MTEP23 Project Selection

Entergy Arkansas LLC
Arkansas Electric Cooperative Corporation

3rd South Subregional Planning Meeting

September 6, 2023

Purpose and Key Takeaways

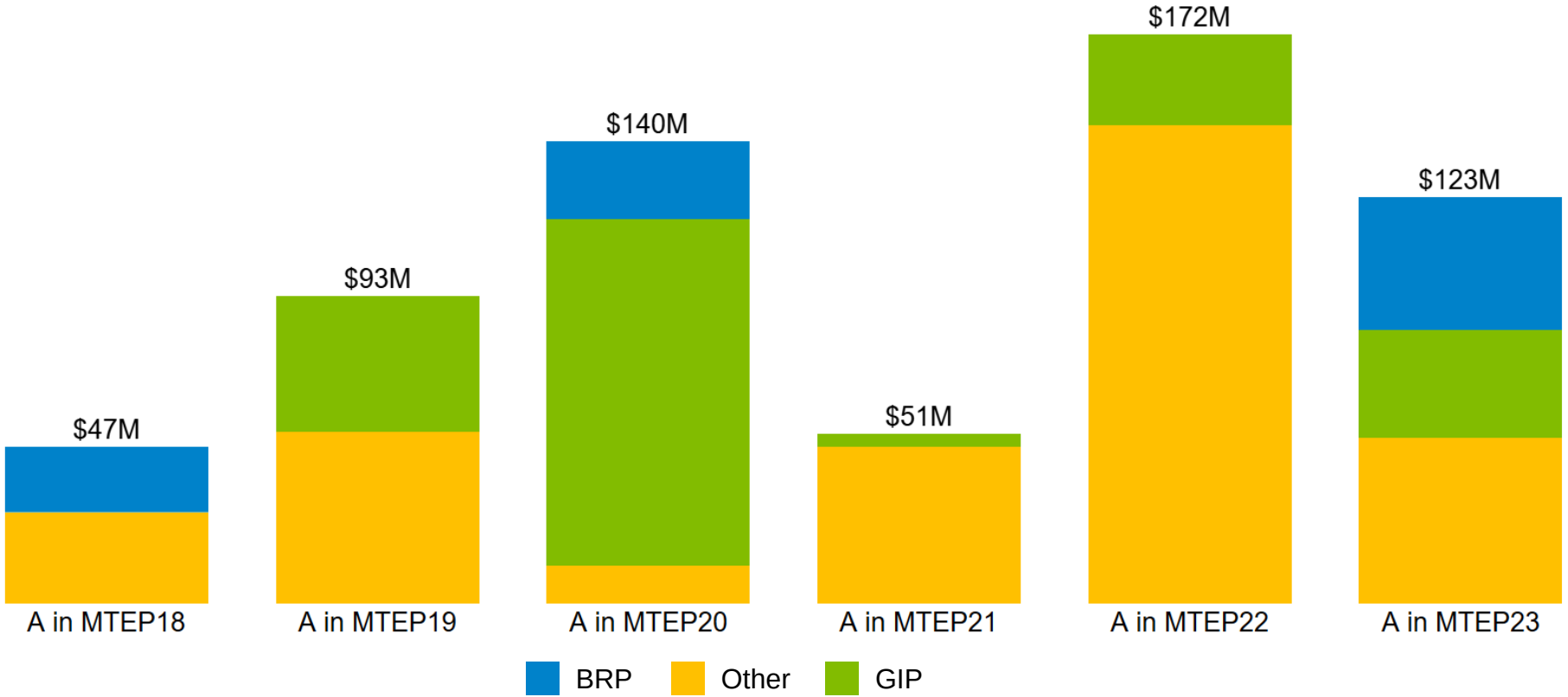
Purpose

To present MISO's final MTEP23 project recommendations

- Entergy Arkansas proposed 12 new projects at an estimated cost of $123 million for MTEP23.
- Present projects submitted for MTEP23 approval and describe any proposed alternatives.
- MISO identified P3/P6 reliability issues and is developing corrective action plans collaboratively with TOs

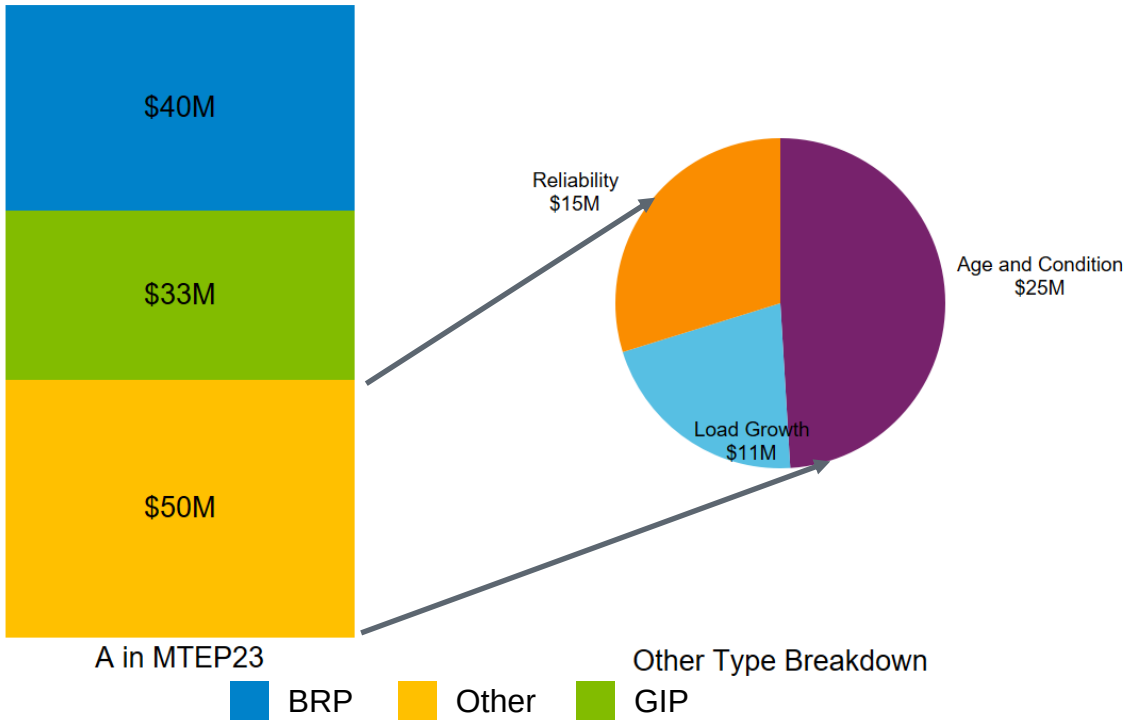
Entergy Arkansas LLC (EAL)

EAL: Appendix A Historical Data



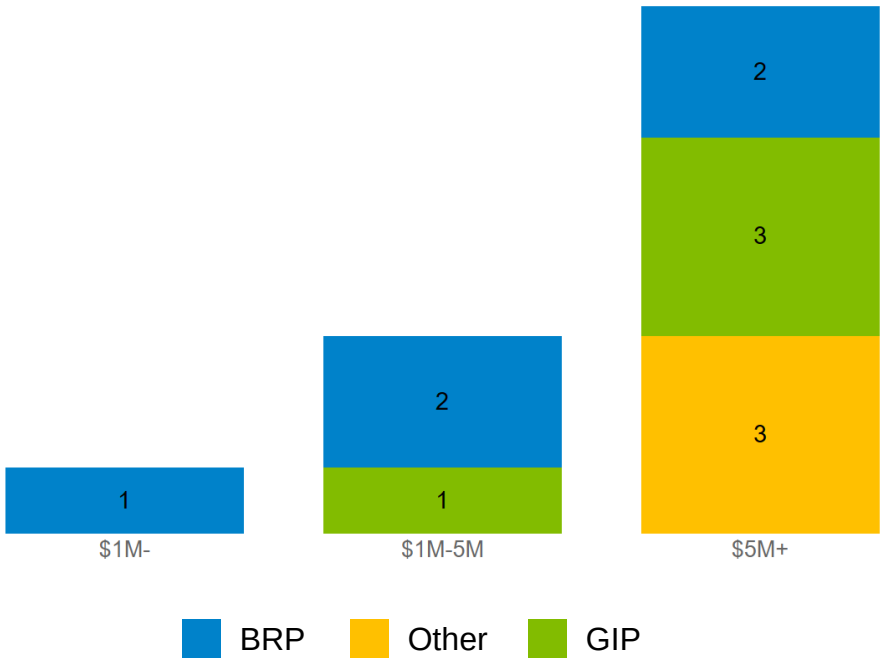
Project information as of August 21, 2023

EAL: Proposed Appendix A investment for MTEP23 is Less than MTEP22. Proposed Target A in MTEP23 Projects: 5 BRP, 4 GIP and 3 Other Projects



Project information as of August 21, 2023

EAL: 12 new projects at an estimated cost of $123 million proposed in MTEP23



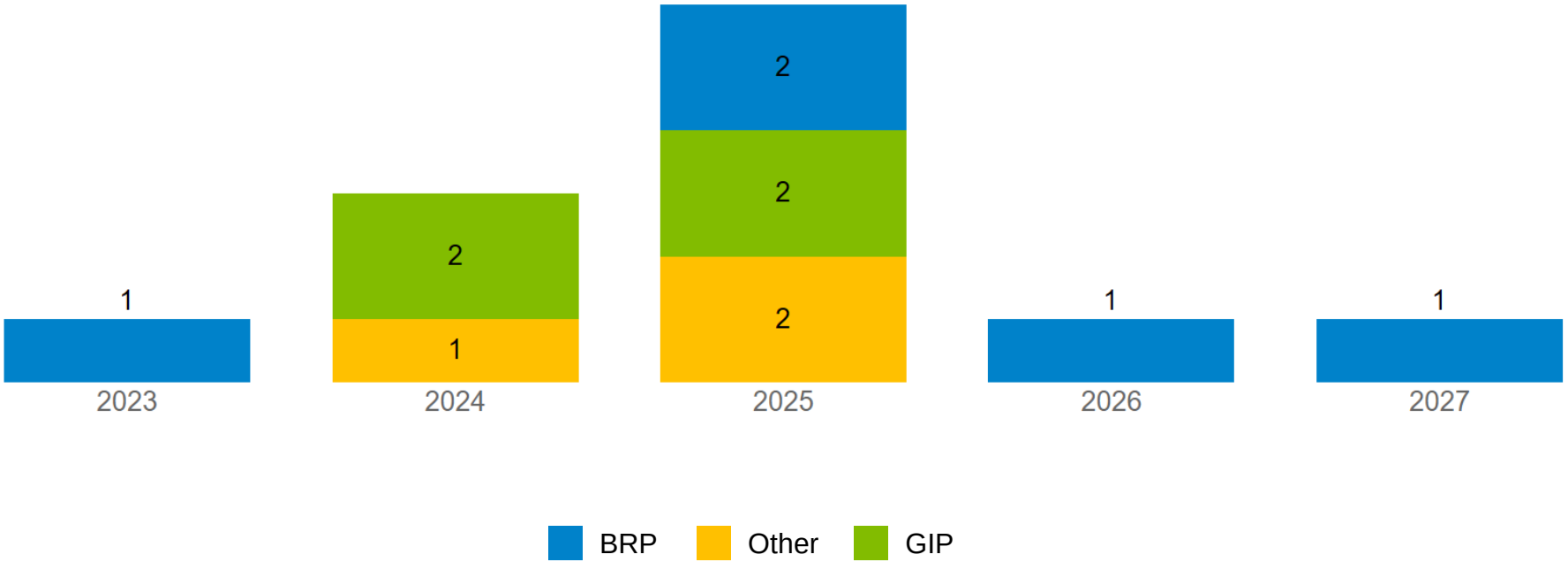
12 projects are targeted for Appendix A in MTEP23

- Of these 12 projects:
  - 8 have an estimated cost greater than $5M
  - 3 have an estimated cost between $1M-$5M
  - 1 have an estimated cost less than $1M
- Of these 12 projects:
  - 5 Baseline Reliability
  - 3 Other
  - 4 Generation Interconnection Project

0 projects proposed for Appendix B

Project information as of August 21, 2023

EAL: MTEP23 Targeted Appendix A Projects Expected In-Service Dates



Project information as of August 21, 2023

EAL: MTEP23 Projects Withdrawn since SPM2

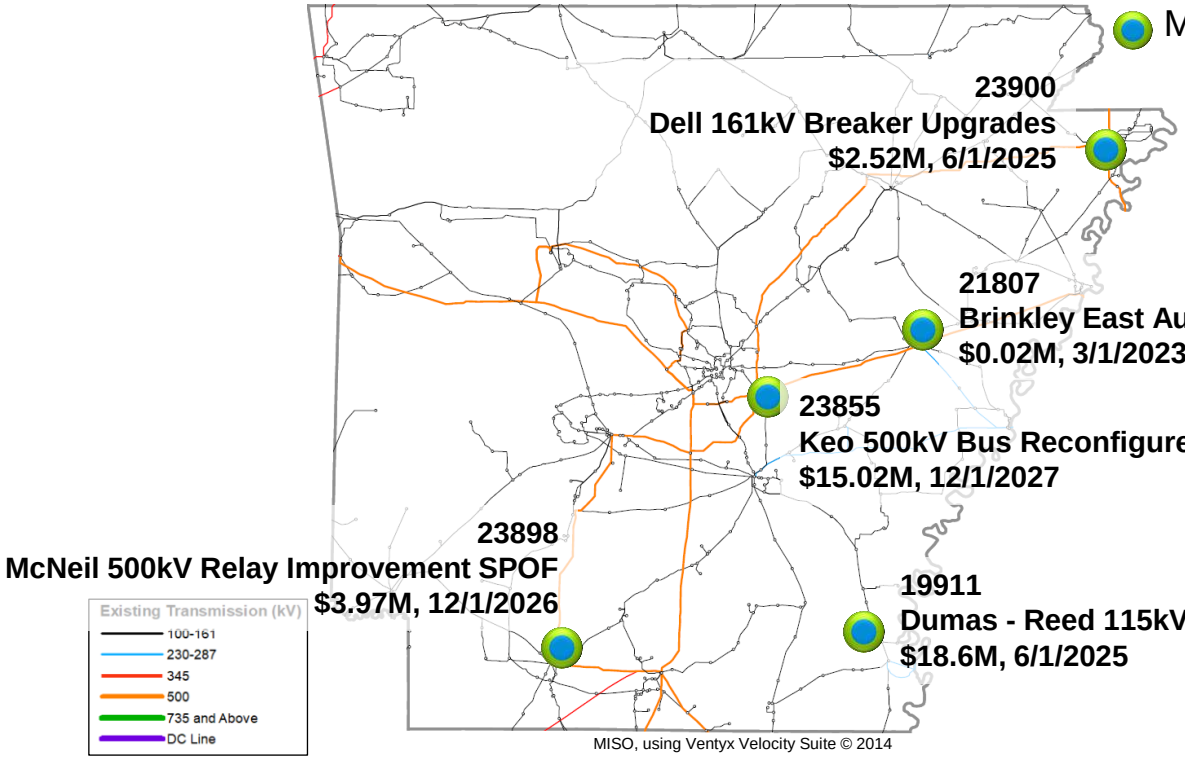
Project ID	Project Name	Project Type	Reason for Withdrawal	Expected ISD
12053	Batesville 161 kV: Install transmission breakers	BRP	Detailed scoping revealed scope changes and costs increases that cause the enhanced reliability project to no longer be justifiable	12/1/2024

Information as of August 21, 2023.

EAL: MTEP23 Proposed Alternatives

MISO did not receive any proposed alternatives for MTEP23 as of date slide is created.

EAL: 5 BRP projects address various needs at an estimated cost of $40M

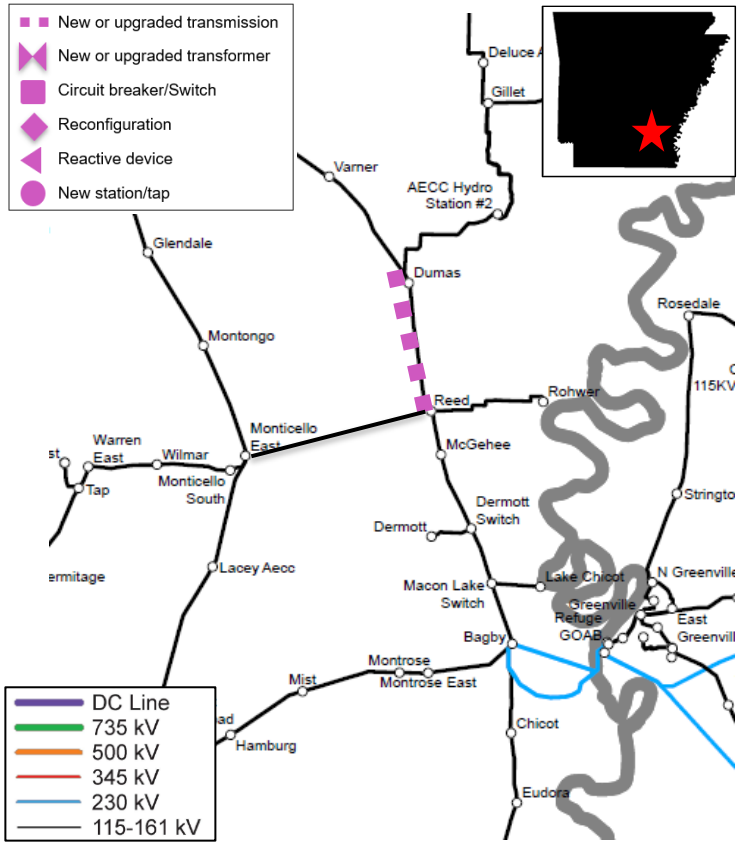


Detailed project information is included in the Project information Tables

MTEP23 Baseline Reliability Projects (BRP)

EAL – 19911 Dumas - Reed 115kV: Rebuild Line – Project Justification

- **Baseline Reliability Project**
- **Project description**
  - Rebuild the 15 mile 115kV line from Dumas - Reed to a minimum through path rating of 259 MVA.
- **System Needs**
  - Thermal overloads on the Dumas - Reed 115kV line for the loss of the Sterlington - El Dorado 500kV or Sterlington - El Dorado 500kV/Sterlington - El Dorado East 115kV double circuit. (NERC TPL P1.2 and P7.1 events)
- **Estimated Cost:** $18.6M
- **Expected ISD:** 6/1/2025
- **Target Appendix:** A in MTEP23

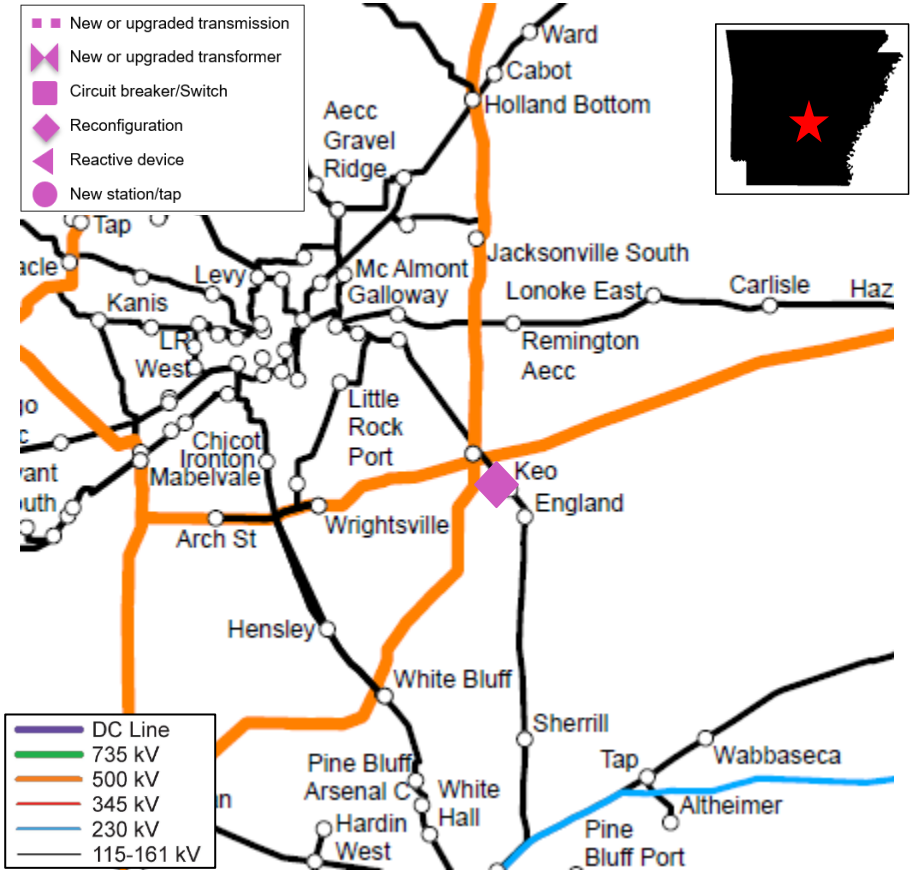


EAL – 21807 Brinkley East Autos: Change Tap Settings – Project Justification

- **Baseline Reliability Project**
- **Project description**
  - Change the high side taps on the Brinkley East 230/115kV Auto to 242 kV [230kV Auto completed on 3/8/2022].
- **System Needs**
  - These tap setting changes are needed to mitigate high voltage around the Brinkley area for the loss of the Walnut Bend Solar plant and the Brinkley East - Marianna 115kV line section. This is a P2.3 contingency.
- **Estimated Cost:** $0.02M
- **Expected ISD:** 3/1/2023
- **Target Appendix:** A in MTEP23

EAL – 23855 Keo 500kV Bus Reconfigure – Project Justification

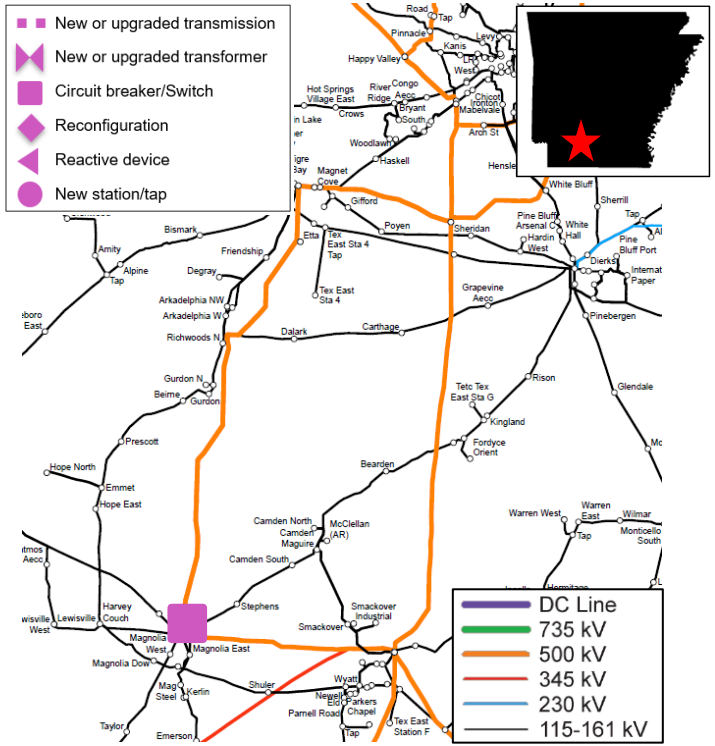
- **Baseline Reliability Project**
- **Project description**
  - Reconfigure the Keo 500 kV substation so that the Keo – White Bluff & Keo - Wrightsville 500kV lines are not lost for a P2.3 internal breaker fault.
- **System Needs**
  - The P2.3 internal breaker fault resulting in the simultaneous loss of the Keo – White Bluff & Keo - Wrightsville 500 kV lines causes thermal overloads on the Conway S. – Ranchette 161 kV, Jacksonville North – Holland Bottom 115 kV, and Jacksonville North – Sylvan Hill 115 kV line sections as well as near thermal overload on the Fourche – LR East 115 kV line section. Compliance with NERC TPL 001-5.
- **Estimated Cost:** $15.02M
- **Expected ISD:** 12/1/2027
- **Target Appendix:** A in MTEP23



MISO, using Ventyx Velocity Suite © 2014

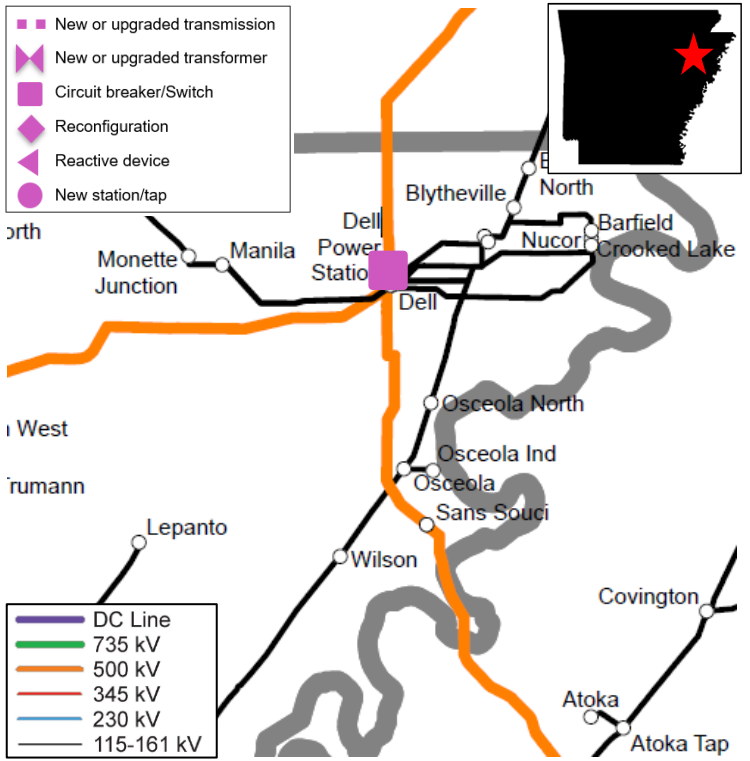
EAL – 23898 McNeil 500kV Relay Improvement SPOF – Project Justification

- **Baseline Reliability Project**
- **Project description**
  - Ensure the McNeil – El Dorado 500 kV line, the McNeil 500/115 kV auto and the McNeil – Etta 500 kV line have redundant high-speed protection. This includes protection schemes with independent CT and PT winding inputs. Ensure dual battery installations or monitoring sufficient to FERC 754 guidelines.
- **System Needs**
  - Potential for up to ~7 GW of generation trip (ANO 1&2, Union CCGT, Ouachita CCGT, Perryville CCGT, Murray Hydro, etc.) for a 3PH fault on the McNeil 500 kV bus with non-redundant relay failure for the McNeil – El Dorado 500 kV line protection, McNeil 500/115 kV auto protection, or the McNeil – Etta 500 kV line protection.
- **Estimated Cost:** $3.97M
- **Expected ISD:** 12/1/2026
- **Target Appendix:** A in MTEP23

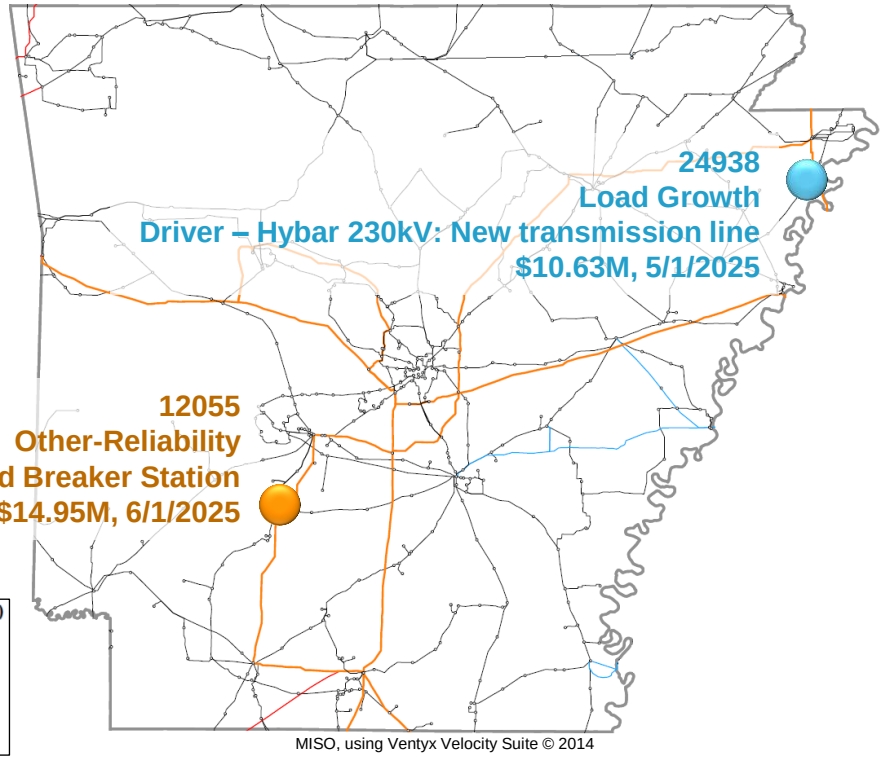


EAL – 23900 Dell 161kV Breaker Upgrades – Project Justification

- **Baseline Reliability Project**
- **Project description**
  - Upgrade Dell 161 kV Breakers B2240, B2205, and B2235 with a 63kA breaker.
- **System Needs**
  - The Dell 161kV Breakers B2240, B2205 and B2235 are underrated. This project is to maintain compliance with NERC TPL-001-5 and Entergy's Local Transmission Criteria
- **Estimated Cost:** $2.52M
- **Expected ISD:** 6/1/2025
- **Target Appendix:** A in MTEP23



EAL: 3 Other Projects identified by MISO/proposed by EAL to address reliability or age and condition issues on Bulk Electric System



- Local Reliability
- Load Growth
- Age & Condition
- Other Local Needs

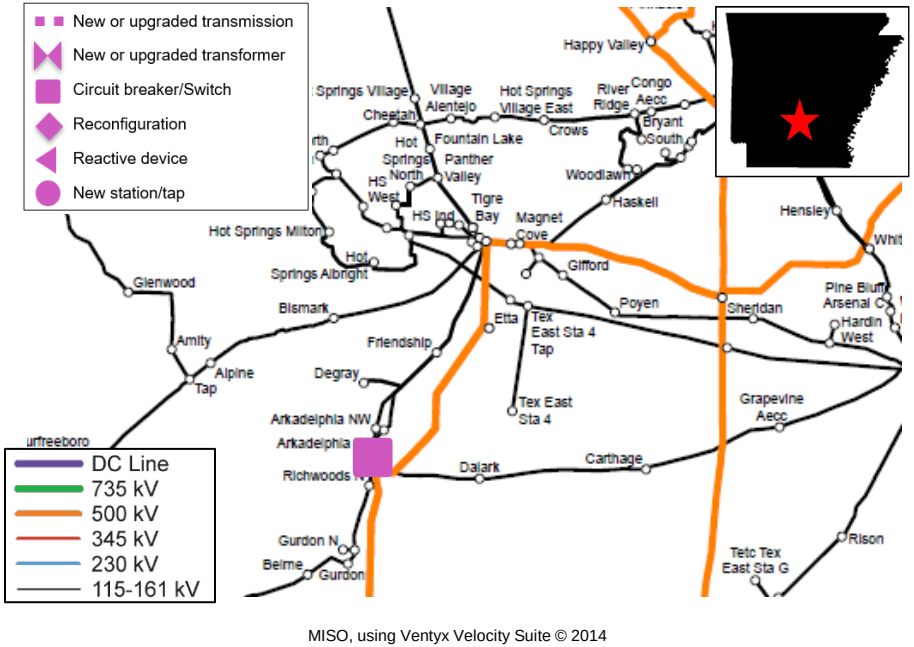
23899
Other-Age and Condition
2024 EAL Asset Renewal Program
$24.64M, 12/31/2024

See Project Information Tables for more details.

MTEP23 Other Projects

EAL – 12055 Gum Springs 115kV: Build Breaker Station – Project Justification

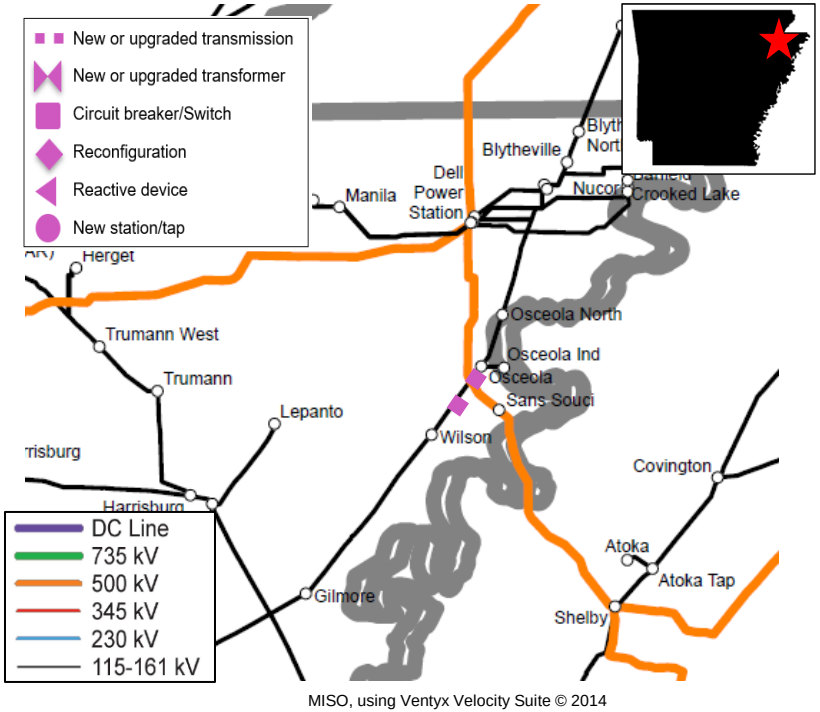
- **Other - Reliability Project**
- **Project description**
  - Create a new 115kV switching station by tapping the Arkadelphia North – Richwood 115kV and the Arkadelphia West – Dalark 115kV line sections.
- **System Needs**
  - This is connecting the Degray – Woodward Breaker to Breaker 115kV line and the Hot Springs EHV – Gurdon Breaker to Breaker 115kV line. Total of over 10,000 customers on both lines. The Degray - Woodward has 77 miles of exposure breaker to breaker. The Hot Springs EHV - Gurdon 115kV line has 40 miles of exposure breaker to breaker.
- **Estimated Cost:** $14.95M
- **Expected ISD:** 6/1/2026
- **Target Appendix:** A in MTEP23



MISO, using Ventyx Velocity Suite © 2014

EAL – 24938 Driver - Hybar 230kV: New transmission line – Project Justification

- **Other – Load Growth Project**
- **Project description**
  - Entergy Arkansas will build a new 2 mile 230kV radial transmission line from the Driver 230kV substation to a new customer build Hybar 230kV substation. A new circuit breaker and relay upgrades will be needed at Driver 230kV substation. Two 500kV transmission lines will be raised for the new 230kV line crossing.
- **System Needs**
  - This project is needed to serve a new 80 MW steel mill.
- **Estimated Cost:** $10.63M
- **Expected ISD:** 6/1/2025
- **Target Appendix:** A in MTEP23

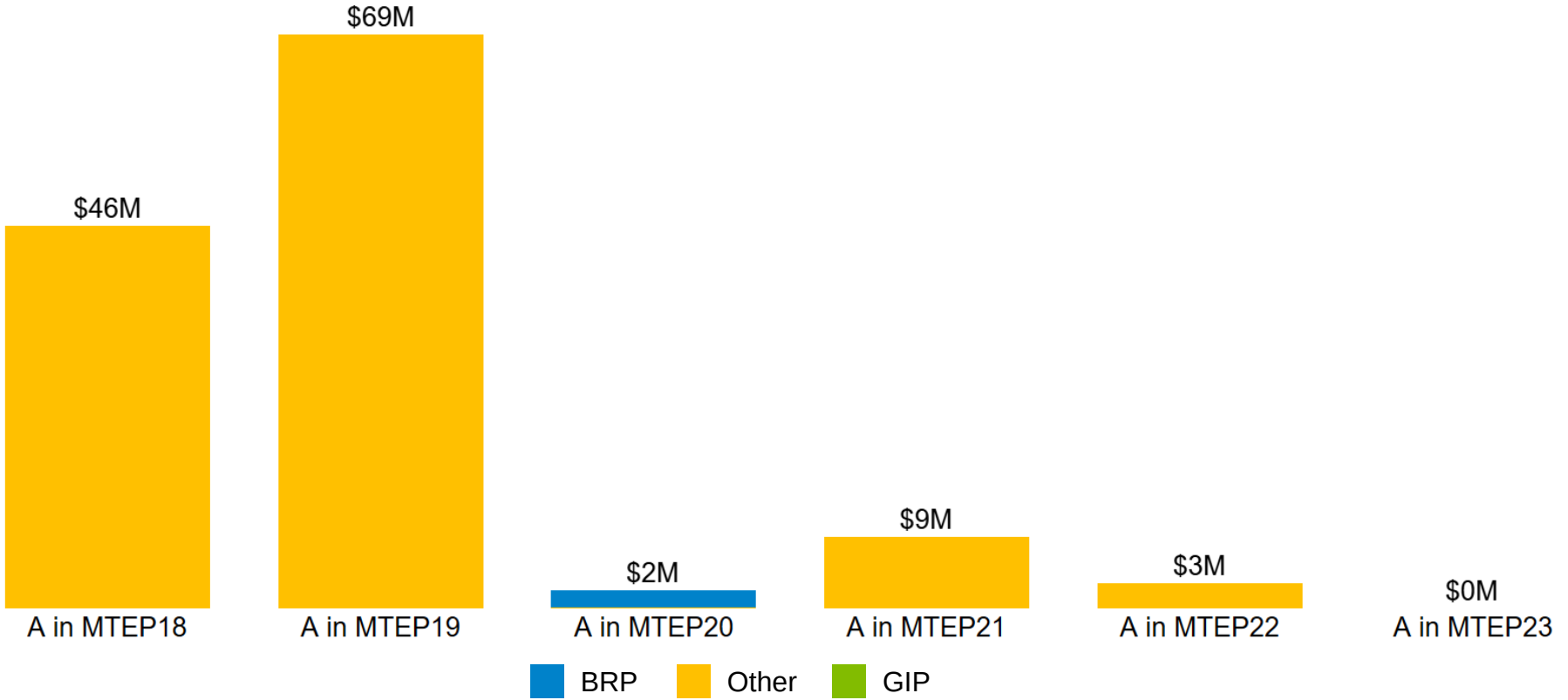


EAL – 23899 2024 EAL Asset Renewal Program – Project Justification

- **Other - Age and Condition Project**
- **Project description**
  - The asset renewal programs replace aged and/or degraded transmission line and transmission substation assets. Entergy continuously reviews asset health to prioritize those replacements and the specifics for the 2024 asset renewal plans have not yet been finalized.
- **System Needs**
  - The program is needed to replace or repair aging or failing transmission assets across EAL's territory.
- **Estimated Cost:** $24.64M
- **Expected ISD:** 12/31/2024
- **Target Appendix:** A in MTEP23

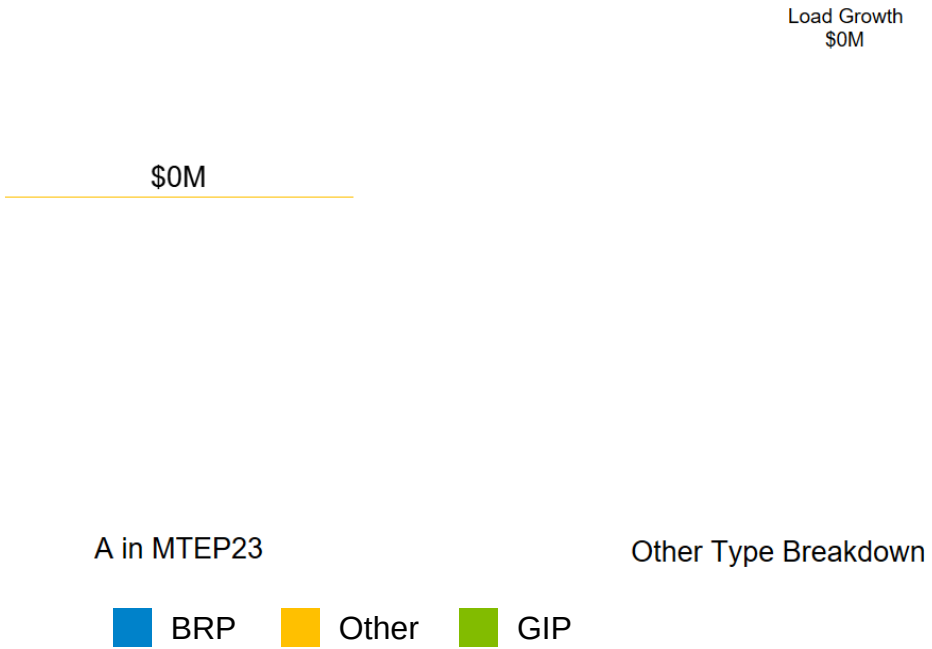
Arkansas Electric Cooperative Corporation (AECC)

AECC: Appendix A Historical Data



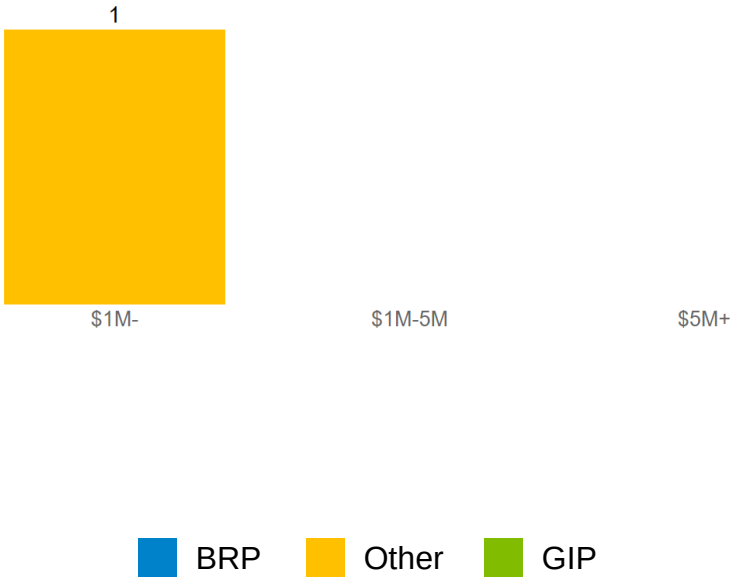
Project information as of August 21, 2023

AECC: Proposed Appendix A investment for MTEP23 is Less than MTEP22. Proposed Target A in MTEP23 Projects: 0 BRP, 0 GIP and 1 Other Project



Project information as of August 21, 2023

AECC: 1 new project at an estimated cost of $0 proposed in MTEP23



1 project is targeted for Appendix A in MTEP23

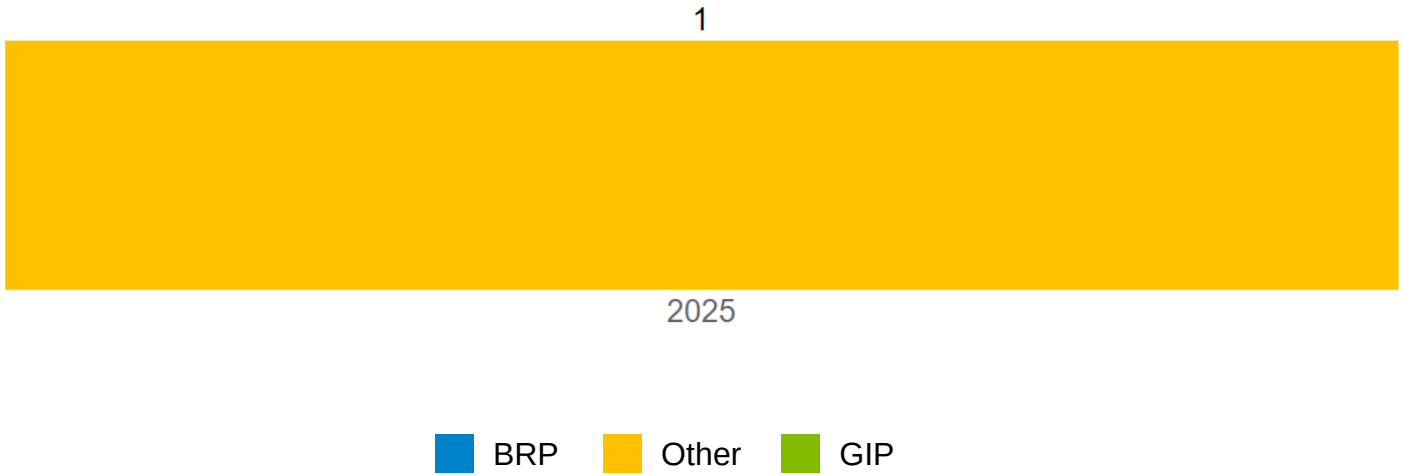
- 0 have an estimated cost greater than $5M
- 0 have an estimated cost between $1M-$5M
- 1 have an estimated cost less than $1M

- 0 Baseline Reliability
- 1 Other
- 0 Generation Interconnection Project

1 project proposed for Appendix B

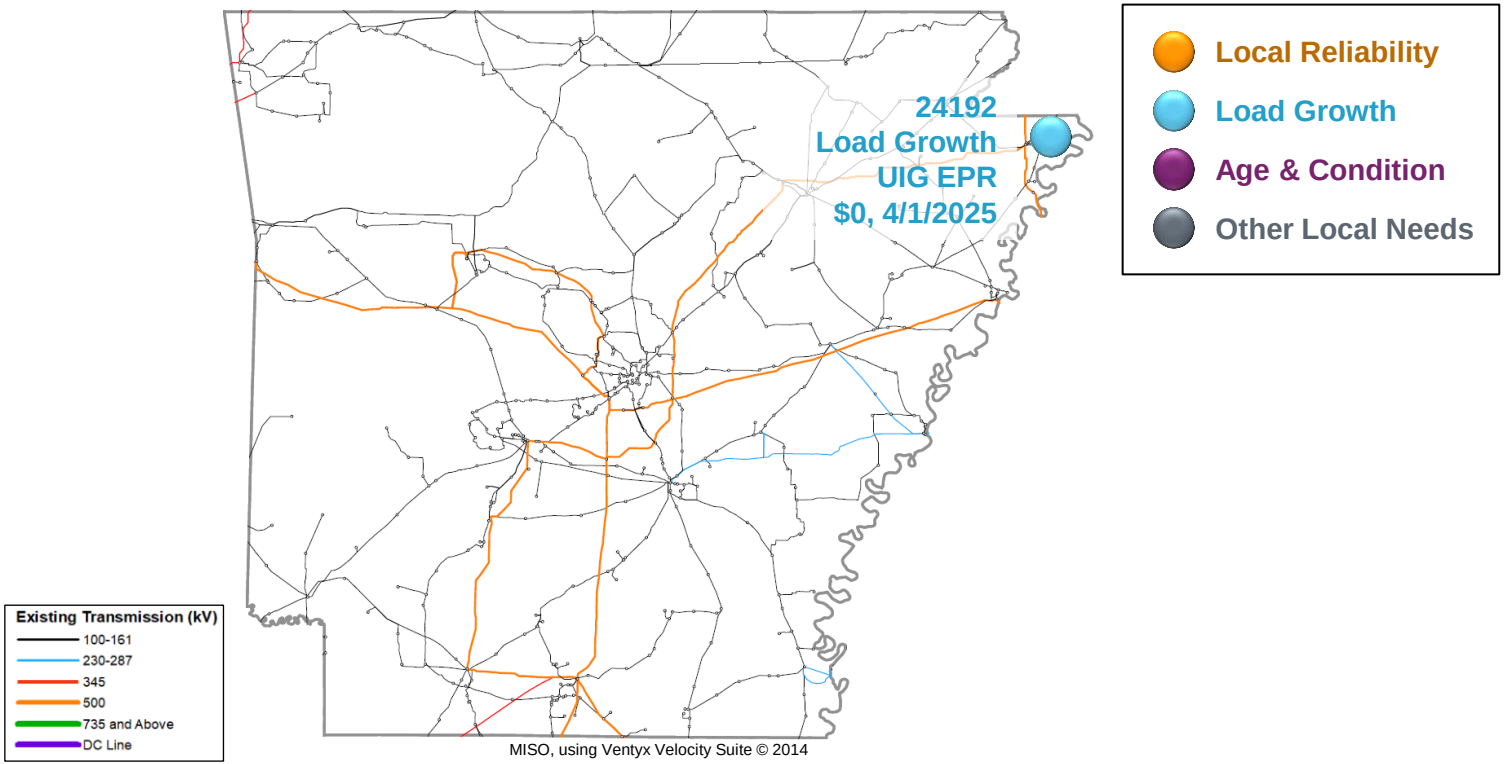
Project information as of August 21, 2023

AECC: MTEP23 Targeted Appendix A Projects Expected In-Service Dates



Project information as of August 21, 2023

AECC: 1 Other Projects Submitted (1 EPR previously presented)



See Project Information Tables for more details.

Going forward

- MISO
  - Continue independent reliability assessment to identify solutions for issues seen in the paired contingency runs
  - Recommend MTEP23 project portfolio for Board of Directors approval
  - Finalize MTEP23 Report
- Stakeholders
  - Provide any remaining comments on the TO-proposed projects and alternatives
  - Provide inputs on identified issues from the paired contingency runs
  - Provide input on MTEP23 Report

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Questions?

Appendix

NERC TPL Contingency Categories

TPL Category	Old TPL Category	Description	Acceptable Mitigation			
			BES Level	Physical Upgrade Required?	Load Shed or Redispatch Allowed?	Interruption of Firm Transmission Service Allowed?
P0	A	System intact	EHV, HV	Yes	No	No
P1	B	Single contingency (Fault of a transmission/generation element)	EHV, HV	Yes	No	No
P2	C1, C2	Single event which may result in multiple element outage. Open line w/o fault, bus section fault, internal breaker fault	EHV HV	Yes No	No Yes	No Yes
P3	C3	Loss of generator unit followed by system adjustments + P1. *No load shed is allowed*	EHV, HV	Yes	Yes	No
P4	C	Fault + stuck breaker events	EHV HV	Yes No	No Yes	No Yes
P5	N/A	Fault + relay failure to operate (new)	EHV HV	Yes No	No Yes	No Yes
P6	C3	Two overlapping singles (not generator)	EHV, HV	No	Yes	Yes
P7	C4, C5	Common tower outages; loss of DC bi-pole	EHV, HV	No	Yes	Yes

Project Information Tables

EAL: 5 Baseline Reliability Projects proposed

Project ID	Project Name	Project Description	System Need	Expected ISD	Estimated Cost
19911	Dumas - Reed 115kV: Rebuild Line	Rebuild the 15 mile 115kV line from Dumas - Reed to a minimum through path rating of 259 MVA.	Thermal overloads on the Dumas - Reed 115kV line for the loss of the Sterlington - El Dorado 500kV or Sterlington - El Dorado 500kV/Sterlington - El Dorado East 115kV double circuit. (NERC TPL P1.2 and P7.1 eve..	June 1, 2025	$18.60M
21807	Brinkley East 230/115kV Auto: Change Tap Setting	Change the high side taps on the Brinkley East 230/115kV Auto to 242 kV [230kV Auto completed on 3/8/2022].	This tap setting change is needed to mitigate high voltage around the Brinkley area for the loss of the Walnut Bend Solar plant and the Brinkley East - Marianna 115kV line section. This is a P2.3 contingency.	March 1, 2023	$0.02M
23855	Keo 500kV Bus Reconfigure	Reconfigure the Keo 500 kV substation so that the Keo – White Bluff & Keo - Wrightsville 500kV lines are not lost for a P2.3 internal breaker fault.	The P2.3 internal breaker fault resulting in the simultaneous loss of the Keo – White Bluff & Keo - Wrightsville 500 kV lines causes thermal overloads on the Conway S. – Ranchette 161 kV, Jacksonville North – Holland Bottom 115 k..	December 1, 2027	$15.02M
23898	McNeil 500kV Relay Improvement SPOF	Ensure the McNeil – El Dorado 500 kV line, the McNeil 500/115 kV auto and the McNeil – Etta 500 kV line have redundant high-speed protection. This includes protection schemes with independent CT and PT winding inputs. Ensure dual battery installations or monitoring sufficient to FERC 754 guidelines.	Potential for up to ~7 GW of generation trip (ANO 1&2, Union CCGT, Ouachita CCGT, Perryville CCGT, Murray Hydro, etc.) for a 3PH fault on the McNeil 500 kV bus with non-redundant relay failure for the McNeil – El ..	December 1, 2026	$3.97M
23900	Dell 161kV Breaker Upgrades	Upgrade Dell 161 kV Breakers B2240, B2205, and B2235 with a 63kA breaker.	The Dell 161kV Breakers B2240, B2205 and B2235 are underrated. This project is to maintain compliance with NERC TPL-001-5 and Entergy's Local Transmission Criteria	June 1, 2025	$2.52M

EAL: 3 Other Projects proposed

Project ID	Project Name	Project Description	System Need	Expected ISD	Estimated Cost
12055	Gum Springs 115kV: Build Breaker Station	Create a new 115kV switching station by tapping the Arkadelphia North – Richwood 115kV and the Arkadelphia West – Dalark 115kV line sections.	This is connecting the Degray – Woodward Breaker to Breaker 115kV line and the Hot Springs EHV – Gurdon Breaker to Breaker 115kV line. Total of over 10,000 customers on both lines. The Degray - Woodward has 77 mil..	June 1, 2025	$14.95M
23899	2024 EAL Asset Renewal Program	The asset renewal programs replace aged and/or degraded transmission line and transmission substation assets. Entergy continuously reviews asset health to prioritize those replacements and the specifics for the 2024 asset renewal plans have not yet been finalized.	The program is needed to replace or repair aging or failing transmission assets across EAL's territory.	December 31, 2024	$24.64M
24938	Driver - Hybar 230kV: New transmission line	Entergy Arkansas will build a new 2 mile 230kV radial transmission line from the Driver 230kV substation to a new customer build Hybar 230kV substation. A new circuit breaker and relay upgrades will be needed at Driver 230kV substation. Two 500kV transmission lines will be raised for the new 230kV line crossing.	This project is needed to serve a new 80 MW steel mill.	May 1, 2025	$10.63M

EAL: 4 Generation Interconnection Projects proposed

Project ID	Project Name	Project Description	System Need	Expected ISD	Estimated Cost
24697	Aurelle 115kV: POI for J1612	A new point of interconnection for J1612 100 MW solar project. The interconnection customer will install the SANU. Network Upgrades at El Dorado 115kV and Sterlington 115kV will be installed by Entergy as well as the transmission line cut-in. New underground fiber will be installed between Strong and Huttig tap stations.	This project is needed for the J1612 executed GIA.	November 27, 2024	$13.03M
24879	Prairie Creek 161kV: POI for J1816	A new interconnection three breaker ring-bus substation will be constructed on the Fisher - Cherry Valley 161kV transmission line. Line protection and breaker control panels will be installed at Newport and Parkin 161kV stations. The existing wave trap will be removed from Pecan Street 161kV station. New underground fiber will be installed between Prairie Creek and Cherry Valley 161kV substation.	This new switching station is needed to interconnect the J1816 solar project per the requirements of the executed GIA.	November 1, 2025	$12.60M
24898	Flat Lake 161kV J1562: Cut-in Switching Station	The interconnection customer will self build the switching station needed to interconnect J1562 200 MW solar project. The cut-in will connect the new POI station to the existing Blytheville I-55 and AECC Blytheville North 161kV line section. Entergy will install new line protection panel and breaker control panel at Blytheville I-55 161kV substation and AECC Blytheville North 161kV substation. Two existing breakers at Blytheville Elm St. ..	This project is needed to interconnect the J1562 200 MW solar project on the Blytheville I-55 - AECC Blytheville North 161kV line section.	January 31, 2025	$5.16M
24918	Hamrick 161kV J1842: Cut-in Switching Station	The Hamrick 161kV switching station will be constructed for the 135 MW wind farm (J1842) per the terms of the executed GIA. The wind farm will be connected by a 4 mile 161kV gen-tie line to the new Hamrick 161kV SS that will be constructed by the Interconnection Customer. Entergy Arkansas will construct the the 161kV cut-in as well as relay settings updates at the remote end stations. New underground fiber will also b..	This projected is needed to interconnect J1842 per the executed GIA.	October 31, 2024	$2.07M

AECC: 1 Other Project proposed

Project ID	Project Name	Project Description	System Need	Expected ISD	Estimated Cost
24192	UIG	NUCOR is expanding their operations by adding to two locations manufacturing facilities to produce liquid products for both their operations and the market. AECC and Mississippi County Electric will be building out the AECC Barfield substation by adding a new 25 MVA; 161/13.8 kV transformer to support 20 MW of new load. AECC and Mississippi County Electric will also be building out the AECC Hickman North substatio..	NUCOR is expanding their operations by adding to two locations manufacturing facilities to produce liquid products for both their operations and the market. AECC and Mississippi County Electric will be building out ..	April 1, 2025	$0.00M

AECC: 1 Appendix B Project proposed

Project ID	Project Name	Project Description	System Need	Expected ISD	Estimated Cost
23517	Monroe South 69kV	AECC will tap the existing Monroe to Holly Grove 69kV line and construct the Monroe South 69kV distribution station. This station was initially going to be called 'Palmer'.	Load growth, reliability, and voltage support in the area.	December 1, 2026	$4.26M

MISO Quarterly Status Reports

The MTEP Quarterly Status Reports can be located via the following link:

https://www.misoenergy.org/planning/planning/mtep-quarterly-status-reports/#t=10&p=0&s=&sd=