



**INTERCONNECTION  
FACILITIES STUDY  
REPORT**

GEN-2017-148

Published Jan 2023

By SPP Generator Interconnections Dept.

## REVISION HISTORY

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DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
January 20, 2023	SPP	Initial draft report issued.
March 2, 2023	SPP	Final report issued.

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# SUMMARY

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## INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2017-148 is for a 202 MW generating facility located in Newton County, MO. The Interconnection Request was studied in the DISIS-2017-002 Impact Study for ERIS. The Interconnection Customer's requested in-service date is December 1, 2026.

The interconnecting Transmission Owner, Liberty Utilities (EDE), performed a detailed IFS at the request of SPP. The full report is included in Appendix A. SPP has determined that full Interconnection Service will be available after the assigned Transmission Owner Interconnection Facilities (TOIF), Non-Shared Network Upgrades, Shared Network Upgrades, Contingent Network Upgrades, and Affected System Upgrades that are required for full interconnection service are completed.

The primary objective of the IFS is to identify necessary Transmission Owner Interconnection Facilities, Network Upgrades, other direct assigned upgrades, cost estimates, and associated upgrade lead times needed to grant the requested Interconnection Service.

## PHASE(S) OF INTERCONNECTION SERVICE

It is not expected that Interconnection Service will occur in phases. However, full Interconnection Service will not be available until all Interconnection Facilities and Network Upgrade(s) can be placed in service.

## COMPENSATION FOR AMOUNTS ADVANCED FOR NETWORK UPGRADE(S)

FERC Order ER20-1687-000 eliminated the use of Attachment Z2 revenue crediting as an option for compensation. The Incremental Long Term Congestion Right (ILTCR) process will be the sole process to compensate upgrade sponsors as of July 1st, 2020.

## **INTERCONNECTION CUSTOMER INTERCONNECTION FACILITIES**

The Generating Facility is proposed to consist of one-hundred one (101) 2.0 MW - GE 2.0 WTG Wind Turbine Generation Systems for a total generating nameplate capacity of 202 MW.

The Interconnection Customer's Interconnection Facilities to be designed, procured, constructed, installed, maintained, and owned by the Interconnection Customer at its sole expense include:

- 34.5 kV underground cable collection circuits;
- 34.5 kV to 161 kV transformation substation with associated 34.5 kV and 161 kV switchgear;
- One 161/34.5 kV 135/180/225 MVA (ONAN/ONAF/ONAF) step-up transformer to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation;
- 26 mile overhead kV line to connect the Interconnection Customer's substation to the Point of Interconnection ("POI") at the 161 kV bus at existing Transmission Owner substation ("Joplin 161kV") that is owned and maintained by Transmission Owner;
- All transmission facilities required to connect the Interconnection Customer's substation to the POI;
- Equipment at the Interconnection Customer's substation necessary to maintain a composite power delivery at continuous rated power output at the high-side of the generator substation at a power factor within the range of 95% lagging and 95% leading in accordance with Federal Energy Regulatory Commission (FERC) Order 827. The Interconnection Customer may use inverter manufacturing options for providing reactive power under no/reduced generation conditions. The Interconnection Customer will be required to provide documentation and design specifications demonstrating how the requirements are met; and,
- All necessary relay, protection, control and communication systems required to protect Interconnection Customer's Interconnection Facilities and Generating Facilities and coordinate with Transmission Owner's relay, protection, control and communication systems.

**TRANSMISSION OWNER INTERCONNECTION FACILITIES AND NON-SHARED NETWORK UPGRADE(S)**

To facilitate interconnection, the interconnecting Transmission Owner will perform work as shown below necessary for the acceptance of the Interconnection Customer’s Interconnection Facilities.

**Table 1** and **Table 2** lists the Interconnection Customer’s estimated cost responsibility for Transmission Owner Interconnection Facilities (TOIF) and Non-Shared Network Upgrade(s) and provides an estimated lead time for completion of construction. The estimated lead time begins when the Generator Interconnection Agreement has been fully executed.

*Table 1: Transmission Owner Interconnection Facilities (TOIF)*

<b>Transmission Owner Interconnection Facilities (TOIF)</b>	<b>Total Cost Estimate (\$)</b>	<b>Allocated Percent (%)</b>	<b>Allocated Cost Estimate (\$)</b>	<b>Estimated Lead Time</b>
<b><u>Transmission Owner’s Joplin 161kV GEN-2017-148 Interconnection (TOIF) (EDE) (143399):</u></b> Interconnect the following Interconnection Customer facility, GEN-2017-148 (202 MW/Wind), into the Point of Interconnection (POI) at Joplin 161kV	\$2,901,000	100%	\$2,901,000	24 Months
<b>Total</b>	<b>\$2,901,000</b>		<b>\$2,901,000</b>	

*Table 2: Non-Shared Network Upgrade(s)*

<b>Non-Shared Network Upgrades Description</b>	<b>ILTCR</b>	<b>Total Cost Estimate (\$)</b>	<b>Allocated Percent (%)</b>	<b>Allocated Cost Estimate (\$)</b>	<b>Estimated Lead Time</b>
<b><u>N/A</u></b>	N/A	N/A	N/A	N/A	N/A
<b>Total</b>		<b>N/A</b>		<b>N/A</b>	

**SHARED NETWORK UPGRADE(S)**

The Interconnection Customer’s share of costs for Shared Network Upgrades is estimated in **Table 3** below.

*Table 3: Interconnection Customer Shared Network Upgrade(s)*

<b>Shared Network Upgrades Description</b>	<b>ILTCR</b>	<b>Total Cost Estimate (\$)</b>	<b>Allocated Percent (%)</b>	<b>Allocated Cost Estimate (\$)</b>	<b>Estimated Lead Time</b>
<u>N/A</u>	N/A	N/A	N/A	N/A	N/A
<b>Total</b>		<b>N/A</b>		<b>N/A</b>	

All studies have been conducted assuming that higher-queued Interconnection Request(s) and the associated Network Upgrade(s) will be placed into service. If higher-queued Interconnection Request(s) withdraw from the queue, suspend or terminate service, the Interconnection Customer’s share of costs may be revised. Restudies, conducted at the customer’s expense, will determine the Interconnection Customer’s revised allocation of Shared Network Upgrades.

**CONTINGENT NETWORK UPGRADE(S)**

Certain Contingent Network Upgrades are **currently not the cost responsibility** of the Interconnection Customer but will be required for full Interconnection Service.

*Table 4: Interconnection Customer Contingent Network Upgrade(s)*

<b>Contingent Network Upgrade(s) Description</b>	<b>Current Cost Assignment</b>	<b>Estimated In-Service Date</b>
<u>N/A</u>	N/A	N/A

Depending upon the status of higher- or equally-queued customers, the Interconnection Request’s in-service date is at risk of being delayed or Interconnection Service is at risk of being reduced until the in-service date of these Contingent Network Upgrades.



**AFFECTED SYSTEM UPGRADE(S)**

To facilitate interconnection, the Affected System Transmission Owner will be required to perform the facilities study work as shown below necessary for the acceptance of the Interconnection Customer’s Interconnection Facilities. **Table 5** displays the current impact study costs provided by either MISO or AECI as part of the Affected System Impact review. The Affected System facilities study could provide revised costs and will provide each Interconnection Customer’s allocation responsibilities for the upgrades.

*Table 5: Interconnection Customer Affected System Upgrade(s)*

<b>Affected System Upgrades Description</b>	<b>Total Cost Estimate (\$)</b>	<b>Allocated Percent (%)</b>	<b>Allocated Cost Estimate (\$)</b>
<b><u>AECI; Rebuild 8.85-mile-long Vandalia to Vandalia Tap 69 kV with 336.4 ACSR rated at 100C</u></b>	\$8,010,000	12.05%	\$965,294
<b>Total</b>	<b>\$8,010,000</b>		<b>\$965,294</b>

## CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 202 MW can be granted. Full Interconnection Service will be delayed until the TOIF, Non-Shared NU, Shared NU, Contingent NU, Affected System Upgrades that are required for full interconnection service are completed. The Interconnection Customer’s estimated cost responsibility for full interconnection service is summarized in the table below.

*Table 6: Cost Summary*

Description	Allocated Cost Estimate
Transmission Owner Interconnection Facilities Upgrade(s)	\$2,901,000
Non-Shared Network Upgrade(s)	\$0
Shared Network Upgrade(s)	\$0
Affected System Upgrade(s)	\$965,294
<b>Total</b>	<b>\$3,866,294</b>

Use the following link for Quarterly Updates on upgrades from this report: <https://spp.org/spp-documents-filings/?id=18641>

A draft Generator Interconnection Agreement will be provided to the Interconnection Customer consistent with the final results of this IFS report. The Transmission Owner and Interconnection Customer will have 60 days to negotiate the terms of the GIA consistent with the SPP Open Access Transmission Tariff (OATT).

# APPENDICES

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**A: TRANSMISSION OWNER'S INTERCONNECTION FACILITIES STUDY  
REPORT AND NETWORK UPGRADES REPORT(S)**

See next page for the Transmission Owner's Interconnection Facilities Study Report and Network Upgrades Report(s).



# **SUB 389 JOPLIN SW: SCOPE SUMMARY**

**Prepared for:**

Liberty Utilities

Joplin, Missouri

May 2022

Olsson Project No. Q20-17770

## **OVERALL PROJECT SUMMARY**

Substation 389- Joplin SW requires a 161kV bay to be cleared of existing equipment, line panel, and transmission line exits to accommodate growth in the area. Rerouting the 161kV transmission line #96-0 State Line exit to bypass Sub 389 completely is required to open the Northeast 161kV bay. Breakers 16173 and 16170 will be affected by the project. This will still allow for a future use of a spare bay. Breaker 16170, will be removed along with the bay's line trap, line panel, and CCVT. However, the middle and north bay can be rearranged in the best manner to receive a future incoming transmission line.

In either scenario, the removal of the bay's line trap is required along with the replacement of the CCVT with a standard 161kV line PT. This will be coupled with a replaced line panel. The new line panel will then be connected into the existing bus differential and SCADA system.

The 96-0 line is constructed with 1780 ACSR and will be deadended at the beginning of the project. The new construction will consist of bundled 556 ACSR to match the existing ampacity of the 1780 and then connect to the existing bundled 556 ACSR, 79-0 line, for consistency.

Transmission line work will include guyed and self-supporting structures, civil sitework improvements on the northeastern portion directly outside the substation footprint, the installation of bundled 556 ACSR and removal of 1780 ACSR; see Figure 1.

The Tipton Ford Sub 292 bay currently houses 161kV line breaker 16170 which protects line 79-0.

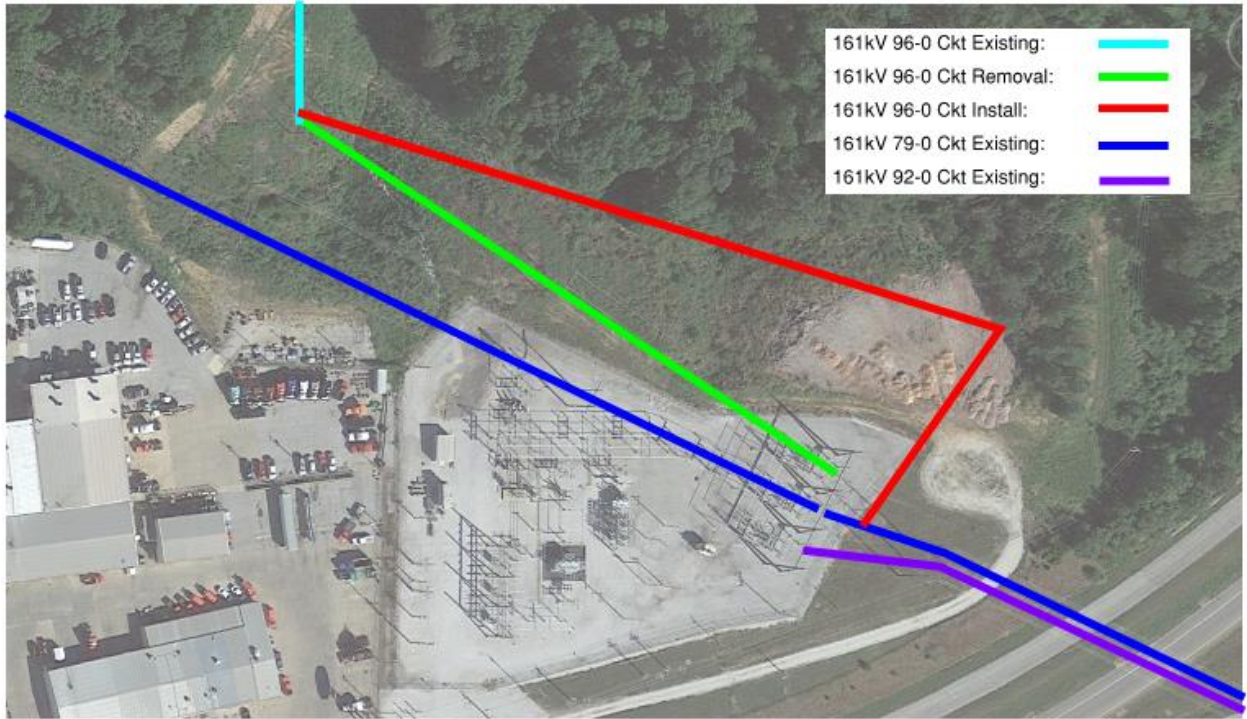


Figure 1: Overall Transmission Line Reconstruction