INTERCONNECTION FACILITIES STUDY REPORT

GEN-2017-022

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By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
02/04/2022	SPP	Initial draft report issued.
2/28/2022	SPP	Updated draft report issued. Updated Network Upgrade Facility Study from Evergy and costs in Tables 3 and 6
03/07/2022	SPP	Updated draft report issued. Updated Network Upgrade Facility Study from Evergy and costs in Tables 3 and 6
03/17/2022	SPP	Updated draft report issued. Updated Tables 3, 6, and Appendix A based on DISIS-2017-001-2 posting
03/28/2022	SPP	Final report issued.

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SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2017-022 is for a 65 MW generating facility located in Wilson County, KS. The Interconnection Request was studied in the DISIS-2017-001 Impact Study, the DISIS-2017-001-1 Impact Restudy, and the DISIS-2017-001-2 Impact Restudy for Network Resource Interconnection Service (NRIS).The Interconnection Customer's requested in-service date is December 31st, 2023.

The interconnecting Transmission Owner, Evergy Electric Services Company (WERE), 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 twenty-six (26) TMEIC Solar Ware Inverters for a total generating nameplate capacity of 65 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 undergroundcablecollectioncircuits;
- 34.5 kVto 138 kVtransformation substationwith associated34.5 kVand 138 kV switchgear;
- One 138/34.5 kV 45/65/75 MVA (ONAN/ONAF/ONAF) step-up transformer to be owned and maintainedbythe Interconnection Customer at the Interconnection Customer'ssubstation;
- An approximately .005 mile overhead mile overhead kV line to connect the Interconnection Customer's substation to the Point of Interconnection ("POI") at the 138 kV bus at existing Transmission Owner substation ("Altoona - Parson 138kV") that is owned and maintained by TransmissionOwner;
- 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 documentationanddesignspecificationsdemonstratinghowtherequirementsaremet;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
Altoona – Parson 138kV GEN-2017-022 Interconnection (TOIF) (WERE) (132964): Install one (1) breaker, three (3) switches, three (3) standalone CT's, three (3) PT's, and one (1) control panel.	$696,119	100%	$696,119	24 Months
Total	**$696,119**		**$696,119**	

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	ILTCR	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)	Estimated Lead Time
Altoona – Parson 138kV GEN-2017-022 Interconnection (Non-Shared NU) (WERE) (132965): Construct two (2) breakers, two (2) wavetraps, seven (7) switches, six (6) CCVTs, two (2) control panels, and all other associated work and materials. Build .1 miles of two (2) new single 1192.5 Bunting ASCR lines with two (2) 64 mm OPGW static wire, one (1) vertical single pole steel dead- end strucutre, and no distribution underbuild.	Not Eligible	$4,790,295	100%	$4,790,295	24 Months
Total		**$4,790,295**		**$4,790,295**	

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	N/A	$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 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)

Affected System Upgrades Description	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
None	$	%	$
Total	$		$

CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 65 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)	$696,119
Non-Shared Network Upgrade(s)	$4,790,295
Shared Network Upgrade(s)	$0
Affected System Upgrade(s)	$0
Total	**$5,486,414**

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-2017-022

September 2021

Introduction

This report summarizes the scope of the Generation Interconnection Facility Study to evaluate the Generation Interconnection Request for GEN-2017-022. GEN-2017-022 is proposing to build a 65.0 MW solar photovoltaic powered generation facility which will interconnect at Evergy's Altoona 138kV substation with an expected in-service date of December 31, 2023.

Southwest Power Pool Generation Interconnection Request:

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

GI Request #	UID	Point of Interconnection	Capacity (MW)	Fuel Type
GEN-2017-022	132964 and 132965	Altoona 138kV substation	65	Solar

Estimated Costs for TOIF and Network Upgrades

Transmission Owner Interconnection Facilities (TOIF)

The estimated cost includes work necessary to install one (1) breaker, three (3) switches, three (3) standalone CT's, three (3) PT's and one (1) control panel.

138kV Transmission Line Work (Network Upgrade)

The estimated cost is for approximately 0.1 miles of two (2) new single 1192.5 Bunting ACSR lines with two (2) 64mm OPGW static wire, one (1) vertical single pole steeldead-end structure, and no distributionunderbuild.

138kV Substation Work (Network Upgrade)

The estimated cost is for two (2) breakers, two (2) wavetraps, seven (7) switches, six (6) CCVTs and two (2) control panels.

The total cost estimate for GEN-2017-022 for the required Transmission Owner Interconnection Facilities (TOIF) and the Network Upgrades:

$	**694,037**	**TOIF (Substation)**
$	**2,082**	**TOIF (AFUDC)**
$	**481,320**	**Transmission Line Work**
$	**4,247,192**	**138 kV Substation Work**
$	**14,327**	**AFUDC**
$	**47,456**	**Contingency**
$	**5,486,414**	**Total**

These estimates are accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However,

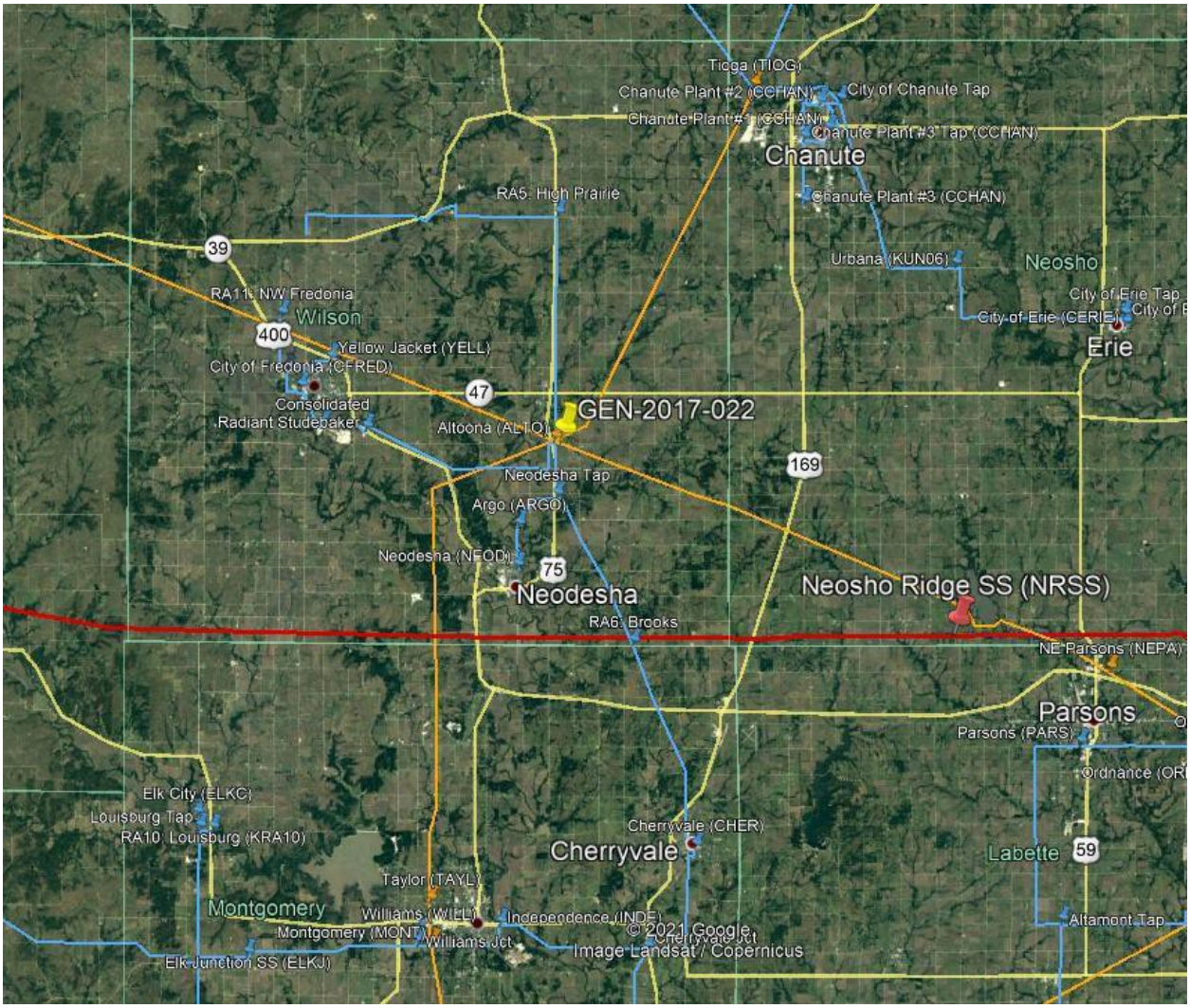
recent cost fluctuations in materials are significant and the accuracy of this estimate at the time of actual settings cannot be assured.

Time Estimate

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

Engineering Time	12	Months
Construction Time	12	Months
Total Project Length	**24**	**Months**

Interconnection Map



The map shows the location of the interconnection project

Results of Short Circuit Analysis

As a part of this Interconnection Facility Study, a short circuit study was performed to determine the available fault current at the interconnection bus (Altoona 138kV) using PSS/E's activity ASCC. The 2022 Summer Peak case from the 2021 MDWG Final Max Fault Short-Circuit model was used. The GEN-2017-022, was taken out of service for this analysis, and all other transmission facilities were in service. As a result, the numbers generated represent the available utility interconnection faultcurrent.

2022 Summer:

3-PH FAULT		1-PH FAULT		THEVENIN IMPEDANCE (PU on 100 MVA and bus base KV)		
AMP	MVA	AMP	MVA	Positive Sequence	Negative Sequence	Zero Sequence
8950.5	2139.38	7686.2	1837.17	0.010654+j0.045512	0.010751+j0.045545	0.013975+j0.068358