INTERCONNECTION FACILITIES STUDY REPORT

GEN-2017-082

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By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
09/17/2021	SPP	Initial draft report issued.
10/8/2021	SPP	Final report issued.

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SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2017-082 is for a 149.4 MW generating facility located in Barton/Jasper Counties, MO. The Interconnection Request was studied in the DISIS-2017-001 Impact Study for Energy Resource Interconnection Service (ERIS). The Interconnection Customer's requested in-service date is December 31st, 2020.

The interconnecting Transmission Owner, Liberty Utilities (EMDE), performed a detailed IFS at the request of SPP. The IFS was performed during the Interim Generator Interconnection Agreement (IGIA), and these facilities have already been built and funded. 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 sixty-nine (69) Vestas (12 X 2.0 MW and 57 X 2.2 MW) Wind Turbine Generation Systems for a total generating nameplate capacity of 149.4 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 collectioncircuits;
- 34.5 kV to 161 kV transformation substation with associated 34.5 kV and 161 kV switchgear;
- One 161/34.5 kV 99/132/165 MVA (ONAN/ONAF/ONAF) step-up transformer to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation;
- An approximately 6.5 mile overhead 161 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 ("Asbury Plant 161 kV Substation") 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)

Transmission Owner Interconnection Facilities (TOIF)	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)	Estimated Lead Time
Asbury Plant 161 kV Substation GEN-2017-082 Interconnection (TOIF) (EDE) (133056): Adding a new 161 kV terminal in the existing 161 kV Asbury Plant Substation.	$800,000	100%	$800,000	N/A
Total	**$800,000**		**$800,000**	

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	ILTCR	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)	Estimated Lead Time
Asbury Plant 161 kV Substation GEN-2017-082 Interconnection (Non-Shared NU) (EDE) (133057): A new 161 kV breaker and associated disconnect switches will be installed between existing breakers to create a new line position on the ring bus. A new line disconnect switch and PTs will be installed for this new line position. The existing Litchfield line will be relocated to this new line position, and the existing Litchfield CCVT, wave trap, line tuner, steel structure and junction box will also be relocated to the new terminal.	TBD	$3,400,000	100%	$3,400,000	N/A
Asbury Plant 161 kV Substation GEN-2017-082 Interconnection (Non-Shared NU) (WERE) (143123): Review relay settings and apply adjusted settings at Litchfield 161kV substation.	TBD	$6,649	100%	$6,649	N/A
Total		**$3,406,649**		**$3,406,649**	

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)

Shared Network Upgrades Description	ILTCR	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)	Estimated Lead Time
None	N/A	$0	100%	$0	N/A
Total		**$0**		**$0**	

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)

Contingent Network Upgrade(s) Description	Current Cost Assignment	Estimated In-Service Date
None	$0	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 MISO 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)

Affected System Upgrades Description	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
AECI AFS for DISIS-2017-001: Replace Sportsman 161/345 kV transformer #1 with 625/712 MVA transformer	$6,500,000	2.32%	$150,887
AECI AFS for DISIS-2017-001: Replace Sportsman 161/345 kV transformer #2 with 625/712 MVA transformer	$6,500,000	2.32%	$150,887
Total	**$13,000,000**		**$301,774**

CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 149.4 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 Facilitie Upgrade(s)	$800,000
Non-Shared Network Upgrade(s)	$3,406,649
Shared Network Upgrade(s)	$0
Affected System Upgrade(s)	$301,774
Total	**$4,508,423**

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

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).

Generation Interconnection Facility Study

For

Generation Interconnection Request GEN-2017-082

September 2021

Introduction

This report summarizes the scope of the Generation Interconnection Facility Study to evaluate the Generation Interconnection Request for GEN-2017-082. GEN-2017-082 is proposing to build a 149.4 MW wind-powered generation facility which will interconnect at Liberty Utility's Asbury 161 kV substation in southwest Missouri with an expected commercial operation date of December 31, 2020.

Southwest Power Pool Generation Interconnection Request:

Southwest Power Pool (SPP) GI requested Evergy to perform an Interconnection Facility Study (IFS).

GI Request #	UID	Upgrade Name	Point of Interconnection	Capacity (MW)	Fuel Type
GEN-2017-082	133123	Asbury 161 kV Substation GEN-2017-082 Interconnection (Non-Shared NU) (WERE)	Asbury 161 kV (EDE)	149.4	Wind

Estimated Costs for Network Upgrades

161 kV Substation Work / Network Upgrades

The estimated cost includes review relay settings and apply adjusted settings at Litchfield 161kV substation.

The total cost estimate for relay settings work:

$	**0**	**TOIF**
$	**6,630**	**Network upgrades associated with Buffalo Flats 345kVsubstations**
$	**19**	**AFUDC**
$	**6,649**	**Total**

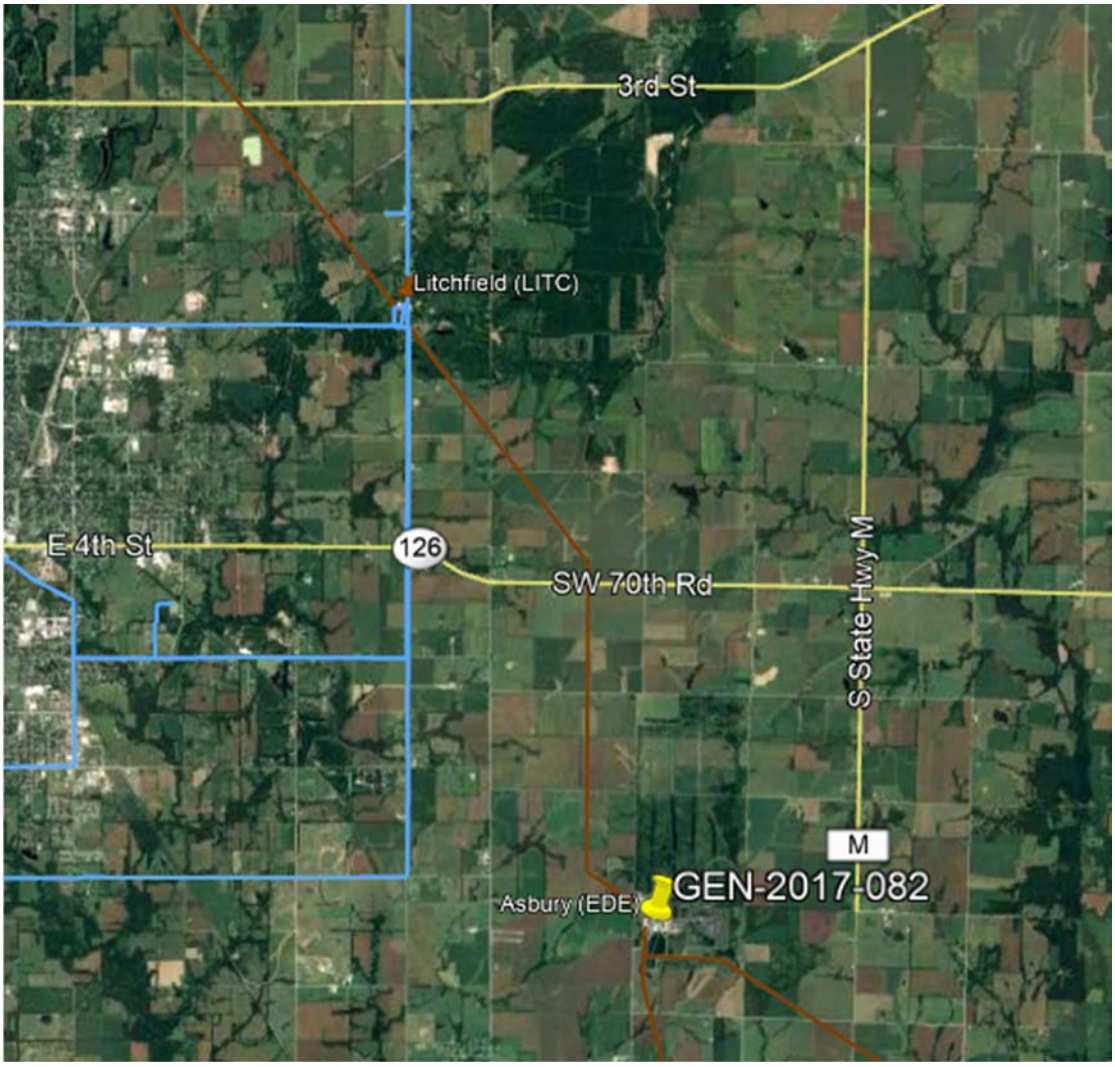
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

Time Estimate

Time estimate is based on current version of the project schedule.

Engineering Time	17	Weeks
Total Project Length	**17**	**Weeks**

Interconnection Map



Asbury 161kV point of interconnection and Litchfield 161kV affected system.