

# Chapter 7 - Appendix A

## Transmission and Distribution Supplemental Information

**Table 7A.1 MTEP Transmission Projects in Missouri<sup>1</sup>**

Project Approved	Project Title	Project Description	Category	Estimated Cost	Estimated In Service
MTEP13	Overton Transformer Replacement	Replace existing 300 MVA transformer with a new 560 MVA transformer	Baseline Reliability	\$5,000,000	2014
MTEP13	Bland 345/138 kV Substation	Bland 345/138 kV Substation - Install new 345/138 kV, 560 MVA transformer at Bland Substation. Supply new substation from 4th position at the Bland 345 kV ring bus. Install 138 kV bus at Bland Substation	Baseline Reliability	\$13,000,000	2015
MTEP13	Osage Substation Transformer Replacement	Replace the 2-100 MVA 161/138 kV transformers with a 300 MVA unit.	Reliability Other	\$1,965,000	2014
MTEP08	Fredericktown-AECI Fredericktown	Increase ground clearance on 12 miles of line	Reliability Other	\$1,200,000	2016
MTEP11	Northwest Cape Area 345/161 kV Substation	Install 560 MVA, 345/161 kV Transformer. Provide 345 kV supply from 11 mile 345 kV line extension from Lutesville Substation	Baseline Reliability	\$30,751,000	2016
MTEP11	MVP # 8 - Adair-Palmyra Tap 345 kV Line	Adair - Palmyra Tap 345 kV, 58 miles, 3000A. Establish a new 345 kV substation at Palmyra Tap	Multi Value	\$108,110,000	2018

<sup>1</sup> 4 CSR 240-22.045(3)(A)1; 4 CSR 240-22.045(3)(A)6

Project Approved	Project Title	Project Description	Category	Estimated Cost	Estimated In Service
MTEP12	Prairie Dell Substation	Install 138 kV breakers, build 2.5 miles of new single circuit 138 kV and 3.1 miles of new 138 kV double circuit line	Reliability Other	\$20,763,000	2018
MTEP12	Wallen Creek Substation High-Side Transfer	Install 2-2000 A, 138 kV PCBs	Reliability Other	\$2,635,000	2014
MTEP11	MVP # 7 - Adair - Ottumwa 345 (The portion in MO is from Adair to the Iowa state line)	Adair Substation - New 560 MVA, 345/161 kV Transformer. New 71 mile 345 kV line from Adair to Ottumwa with 3000 A summer emergency capability	Multi Value	\$171,114,000	2018
MTEP13	Maurer Lake 161 kV Breaker	Maurer Lake 161-69 kV Substation - Install 161 kV PCB on the Missouri City line terminal. Minimum capability - 1200 A.	Baseline Reliability	\$1,775,000	2013
MTEP11	MVP # 9 – Palmyra Tap – Quincy – Meredosia – Ipava & Meredosia – Pawnee (The portion in MO is from Palmyra Tap to the Illinois state line)	Palmyra Tap to Quincy to Meredosia to Ipava 345 line and Meredosia to Pawnee 345 kV line. Install additional transformers at Quincy, Meredosia and Pawnee.	Multi Value	\$505,693,000	2016- 2017

**Table 7A.2 Transmission Projects under Consideration<sup>2</sup>**

<b>Project</b>	<b>Description</b>	<b>Status</b>
Adair Wind Farm	Connect Wind Farm at Adair Substation	Cancelled due to wind farm project cancellation
Apache Flats - Scruggs Delivery Point	Apache Flats 161 kV Substation - Install 1-161 kV, 2000 A PCB and necessary metering and relaying to provide a delivery point for Associated Electric's Scruggs 161-69 kV Substation.	Cancelled after further discussions with Associated Electric
Howard Bend Substation Connection	Howard Bend 138-12 kV Substation - Provide 138 kV ring bus connection from Mason-Carrollton-8 138 kV line to new Howard Bend Substation. Install 1-138 kV, 2000 A PCB at Carrollton Substation as a bus-tie.	In service approximately 2020
Enon 345 kV Breaker Addition	Enon 345/161 kV Substation - Install 2-345 kV PCB's on incoming 345 kV lines.	Cancelled after further discussions with Associated Electric
Warrenton-Lincoln Bulk 161 kV Line	Warrenton-Lincoln Bulk Substation 161 kV - Establish a second 161 kV supply to Lincoln Bulk Substation from Warrenton Substation. 10 miles of new 161 kV line, 2-161 kV, 2000 A PCBs at Warrenton Substation.	In service approximately 2022
Belleau 345/138 kV Substation - Second Transformer	Install 2nd. 560 MVA, 345/138 kV Transformer and Complete 345 kV Ring Bus	In service approximately 2018 - 2020
Belleau 345/138 kV Substation - Install 138 kV capacitor bank	Install 138 kV, 120 Mvar capacitor bank at Belleau Substation	In service approximately 2021 – 2023
Mason Transformer Replacement	Mason 345/138 kV Substation - Replace 345/138 kV, 560 MVA Transformer #2 with a 700 MVA unit	In service approximately 2024 - 2026
Camden-Ullman 138 kV Line	Camden-Ullman 138 kV Line - Construct approximately 16 miles of 138 kV line between Camden Substation and Ullman (switching station connecting to Maries-Osage-1 138 kV line), with 1600 A summer emergency capability. Install 300 MVA, 161/138 kV transformer	In service approximately 2024
Overton-Columbia Terminal Upgrade	Overton-Huntsdale-Columbia 161 kV - Replace 800 A CT at Overton Terminal with 1200 A unit.	In service approximately 2018

<sup>2</sup> 4 CSR 240-22.045(6)

Project	Description	Status
Labadie-Mason 345 kV Line #3	Labadie-Mason 345 kV Line #3 - New 25 mi. 3000 A summer emergency capability line designed for double-circuit. 345 kV PCBs: 1- Labadie, 1- Mason. Install WAMS - PMU at Labadie on new line terminal	Project deferred indefinitely
Pershall Substation	Install 4-2000 A breaker ring bus and connect to Berkeley-Sioux-1 138 kV to establish 138 kV connections for Pershall 138-12.47 kV Sub	In service approximately 2021
Mason-Carrollton-8 Increase Relay Limit	Mason-Carrollton-8 138 kV Line - Increase relay load limit on Mason-Mason 34 kV Substation segment of line to permit carrying full line capability	In service approximately 2020
Cotter Creek 138-34.5 kV Substation Supplies	Cotter Creek 138-34.5 kV Substation - Provide 138 kV supplies to new Cotter Creek Substation. Install a 2000 A, 138 kV PCB at Joachim Substation, and extend new 138 kV line from Joachim to Cotter Creek Substation. Also, for the second 138 kV supply to Cotter Creek, a new 3-2000 A breaker 138 kV switching station (Olympian Village) will be established in the Joachim-St. Francois-2 138 kV line, with a 138 kV line extended from Olympian Village Switching Station to Cotter Creek Substation.	In service approximately 2023
Viaduct-Clark 161 kV Conversion	Cape Area (Viaduct and Cape Clark Substations) - Convert radial 115 kV line to 161 kV and remove 115 kV facilities at Viaduct and Cape Clark Substation. Install 5-161 kV breakers at Viaduct	Cancelled
Fountain Lake 2nd. Transformer	Install 2nd. 138-12.5 kV Transformer	In service approximately 2018
Montgomery-Spencer Creek-Palmyra Tap-Sub T-Hills - Increase Ground Clearance	Montgomery-Spencer Creek-Palmyra Tap-Sub T-Hills 345 kV - Increase ground clearance on 187 miles of 795 kcmil ACSR conductor.	Frist section in service approximately 2015
Maurer Lake 161 kV Capacitor Bank	Install 30 Mvar, 161 kV capacitor bank and PCB.	In service approximately 2015

Project	Description	Status
Pike Substation Transformer Reconnection	Reconnect Pike 161-69 kV Transformer #1 to 161 kV Bus #1.	Cancelled
Meramec-Watson-2 138 kV Line Reconductoring	Reconductor 3.7 miles of 795 kcmil AA conductor between Watson Substation and the Mackenzie Switch Rack with conductor capable of carrying 1200 A under summer emergency conditions.	In service approximately 2021
Sioux-Huster-3 138 kV Reconductoring	Reconductor 5.9 miles of 954 kcmil ACSR with conductor capable of carrying 1600 A under summer emergency conditions. Replace 1200 A terminal equipment (disconnect switches, CT's, bus conductor) at Huster with equipment capable of carrying 1600 A or better.	In service approximately 2020
Rush-Joachim-2 345 kV Position Upgrade	Rush Island 345 kV Switchyard - Upgrade the Rush Island terminal of the Rush Island-Joachim-2 345 kV line to a minimum of 2500 A capability by replacing the 2000 A wavetrapp and reconnecting the 2000:5A CTs to 2500:5A.	In service approximately 2017

**Table 7A.3 Transmission and Distribution Avoided Costs<sup>3</sup>**

<b>Year</b>	<b>Avoided Distribution (\$/kW-Year)</b>	<b>Avoided Transmission (\$/kW-Year)</b>
2015	\$17	\$6
2016	\$17	\$6
2017	\$18	\$6
2018	\$18	\$6
2019	\$18	\$6
2020	\$19	\$6
2021	\$19	\$6
2022	\$19	\$7
2023	\$20	\$7
2024	\$20	\$7
2025	\$21	\$7
2026	\$21	\$7
2027	\$21	\$7
2028	\$22	\$7
2029	\$22	\$7
2030	\$23	\$8
2031	\$23	\$8
2032	\$24	\$8
2033	\$24	\$8
2034	\$25	\$8

<sup>3</sup> 4 CSR 240-22.045(2); 4 CSR 240-22.045(3)(A)3

## Compliance References

4 CSR 240-22.045(2) .....	6
4 CSR 240-22.045(3)(A)1 .....	1
4 CSR 240-22.045(3)(A)3 .....	6
4 CSR 240-22.045(3)(A)6 .....	1
4 CSR 240-22.045(6) .....	3