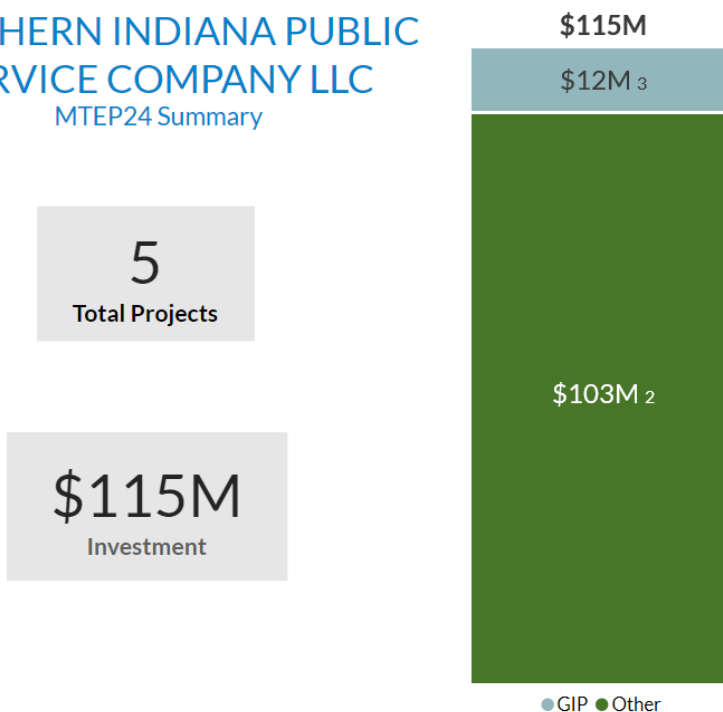
Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25402	Replace Petersburg 138 kV #4 Breaker	Age and Condition	5/28/2025	\$0.9
50095	Upgrade Stout CT - CT 4 and 5 Relaying	Local Reliability	9/30/2026	\$0.3
50096	Upgrade Stout CT - CT Bus Relaying	Local Reliability	9/30/2026	\$0.2

### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
50032	New Pike County Energy Storage 345 kV (R1021 & R1022)	1/15/2026	\$3.0

### 4.3.13 Northern Indiana Public Service Company (NIPSCO)

#### NORTHERN INDIANA PUBLIC SERVICE COMPANY LLC MTEP24 Summary



### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
*50089	Aetna Synchronous Condenser	Local Reliability	5/1/2024	\$91.0



Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
*50174	New Customer X 138 kV Substation	Load Growth	12/31/2026	\$12.0

\* Project studied through Expedited Project Review (EPR) process.

### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
24939	J1407 Network Upgrades	8/1/2025	\$5.4
25021	J1387 Network Upgrades	10/16/2025	\$1.1
25080	J1323 J1392 Network Upgrades	6/1/2025	\$5.4

### 4.3.14 Pioneer Transmission, LLC (PTx)

Pioneer Transmission, LLC and MISO are not recommending any new projects for MTEP24.

### 4.3.15 Prairie Power, Inc. (PPI)

#### PRAIRIE POWER, INC. MTEP24 Summary





## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
23373	New Industry-Ipava 69 kV Line	Local Reliability	12/31/2027	\$15.7
23374	New Babylon 138/69 kV Substation and Lines	Local Reliability	12/31/2027	\$18.3
23375	Replace Babylon 138/69 kV XFMR	Local Reliability	12/31/2029	\$2.6
23426	New Rushville-Ipava 69 kV Line	Local Reliability	12/31/2029	\$16.2
25315	New Forest City-St. David 69 kV Line	Local Reliability	12/31/2029	\$20.1
25316	New Plymouth-Macomb 69 kV Line	Local Reliability	12/31/2029	\$19.1
25318	Upgrade Winchester 138/69 kV Transformer	Age and Condition	12/31/2029	\$3.5
25450	Rebuild Breiner-Spring Lake Jct. 69 kV Line	Age and Condition	12/31/2027	\$5.5

### 4.3.16 Republic Transmission, LLC (RTx)

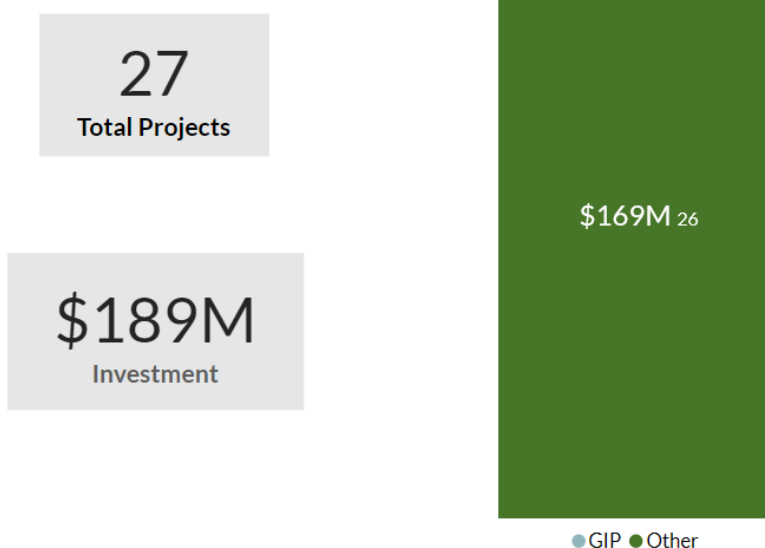
Republic Transmission and MISO are not recommending any new projects for MTEP24.



### 4.3.17 Southern Indiana Gas & Electric Company (SIGE)

## Southern Indiana Gas & Electric Company

MTEP24 Summary



### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25088	Givens 69/12 kV T1 Replacement	Age and Condition	4/1/2025	\$3.5
25089	New Harmony 69/12 kV T2 and CB's Replacement	Age and Condition	10/1/2025	\$5.3
25090	Northwest CB's Replacement	Age and Condition	10/17/2025	\$5.0
25144	Y52-3 Oakland City - Duke Oakland City Rebuild	Age and Condition	8/1/2024	\$3.9
25145	Lynnville 69 kV OCB Replacement	Age and Condition	11/1/2024	\$0.9
25146	Fairlawn 69 kV Switch Replacement	Age and Condition	12/1/2024	\$1.0
25147	Mead Johnson 69/12 kV Transformer Replacement	Age and Condition	12/31/2028	\$3.8
25149	County Line 69/12 kV T1 Replacement	Age and Condition	12/31/2025	\$3.0
25150	Y52-2 Mackey - Oakland City Rebuild	Age and Condition	12/31/2025	\$8.0
25151	Y67/Z78 Junction - Jasper South Rebuild	Age and Condition	12/31/2025	\$10.0
25152	Z99 AB Brown - Wolf Road Rebuild	Age and Condition	12/31/2025	\$8.5



Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25359	Louis Allis Switch Replacement	Age and Condition	12/31/2028	\$2.3
25393	Chrisney 69/12 kV T1 Replacement	Age and Condition	12/31/2026	\$4.0
25394	Midway 69/2.4 kV Transformer Replacement	Age and Condition	12/31/2028	\$2.0
25395	Oakland City 69/15 kV Xformer and CB Replacement	Age and Condition	12/31/2026	\$2.7
25397	Tepe Park 138/15 kV Transformer Addition	Age and Condition	12/31/2026	\$4.0
25403	Newtonville T3, T2 and CB's Replacement	Age and Condition	12/31/2026	\$18.5
25404	Winslow 69 kV CB Replacement	Age and Condition	12/31/2026	\$1.5
25406	Santa Claus Switch Replacement	Age and Condition	12/31/2028	\$1.5
25407	Angel Mounds CB and Switch Replacement	Age and Condition	12/31/2026	\$3.0
25408	Fort Branch 69 kV Capacitor Bank	Local Reliability	12/31/2025	\$3.0
25440	Vigo Coal 69/12 kV Xformer and CB Replacement	Age and Condition	12/31/2028	\$6.0
25441	Z91-2 Pigeon Creek - Heidelbach Rebuild	Age and Condition	12/31/2025	\$5.5
25442	Z91-1 NW - Pigeon Creek Rebuild	Age and Condition	12/31/2026	\$11.0
25443	Z84-1 Culley - Dubois Rebuild	Age and Condition	12/31/2027	\$47.5
25444	Y74 Azteca - VIP Pole Replacement	Age and Condition	12/31/2026	\$4.0

### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
25148	Posey Solar Gen Interconnection (J1308)	10/1/2024	\$20.0

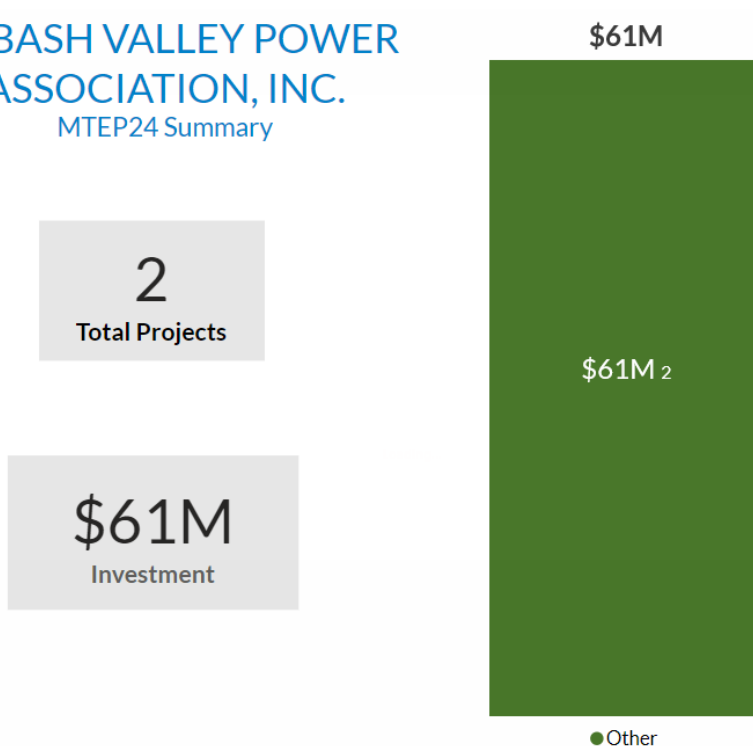
### 4.3.18 Southern Illinois Power Cooperative (SIPC)

Southern Illinois Power Cooperative and MISO are not recommending any new projects for MTEP24.



### 4.3.19 Wabash Valley Power Association, Inc. (WVPA)

#### WABASH VALLEY POWER ASSOCIATION, INC. MTEP24 Summary



#### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25284	Rebuild Salem Bulk to Seminary 69 kV Line T10	Age and Condition	12/31/2028	\$60.0
25290	Sprott 69/12 kV Substation	Load Growth	12/31/2027	\$1.2



## 4.4 Project Justifications – East Region

### East Region Overview

The MISO East Planning Region consists of six Transmission-Owners within Michigan. These Transmission Owners are:

ITC Transmission (ITCT)	Michigan Public Power Agency (MPPA)
Michigan Electric Transmission Co. (METC)	Michigan South Central Power Agency (MSCPA)
Wolverine Power Supply Cooperative Inc. (WPSC)	Lansing Board of Water & Light (LBWL)

The region contains 9710 circuit miles of transmission lines ranging from 120 kV to 345 kV. It also contains 1227 circuit miles of 69 kV sub-transmission system. The MISO East Region is interconnected with non-MISO systems: Hydro One Networks Inc. and American Electric Power to the east.

The 2024 Summer Peak planning model indicates the region contains 34 GW of generation. Installed generation capacity in the region consists mostly of coal, gas, and solar. Figure 4.4-1 shows the major load centers and generation pockets within the East Region. The load centers are typically found around larger cities in the region, i.e., Detroit, Lansing, and Grand Rapids. According to the 2024 Summer Peak planning model, the region's load is 22 GW.

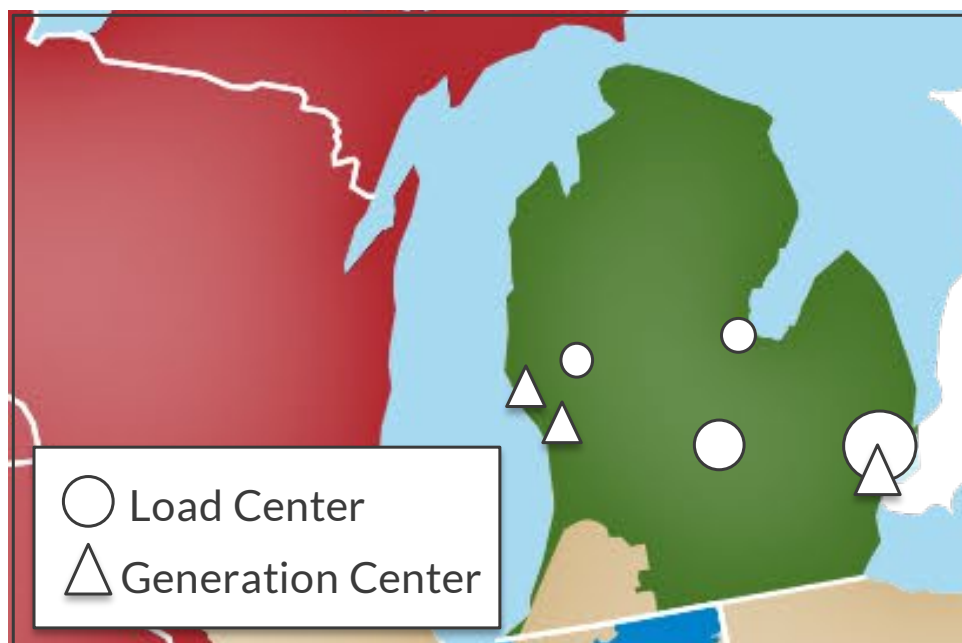
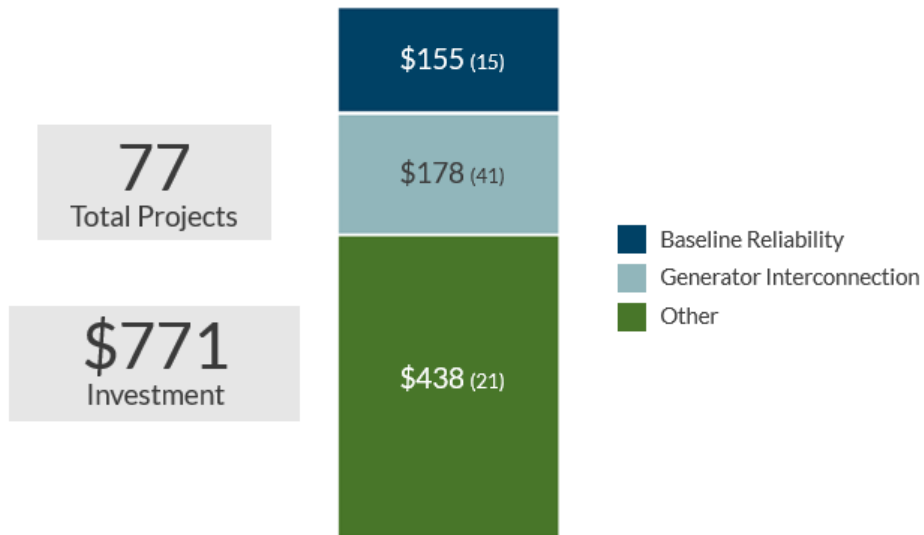


Figure 4.4-1: Generation and load centers in the East planning region.

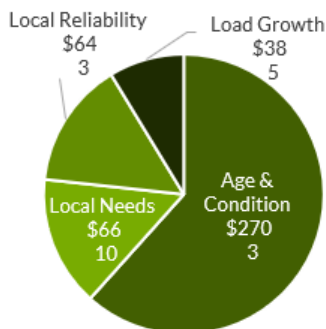


# East Planning Region Local MTEP24 Summary

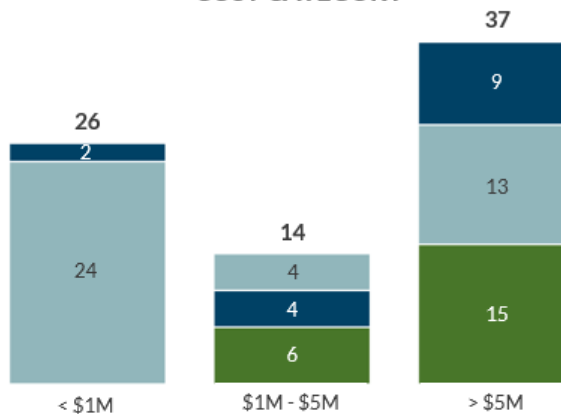
(Data as of August 27, 2024; \$M, # project count)



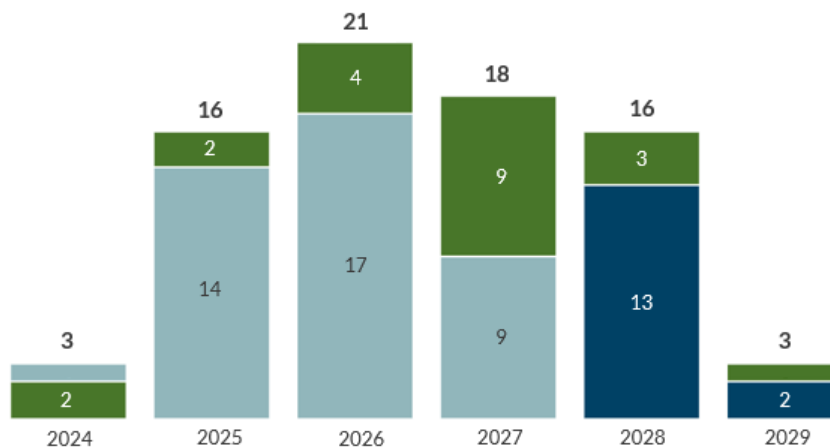
**BREAKDOWN OF OTHER PROJECTS BY COST**



**PROJECT COUNT BY COST CATEGORY**



**PROJECTS BY IN-SERVICE DATE**





The ten largest project investments in the MISO East region represent \$367 million (48%) of the \$771 million total recommended projects for the East region in the local MTEP24 portfolio, or 5% of the \$6.7 billion total recommended in the MISO footprint. The locations of these projects are shown in Figure 4.4-2. Projects that are blanket expenditures (relays, physical security, etc.) are excluded from this list.

## East Region Top 10 Local MTEP24 Projects

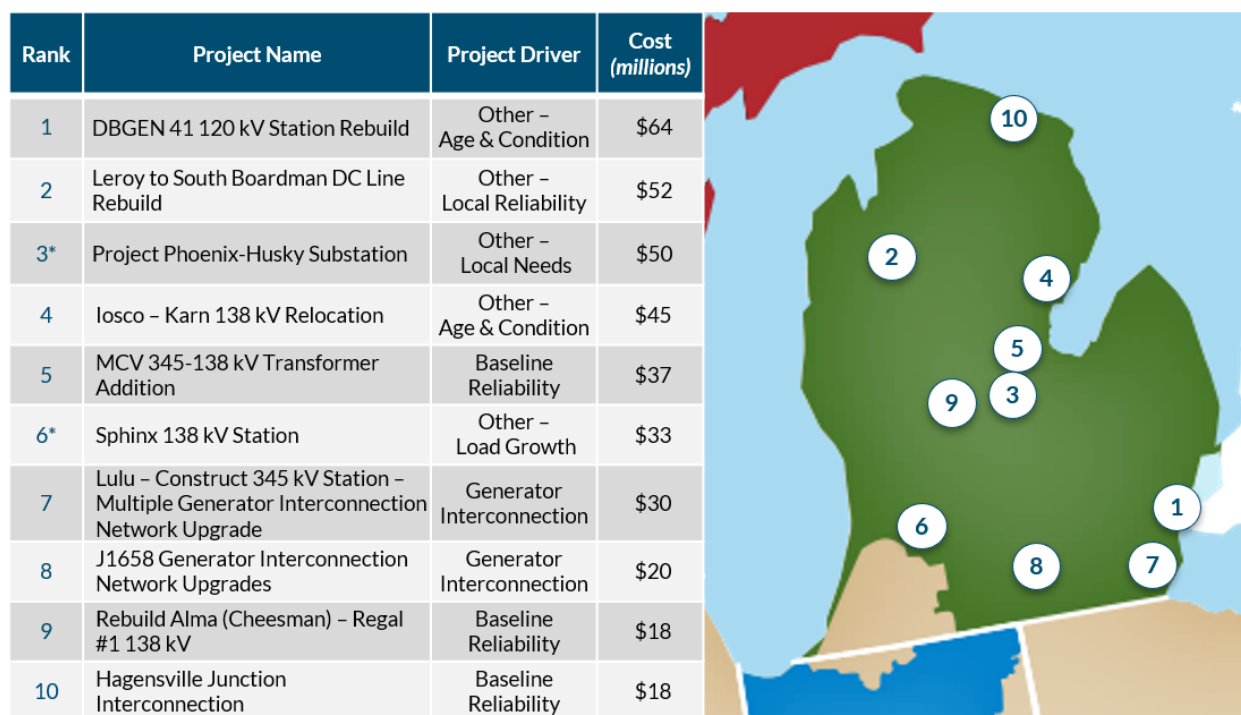
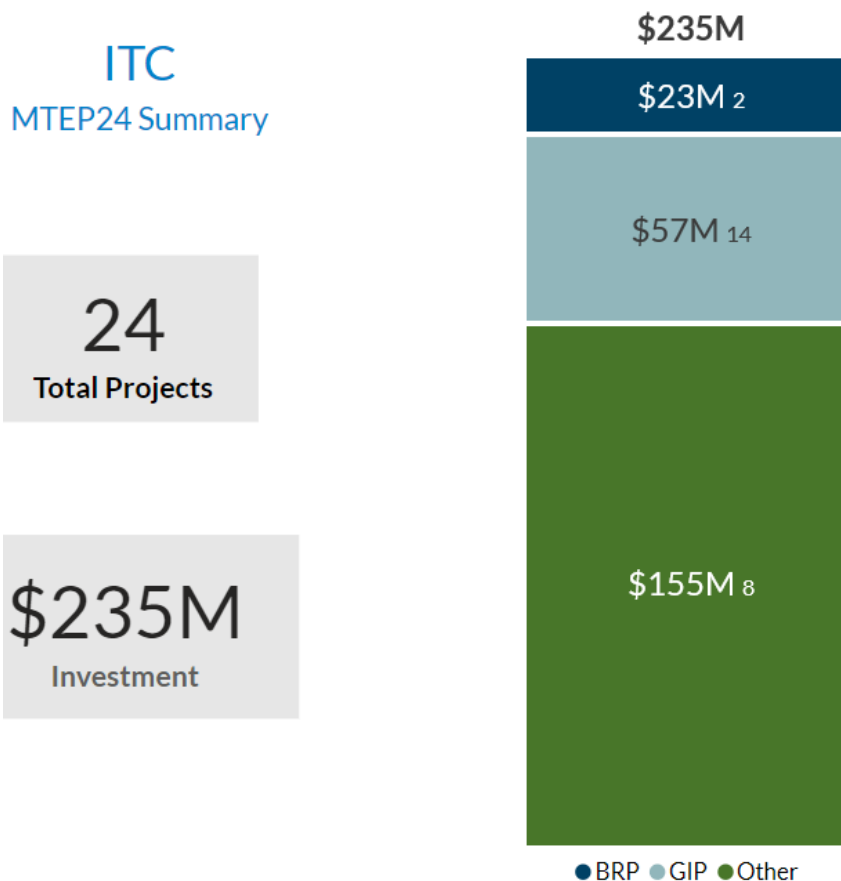


Figure 4.4-2: East region top ten projects by cost; \* represents project studied through Expedited Project Review (EPR) process (as of 8-27-2024).

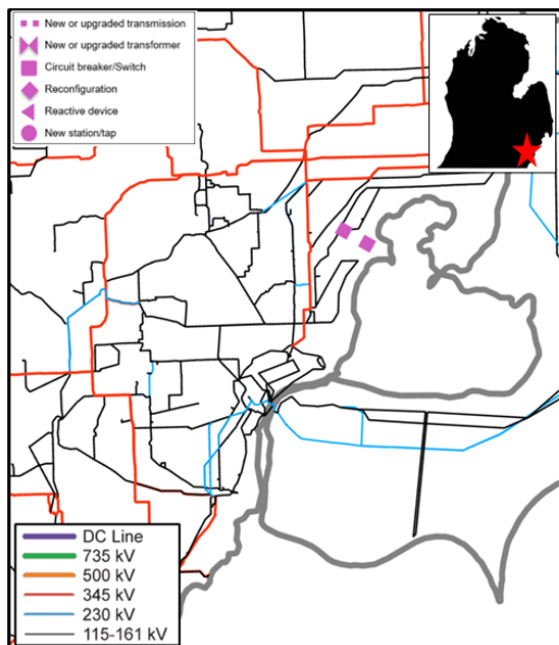


#### 4.4.1 ITC Transmission (ITCT)



#### Baseline Reliability Projects

ITCT 50060 – Bismarck – Macomb 120 kV Line



Project #	50060
Project Name	Bismarck - Macomb 120 kV Line
Project Type	BRP
Project Description	Construct a new 120 kV line (~6.7 miles) from Bismarck to Macomb. Approximately 3.9 miles of this new circuit will be using new 954 ACSR conductor, 2.7 miles of which will be strung on the vacant side of existing Lenox - Stephens 120 kV structures and the other 1.2 miles will be on new ROW. The remaining section from the west-to-east crossover point toward Macomb (2.8 miles) will utilize existing 795 ACSR conductor through undoing 6-wire on the Macomb - Stephens 120 kV circuit. This new 120 kV line will require installations of a new 120 kV breaker at Bismarck and Macomb stations.
System Needs	MISO identified various voltage and thermal violations around the Golf and Macomb areas in the MTEP23 study .
Estimated Cost	\$11,160,000
Expected ISD	6/1/28
Target Appendix	A

Figure 4.4.1-1: P50060 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The Benson – Stephens #1 120 kV line is overloaded for NERC defined P6 contingencies. Voltage results are also found in the Golf area buses for a P6 contingency. Post project values are within limits.

**Alternatives Considered:** An alternative project was studied but did not resolve all issues to the standards of Local Planning Criteria, therefore MISO recommends the original version.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P2	[ITCT] Benson – [ITCT] Stephens #1 120 kV line	249	103	61
P6	[ITCT] Benson – [ITCT] Stephens #1 120 kV line	249	110	55
P6	[ITCT] Houston Tap 2 – [ITCT] St. Clair 120 kV line	204	99	32

Table 4.4.1-1: P50060 Thermal loading drivers.

Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
P6	[ITCT] Golf Station	0.97	0.90	0.99

Table 4.4.1-2: P50060 Voltage loading drivers.



## ITCT 25363 – ITCT SPOF Blanket



Project #	25363
Project Name	ITCT SPOF Blanket
Project Type	BRP
Project Description	Blanket for projects to address locations where single point of failure (SPOF) are identified that cause system issues.
System Needs	System violations throughout ITCT system that are caused by single point of failure (SPOF) contingencies.
Estimated Cost	\$12,100,000
Expected ISD	6/1/29
Target Appendix	A

Figure 4.4.1-2: P25363 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** Since the implementation of TPL-001-5.1, many ITCT BES substations have been identified as having single points of failure (SPOF) violations in MISO steady-state and dynamic analysis and ITCT short-circuit analysis. This blanket project addresses 29 facilities with these SPOFs prior to the implementation deadline of the standard. The highest observed thermal and voltage violations are listed below.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P5	[ITCT] Scott - [ITCT] B3N 120 kV	456	146	Project upgrade invalidates the single point of failure contingency impact on this line

Table 4.4.1-3: P25363 Thermal loading drivers.



Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
P5	[ITCT] State 1 120 kV – [ITCT] State 2 120 kV	0.92	0.89	Project upgrade invalidates the single point of failure contingency impact on this line

Table 4.4.1-4: P25363 Voltage loading drivers.

### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
24998	Pontiac 345 kV Station - Extend Buses and Add A Row	Local Needs	6/1/2027	\$8.3
25208	Brownstown #304 345-120 kV Transformer Replacement	Age and Condition	12/31/2027	\$6.6
25218	Sterling #201 230-120 kV Transformer Replacement	Age and Condition	12/31/2027	\$8.0
25228	DBGEN 41 120 kV Station Rebuild	Age and Condition	3/31/2029	\$64.2
25364	ITCT Customer Interconnections - 2027	Load Growth	12/31/2027	\$2.5
25365	ITCT Line Relocation - 2024	Local Needs	12/31/2024	\$2.5
25366	ITCTransmission Asset Replacement Program - 2026	Age and Condition	12/31/2026	\$60.7
25478	ITCT Line Relocation - 2025	Local Needs	12/31/2025	\$2.5

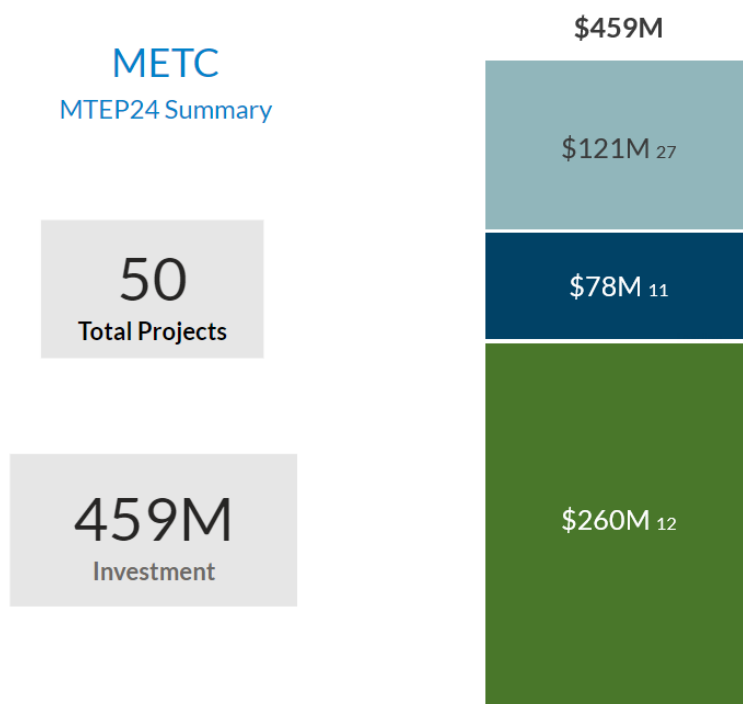
### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
24450	J1516 Generator Interconnection Network Upgrades	8/3/2026	\$0.9
24451	J1516 Generator Interconnection TOIF	8/3/2026	\$0.0
24461	Grassmere - J1525 Gen Network Upgrade	11/17/2025	\$7.6
24462	Grassmere - J1525 TOIF - Install Position CQ and switch CQA	11/17/2025	\$0.0
24463	Greenwood-Rapson#1 - J1557 Generator Interconnection (Cribbins) - Network Upgrade	7/1/2027	\$14.0



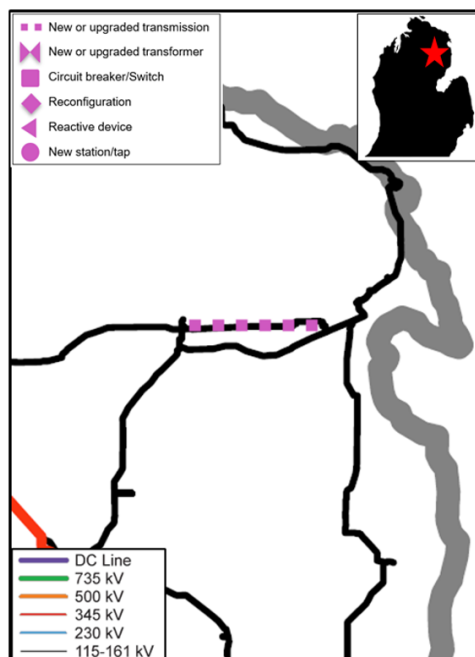
Project ID	Project Name	ISD	Estimated Cost (\$M)
24494	Cribbins-J1557 TOIF- Install position CQ and switch CQA	7/1/2027	\$0.0
24533	J1526 Generator Interconnection Network Upgrades	5/13/2026	\$1.4
24534	J1526 Generator Interconnection TOIF	5/13/2026	\$0.0
24553	J1659 Generator Interconnection Network Upgrades	4/1/2026	\$0.9
24554	J1659 Generator Interconnection TOIF	4/1/2026	\$0.0
24574	J1664 Generator Interconnection Network Upgrades	1/1/2027	\$2.0
24693	Milan - J799 Amended Generation Interconnection - TOIF	12/31/2024	\$0.0
25082	J1664 Generator Interconnection TOIF	1/1/2027	\$0.0
25223	Lulu - Construct 345 kV Station - Multiple Generator Interconnect Network Upgrade	6/11/2027	\$29.9

#### 4.4.2 Michigan Electric Transmission Co. (METC)



#### Baseline Reliability Projects

##### METC 14344 – Airport – Hillman Tap 138 kV Sag Remediation



Project #	14344
Project Name	Airport - Hillman Tap 138 kV Sag Remediation
Project Type	BRP
Project Description	Remediate the sag limit on ~17.0 miles of 266 ACSR conductor of the ~21.3 mile-long Airport - Hillman Tap 138 kV section of the Airport - Mio 138 kV line to at least the planned target summer normal/summer emergency rating of 133 MVA/556 Amps.
System Needs	The Airport - Hillman Tap 138 kV section of the Airport - Mio 138 kV line is projected to become overloaded for P6 contingencies.
Estimated Cost	\$1,061,250
Expected ISD	6/1/28
Target Appendix	A

Figure 4.4.2-1: P14344 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [METC] Hillman Junction – [WPSC] Airport section #1 138 kV line is approaching overload to ninety-six (96%) percent in year 2029 for a NERC defined category P5 contingency event. It becomes overloaded to one hundred twenty-seven (127%) percent in year 2029 for NERC defined category P6 contingency events. Upgrading [METC] Hillman Junction - [WPSC] Airport section #1 138 kV line will increase the summer emergency rating of the line from 76 MVA to 133 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P5	[METC] Hillman Jct. - [WPSC] Airport 1 138 kV line	76	96	22
P6	[METC] Hillman Jct. - [WPSC] Airport 1 138 kV line	76	127	61

Table 4.4.2-1: P14344 Thermal loading drivers.



## METC 15831 - Alma - Regal #2 138 kV Rebuild

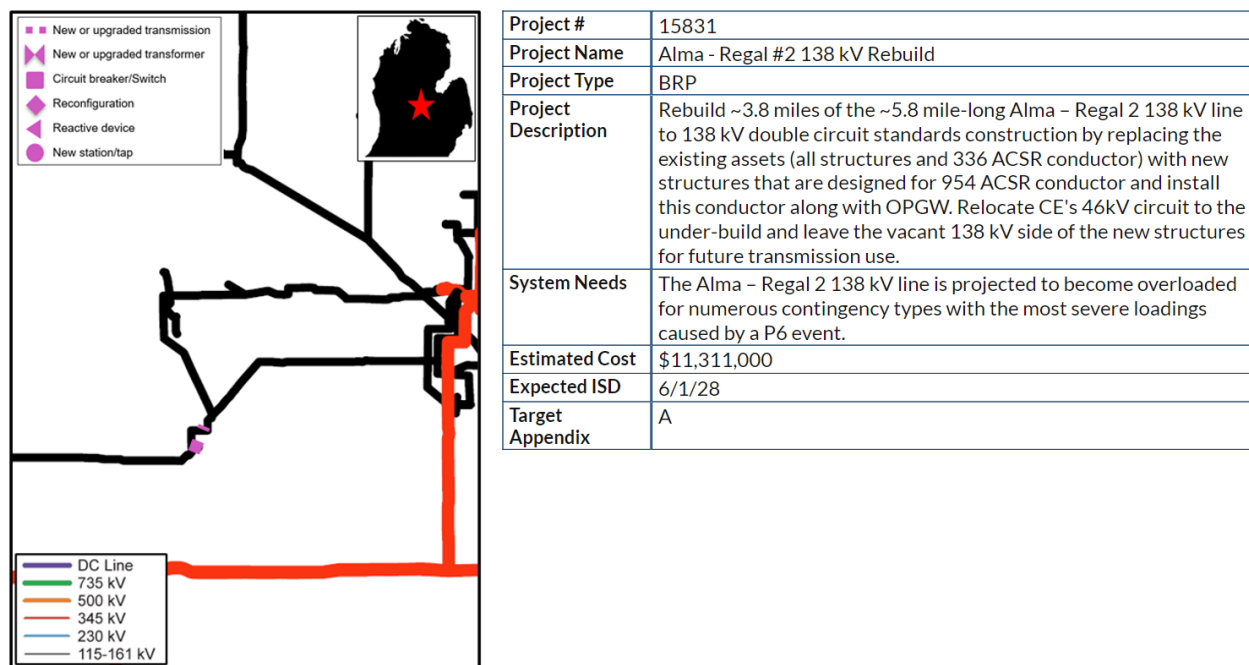


Figure 4.4.2-2: P15831 Geographic transmission map of project area and MTEP Portal project details.

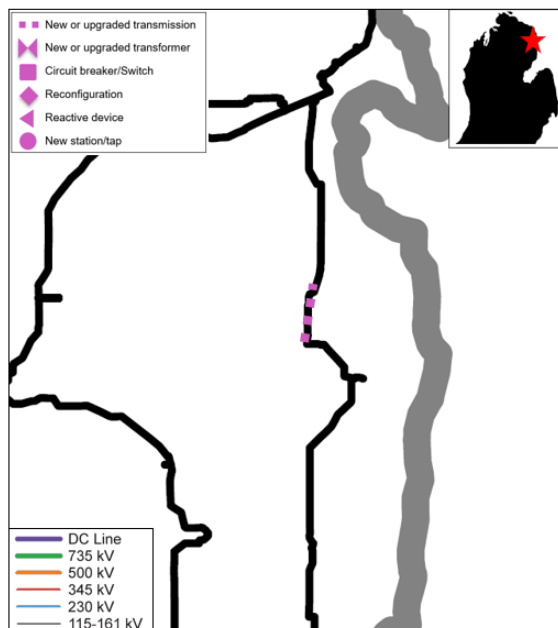
**Project Justification:** The [METC] Alma - [METC] Regal bus section #2 138 kV line becomes nearly overloaded to ninety-eight (98%) percent in year 2029 for a NERC defined category P2 contingency event. It becomes overloaded to one hundred twelve (112%) percent in year 2029 for NERC defined category P6 events. Upgrading [METC] Alma - [METC] Regal bus section #2 138 kV line will increase the summer emergency rating of the line from 171 MVA to 234 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P2	[METC] Alma - [METC] Regal 2 138 kV line	171	98	73
P6	[METC] Alma - [METC] Regal 2 138 kV line	171	112	83

Table 4.4.2-2: P15831 Thermal loading drivers.



## METC 18072 – Sag Remediation Hubbard Lake – Spruce Road 138 kV



Project #	18072
Project Name	Sag Remediation Hubbard Lake – Spruce Road 138 kV
Project Type	BRP
Project Description	Remediate the sag on the Hubbard Lake – Spruce Road section of the Alpena – Iosco 138kV line to at least 124 MVA for summer emergency rating.
System Needs	The Hubbard Lake – Spruce Road section of the Alpena – Iosco 138kV circuit is projected to overload for P6 contingency.
Estimated Cost	\$700,000
Expected ISD	6/1/28
Target Appendix	A

Figure 4.4.2-3: P18072 Geographic transmission map of project area and MTEP Portal project details.

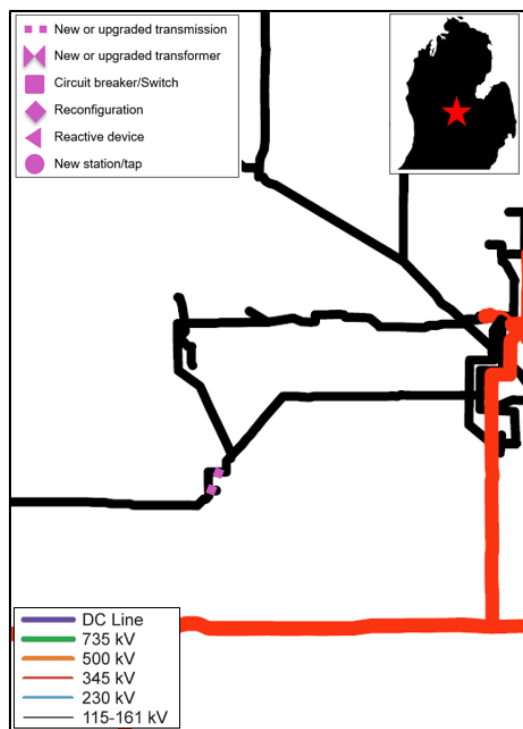
**Project Justification:** The [METC] Spruce Road – [METC] Hubbard Lake Junction 138 kV line becomes overloaded to one hundred six (106%) percent in year 2029 for NERC defined category P6 contingency events. Upgrading [METC] Spruce Road – [METC] Hubbard Lake Junction 138 kV line will increase the summer emergency rating of the line from 100 MVA to 124 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P6	[METC] Spruce Road – [METC] Hubbard Lake Jct. #1 138 kV line	100	106	68

Table 4.4.2-3: P18072 Thermal loading drivers.



## METC 20017 – Rebuild Alma (Cheesman) – Regal #1 138 kV



Project #	20017
Project Name	Rebuild Alma (Cheesman) - Regal #1 138 kV
Project Type	BRP
Project Description	ITC is to rebuild approximately 1.34 miles of the Alma (Cheesman) – Regal #1 138kV with 954 ACSR 138kV double circuit standards with OPGW and upgrade terminal station equipment at Regal.
System Needs	Alma (Cheesman) to Regal #1 138 kV line is projected to be overloaded for category P1, P2, and P6 contingencies in light load and shoulder peak conditions. The overloaded equipment identified on this circuit is the overhead conductor.
Estimated Cost	\$18,031,000
Expected ISD	6/1/28
Target Appendix	A

Figure 4.4.2-4: P20017 Geographic transmission map of project area and MTEP Portal project details.

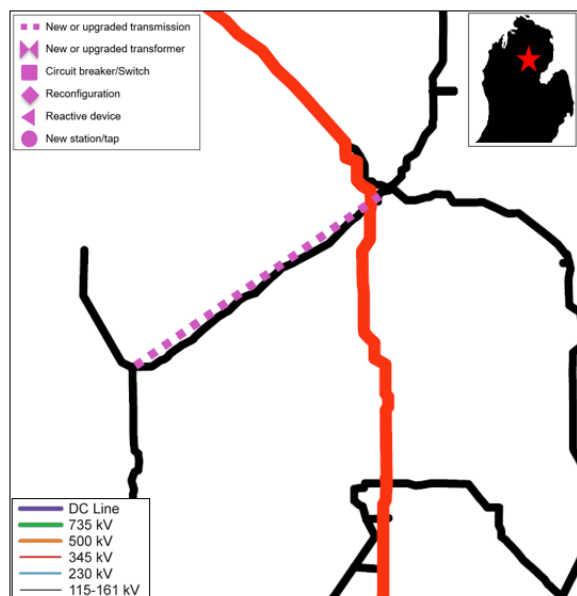
**Project Justification:** The [METC] Regal – [METC] Cheesman Junction #1 138 kV line becomes overloaded to one hundred two (102%) percent in year 2029 for a NERC defined category P2 contingency event. It also becomes overloaded to one hundred eleven (111%) percent in year 2029 for NERC defined category P6 contingency events. Upgrading [METC] Regal – [METC] Cheesman Junction #1 138 kV line will increase the summer emergency rating of the line from 171 MVA to 332 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P2	[METC] Regal – [METC] Cheesman Jct. 138 kV line	76	102	54
P6	[METC] Regal – [METC] Cheesman Jct. 138 kV line	76	111	58

Table 4.4.2-4: P20017 Thermal loading drivers.



## METC 20034 – Sag Remediate Higgins – Mio Dam 138 kV



Project #	20034
Project Name	Sag Remediate Higgins - Mio Dam 138 kV
Project Type	BRP
Project Description	The proposed solution is to remediate sag limit on the 266.8 ACSR on the Higgins – Mio Dam 138kV line up to the conductor's limit.
System Needs	Higgins to Mio Dam 138 kV line is projected to be overloaded for category P3 and P6 contingencies in the light load case.
Estimated Cost	\$2,800,000
Expected ISD	6/1/28
Target Appendix	A

Figure 4.4.2-5: P20034 Geographic transmission map of project area and MTEP Portal project details.

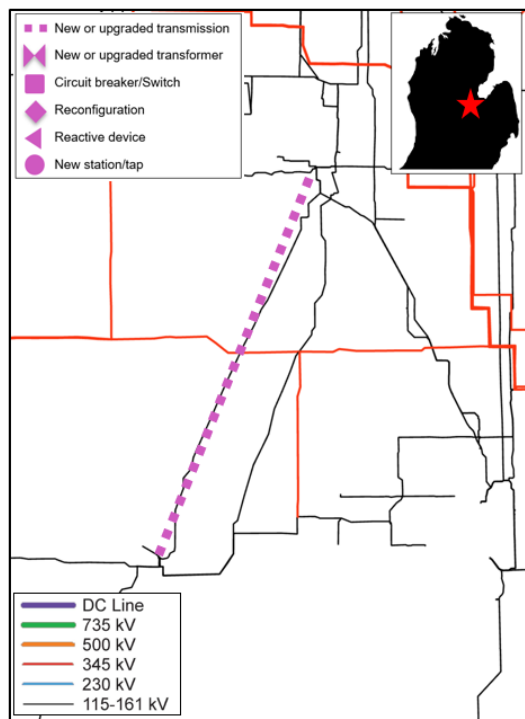
**Project Justification:** The [METC] Ryno Junction – [METC] Higgins #1 138 kV line becomes overloaded to one hundred six (106%) percent in year 2034 for NERC defined category P6 contingency events. Upgrading [METC] Ryno Junction – [METC] Higgins #1 138 kV line will increase the summer emergency rating of the line from 109 MVA to 147 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P6	[METC] Ryno Jct. – [METC] Higgins 2 138 kV line	109	106	74

Table 4.4.2-5: P20034 Thermal loading drivers.



## METC 20119 – Sag Remediate Claremont – Cornell #2 138 kV



Project #	20119
Project Name	Sag Remediate Claremont - Cornell #2 138 kV
Project Type	BRP
Project Description	METC is to raise the sag limit on the 477 ACSR to 257F and 795 ACSR to 178F on the Bell Road - Cornell section of the Claremont - Cornell #2 138 kV Line
System Needs	Claremont to Cornell #2 138 kV line is projected to be overloaded for category P6 contingencies in the light load, off-peak cases, and peak cases.
Estimated Cost	\$1,263,000
Expected ISD	6/1/28
Target Appendix	A

Figure 4.4.2-6: P20119 Geographic transmission map of project area and MTEP Portal project details.

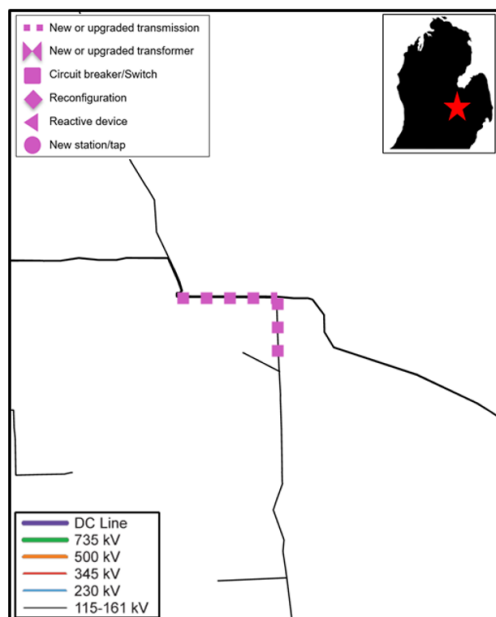
**Project Justification:** The [METC] North Corunna Junction – [METC] Cornell 138 kV line 2 becomes overloaded to one hundred twenty-four (124%) percent in year 2029 for a NERC defined category P7 contingency event. It also becomes overloaded to one hundred twenty-seven (127%) percent in year 2029 for NERC defined category P6 contingency events. Upgrading [METC] North Corunna Junction – [METC] Cornell 138 kV line 2 will increase the summer emergency rating of the line from 152 MVA to 217 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P7	[METC] North Corunna Jct. - [METC] Cornell 2 138 kV line	152	124	88
P6	[METC] North Corunna Jct. - [METC] Cornell 2 138 kV line	152	127	91

Table 4.4.2-6: P20119 Thermal loading drivers.



## METC 22015 – Blackstone – Leoni #1 and #2 138 kV Rebuild



Project #	22015
Project Name	Blackstone – Leoni #1 and #2 138 kV Rebuild
Project Type	BRP
Project Description	Rebuild approximately 4.2 miles of circuits #1 and #2 from Blackstone 138 kV to Leoni 138 kV to 954 ACSR conductor using 138 kV double- circuit structures. Install OPGW. Upgrade station equipment at Blackstone to at least 431 MVA (1804 Amps) summer emergency rating. The Blackstone – Leoni #2 138 kV circuit currently shares towers with both the Blackstone – Leoni #1 and #3 138 kV circuits. This project moves the Blackstone – Leoni #2 138 kV circuit entirely on to the Blackstone – Leoni #1 138 kV double-circuit structures.
System Needs	Blackstone – Leoni #1, #2 and #3 138 kV lines are projected to be overloaded for P6 and P7 contingency involving the loss of the other two circuits between Blackstone and Leoni during shoulder peak and light load conditions.
Estimated Cost	\$9,840,000
Expected ISD	6/1/28
Target Appendix	A

Figure 4.4.2-7: P22015 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [METC] Blackstone – [METC] Leoni 138 kV line 1 becomes overloaded to one hundred twenty-five (125%) percent in year 2029 for both NERC defined category P7 and P6 contingency events. Upgrading [METC] Blackstone – [METC] Leoni 138 kV line 1 will increase the summer emergency rating of the line from 263 MVA to 332 MVA.

The [METC] Leoni – [METC] Blackstone 138 kV line 2 becomes overloaded to one hundred twenty (120%) percent in year 2029 for NERC defined category P6 contingency events. Upgrading [METC] Leoni – [METC] Blackstone 138 kV line 2 will increase the summer emergency rating of the line from 263 MVA to 332 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P7	[METC] Blackstone – [METC] Leoni 1 138 kV line	263	125	99
P6	[METC] Blackstone – [METC] Leoni 1 138 kV line	263	125	97
P6	[METC] Blackstone – [METC] Leoni 2 138 kV line	263	120	97

Table 4.4.2-7: P22015 Thermal loading drivers.



## METC 22018 – Blackstone – Leoni #3 138 kV Rebuild

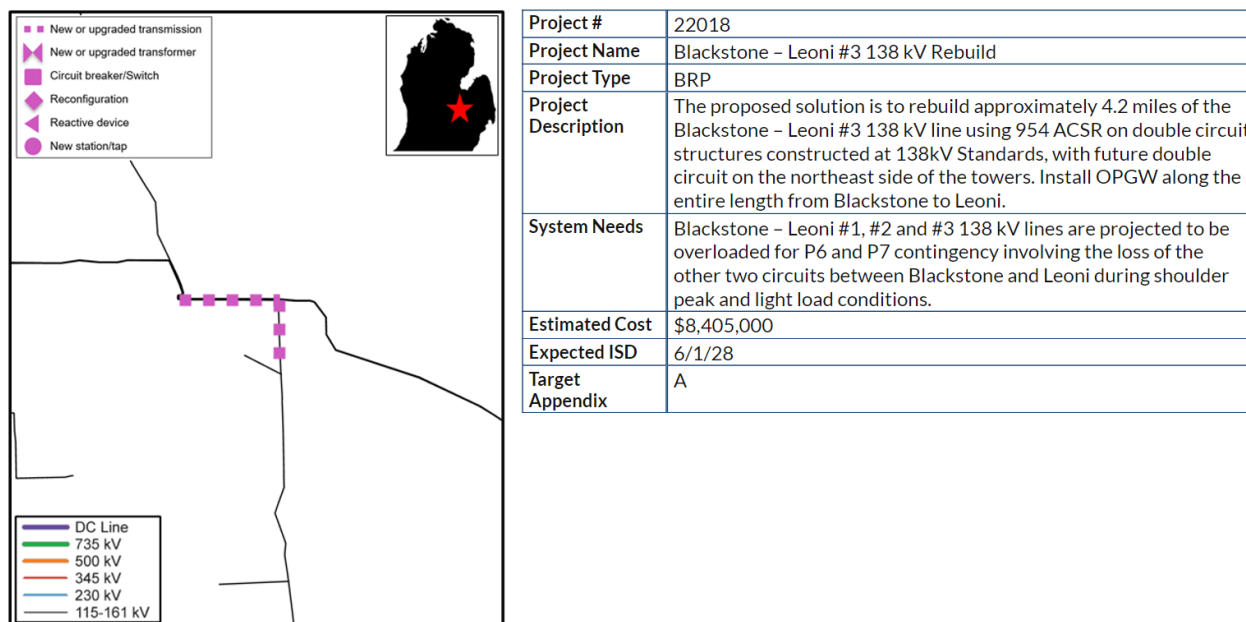


Figure 4.4.2-8: P22018 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [METC] Leoni – [METC] Blackstone 138 kV line 3 becomes overloaded to one hundred twenty-three (123%) percent in year 2029 for NERC defined P7 and P6 contingency events. Rebuilding [METC] Leoni – [METC] Blackstone 138 kV line 3 will increase the summer emergency ratings of the line from 263 MVA to 332 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P7	[METC] Leoni – [METC] Blackstone 138 kV line 3	236	123	97
P6	[METC] Leoni – [METC] Blackstone 138 kV line 3	263	123	97

Table 4.4.2-8: P22018 Thermal loading drivers.



## METC 25195 – MCV 345-138 kV Transformer Addition

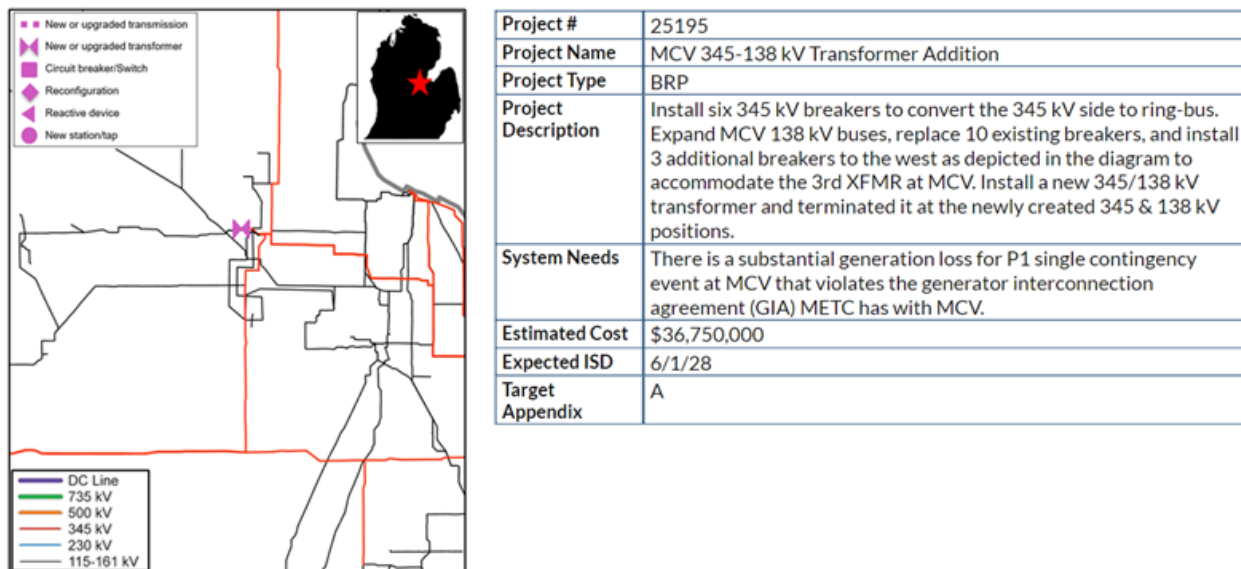


Figure 4.4.2-9: P25195 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [METC] MCV Transformer #1 and #2 show angular instability for NERC defined category P1 contingency events in MISO’s dynamic analysis. Adding a third transformer and reconfiguring the station mitigates these violations.



## METC 25216 – Gaines – Caledonia Jct. 138 kV Sag Remediation

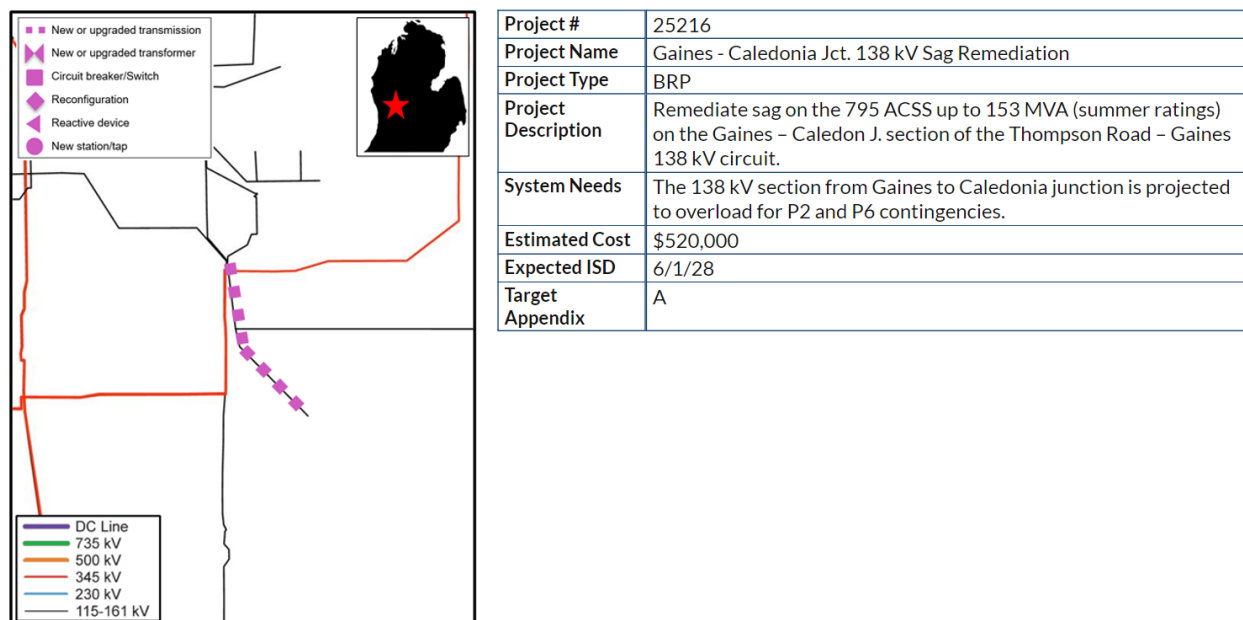


Figure 4.4.2-10: P25216 Geographic transmission map of project area and MTEP Portal project details.

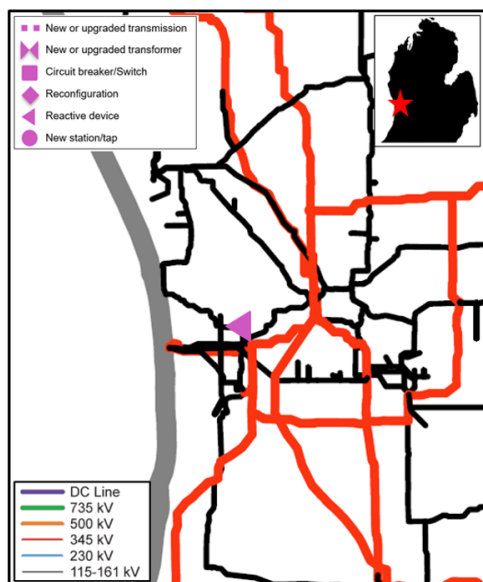
**Project Justification:** The [METC] Gaines – [METC] Caledonia Junction 138 kV line becomes overloaded to one hundred six (106%) percent in year 2029 for NERC defined category P7 and P6 contingency events. Upgrading [METC] Gaines – [METC] Caledonia Junction 138 kV line will increase the summer emergency rating from 107 MVA to 153 MVA.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P7	[METC] Gaines – [METC] Caledonia Jct. 138 kV line	107	106	76
P6	[METC] Gaines – [METC] Caledonia Jct. 138 kV line	107	106	76

Table 4.4.2-9: P25216 Thermal loading drivers.



## METC 25217 – Blendon 138 kV Capacitor



Project #	25217
Project Name	Blendon 138 KV Capacitor
Project Type	BRP
Project Description	Install (1) 33.33 MVAR capacitor bank with associated 138kV, 40 kA synchronous breakers and disconnect switch at the Blendon 138kV substation. The proposed capacitor will be connected to bus 40 and Transformer 1 will be moved to Bus 50. Relocate the existing Blendon-Campbell 138kV line termination from bus 30 to the bus 60. Also, Relocate the existing Blendon-Fairview 138kV line termination from bus 60 to the section 30 bus.
System Needs	Low voltage is projected to occur at Blendon 138kV buses for P6 or P23 contingencies. The low voltage violations were identified in the 2025, 2028 and 2033, peak and off-peak load models.
Estimated Cost	\$4,260,000
Expected ISD	6/1/28
Target Appendix	A

Figure 4.4.2-11: P25217 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The Blendon 138 kV bus has undervoltage issues of 0.90 p.u. in year 2034 for both NERC defined category P2 and P6 contingency events. Adding a capacitor at the Blendon 138 kV bus will provide voltage support.

Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
P2	[METC] Blendon 138 kV bus	0.92	0.90	0.99
P6	[METC] Blendon 138 kV bus	0.92	0.90	0.94

Table 4.4.2-10: P25217 Voltage loading drivers.



## METC 25275 – METC SPOF Blanket



Project #	25275
Project Name	METC SPOF Blanket
Project Type	BRP
Project Description	Blanket for projects to address locations where single point of failure (SPOF) are identified that cause system issues.
System Needs	System violations throughout METC system that are caused by single point of failure (SPOF) contingencies.
Estimated Cost	\$19,500,000
Expected ISD	6/1/29
Target Appendix	A

Figure 4.4.2-12: 25275 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** Since the implementation of TPL-001-5.1, many METC BES substations have been identified as having single points of failure (SPOF) violations in MISO steady-state and dynamic analysis and METC short-circuit analysis. This blanket project addresses 35 facilities with these SPOFs prior to the implementation deadline of the standard. The highest observed thermal and voltage violations are listed below.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P5	[METC] Long Rapids – [METC] Rockport 138 kV line	92	132	Project upgrade invalidates the single point of failure contingency impact on this line

Table 4.4.2-11: P25275 Thermal loading drivers.



Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
P5	[METC] Ellis Jct. 138 kV bus	0.92	0.90	Project upgrade invalidates the single point of failure contingency impact on this bus

Table 4.4.2-12: P25275 Voltage loading drivers.

## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
21968	Delaney 138 kV Station Rebuild	Age and Condition	6/1/2027	\$8.6
25198	Port Calcite 138 kV Station Rebuild	Local Reliability	6/1/2028	\$9.8
25230	Manning #2 345-138 kV Transformer Replacement	Age and Condition	12/31/2027	\$7.1
25277	METC Customer Interconnections - 2027	Load Growth	12/31/2027	\$2.5
25278	METC Line Relocation - 2024	Local Reliability	12/31/2024	\$2.5
25327	METC Asset Replacement Program - 2026	Age and Condition	12/31/2026	\$54.0
25500	METC Line Relocation - 2025	Local Needs	12/31/2025	\$2.5
25522	Oakland 138 kV Station Rebuild	Age and Condition	6/1/2027	\$8.3
*50038	Project Phoenix-Husky Substation	Local Needs	8/19/2026	\$50.3
**50121	Iosco - Karn 138 kV Relocation (Alternative)	Age and Condition	6/1/2028	\$45.1
*50151	Sphinx 138 kV Station	Load Growth	9/1/2027	\$32.8

\* Project studied through Expedited Project Review (EPR) process; \*\* Project included an original project (50064 Iosco-Karn 138 kV Rebuild) which was evaluated and not selected due to cost, therefore MISO recommends the alternative project as listed in the table above.

## Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
24440	Van Tyle - J1603 NU - Install breaker 4B7 and switches 4M5 and 4B3	8/1/2025	\$1.1



Project ID	Project Name	ISD	Estimated Cost (\$M)
24442	Van Tyle-J1603 TOIF-Install position BM4 and switch 177	8/1/2025	\$0.0
24443	Tallmadge-Argenta - J1663 Generator Interconnection (Gordon) - Network Upgrade	5/1/2026	\$14.8
24444	Barton Lake-Batavia - J1550 Generator Interconnection (Dorrance) TOIF	5/1/2025	\$0.0
24458	Kenowa - J1527 TOIF - Install position FH35 and switch 177	12/31/2026	\$0.0
24477	Gaines - Thompson Road 138 kV - J1292 GIA (Peddler) TOIF	9/29/2027	\$0.0
24478	Kenowa - J1527 Gen Network Upgrade	4/1/2026	\$5.6
24479	Gordon-J1663 TOIF-Install position RH29 and switch 177	5/1/2026	\$0.0
24515	J1553 Generator Interconnection TOIF	5/30/2025	\$0.0
24516	J1571 Generator Interconnection Network Upgrades	12/31/2026	\$8.6
24535	J1553 Generator Interconnection Network Upgrades	5/30/2025	\$6.2
24536	J1571 Generator Interconnection TOIF	12/31/2026	\$0.0
24537	J1635 Generator Interconnection Network Upgrades	4/3/2025	\$9.6
24538	J1635 Generator Interconnection TOIF	4/1/2025	\$0.0
24556	J1586 Generator Interconnection Network Upgrades	1/21/2027	\$14.5
24557	J1586 Generator Interconnection TOIF	12/31/2026	\$0.0
24558	J1658 Generator Interconnection Network Upgrades	2/2/2026	\$19.7
24559	J1658 Generator Interconnection TOIF	12/31/2025	\$0.0
24560	J1614 Generator Interconnection Network Upgrades	3/3/2026	\$11.8
24561	J1614 Generator Interconnection TOIF	12/31/2025	\$0.0
25194	Cronk-Moore Road Rebuild & Station Equipment Upgrades (J1550, J1635, J1658) - Network Upgrade	2/2/2026	\$11.3
25196	Beecher-Dowling Junction Sag Remediation (J1550, J1635, J1658) - Network Upgrade	9/30/2025	\$0.3
25209	Battle Creek-Oneida and Argenta-Tompkins Line Upgrades (J1586) - Network Upgrade	2/1/2027	\$16.2
25210	Replace Moore Road WM33 Trainer (J1658) - Network Upgrade	1/30/2026	\$0.0
25227	Dowling Junction-Knowles Sag Remediation (J1658) - Network Upgrade	3/3/2025	\$1.1
25244	Morocco - Replace RH34 Relaying - Multiple Generator Network Upgrade	6/11/2027	\$0.3

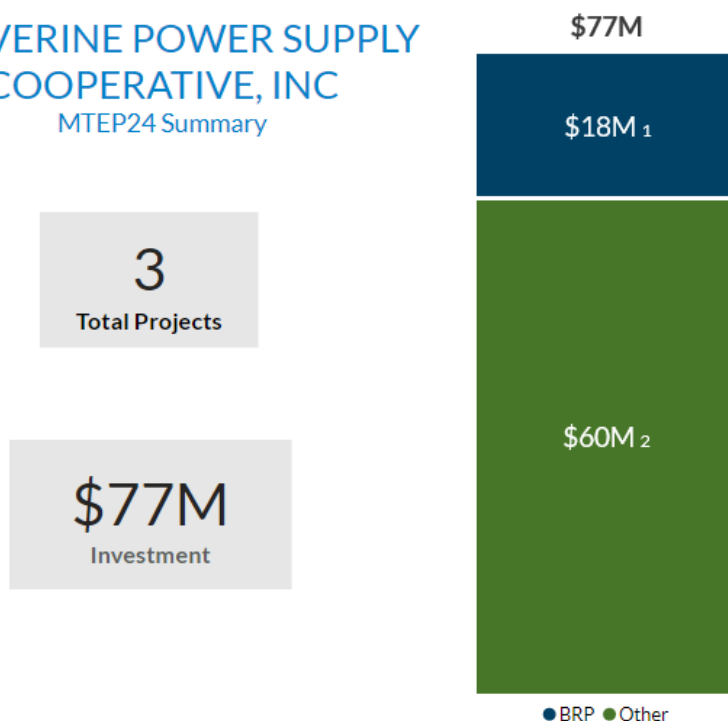


Project ID	Project Name	ISD	Estimated Cost (\$M)
25245	Coldwater-Ash Road Junction Sag Remediation (J1550) - Network Upgrade	10/31/2025	\$0.3

#### 4.4.3 Wolverine Power Supply Cooperative Inc. (WPSC)

### WOLVERINE POWER SUPPLY COOPERATIVE, INC

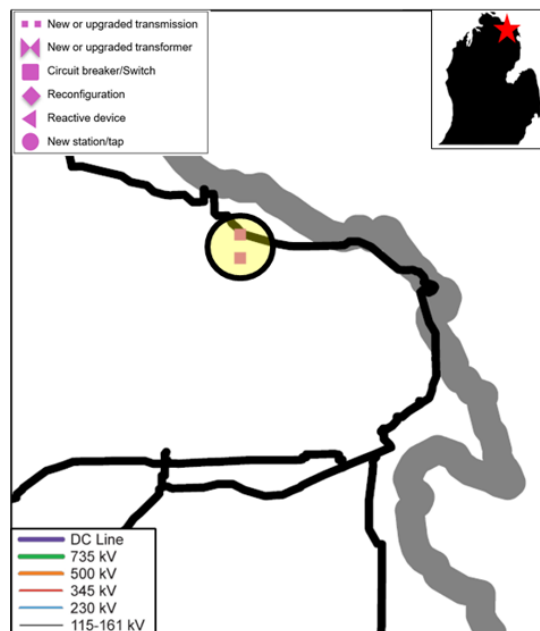
MTEP24 Summary





## Baseline Reliability Projects

### WPSC 50098 – Hagensville Junction Interconnection



Project #	50098
Project Name	Hagensville Junction Interconnection
Project Type	BRP
Project Description	Interconnect Wolverine's Hagensville Junction with METC's Rockport to Port Calcite line.
System Needs	Voltage support of Northeast Michigan for P6 contingencies as observed in MTEP23 with further integration of Wolverine's system to METC's system.
Estimated Cost	\$17,550,000
Expected ISD	12/31/28
Target Appendix	A

Figure 4.4.3-1: P50098 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [METC] Long Rapids – [METC] Rockport 138 kV line becomes overloaded to one hundred eighteen (118%) percent in year 2029 for a NERC defined category P6 contingency event. This project will provide an additional path for power flow and reduce loading on the nearby lines.

The [METC] Grand Lake 138 kV bus is projected to have an under-voltage level of 0.90 p.u. in year 2029 for NERC defined category P6-contingencies. The [METC] Rockport 138 kV bus is projected to have an under-voltage level of 0.91 p.u. in year 2029 for NERC defined category P6-contingencies. The [METC] Hagensville Junction 138 kV bus is projected to have an under-voltage level of 0.91 p.u. in year 2029 for NERC defined category P6 contingency events. The additional Hagensville Junction 138 kV line will provide voltage support.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P6	[METC] Long Rapids – [METC] Rockport 138 kV	133	118	78

Table 4.4.3-1: P50098 Thermal loading drivers.



Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
P6	[METC] Grand Lake 138 kV	0.92	0.90	0.94
P6	[METC] Rockport 138 kV	0.92	0.91	0.94
P6	[METC] Hagensville Jct. 138 kV	0.92	0.91	0.94

Table 4.4.3-2: P50098 Voltage loading drivers.

## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
21786	Vestaburg 69 kV Relocation	Age and Condition	12/31/2026	\$7.5
25191	Leroy to South Boardman DC Line Rebuild	Local Reliability	12/31/2028	\$52.1

### 4.4.4 Michigan Public Power Agency (MPPA)

Michigan Public Power Agency and MISO are not recommending any new projects for MTEP24.

### 4.4.5 Lansing Board of Water and Light (LBWL)

Lansing Board of Water and Light and MISO are not recommending any new projects for MTEP24.

### 4.4.6 Michigan South Central Power Agency (MSCPA)

Michigan South Central Power Agency and MISO are not recommending any new projects for MTEP24.



## 4.5 Project Justifications – South Region

### South Region Overview

The MISO South Planning Region consists of eleven Transmission-Owning members spanning four states, Arkansas, Louisiana, Mississippi, and parts of Texas. These Transmission Owners are:

Arkansas Electric Cooperative Corporation (AECC)	Entergy Louisiana LLC (ELL)
City of Alexandria (AXLA)	Entergy Mississippi LLC (EML)
CLECO Power LLC (CLEC)	Entergy Texas Incorporated (ETI)
Cooperative Energy (SMEPA)	Lafayette Utilities Systems (LAFA)
East Texas Electric Cooperative (ETEC)	City Water and Light Jonesboro (CWLT)
Entergy Arkansas LLC (EAL)	

The region contains approximately 17,800 circuit miles of transmission lines ranging from 115 kV to 500 kV. There is also a significant 69 kV sub-transmission network interspersed across the footprint.

In the 2024 series of planning models, the south region contains more than 54.7 GW of generation. The MISO South generation profile consists of mostly combined cycle, nuclear, gas, coal fuel types, and solar serving major load centers such as Little Rock, New Orleans, etc. Approximately 40% (21.9 GW) of the South region's generation capacity is made up of combined cycle (CC) units. Major generation centers are in central Arkansas, lower Louisiana, and western Mississippi (Figure 4.5-1).

Major load centers are typically found around larger cities in the region such as Little Rock, Jonesboro, and Pine Bluff in Arkansas; Monroe, Alexandria, Lake Charles, Lafayette, New Orleans, and Baton Rouge in Louisiana; Jackson, Hattiesburg, Natchez, Vicksburg, and Greenville in Mississippi. Texas major load centers in the Western load pocket include Bryan and the Woodlands area. The major load center in the West of the Atchafalaya Basin (WOTAB) load pocket portion of Texas is in South Beaumont and the Port Arthur Area (Figure 4.5-1). According to the 2026 Summer Peak planning model, the regional load is over 39.8 GW.

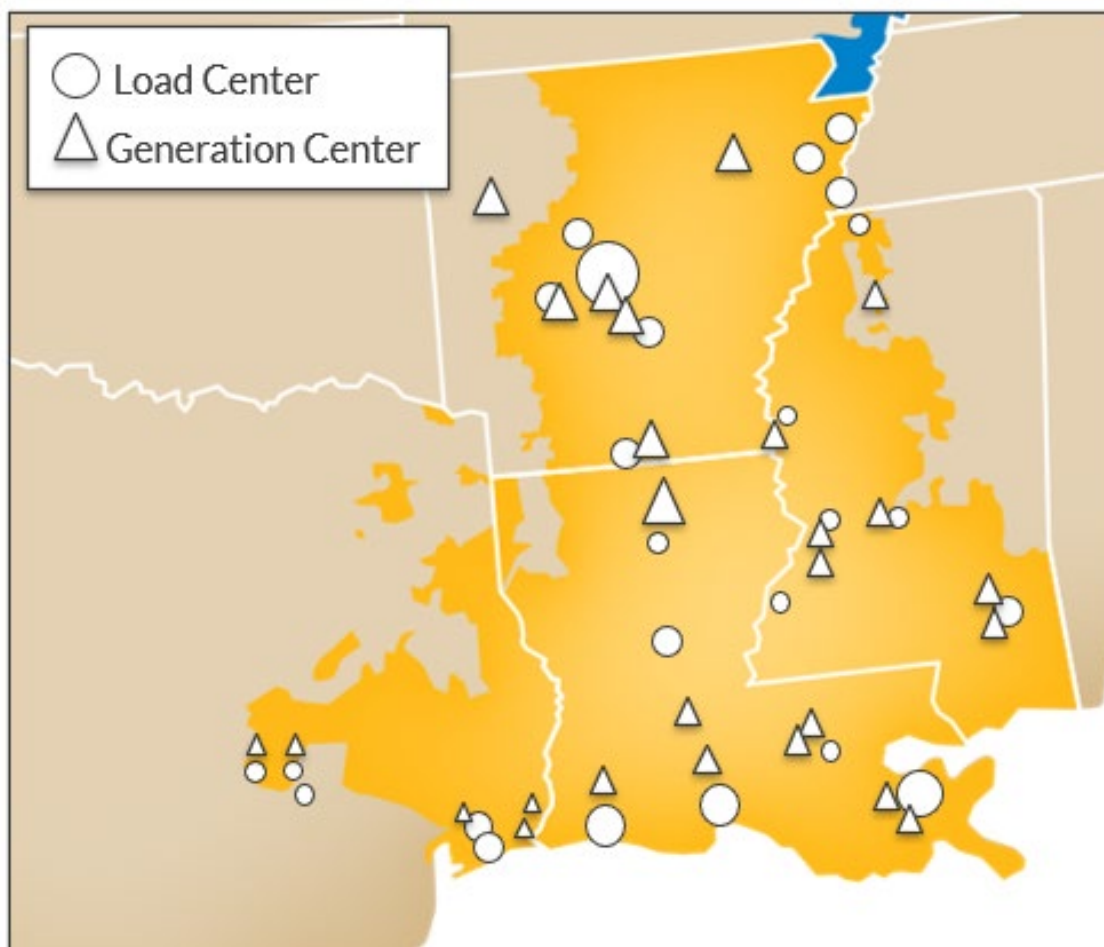
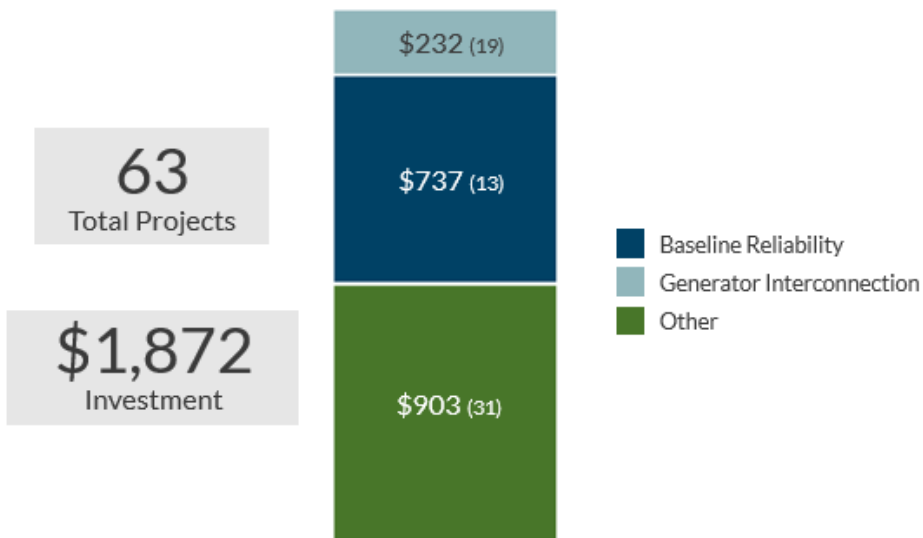


Figure 4.5-1: Generation and load centers in the South planning region.

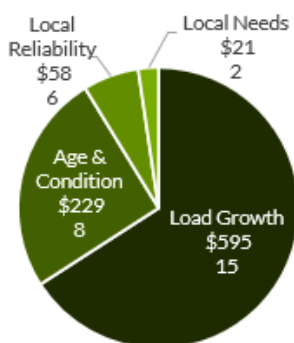


# South Planning Region Local MTEP24 Summary

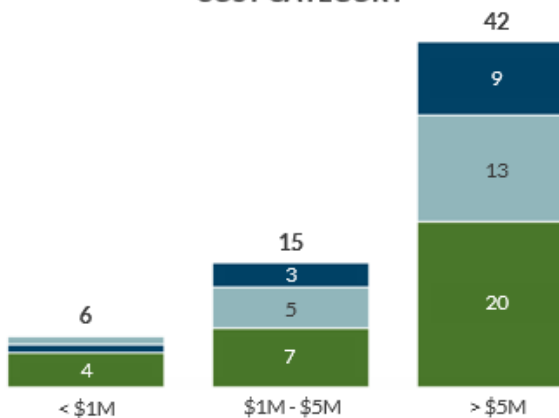
(Data as of August 27, 2024; \$M, # project count)



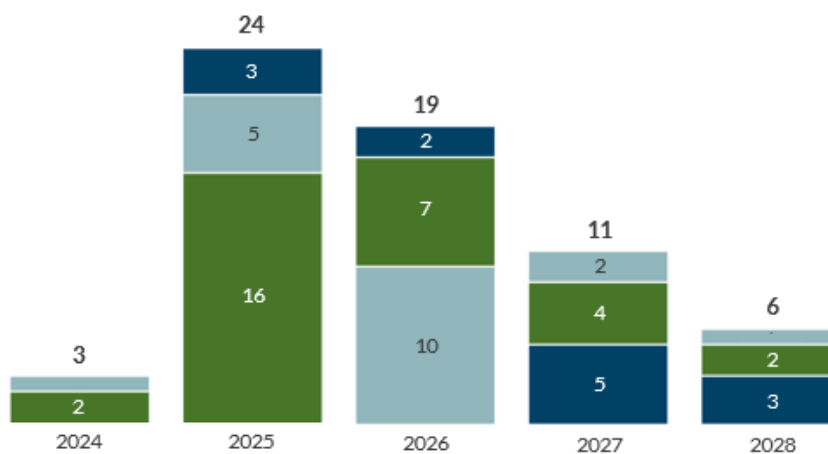
**BREAKDOWN OF OTHER PROJECTS BY COST**



**PROJECT COUNT BY COST CATEGORY**



**PROJECTS BY IN-SERVICE DATE**





The ten largest project investments in the MISO South region represent an estimated \$1.2 billion (62%) of the \$1.9 billion total recommended projects for the South region in the local MTEP24 portfolio, or 17% of the \$6.7 billion total recommended in the MISO footprint. The locations of these projects are shown in Figure 4.5-2. Projects that are blanket expenditures (relays, physical security, etc.) are excluded from this list.

### South Region Top 10 Local MTEP24 Projects

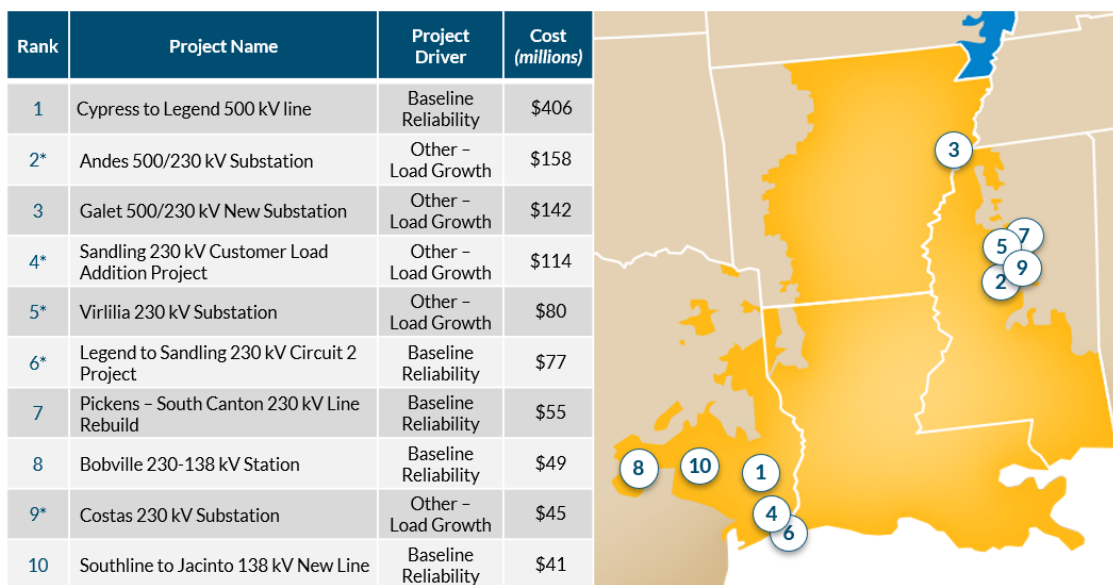
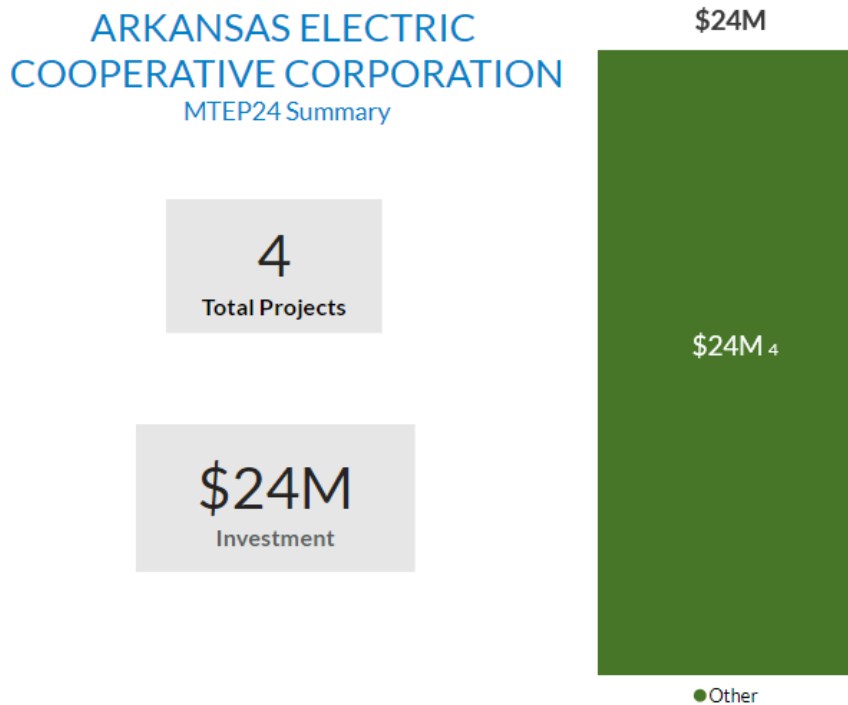


Figure 4.5-2: South region top ten projects by cost; \* represents project studied through Expedited Project Review (EPR) process (data as of 8-27-2024).



### 4.5.1 Arkansas Electric Cooperative Corporation (AECC)



#### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
24694	Coop Office Breaker Addition	Local Reliability	12/31/2026	\$2.5
*50094	Northstar	Load Growth	4/1/2026	\$7.0
*50099	Lewisville West Capacity Increase	Load Growth	10/1/2025	\$4.5
*50164	Woodberry Load Addition	Load Growth	12/1/2025	\$10.2

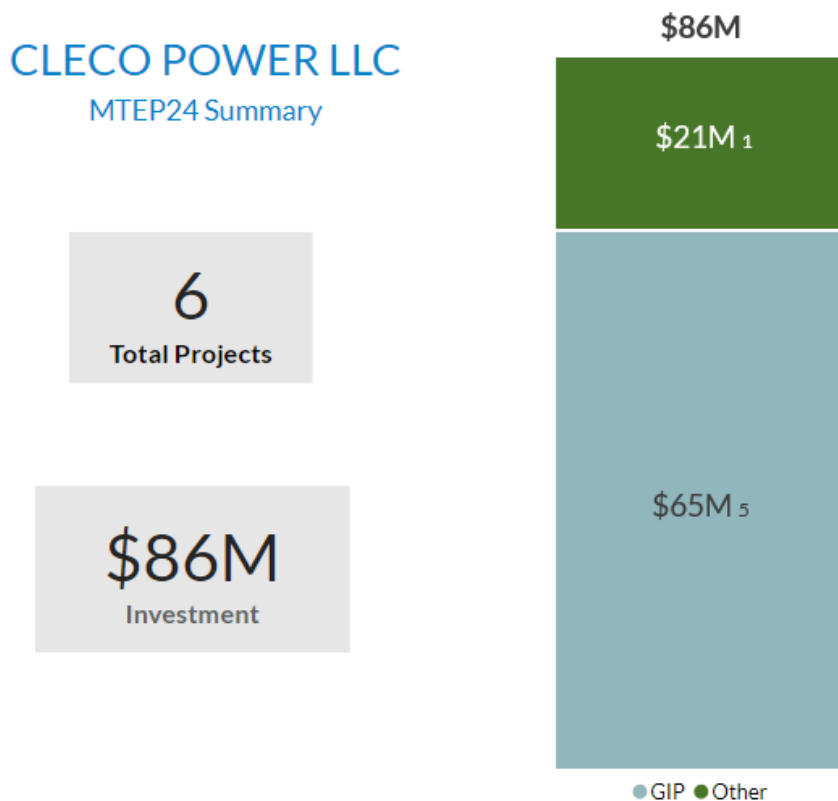
\* Project studied through Expedited Project Review (EPR) process.

### 4.5.2 City of Alexandria (AXLA)

City of Alexandria and MISO are not recommending any new projects for MTEP24.



### 4.5.3 CLECO Power LLC (CLEC)



#### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
*50011	Weeks Island Sub	Local Reliability	5/16/2025	\$21.2

\* Project studied through Expedited Project Review (EPR) process.

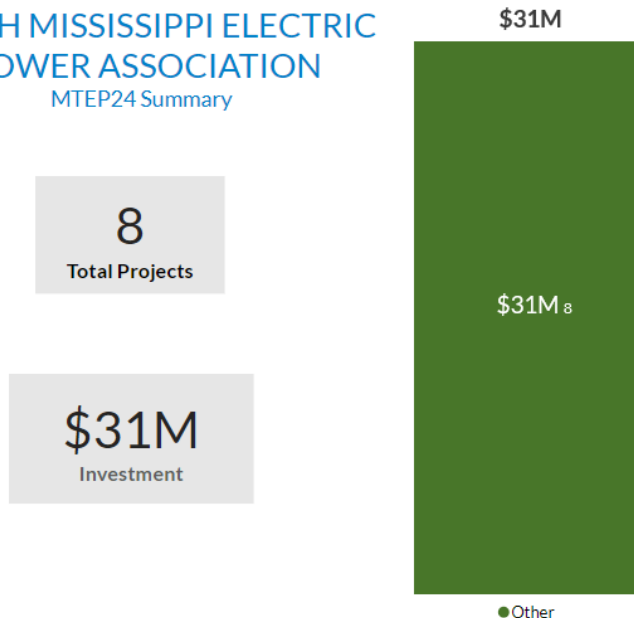
#### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
25283	Dolet Solar Replacement R1004	12/15/2026	\$19.7
25312	J1832 Plaisance Expansion	7/15/2024	\$6.5
25313	J1599 Daspit Substation	9/1/2025	\$16.2
50067	J1686 Generator Interconnection on Coughlin - Plaisance 138 kV	9/1/2026	\$18.2
50087	J1673 & J1759 Ft. Jessup Substation	7/1/2025	\$4.1



## 4.5.4 Cooperative Energy (formerly SMEPA)

### SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION MTEP24 Summary



### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25416	Lucedale 69 kV Switching Station	Load Growth	10/1/2025	\$2.9
25417	Line 34 Rebuild	Age and Condition	12/1/2025	\$5.0
25419	Hermanville 115 kV Delivery Point	Load Growth	11/1/2028	\$0.7
25459	Line 35 Rebuild	Age and Condition	6/1/2026	\$7.1
25489	North Lucedale 69 kV Delivery Point	Load Growth	12/1/2027	\$6.4
25501	County Line 115 kV Delivery Point	Load Growth	12/1/2026	\$2.2
25520	South Lucedale 69 kV Delivery Point	Load Growth	3/1/2028	\$6.5
25540	State Line 69 kV Delivery Point	Load Growth	12/1/2025	\$0.7

## 4.5.5 East Texas Electric Cooperative (ETEC)

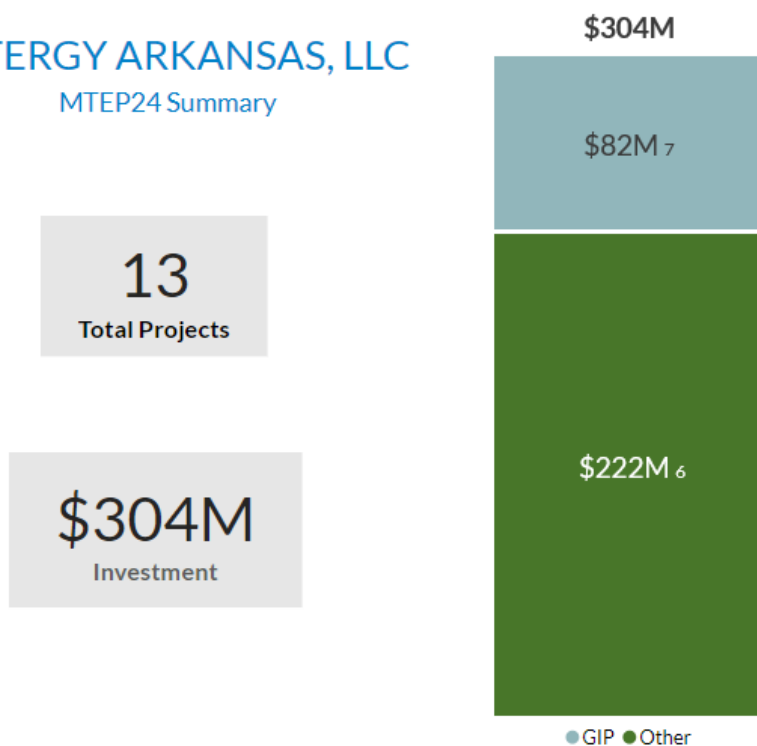
East Texas Electric Cooperative and MISO are not recommending any new projects for MTEP24.



## 4.5.6 Entergy Arkansas LLC (EAL)

### ENTERGY ARKANSAS, LLC

MTEP24 Summary



### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25472	2025 EAL Asset Renewal Program	Age and Condition	12/1/2025	\$32.9
25481	Arklahoma 115 kV Bus Relay Improvement SPOF	Local Reliability	12/1/2025	\$2.5
25485	Champs 115 kV: New Substation Phase 1	Local Reliability	12/1/2025	\$10.8
25487	Frazier Pike 115 kV: New Substation	Local Reliability	12/1/2025	\$18.0
50013	Grand Prairie 115 kV: New substation	Load Growth	4/1/2025	\$15.6
50093	Galet 500/230 kV New Substation	Load Growth	9/30/2026	\$142.0

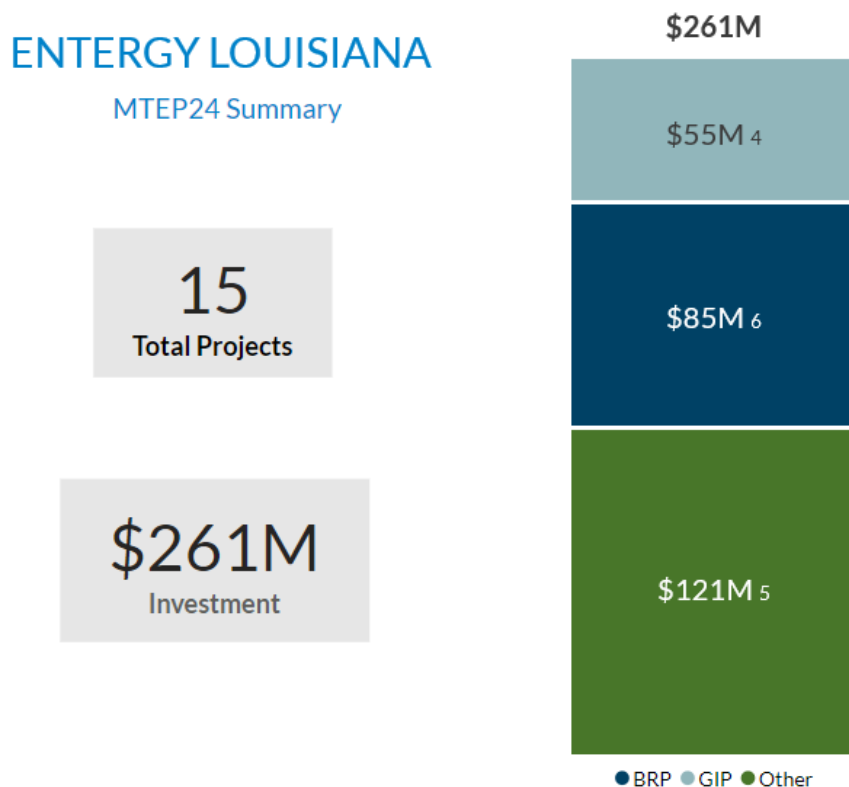
### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
50004	J1670 Crooked Lake 2 GIA upgrades	4/3/2026	\$1.3



Project ID	Project Name	ISD	Estimated Cost (\$M)
50034	J1437 Nimbus Wind FCA	4/30/2025	\$1.9
50035	Doylestown 115 kV: Cut in Switching Station (J1577 & J1607)	5/1/2025	\$3.8
50040	Morrilton East 161 kV: POI for J1559	4/1/2026	\$3.2
50059	Kinder 161 kV: New POI J1558	10/1/2026	\$14.0
50090	Wheatley 500 kV: New POI J1710 J1819 J1820 J1821	9/13/2026	\$32.4
50197	West Memphis 500/161 kV Auto Replacement MPFCA	12/5/2026	\$25.5

### 4.5.7 Entergy Louisiana LLC (ELL)





## Baseline Reliability Projects:

### Project 13905 – Burnside 230-115 kV Autotransformer

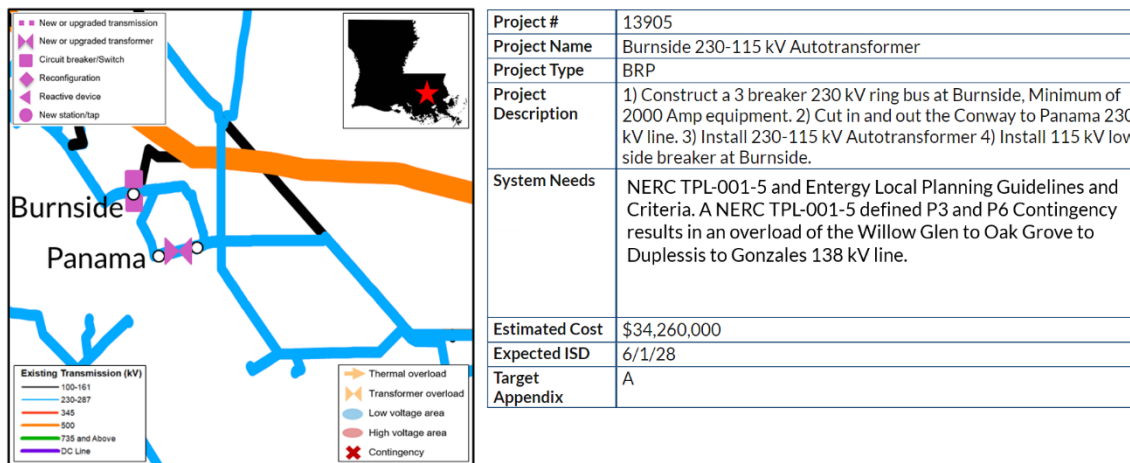


Figure 4.5.7-1: P13905 Geographic transmission map of project area and MTEP Portal project details.

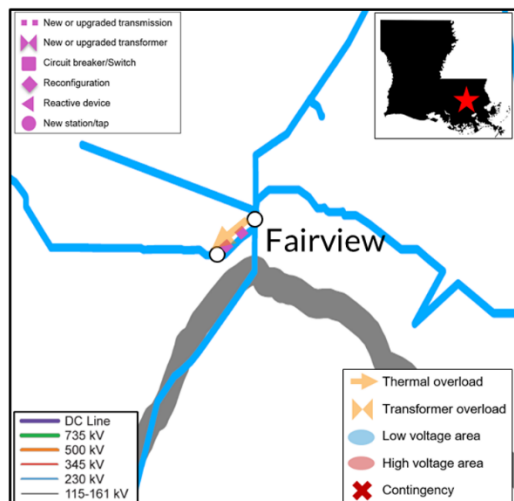
**Project Justification:** A NERC TPL-001-5 defined P3 and P6 contingency results in an overload of the Willow Glen to Oak Grove to Duplessis to Gonzales 138 kV line.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P6	[EES] Willow Glen to Oak Grove 138 kV	309	143	50
P6	[EES] Oak Grove to Duplessis 138 kV	232	112	31

Table 4.5.7-1: P13905 Thermal loading drivers.



## Project 25430 – Fairview to Madisonville 230 kV Upgrades



Project #	25430
Project Name	Fairview to Madisonville 230 kV Upgrades
Project Type	BRP
Project Description	Upgrade Fairview to Madisonville 230 kV circuit to at least 2000 Amps. This includes conductor on this 0.2 mile facility.
System Needs	NERC TPL-001-5 and Entergy Local Planning Guidelines and Criteria. A NERC TPL-001-5 defined P2.3 Contingency causes reduced flow path into Amite South being funneled into Fairview going towards Madisonville 230kV, overloading the circuit.
Estimated Cost	\$700,000
Expected ISD	12/1/27
Target Appendix	A

Figure 4.5.7-2: P25430 Geographic transmission map of project area and MTEP Portal project details.

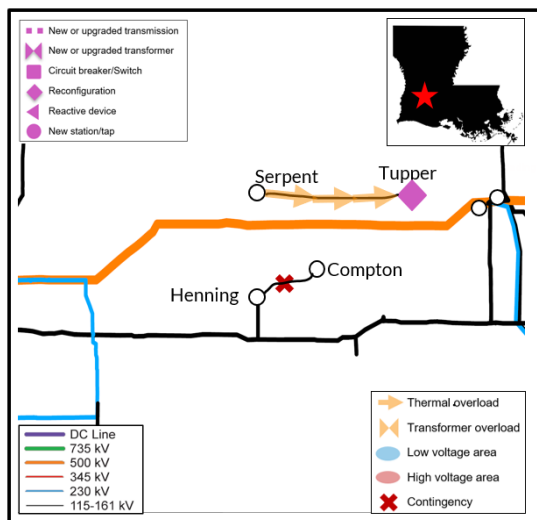
**Project Justification:** A NERC TPL-001-5 defined P2.3 contingency causes reduced flowpath into Amite South being funneled into Fairview going towards Madisonville 230 kV, overloading the circuit.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P2.3	[EES] Fairview to Madisonville 230 kV	467	102	67

Table 4.5.7-2: P25430 Thermal loading drivers.



## Project 25435 – Serpent to Tupper 69 kV Upgrade



Project #	25435
Project Name	Serpent to Tupper 69 kV Upgrade
Project Type	BRP
Project Description	Upgrade 69 kV bus at Tupper.
System Needs	NERC TPL-001-5 and Entergy Local Planning Guidelines and Criteria. A NERC TPL-001-5 defined P1.2 Contingency causes an overload on the Serpent to Tupper 69kV line.
Estimated Cost	\$1,200,000
Expected ISD	12/1/28
Target Appendix	A

Figure 4.5.7-3: P25435 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** A NERC TPL-001-5 defined P1.2 contingency causes an overload on the Serpent to Tupper 69 kV line.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
N-1	[EES] Serpent to Tupper 69 kV line	105	111	50

Table 4.5.7-3: P25435 Thermal loading drivers.



## Project 25465 – Paincourtville 115 kV Capacitor Bank Split

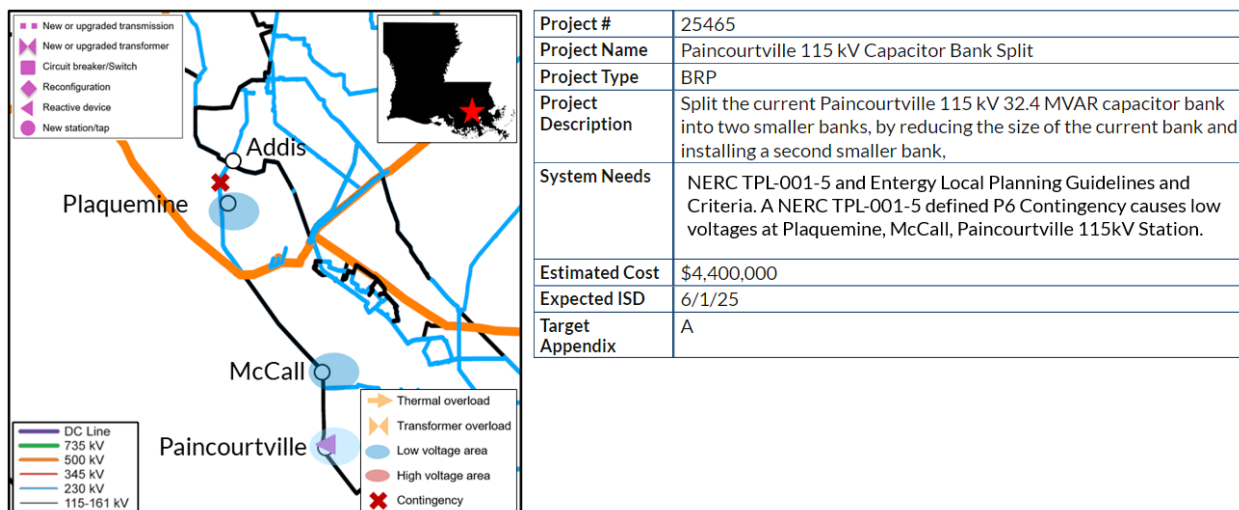


Figure 4.5.7-4: P25465 Geographic transmission map of project area and MTEP Portal project details.

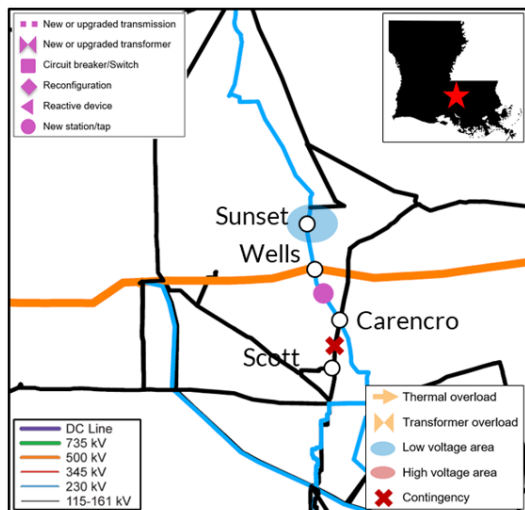
**Project Justification:** A NERC TPL-001-5 defined P6 contingency causes low voltages at Plaquemine, McCall, Paincourtville 115 kV Station.

Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
N-1-1	[EES] McCall 115 kV	0.92 - 1.05	0.91	0.96
N-1-1	[EES] Plaquemine 115 kV	0.92 - 1.05	0.90	0.95
N-1-1	[EES] Paincourtville 115 kV	0.92 - 1.05	0.91	0.95

Table 4.5.7-4: P25465 Voltage loading drivers.



## Project 25470 – Sunrise 230 kV New Station



Project #	25470
Project Name	Sunrise 230 kV New Station
Project Type	BRP
Project Description	Cut a new 230 kV station named Sunrise on the Wells to Labbe 230 kV line. Install distribution facilities to serve load currently served from the existing Sunset 69 kV station.
System Needs	Entergy Local Planning Guidelines and Criteria. A NERC TPL-001-5 defined P1.2 Contingency causes and overload on the Champagne to Sunset 69 kV Line and low voltage at the Sunset and International Pipeline 69kV stations.
Estimated Cost	\$39,600,000
Expected ISD	6/1/27
Target Appendix	A

Figure 4.5.7-5: P25470 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** A NERC TPL-001-5 defined P1.2 contingency causes an overload on the Champagne to Sunset 69 kV Line and low voltage at the Sunset and International Pipeline 69 kV stations.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
N-1	[EES] Champagne to Sunset 69 kV line	56	110	38

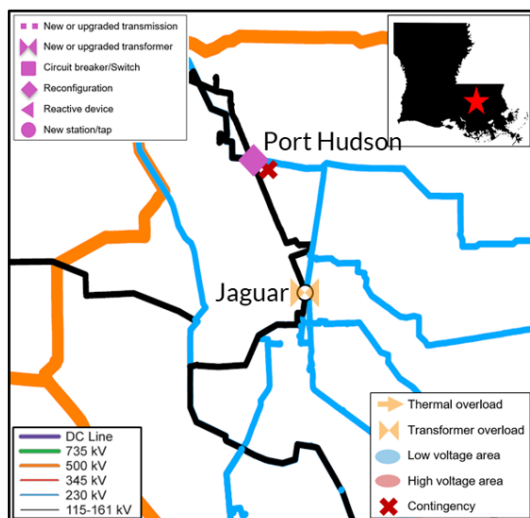
Table 4.5.7-5: P25470 Thermal loading drivers

Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
N-1	[EES] Sunset 69 kV	0.90 – 1.05	0.89	0.99
N-1	[EES] International Pipeline 69 kV	0.90 – 1.05	0.88	0.99

Table 4.5.7-6: P25470 Voltage loading drivers.



## Project 25480 – Port Hudson 230-138 kV AT4 & 5 SPOF



Project #	25480
Project Name	Port Hudson 230-138 kV AT4 & 5 SPOF
Project Type	BRP
Project Description	Ensure Port Hudson 230/138 kV AT4 and AT5 both have redundant high-speed protection.
System Needs	NERC TPL-001-5 and Entergy Local Planning Guidelines and Criteria. A NERC TPL-001-5 defined P5 Contingency will overload the Jaguar 230-69 kV AT, Jaguar to Blount 69 kV line and Swan to Grace 69 kV.
Estimated Cost	\$4,400,000
Expected ISD	6/1/25
Target Appendix	A

Figure 4.5.7-6: P25480 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** A NERC TPL-001-5 defined P5 contingency will overload the Jaguar 230-69 kV AT, Jaguar to Blount 69 kV line and Swan to Grace 69 kV.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P5	[EES] Jaguar to Blount 69 kV	148	122	44
P5	[EES] Swan to Grace 69 kV	101	109	35

Table 4.5.7-7: P25480 Thermal loading drivers.

## Other Projects

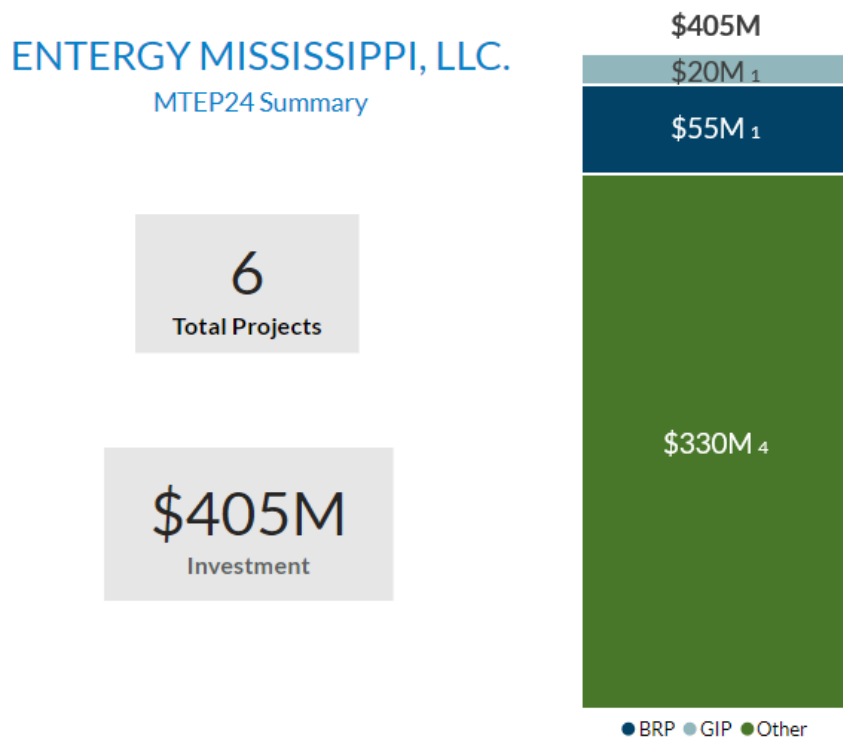
Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25413	Retirement of Golden Meadow to Barataria 115 kV line	Local Needs	12/31/2024	\$0.0
25455	Amite South/DSG Reactive Support Project	Local Needs	6/1/2027	\$21.0
25457	PCI 69 kV Breaker Upgrades	Local Reliability	6/1/2027	\$2.7
25482	2025 ELL Asset Renewal Program	Age and Condition	12/31/2025	\$87.9
25483	2025 ENOL Asset Renewal Program	Age and Condition	12/31/2025	\$9.6



## Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
25352	J1833 Generator Interconnection	4/1/2027	\$17.8
50039	J1561 Generator Interconnection at Richard 138 kV	4/1/2026	\$8.3
50048	MPFCA J1644, J1686, J1832: Upgrade of Champagne – East Opelousas – Colton 138 kV line	6/9/2026	\$9.1
50065	J1576 Generator Interconnection on the Adams Creek - Angie 230 kV	11/15/2026	\$19.7

### 4.5.8 Entergy Mississippi LLC (EML)





## Baseline Reliability Projects:

### Project 25438 – Pickens – South Canton 230 kV Line Rebuild

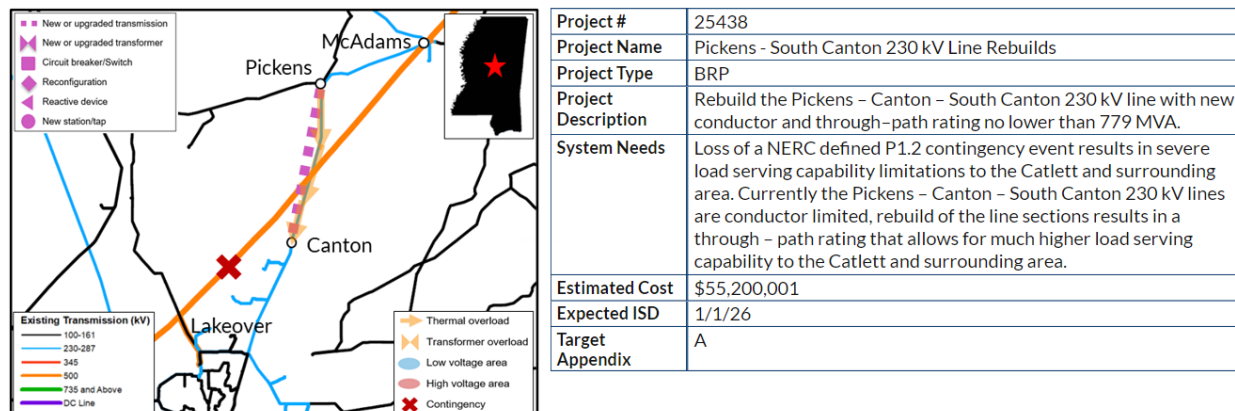


Figure 4.5.8-1: P25438 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [EML] Pickens – [EML] Canton 230 kV & [EML] Canton – [EML] South Canton 230 kV line sections become overloaded in year 2023 for a NERC defined category P1-2 contingency event. Reconductoring [EML] Pickens – [EML] Canton – [EML] South Canton 230 kV to a minimum summer emergency rating of 779 MVA will decrease post-contingent Loading and resolve thermal violations.

Cont. Type	MTEP Cycle	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P1-2	24	[EML] Pickens – [EML] Canton 230 kV	462	88	53
P1-2	24	[EML] Canton – [EML] South Canton 230 kV	462	80	48
P1-2	23 EPR	[EML] Pickens – [EML] Canton 230 kV	462	102	48
P1-2	23 EPR	[EML] Canton – [EML] South Canton 230 kV	462	95	41

Table 4.5.8-1: P25438 Thermal loading drivers.

## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
*25214	Virililia 230 kV Substation	Load Growth	1/1/2025	\$79.5
*25215	Andes 500/230 kV Substation	Load Growth	6/1/2027	\$158.0



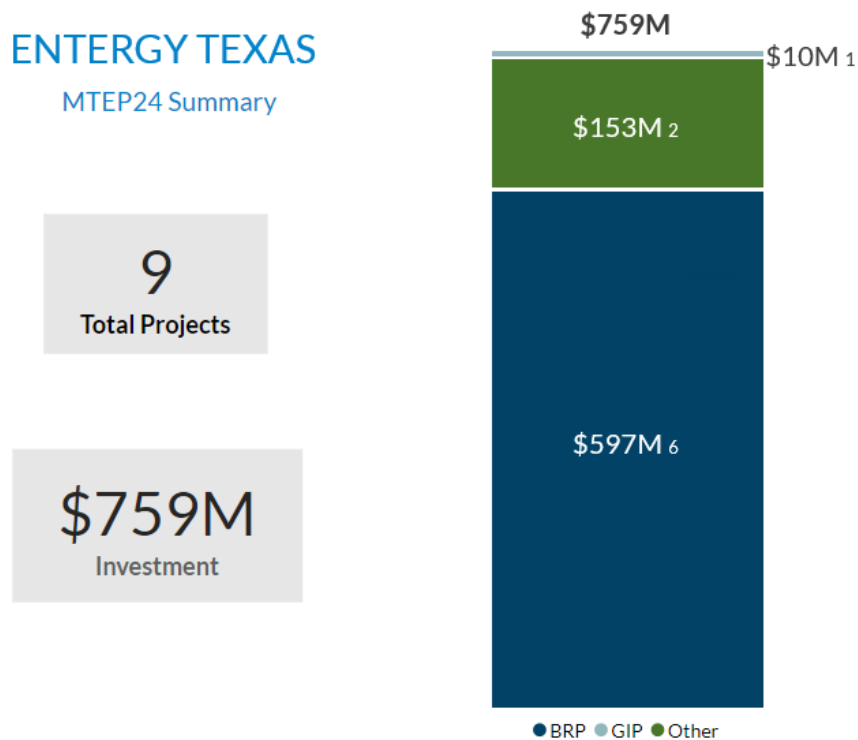
Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
*25229	Costas 230 kV Substation	Load Growth	1/1/2026	\$44.5
25486	2025 EML Asset Renewal Program	Age and Condition	12/31/2025	\$47.8

\* Project studied through Expedited Project Review (EPR) process.

### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
50160	J1672 Network Upgrades: Gerald Andrus 230 kV Auto	12/15/2027	\$19.8

### 4.5.9 Entergy Texas, Inc. (ETI)





## Baseline Reliability Projects:

### Project 24959 – Kolbs to Port Acres 230 kV Upgrade Project

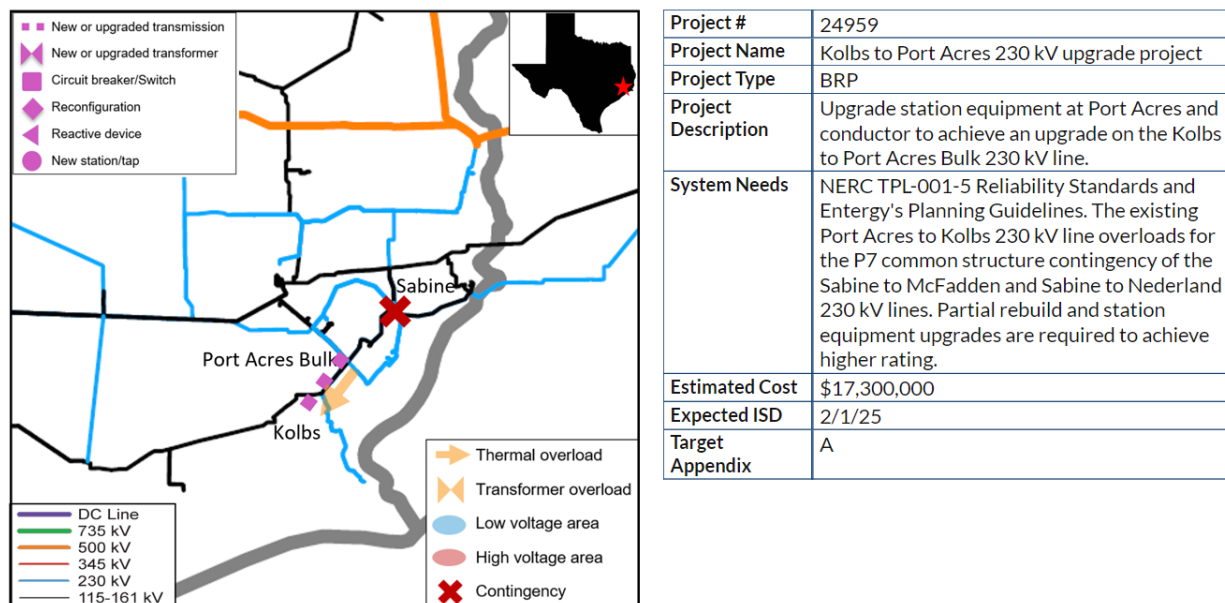


Figure 4.5.9-1: P24959 Geographic transmission map of project area and MTEP Portal project details.

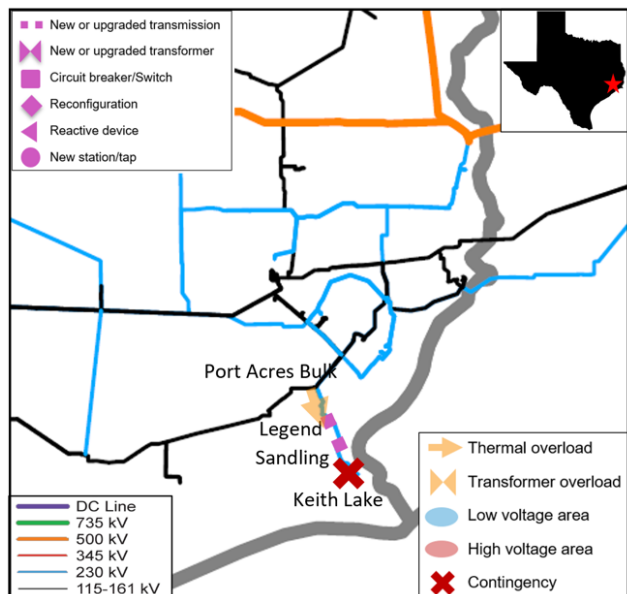
**Project Justification:** The [EES] Port Acres Bulk – [EES] Kolbs 230 kV line becomes overloaded to one hundred nineteen (119%) percent in year 2029 for a NERC defined category P7 contingency event. Partial rebuild and station equipment upgrades will decrease post-contingent loading to fifty-seven (57%) percent and resolve thermal violations.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P7	[EES] Port Acres Bulk – [EES] Kolbs 230 kV	502	119	57

Table 4.5.9-1: P24959 Thermal loading drivers.



## Project 24960 – Legend to Sandling 230 kV Circuit 2 Project



Project #	24960
Project Name	Legend to Sandling 230 kV Circuit 2 Project
Project Type	BRP
Project Description	Construct a new ~7.6 mile 230 kV Legend to Sandling Ckt 2.
System Needs	NERC TPL-001 and Entergy's Local Planning Guidelines and Criteria. The Legend to Sandling 230 kV circuit 2 is driven by a P3 contingency overloading either Legend to Sandling or Port Acres to Sandling 230 kV lines.
Estimated Cost	\$77,320,000
Expected ISD	7/31/27
Target Appendix	A

Figure 4.5.9-2: P24960 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [EES] Port Acres Bulk – [EES] Legend 230 kV & [EES] Port Acres Bulk – [EES] Sandling 230 kV line sections become overloaded to one hundred twenty-three (123%) percent and one hundred eight (108%) percent, respectively in year 2029 for a NERC defined category P3 contingency. Building a new Legend to Sandling 230 kV Ckt 2 will decrease post-contingent loading and resolve thermal violations.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P3	[EES] Port Acres Bulk – [EES] Legend 230 kV	351	123	65
P3	[EES] Port Acres Bulk – [EES] Sandling 230 kV	352	108	46

Table 4.5.9-2: P24960 Thermal loading drivers.



## Project 25410 – Winshire 69 kV Capacitor Banks

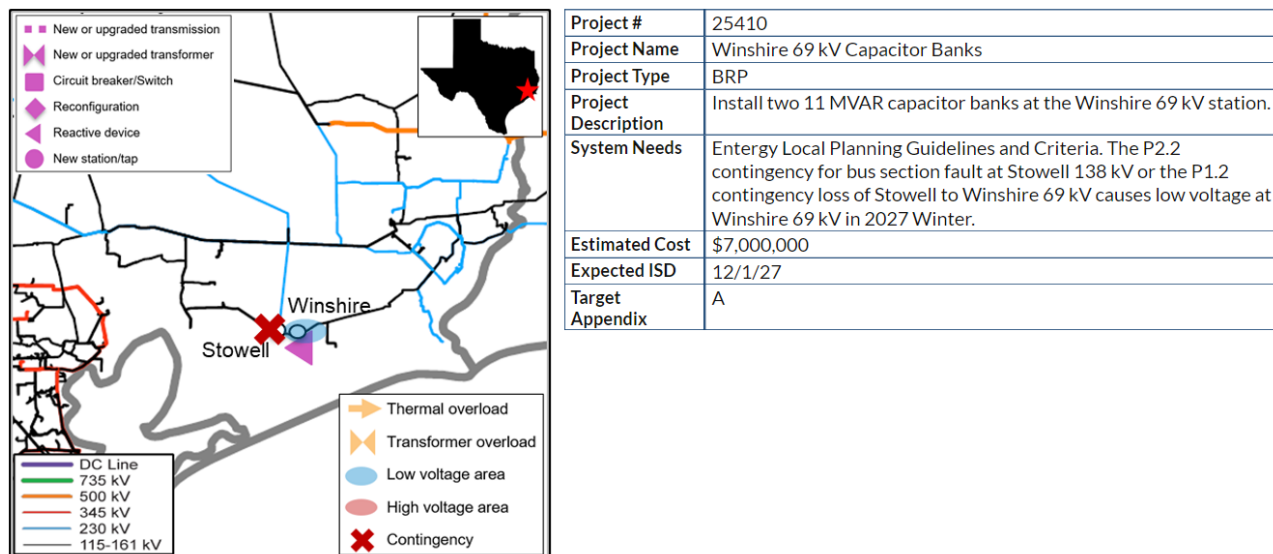


Figure 4.5.9-3: P25410 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [EES] Winshire 69 kV substation’s voltage drops to 0.87 pu in year 2029 for a NERC defined category P1 contingency event. Adding a 11MVAR capacitor bank at [EES] Winshire substation will increase the post-contingency voltage to 0.98 pu.

Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
P1	[EES] Winshire 69 kV	0.9	0.87	0.98

Table 4.5.9-3: P25410 Voltage loading drivers.



## Project 25432 – Cypress to Legend 500 kV Line

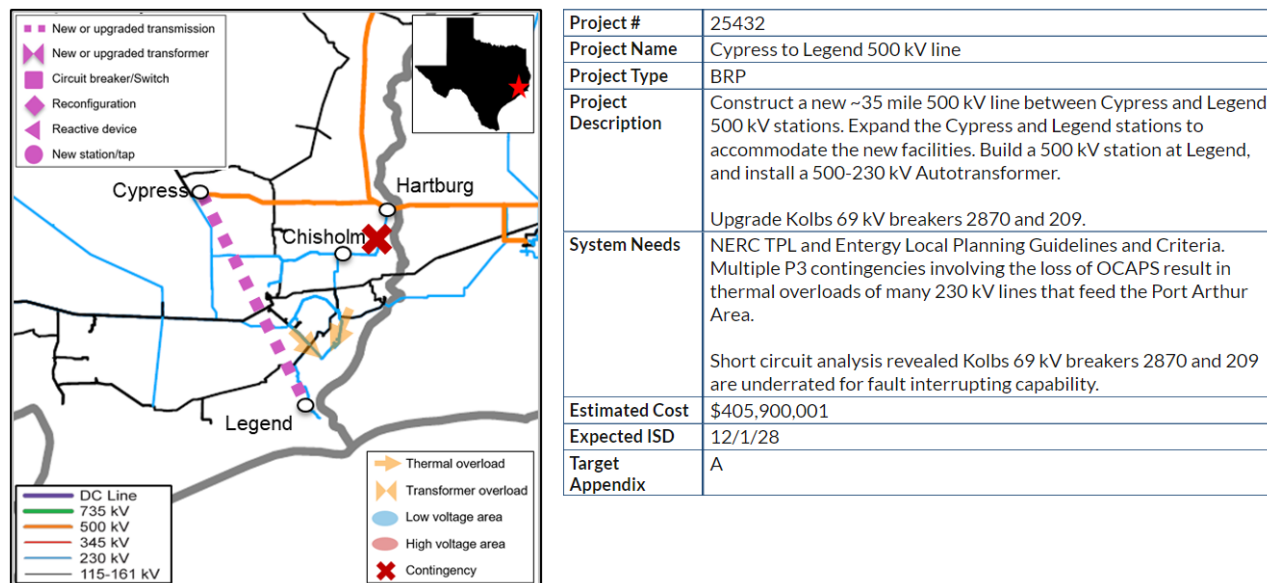


Figure 4.5.9-4: P22432 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [EES] McLewis –[EES] Inland, [EES] McLewis –[EES] Chisholm, [EES] Inland –[EES] Hartburg 230 kV lines become overloaded in year 2028 for a NERC defined category P3 contingency event. The Cypress to Legend 500 kV line will mitigate these overloads.

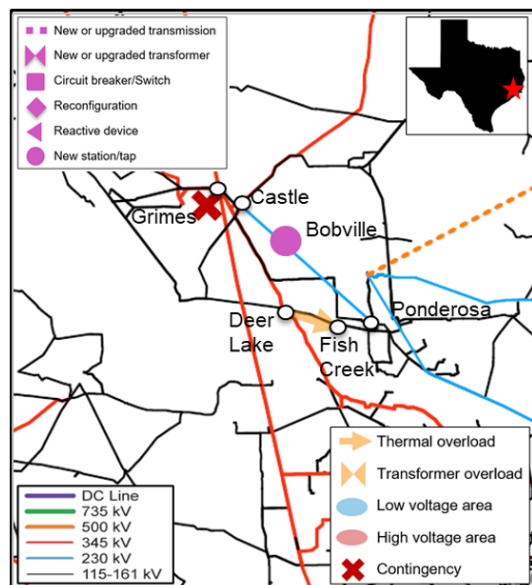
**Alternatives Considered:** An alternative project, Hartburg to Sabine 500 kV Line, was submitted and studied. Both projects were studied on MTEP24 base case planning models and load growth sensitivities. Both projects showed similar performance for the base case planning models, however the original project showed superior performance when taking future load growth into account represented in the sensitivity. Therefore, MISO is recommending the original project, Cypress to Legend 500 kV.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P3	[EES] McLewis – [EES] Inland	681	115	89
P3	[EES] McLewis – [EES] Chisholm 230 kV	681	111	86
P3	[EES] Inland – [EES] Hartburg 230 kV	797	104	81

Table 4.5.9-4: P25432 Thermal loading drivers.



## Project 25436 – Bobville 230-138 kV Station



Project #	25436
Project Name	Bobville 230-138 kV Station
Project Type	BRP
Project Description	Cut a new 230 kV station called Bobville into the Castle to Ponderosa 230 kV line. Install a 230-138 kV Autotransformer. Cut Bobville 138 kV station into the Dobbin to Spring Branch 138 kV line. Bobville 230 kV and 138 kV stations will both be three breaker ring. Upgrade the short section between the Dobbin and Bobville 138 kV stations.
System Needs	NERC TPL-001-5 Reliability Standards and Entergy's Planning Guidelines and Criteria. The P2-1 contingency of the Ponderosa to Fish Creek 138 kV line section results in low voltage at Fish Creek, Dobbin, Spring Branch, and Deer Lake 138 kV and a thermal overload on the Tubular to Dobbin 138 kV line. The P2-3 contingency of a Grimes 345 kV breaker results in a thermal overload of the Deer Lake to Fish Creek 138 kV line section. A P5 at Grimes overloads Fish Creek to Deer Lake to Spring Branch.
Estimated Cost	\$48,600,001
Expected ISD	6/1/26
Target Appendix	A

Figure 4.5.9-5: P25436 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [EES] Dobbin–[EES] Tubular 138 kV line becomes overloaded and causes low voltage in its adjacent buses in year 2034 for a NERC defined category P2 contingency event. Adding the Bobville station will reduce the loading and mitigate low voltage issues.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P2	[EES] Dobbin – [EES] Tubular	112	113	13

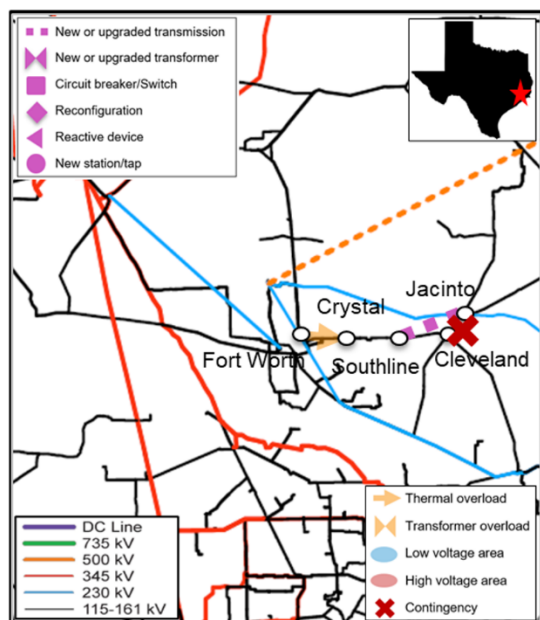
Table 4.5.9-5: P25436 Thermal loading drivers.

Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
P2	[EES] Fish Creek	0.92	0.88	0.96
P2	[EES] Deer Lake 138 kV	0.92	0.88	0.96
P2	[EES] Spring Branch 138 kV	0.92	0.89	0.97
P2	[EES] Dobbin 138 kV	0.92	0.90	0.98

Table 4.5.9-6: P25436 Voltage loading drivers.



## Project 25468 – Southline to Jacinto 138 kV New Line



Project #	25468
Project Name	Southline to Jacinto 138 kV New Line
Project Type	BRP
Project Description	Construct a new ~6 mile 138 kV line between Jacinto and Southline 138 kV stations.
System Needs	NERC TPL-001-5 Reliability Standards and Entergy's Planning Guidelines and Criteria. P1 contingencies cause low voltage near Cleveland and thermal overloads on Fort Worth Pipe to Crystal 138 kV line. N-1-1 contingencies cause low voltages due to the amount of load being served radially back out of Dayton 138 kV.
Estimated Cost	\$40,700,000
Expected ISD	6/1/27
Target Appendix	A

Figure 4.5.9-6: P25468 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [EES] Fort Worth Pipe—[EES] Crystal 138 kV line becomes overloaded in year 2034 for a NERC defined category P1 contingency event. Adding a new 138 kV line from Southline to Jacinto will reduce the loading.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P1	[EES] Fort Worth Pipe - [EES] Crystal	206	102	46

Table 4.5.9-7: P25468 Thermal loading drivers.

### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
*24958	Sandling 230 kV Customer Load Addition Project	Load Growth	1/30/2026	\$114.2
25484	2025 ETI Asset Renewal Program	Age and Condition	12/31/2025	\$38.3

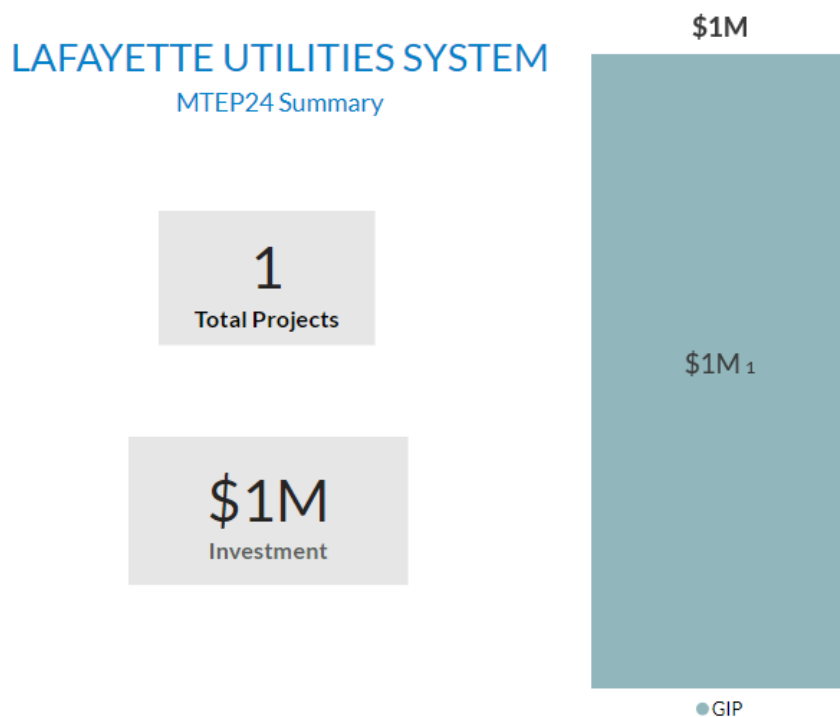
\* Project studied through Expedited Project Review (EPR) process.



## Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
50043	J1834 NRIS/ERIS Sabine to Neches L5 & L-172 upgrade to Double Bus Double Breaker	9/30/2025	\$10.0

### 4.5.10 Lafayette Utilities System (LAFA)



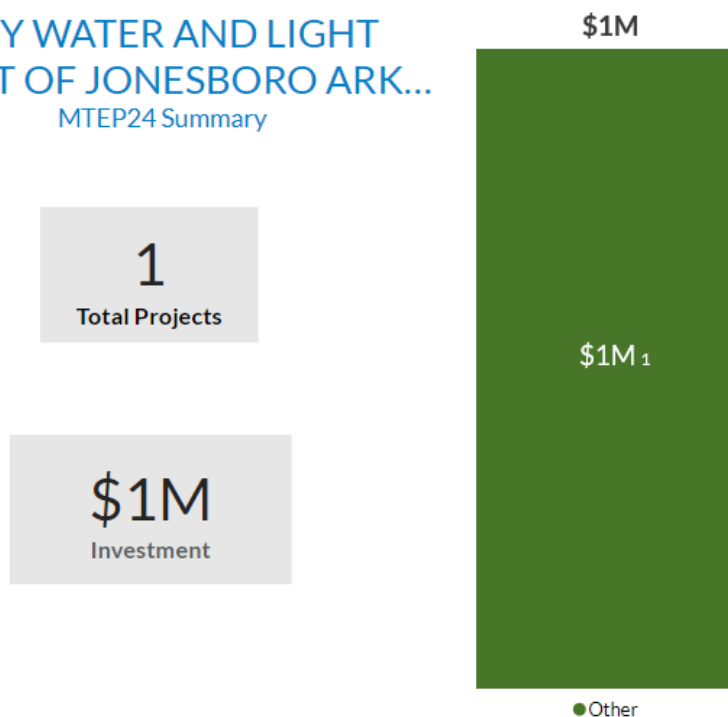
## Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
50139	J1818 Generator Interconnection at Moss 69 kV Station	6/30/2028	\$1.0



## 4.5.11 City Water and Light Jonesboro (CWLT)

### CITY WATER AND LIGHT PLANT OF JONESBORO ARK... MTEP24 Summary



### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
*25544	JCWL - Commerce to Ringier 69 kV Rebuild	Age and Condition	7/1/2024	\$0.9

\* Project studied through Expedited Project Review (EPR) process.



## 4.6 Project Justifications – West Region

### West Region Overview

The MISO West Planning Region consists of 21 Transmission-Owning members spanning eight states in the upper Midwest. It includes Iowa, Minnesota, Wisconsin, and parts of North Dakota, South Dakota, Montana, Michigan, and Illinois. These Transmission Owners are:

American Transmission Company (ATC)	Missouri River Energy Services (MRES)
Cedar Falls Utilities (CFU)	Montana-Dakota Utilities Co. (MDU)
Central Minnesota Municipal Power Agency (CMMPA)	Muscatine Power and Water (MPW)
City of Ames, IA (COA)	Northwestern Wisconsin Electric (NWECE)
Dairyland Power Cooperative (DPC)	Otter Tail Power Company (OTP)
Great River Energy (GRE)	Rochester Public Utilities (RPU)
ITC Midwest (ITCM)	Southern Minnesota Municipal Power Agency (SMMMPA)
MidAmerican Energy Company (MEC)	Wilmar Municipal Utilities (WMU)
Minnesota Municipal Power Agency (MMPA)	WPPI Energy (WPPI)
Minnesota Power (MP)	Xcel Energy (Northern States Power, XEL/NSP)
Minnkota Power Cooperative	

The West planning region contains approximately 27,300 miles of transmission ranging from 57 kV to 500 kV. In the 2026 Summer Peak planning model, the region contains more than 75.5 GW of generation, around 20.6 GW of that being wind. Installed generation capacity in the region consists mostly of coal, gas and wind.

Major generation centers are located in central North Dakota; the Twin Cities in Minnesota; and the Quad Cities in Iowa and Illinois, with wind generation located in the eastern Dakotas and western Iowa and Minnesota (Figure 4.6-1). Major load centers are typically found around larger cities in the region: Minneapolis/Saint Paul, Milwaukee, and Des Moines. In the 2026 Summer Peak planning model, the regional load exceeds 43.7 GW. Power generally flows from generation-rich areas in the western portion of the region through Minnesota, Iowa, and Wisconsin, toward large load centers in the east. This is especially prevalent in times of high wind output.

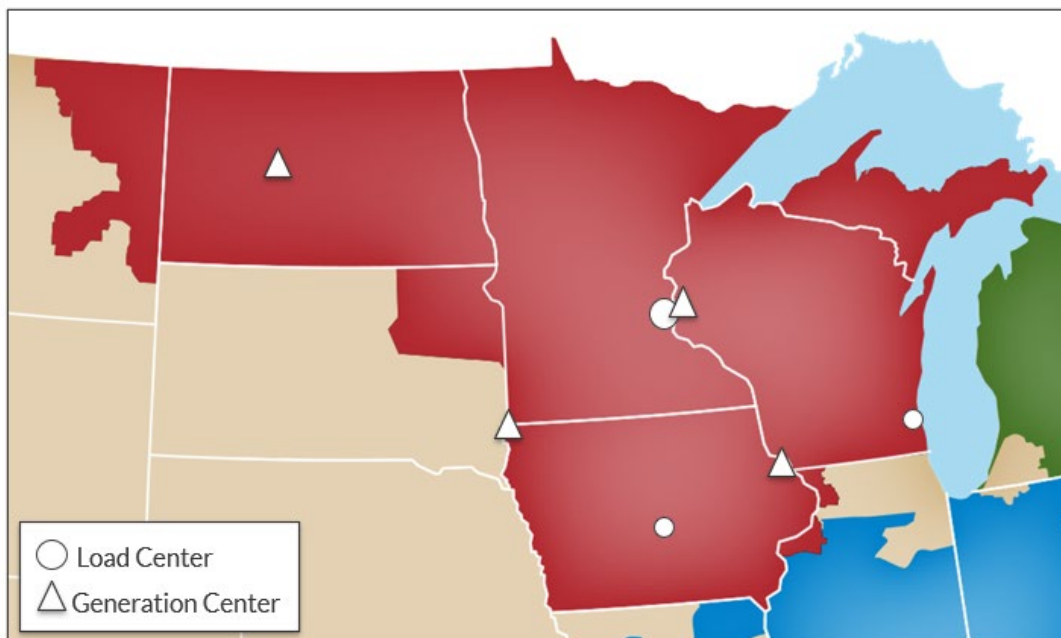
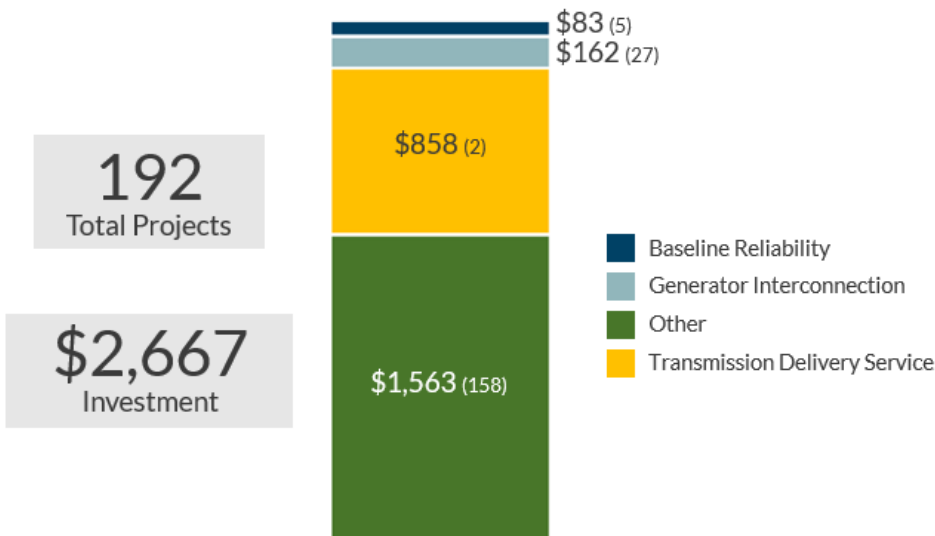


Figure 4.6-1: Generation and load centers in the West Planning Region.

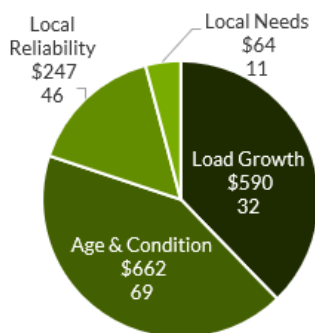


# West Planning Region Local MTEP24 Summary

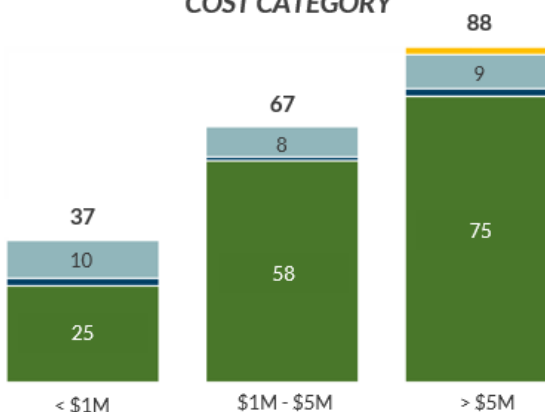
(Data as of August 27, 2024; \$M, # project count)



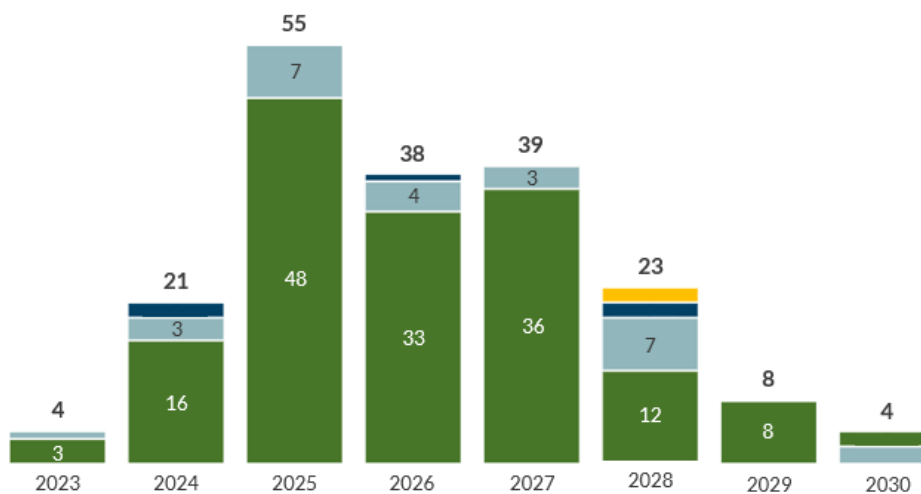
**BREAKDOWN OF OTHER PROJECTS BY COST**



**PROJECT COUNT BY COST CATEGORY**



**PROJECTS BY IN-SERVICE DATE**





The ten largest project investments in the MISO West region represent nearly \$1.5 billion (55%) of the \$2.7 billion total recommended projects for the West region in the local MTEP24 portfolio, or 22% of the \$6.7 billion total recommended in the MISO footprint. The locations of these projects are shown in Figure 4.6-2 and the investment is spread across the West planning region. Projects that are blanket expenditures (relays, physical security, etc.) are excluded from this list.

### West Region Top 10 Local MTEP24 Projects

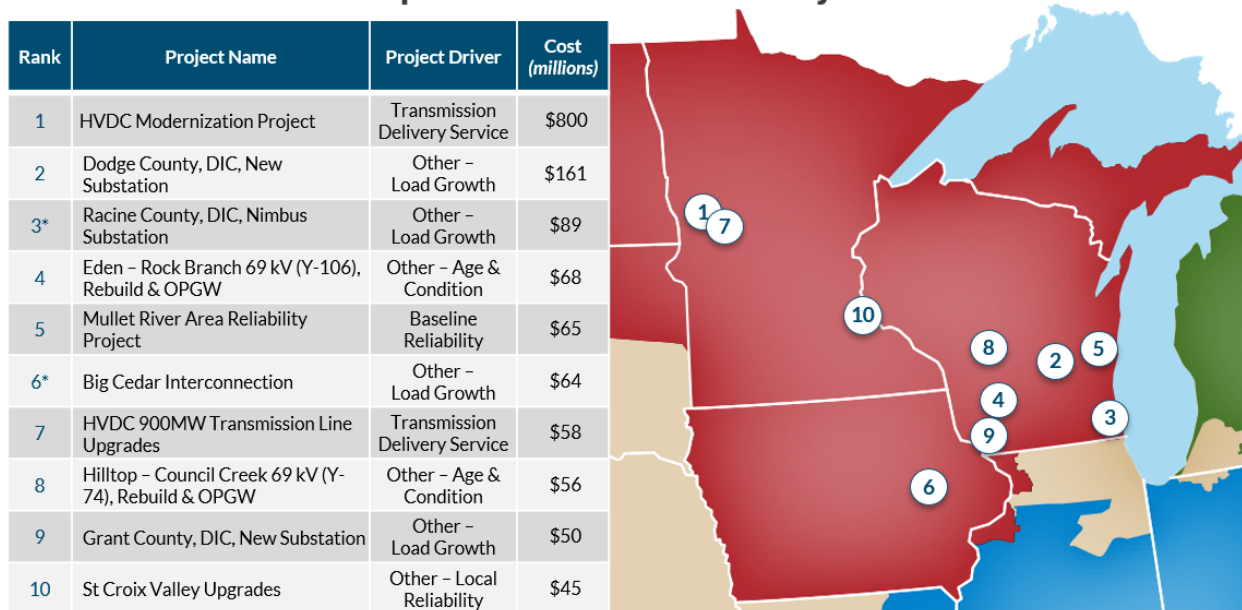


Figure 4.6-2: West region top ten projects by cost; \* represents project studied through Expedited Project Review (EPR) process (data as of 8-27-2024).

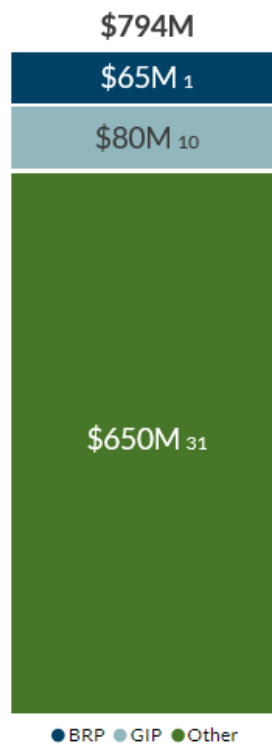


## 4.6.1 American Transmission Company (ATC)

### AMERICAN TRANSMISSION COMPANY MTEP24 Summary

42  
Total Projects

\$794M  
Investment





## Baseline Reliability Projects

### ATC 21900 – Mullet River Area Reliability Project

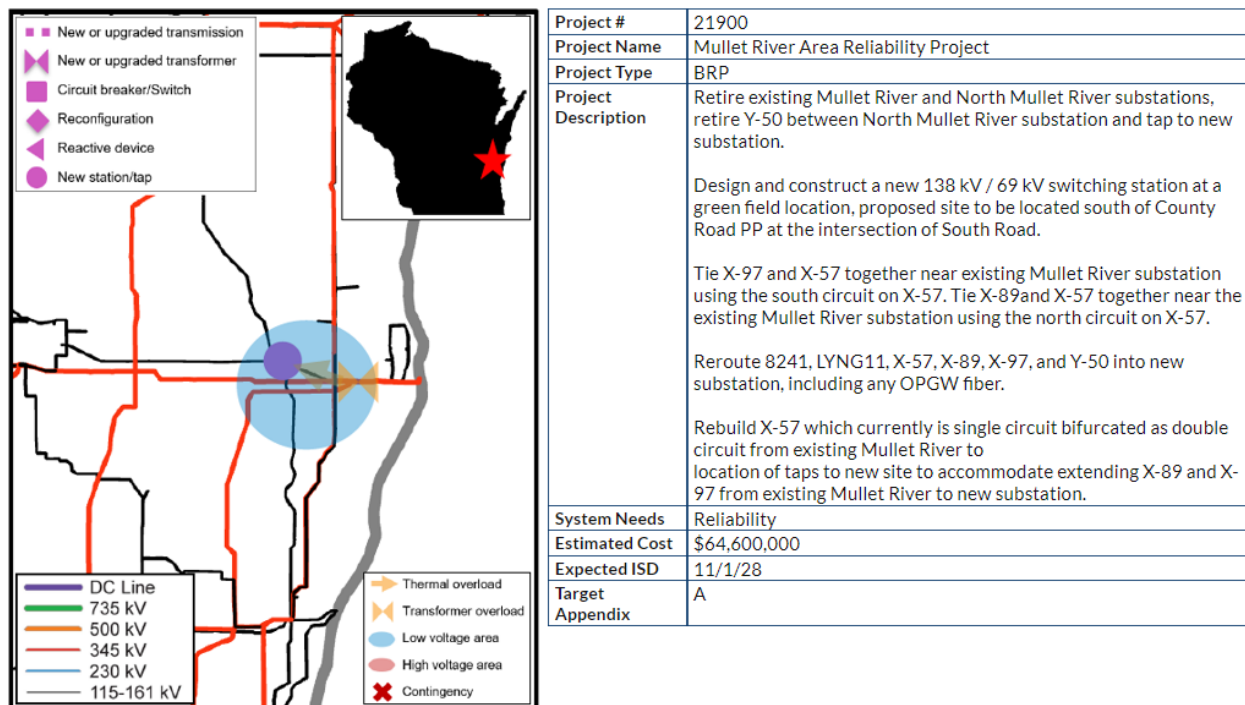


Figure 4.6.1-1: P21900 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** For NERC defined category P6 contingency events, multiple buses experience voltages below their emergency limits. Additionally, six unique non-BES elements experience thermal violations beyond their emergency limits. The new Mullet River Substation will provide the area multiple additional connections to enhance reliability under P6 events. All thermal/voltage issues are resolved, and the existing corrective action plan resulting in non-consequential load loss is no longer needed. This project will also address ATC’s asset renewal needs by retiring both the existing Mullet River and North Mullet River substations, which are space-constraint for modernization or expansion.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P6	Multiple non-BES elements	56-75	106-141	50

Table 4.6.1-1: P25300 Thermal loading drivers.



Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
P6	Multiple 138 and 69 kV buses	0.90	0.60-0.89	~1.01

Table 4.6.1-2: P14344 Voltage loading drivers.

## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
22798	Small Capital Project and Asset Renewal Program 2025	Age and Condition	6/30/2027	\$45.0
22911	Load Interconnection Program 2025	Load Growth	6/30/2027	\$19.0
23910	Eden – Rock Branch 69 kV (Y-106), Rebuild & OPGW	Age and Condition	12/31/2030	\$67.9
23951	Line Clearance Mitigation Program 2025	Local Reliability	6/30/2027	\$5.4
24778	Grant County, DIC, New Substation	Load Growth	1/1/2028	\$50.1
24842	Atlantic – Osceola 69 kV (Laurium2), Re-insulate	Age and Condition	12/31/2025	\$8.1
24922	Forest Junction SS and Remote End Relay Asset Renewal	Age and Condition	12/1/2027	\$6.5
24980	Pioneer SS Breaker Relay and Remote Ends Asset Renewal	Age and Condition	12/31/2027	\$3.8
24983	Hilltop – Council Creek 69 kV (Y-74), Rebuild & OPGW	Age and Condition	10/31/2026	\$56.0
25000	Lakefront SW YD – Revere Dr 69 kV (D-104), Partial Rebuild	Age and Condition	10/1/2028	\$9.0
25104	2nd St. Tap - 30th Ave. 69 kV (N-14), Partial Rebuild	Age and Condition	11/1/2027	\$7.5
25160	Weston - Morrison Ave 115 kV (Z-52), Reconductor	Local Reliability	6/1/2026	\$3.8
25162	Milwaukee Leased Dark Fiber Retirement Plan	Local Needs	12/31/2027	\$6.0
25163	Freeman - Presque Isle (X-118), OPGW Addition	Local Needs	12/31/2026	\$7.0
25164	Menominee - 30th Ave. 69 kV (Y-199), Rebuild	Age and Condition	6/1/2028	\$8.4
25165	Glory Road - Oak St. 69 kV (GLNY41), Partial Rebuild	Age and Condition	6/1/2028	\$6.0
25190	Badger SS Control House, Breaker, and Relay Asset Renewal	Age and Condition	6/1/2026	\$5.9
25220	Cuba City South, DIC, Sub Expansion	Load Growth	12/31/2027	\$11.0
25226	Union Townline, DIC, Sub Expansion	Load Growth	11/1/2026	\$11.6
*25299	Racine County, DIC, Nimbus Substation	Load Growth	4/1/2025	\$89.0



Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25309	Substation Technology Package #2 - 2024	Local Needs	12/31/2024	\$3.6
25348	Saratoga - 7 Mile Creek 138 kV, Construct New Line	Local Reliability	12/31/2027	\$10.3
50017	West Middleton - Str 36 69 kV (6967/6963), Rebuild Green Poles (CAC/CCA/SX) Replacements	Age and Condition	10/1/2026	\$7.2
50026	Kaukauna Central Tap - Melissa 138 kV (971K11), Rerate	Local Reliability	5/1/2025	\$7.0
50041	West Junction SS 138 kV Sectionalizing	Local Reliability	12/31/2026	\$8.7
50042	Substation Technology Package #2 - 2025	Local Needs	12/31/2025	\$10.5
50091	Milwaukee County, New DIC	Load Growth	6/1/2027	\$2.6
50102	University - Whitewater 138 kV (UNIG51), Partial Reconductor & OPGW	Local Reliability	12/31/2025	\$4.8
50136	Baraboo SS, DIC, Substation Relocation	Load Growth	6/1/2027	\$3.0
50137	Line ILKY31 and 6912 Grounding Improvement	Age and Condition	12/1/2025	\$4.0
50138	Dodge County, DIC, New Substation	Load Growth	6/1/2027	\$161.0

\* Project studied through Expedited Project Review (EPR) process.

## Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
50036	J1304 Big Hill Park SS Network Upgrades and Interconnection Facilities	7/31/2023	\$9.1
50107	J1513 Clintonville Swt St Network Upgrades and Interconnection Facilities	9/10/2028	\$3.2
50108	J1573 Plover SS Network Upgrades and Interconnection Facilities	9/10/2028	\$2.6
50109	J1814 Nordic SS Network Upgrades and Interconnection Facilities	9/10/2028	\$2.2
50110	J1751 Young St SS Network Upgrades and Interconnection Facilities	9/10/2028	\$9.7
50111	J1773 Edmund Swt St Network Upgrades and Interconnection Facilities	3/10/2030	\$19.7
50112	J1781 Hill Valley SS Network Upgrades and Interconnection Facilities	3/10/2030	\$7.2
50113	J1716 Eldorado SS Network Upgrades	3/19/2027	\$0.2
50120	J1615 Morgan SS Network Upgrades and Interconnection Facilities	9/10/2028	\$3.3
50184	Elm Road Generation POI Relocation Project	6/30/2026	\$22.6



### 4.6.2 Cedar Falls Utilities (CFU)

Cedar Falls Utilities and MISO are not recommending any new projects for MTEP24.

### 4.6.3 Central Minnesota Municipal Power Agency (CMMPA)

Central Minnesota Municipal Power Agency and MISO are not recommending any new projects for MTEP24.

### 4.6.4 City of Ames, IA (COA)

City of Ames, IA and MISO are not recommending any new projects for MTEP24.

### 4.6.5 Dairyland Power Cooperative (DPC)

#### DAIRYLAND POWER COOPERATIVE MTEP24 Summary



### Generator Interconnection Projects

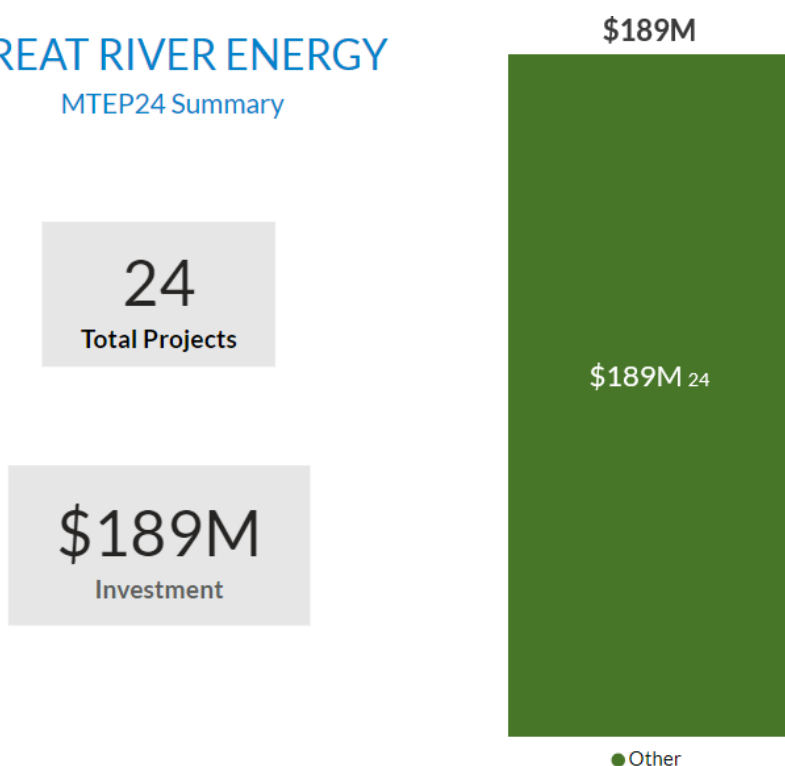
Project ID	Project Name	ISD	Estimated Cost (\$M)
25498	J898 Generation Interconnection Network Upgrades	9/1/2027	\$19.6
25505	J1314/S1039 Generation Interconnection Upgrades	6/30/2025	\$1.3



## 4.6.6 Great River Energy (GRE)

### GREAT RIVER ENERGY

MTEP24 Summary



### Other Projects

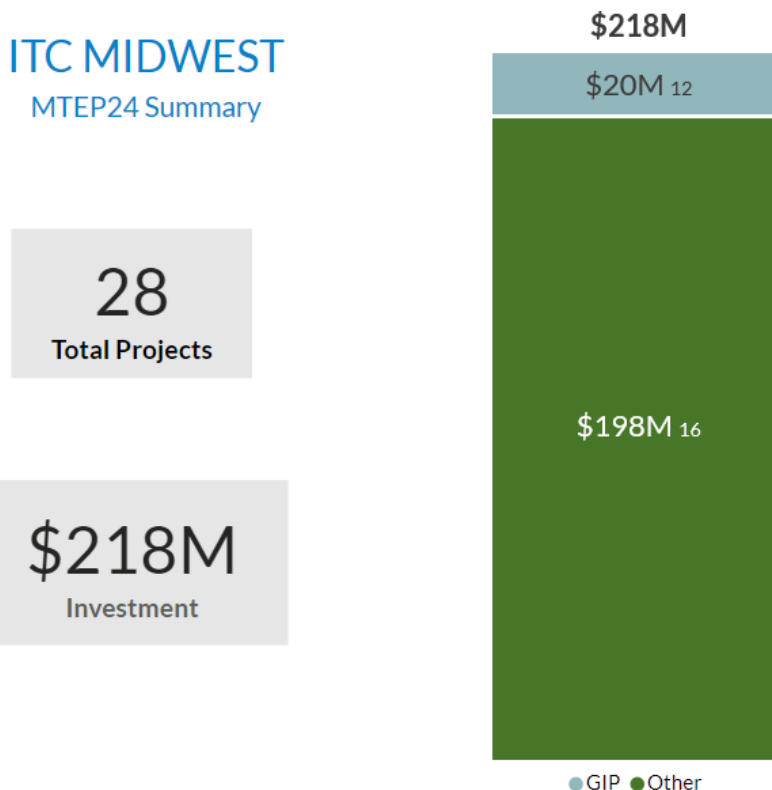
Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
23851	Stanton Breaker Replacement	Age and Condition	11/5/2026	\$2.2
25337	Meadowbrook to Side Lake Area Projects	Age and Condition	12/1/2027	\$12.1
25338	Victor to Woodland Rebuild Projects	Local Reliability	12/1/2027	\$9.3
25358	Burnsville Area Projects	Local Needs	5/31/2028	\$4.0
25373	Salem Breaker Station	Local Reliability	10/17/2025	\$1.3
25374	Blackberry Area Rebuild Projects	Local Reliability	12/10/2027	\$14.3
25381	Long Siding - Princeton Area Projects	Local Reliability	12/19/2027	\$5.7
25388	Cleveland Breaker Replacement	Local Reliability	10/1/2025	\$1.3
25391	Mud Lake to Riverton 230 kV Upgrade	Local Reliability	6/1/2027	\$1.1
25396	Otsego Area Rebuilds	Age and Condition	2/28/2029	\$40.1
25399	Congestion Mitigation Projects	Local Reliability	2/1/2028	\$23.5



Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25405	Lakeville Area Projects	Local Reliability	9/30/2025	\$1.2
25421	Sand Lake Area Projects	Age and Condition	11/20/2024	\$1.6
25422	Airport Substation Breaker Addition	Local Reliability	6/30/2026	\$5.7
25423	Fox Lake Area Upgrades	Age and Condition	9/30/2027	\$12.5
25445	Prairie Woods to Sunburg Rebuild	Age and Condition	12/31/2027	\$7.6
25452	Dickinson Breaker Replacement	Age and Condition	6/1/2027	\$1.8
25453	Medina Breaker Addition and Replacement	Age and Condition	11/30/2026	\$1.4
25454	East Chain Tie Line Projects	Local Reliability	10/6/2028	\$3.0
25456	Spring Creek Upgrade Projects	Age and Condition	12/31/2029	\$20.0
25469	Silver Lake Transformer Replacement	Age and Condition	12/31/2027	\$4.6
25471	St. Clair Tap Rebuild	Age and Condition	12/30/2027	\$4.7
25547	Blind Lake Breaker Addition	Local Reliability	12/30/2027	\$8.8
50101	Hodges Substation Tap	Load Growth	7/31/2025	\$0.8



## 4.6.7 ITC Midwest (ITCM)



### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25188	ITCM Boone South 69 kV Substation Interconnection	Load Growth	12/1/2025	\$4.4
25205	ITCM Meservey 69 kV Tap Rebuild	Age and Condition	12/31/2027	\$4.8
25206	ITCM Lime Creek 161/69 kV Transformer Replacement	Age and Condition	12/31/2026	\$5.7
25211	ITCM Customer Interconnects with short lead time 2026	Load Growth	12/31/2026	\$3.8
25212	ITC Midwest Asset Replacement Program 2026	Age and Condition	12/31/2026	\$52.6
25213	ITC Midwest SCADA Controlled Motor Operated Switch Addition Program 2025	Local Needs	12/31/2025	\$3.1
25241	ITCM Newton 8th St Control Enclosure, Relay, and SCADA Replacement	Age and Condition	12/31/2026	\$2.7
25247	ITCM Abbott - Marshalltown 161 kV Rebuild	Age and Condition	12/31/2028	\$10.8
25253	ITCM Flint Ridge Control Enclosure & 69 kV Tie Breaker Addition	Load Growth	12/31/2026	\$2.2



Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25306	ITCM Burlington 4th Street Control Enclosure & 69 kV Tie Breaker Addition	Load Growth	12/31/2026	\$2.0
25307	ITCM State Center Rural 69 kV Interconnection	Load Growth	12/15/2026	\$2.9
25308	ITCM Leon Rodeo 69 kV Substation Interconnection	Load Growth	12/31/2028	\$4.9
*25321	Winnebago City Substation Interconnection	Local Needs	10/31/2025	\$7.9
25345	ITCM Cleveland to Sheas Lake Rebuild	Age and Condition	12/30/2029	\$22.3
25346	ITCM Walcott 80 Substation Interconnection	Local Needs	12/30/2029	\$4.5
*50106	Big Cedar Interconnection	Load Growth	3/31/2026	\$63.7

\* Project studied through Expedited Project Review (EPR) process.

### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
25181	J1190 GIA TOIF Calamus East 161 kV Terminal Addition	10/1/2026	\$0.8
25182	J1313 GIA TOIF Karma 161 kV Terminal Addition	6/30/2025	\$0.4
25183	J1313 GIA NU Karma 161 kV Ring Bus Expansion	6/30/2025	\$0.6
25184	J1365 GIA TOIF Traer 161 kV Terminal Addition	9/6/2024	\$0.5
25197	J1734 GIA TOIF New Wever 161 kV Terminal	6/1/2024	\$0.6
25200	J1190 GIA NU Calamus East 161 kV Bus Expansion	10/1/2026	\$0.2
25201	J1325 GIA TOIF Magnolia 161 kV Terminal Addition	6/30/2025	\$0.4
25202	J1325 GIA NU Magnolia 161 kV Bus Expansion	6/30/2025	\$0.5
25204	J1365 GIA NU Traer 161 kV Ring Bus Expansion	7/26/2024	\$1.6
25221	J1432 GIA TOIF New Bryant 345 kV Terminal	9/1/2028	\$0.7
25222	J1432 GIA NU New Bryant 345 kV Switch Station	9/1/2028	\$12.8
25251	J1734 GIA NU Wever 161 kV Bus Expansion	7/31/2025	\$1.1



## 4.6.8 MidAmerican Energy Company (MEC)

### MIDAMERICAN ENERGY CO.

MTEP24 Summary

25

Total Projects

\$200M

Investment

\$200M

\$24M<sup>2</sup>

\$177M<sup>23</sup>

● GIP ● Other

### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25302	Hills 69 kV Breaker Replacement	Local Reliability	12/1/2025	\$0.5
25411	Second 69 kV Line into Rock Valley Town Substation	Load Growth	12/1/2027	\$1.6
25412	Line Rebuilds Blanket 2025 - 2027	Age and Condition	12/1/2029	\$45
25424	NE 6th St Substation and 161 kV line taps	Load Growth	6/1/2027	\$6.5
25425	Metro East Substation 161 kV line breakers	Local Reliability	12/1/2027	\$3.0
25428	New Shenandoah Substation and 69 kV lines	Load Growth	12/31/2027	\$19.1
25429	Liberty Substation 161-69 kV Expansion and Associated Lines	Local Reliability	12/1/2027	\$12.5
25431	Dakota Dunes: Install 69 kV Capacitor Bank	Local Reliability	6/1/2026	\$2.8
25437	Substation 85: Convert to Ring Bus	Local Reliability	12/31/2027	\$7.0
25439	Sub G 69 kV Line Taps	Local Reliability	12/31/2030	\$0.6
25447	Forest & Vermont Breaker Replacements	Local Reliability	12/1/2025	\$2.4



Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25448	Browns Woods Substation and 161 kV lines	Load Growth	12/1/2026	\$13.4
25449	Norwoodville Substation and 69 kV lines	Local Reliability	12/31/2027	\$16.9
25460	Southridge Substation and 161 kV line taps	Load Growth	6/1/2027	\$6.5
25461	Johnson Creek - Maffitt Lake 161 kV line	Load Growth	8/1/2027	\$15.3
25464	CBEC Upgrade Sync Check Relaying	Local Reliability	12/1/2025	\$1.2
25466	Maynard Substation: Replace Three 69 kV Breakers and Relaying	Age and Condition	12/31/2029	\$1.6
25467	Substation P Iowa City Transformer Breakers	Local Reliability	12/1/2025	\$0.9
50014	West Grand Add 161 kV Line Breakers	Load Growth	6/30/2025	\$3.0
50029	SE Soteria Add 161 kV Breakers	Load Growth	6/1/2026	\$6.0
50030	Johnson Creek Add 161 kV Breakers	Load Growth	6/1/2026	\$6.0
50031	Maffitt Lake Add 161 kV Breakers	Load Growth	6/1/2025	\$4.0
50075	Raun-Remsen 345 kV Structure Replacement	Local Needs	6/1/2025	\$0.7

### Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
25433	J1270 POI New 345 kV Interconnection Substation and 345 kV Line Taps	9/18/2025	\$19.5
25434	J1218/J1229 Network Upgrades at Sub 92	6/30/2027	\$4.0

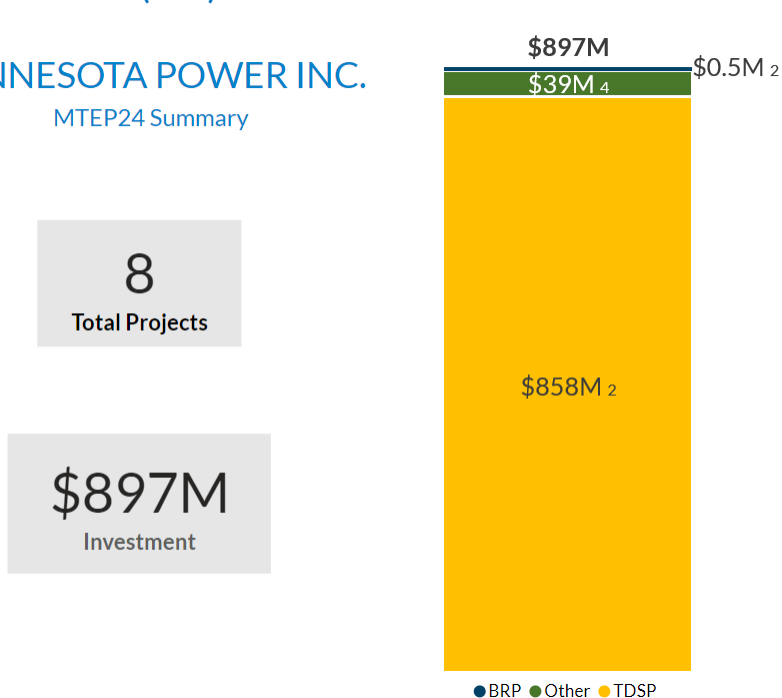
### 4.6.9 Minnesota Municipal Power Agency (MMPA)

Minnesota Municipal Power Agency and MISO are not recommending any new projects for MTEP24.



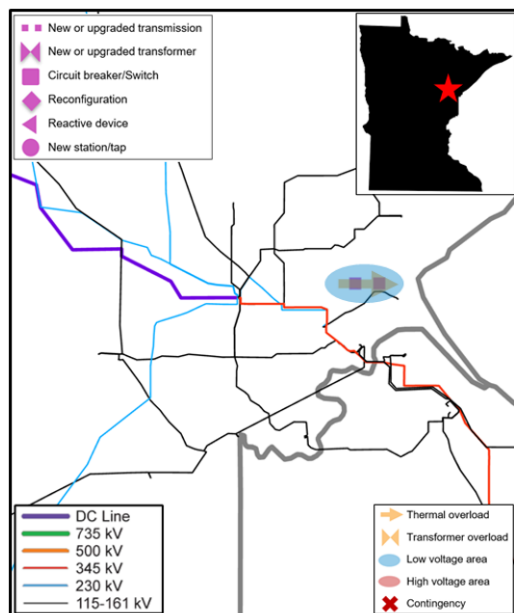
## 4.6.10 Minnesota Power (MP)

### MINNESOTA POWER INC. MTEP24 Summary



### Baseline Reliability Projects

#### P25141 – Arrowhead 115 kV SPF Upgrade



Project #	25141
Project Name	Arrowhead 115kV SPF Upgrade
Project Type	BRP
Project Description	Add redundancy or monitoring to the single point of failures to mitigate P5 contingencies associated with the Arrowhead 115kV buses.
System Needs	MTEP23 results shows multiple thermal and voltage violation in the Duluth area caused by multiple NERC defined P5 contingencies.
Estimated Cost	\$250,000
Expected ISD	12/31/24
Target Appendix	A

Figure 4.6.10-1: P25141 Geographic transmission map of project area and MTEP Portal project details.



**Project Justification:** The [MP] Thomson7–[MP] Fondulac 115kV line becomes overloaded to one hundred twenty-one (121%) percent and has several low voltage issues in year 2025 for a NERC defined category P5 contingency event. The reconfiguration of the Arrowhead substation area changes the P5 contingency that is created on this line and the overload and voltage impact no longer exists.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P5	[MP] Thomson7 - [MP] Fondulac	115	122	Project upgrade invalidates the single point of failure contingency impact on this line.

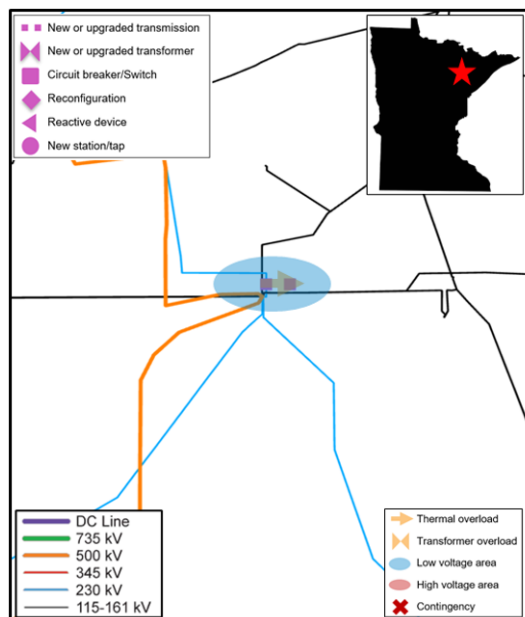
Table 4.6.10-1: P25141 Thermal loading drivers.

Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
P5	[MP] Hanes Road7	0.9	0.89	Project upgrade invalidates the single point of failure contingency impact at this bus.

Table 4.6.10-2: P25141 Voltage loading drivers.



## P25142 – Forbes 115 kV SPF Upgrade



Project #	25142
Project Name	Forbes 115kV SPF Upgrade
Project Type	BRP
Project Description	Add redundancy or monitoring to the single point of failures to mitigate P5 contingences associated with the Forbes 115kV buses.
System Needs	MTEP23 results shows multiple thermal and voltage violation in the Northern MN area caused by multiple NERC defined P5 contingencies.
Estimated Cost	\$250,000
Expected ISD	12/31/24
Target Appendix	A

Figure 4.6.10-2: P25142 Geographic transmission map of project area and MTEP Portal project details.

**Project Justification:** The [MP] Kewntnp7–[MP] Hibbing7 115kV line becomes overloaded to one hundred forty (140%) percent in year 2025 for a NERC defined category P5 contingency events. The reconfiguration of the Forbes substation area changes the P5 contingency that is created on this line and the overload issue is resolved.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P5	[MP] Kewntnp7 - [MP] Hibbing	115	141	Project upgrade invalidates the single point of failure contingency impact on this line.

Table 4.6.10-3: P25142 Thermal loading drivers.



## Other Projects

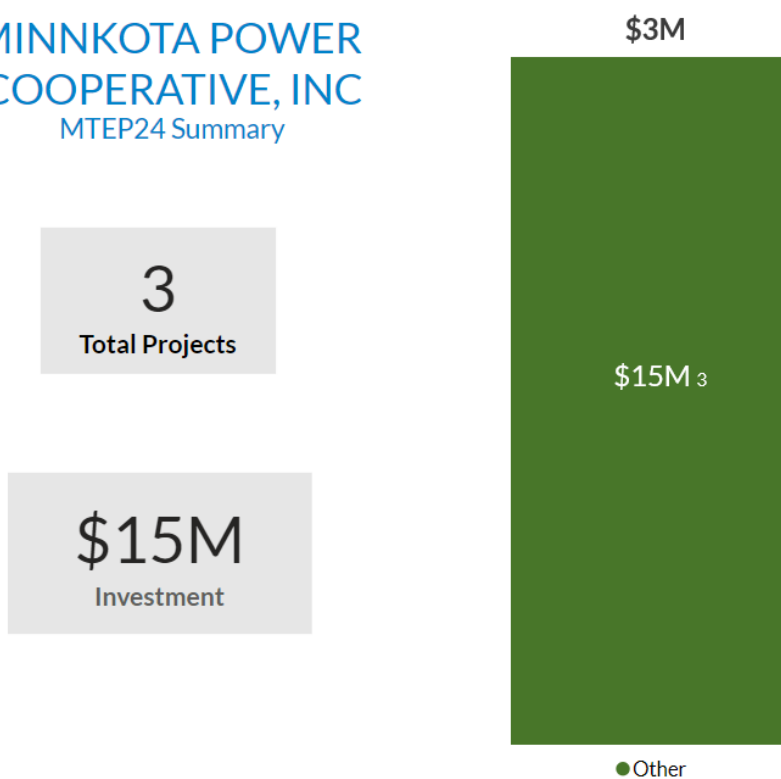
Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
20030	LSPI Cap Bank Asset Renewal	Age and Condition	12/31/2024	\$0.8
21767	13 Line Rebuild	Age and Condition	3/31/2027	\$12.0
23706	158 Line Rebuild	Age and Condition	3/31/2027	\$25.0
25311	Stinson PST Retirement	Age and Condition	12/31/2028	\$1.0

## Transmission Delivery Service Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
3856	HVDC 900MW Transmission Line Upgrades	12/31/2028	\$58.0
4295	HVDC Modernization Project	12/31/2028	\$800.0

### 4.6.11 Minnkota Power Cooperative (MPC)

#### MINNKOTA POWER COOPERATIVE, INC MTEP24 Summary



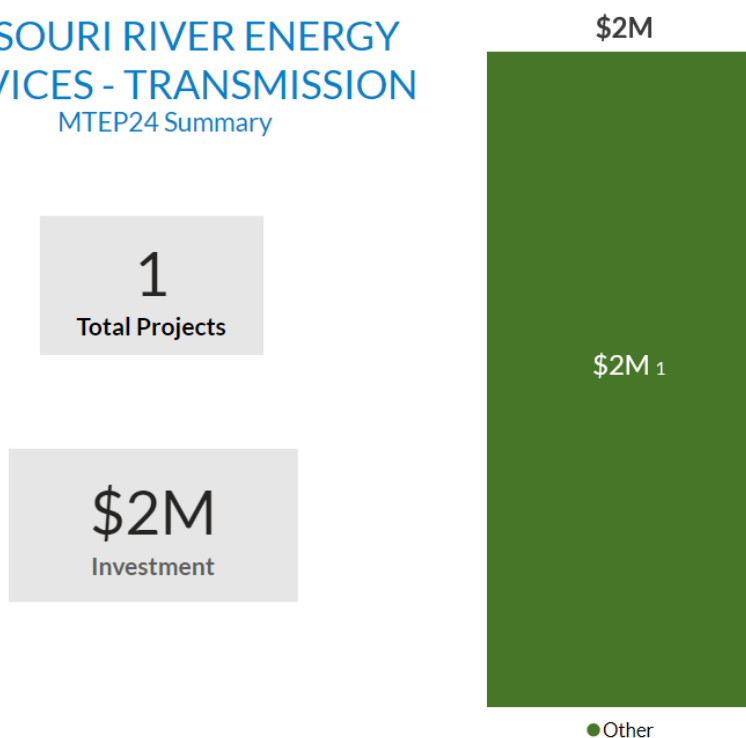


## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
24375	Center-Maple River 345 kV Foundation Restoration	Age and Condition	12/31/2028	\$7.6
24394	Maple River-Buffalo River 69 kV Line Rebuild	Age and Condition	12/31/2024	\$6.1
24413	Richer-Littlefork 230 kV Line Rebuild	Age and Condition	2/28/2025	\$1.6

## 4.6.12 Missouri River Energy Services (MRES)

### MISSOURI RIVER ENERGY SERVICES - TRANSMISSION MTEP24 Summary



## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25446	Willmar System Upgrades	Age and Condition	12/05/2025	\$2.0



### 4.6.13 Montana-Dakota Utilities Co. (MDU)

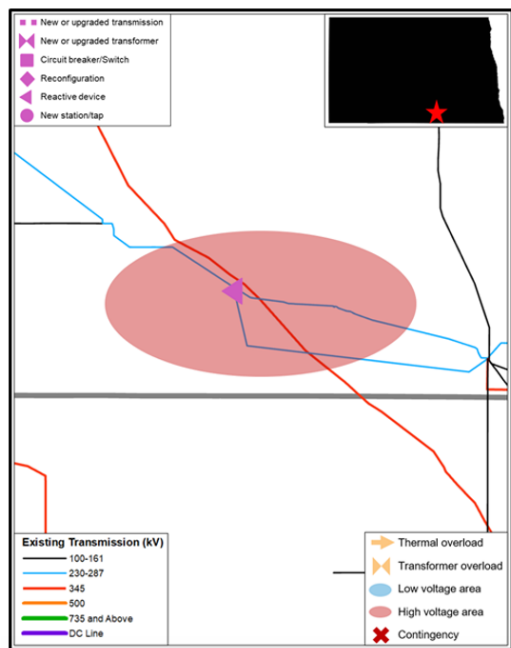
## MONTANA-DAKOTA UTILITIES

CO.  
MTEP24 Summary



### Baseline Reliability Projects

#### P25475 – Merricourt Reactor



Project #	25475
Project Name	Merricourt Reactor
Project Type	BRP
Project Description	Adding a 50 MVar reactor at Merricourt to support high voltages on the 230 kV when wind and load are low.
System Needs	To support high voltages on the 230 kV path when wind and load are low.
Estimated Cost	\$5,000,000
Expected ISD	12/31/26
Target Appendix	A

Figure 4.6.13-1: P25475 Geographic transmission map of project area and MTEP Portal project details.



**Project Justification:** The area around Merricourt, ND experiences high voltage violations on the 230 kV path when wind and load are low. Buses in the Merricourt area exceed their transient voltage threshold value of 1.20 pu due to NERC defined category P1 contingency events. Installing the 50 MVar reactor at Merricourt will remove these voltage violations in the area.

Cont. Type	Limiting Element	Summer Emergency Rating (pu)	Pre-Project (pre-cont.) Voltage (pu)	Post-Project (post-cont.) Voltage (pu)
P1	Merricourt 230 kV	1.20	1.21	1.22
P1	Tatanka North 230 kV	1.20	1.20	1.22
P1	Foxtail 230 kV	1.20	1.21	1.22

Table 4.6.13-1: P25475 Voltage loading drivers.

## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
*25301	Leola load addition	Load Growth	9/1/2024	\$3.6
*50037	Ellendale load 2 addition	Load Growth	9/1/2024	\$16.8
*50152	Ellendale load 3 addition	Load Growth	9/1/2025	\$12.6

\* Project studied through Expedited Project Review (EPR) process.

## Generator Interconnection Projects

Project ID	Project Name	ISD	Estimated Cost (\$M)
25503	MDU Network and Interconnection Upgrades - J1040	10/1/2026	\$18.1

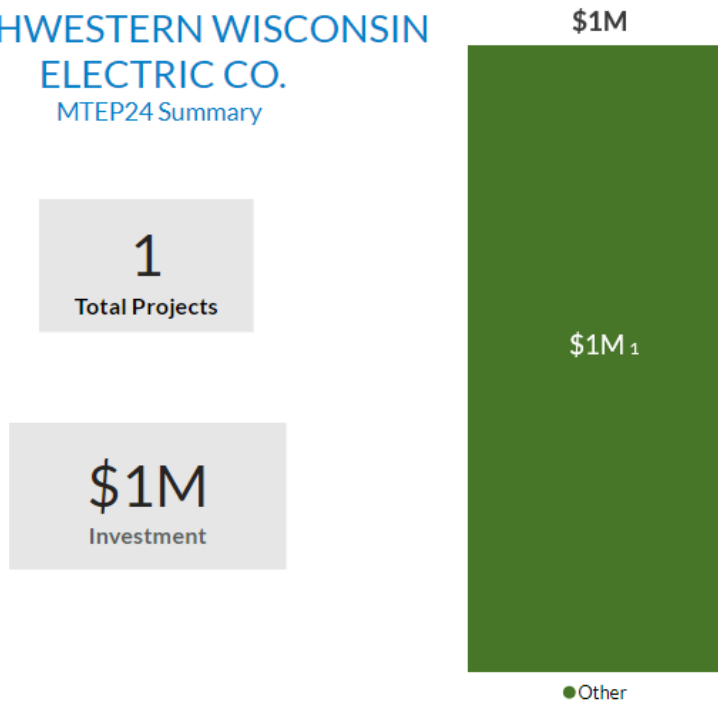
### 4.6.14 Muscatine Power and Water (MPW)

Muscatine Power and Water and MISO are not recommending any new projects for MTEP24.



## 4.6.15 Northwestern Wisconsin Electric (NWECE)

### NORTHWESTERN WISCONSIN ELECTRIC CO. MTEP24 Summary



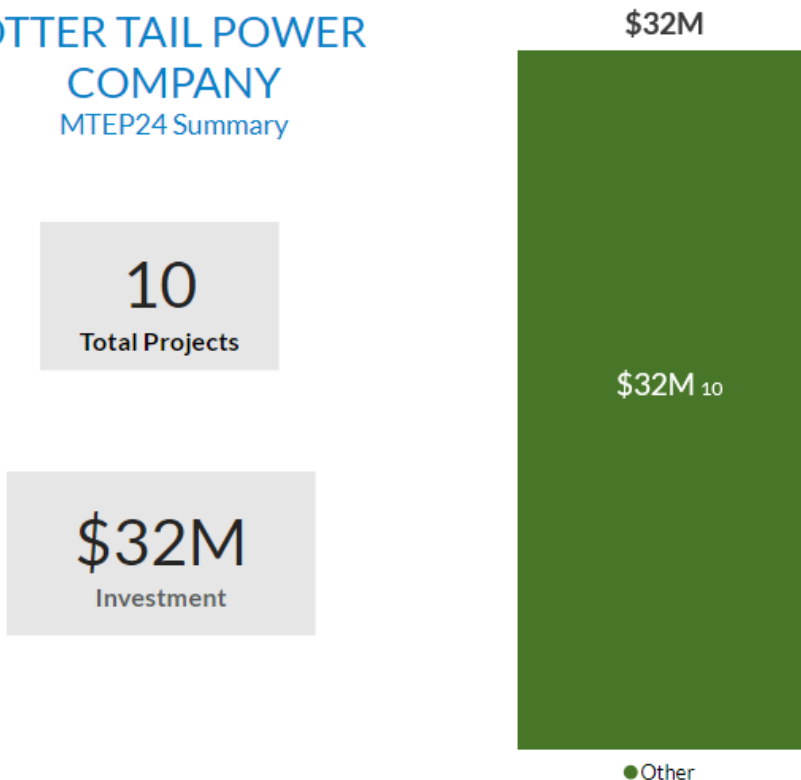
### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
50147	Frederic To Lewis - 69 kV - Clam Falls Drive Section	Local Reliability	5/1/2027	\$0.7



## 4.6.16 Otter Tail Power Company (OTP)

### OTTER TAIL POWER COMPANY MTEP24 Summary



### Other Projects

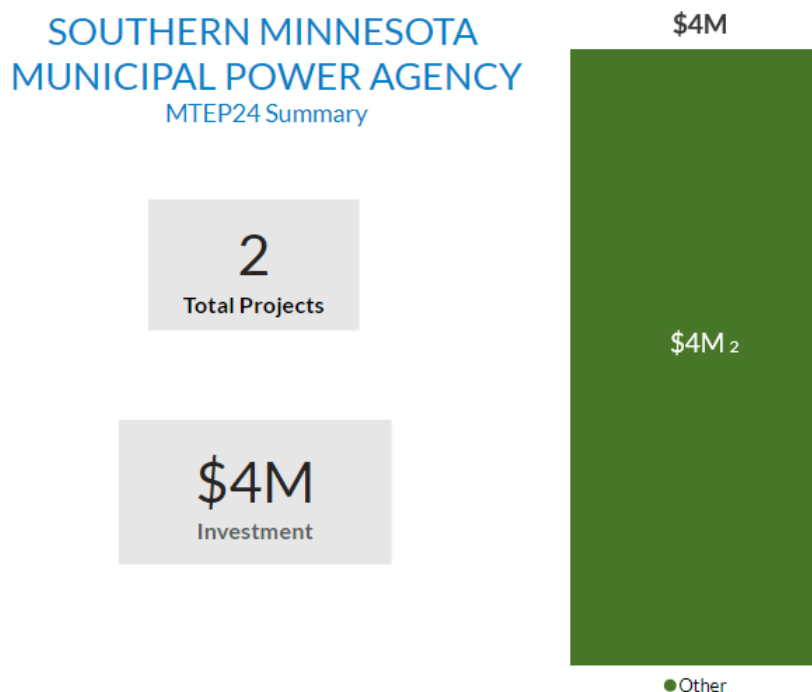
Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
10001	OTP Voltaire 115 kV Substation	Local Needs	12/31/2026	\$8.1
16289	Bemidji 115/12.5 kV Substation	Load Growth	12/31/2025	\$8.0
22487	OTP Audubon and Erie 230/115 kV Transformer Tap Adjustments	Local Reliability	11/30/2025	\$0.0
50005	OTP Donaldson 41.6 kV CB 215 Reconductor	Age and Condition	12/31/2025	\$0.8
50006	OTP Marvin - Corona Area 41.6 kV Rebuild	Local Reliability	12/31/2025	\$1.5
50007	OTP Omemee Rebuild 41.6 kV Line	Local Reliability	11/1/2025	\$0.8
50008	OTP Oklee Rebuild 41.6 kV Tap	Local Reliability	12/31/2025	\$0.5
50009	OTP Winger 41.6 kV Line Reroute	Local Reliability	12/31/2025	\$0.1
50012	OTP Buffalo Area 41.6 kV Rebuild	Age and Condition	12/31/2028	\$3.8
9997	OTP Rolette 230 kV Substation	Local Needs	12/31/2026	\$8.7



### 4.6.17 Rochester Public Utilities (RPU)

Rochester Public Utilities and MISO are not recommending any new projects for MTEP24.

### 4.6.18 Southern Minnesota Municipal Power Agency (SMMPA)



#### Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25199	Fairmont 10th St 69 kV Substation Modernization	Age and Condition	2/1/2025	\$1.8
25260	Loon Lake 69 kV Substation Modernization	Age and Condition	2/1/2025	\$1.8

### 4.6.19 Wilmar Municipal Utilities (WMU)

Wilmar Municipal Utilities and MISO are not recommending any new projects for MTEP24.

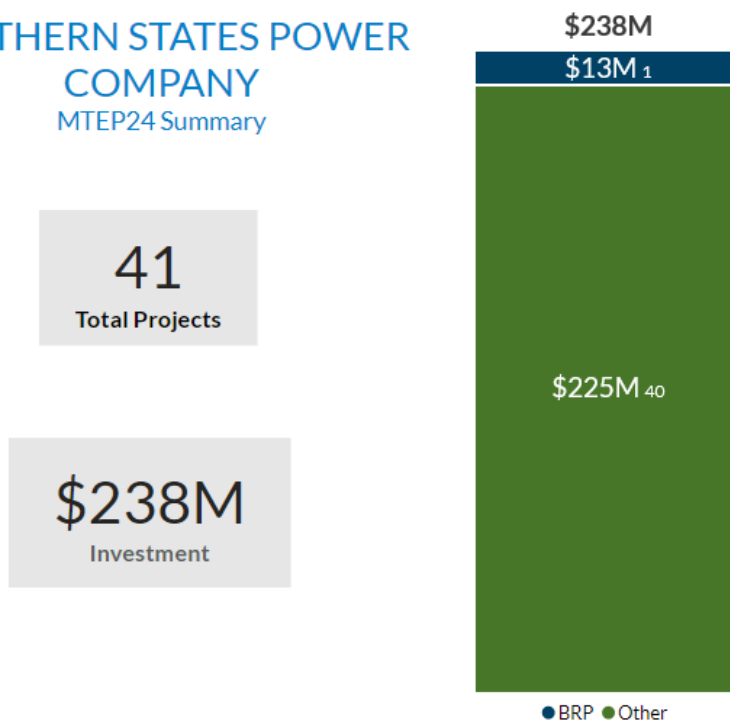
### 4.6.20 WPPI Energy (WPPI)

WPPI Energy and MISO are not recommending any new projects for MTEP24.



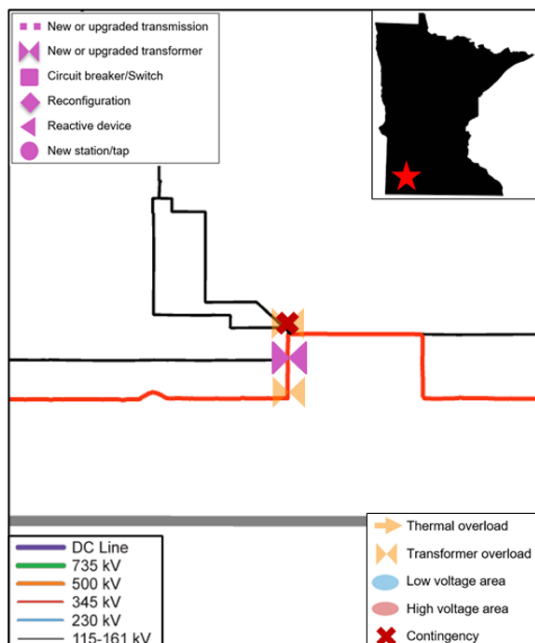
## 4.6.21 Xcel Energy (Northern States Power)

### NORTHERN STATES POWER COMPANY MTEP24 Summary



### Baseline Reliability Projects

#### P25300 – Nobles County Third Transformer



Project #	25300
Project Name	Nobles County Third Transformer
Project Type	BRP
Project Description	Add third 345/115 kV transformer with tertiary reactor at Nobles County.
System Needs	Needed to prevent overloads for P6 contingencies in high wind scenarios.
Estimated Cost	\$13,250,000
Expected ISD	5/1/28
Target Appendix	A

Figure 4.6.21-1: P25300 Geographic transmission map of project area and MTEP Portal project details.



**Project Justification:** The transformers at Nobles County substation become overloaded for several NERC defined P6 contingency events in high wind conditions. Adding a third transformer at the substation relieves these overloads to well below emergency limits.

Cont. Type	Limiting Element	Summer Emergency Rating (MVA)	Pre-Project (pre-cont.) Loading (%)	Post-Project (post-cont.) Loading (%)
P6	Nobles Transformer #9	598	111	56
P6	Nobles Transformer #10	598	111	56

Table 4.6.21-1: P25300 Thermal loading drivers.

## Other Projects

Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25257	W3419 Str 162 Switch Replacement	Age and Condition	12/31/2024	\$0.7
25258	Prior TR02 And Feeder	Local Reliability	6/15/2026	\$7.3
25270	0760 Redwing - Lake City - Str 217 Rebuild	Age and Condition	12/31/2026	\$10.0
25272	MNN MOD Installation	Local Reliability	6/13/2025	\$3.6
25273	Bateman Substation Breaker Upgrade	Local Reliability	12/31/2025	\$1.0
25285	0891 West St Cloud - Crossroads Rebuild	Age and Condition	12/15/2025	\$3.5
25286	0754 Buffalo - Maple Lake Rebuild	Age and Condition	12/15/2025	\$6.0
25287	W3402 Loyal - Spokesville Rebuild	Age and Condition	12/31/2025	\$6.0
25288	0774 Goodview - Str 444 Rebuild	Age and Condition	12/31/2025	\$6.0
25289	0821 Highbridge - Miriam Park Refurb	Age and Condition	12/31/2025	\$4.0
25293	0725 Tracy Switching Station to 5535 Str 191 Rebuild	Age and Condition	12/31/2024	\$0.8
25294	Reinforce Tracy Switching Station TR01	Local Reliability	10/15/2025	\$2.2
25295	2023 Line Clearance Mitigations	Local Reliability	9/30/2023	\$0.6
25296	Install Lawrence LAW TR02	Local Reliability	6/15/2025	\$4.2
25297	Blue Heron Second Transformer	Local Reliability	10/15/2025	\$5.8
25317	Wakefield Protection Upgrade	Local Reliability	9/30/2024	\$0.5
25319	Sheas Lake Pilot Channel Replacement	Age and Condition	4/1/2024	\$0.3



Project ID	Project Name	Other Breakdown	ISD	Estimated Cost (\$M)
25322	0890 Granite City - Crossroads Rebuild	Age and Condition	12/15/2025	\$4.0
25323	St Croix Valley Upgrades	Local Reliability	9/30/2029	\$45.0
25324	Downing Substation	Local Reliability	10/15/2025	\$4.0
25325	0986 K Frame Replacement	Age and Condition	12/31/2026	\$15.0
25340	Albany Second Transformer	Local Reliability	10/15/2025	\$5.5
25341	0987 K Frame Replacement	Age and Condition	12/31/2026	\$15.0
25342	Missouri Creek Substation	Age and Condition	6/1/2029	\$9.0
25356	CNC-BUL-SHC Pilot Channel Replacement	Age and Condition	1/15/2024	\$0.3
25357	BYN-NRH Pilot Channel Replacement	Age and Condition	12/15/2023	\$0.2
25368	W3418 Insulator Replacement and Refurb	Age and Condition	12/31/2024	\$0.5
25369	W3410 Ellsworth Switch Replacement	Local Reliability	12/31/2024	\$0.5
25370	W3401 Insulator Replacement and Refurb	Age and Condition	12/31/2024	\$1.0
25375	W3415 EGA-DUR-ARK Insulator Replacement and Refurbishment	Age and Condition	12/1/2025	\$1.0
25376	Line 0876 Redwood Falls Tap Switch Replacement	Age and Condition	12/1/2024	\$0.4
25377	DPC North Wal Interconnection	Load Growth	12/1/2024	\$0.5
25378	Gaylord Substation Rebuild	Age and Condition	10/15/2026	\$5.1
25379	Rebuild Wabasha Substation	Age and Condition	12/31/2026	\$3.0
25380	OTP Erie Junction Interconnection	Local Reliability	11/1/2023	\$0.7
25506	Inver Grove - Inver Hills 115 kV Rebuild to Double Circuit 115 kV	Age and Condition	12/31/2025	\$10.0
25507	Umore Park 115 kV Substation	Load Growth	12/31/2025	\$35.0
50002	Overstress Breaker Replacement	Age and Condition	5/1/2026	\$0.8
50020	0711 Redwing - Str 11 Rebuild	Age and Condition	12/31/2026	\$2.0
50061	CAPX Fargo-TC OPWG Replacement	Age and Condition	12/15/2026	\$4.3

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