INTERCONNECTION FACILITIES STUDY REPORT

GEN-2021-096

Published August 2025

By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
August 22, 2025	SPP	Initial draft report issued.
September 10, 2025	SPP	Final report issued.

CONTENTS

SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2021-096 is for a 500 MW generating facility located in Coffey County, KS. The Interconnection Request was studied in the DISIS-2021-001 Impact Study for ERIS/NRIS. The Interconnection Customer's requested in-service date is 12/1/2027.

The interconnecting Transmission Owner, Evergy (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 two-hundred twelve (212) Siemens SINACON PV 2500 inverters for a total generating nameplate capacity of 500 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 345 kV transformation substation with associated 34.5 kV and 345 kV switchgear;
- Two 345 kV/34.5 kV 159/212/265 MVA (ONAN/ONAF/ONAF) step-up transformers to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation;
- An Approximately 0.2 mile overhead 345 kV line to connect the Interconnection Customer's substation to the Point of Interconnection ("POI") at the 345 kV bus at existing Transmission Owner substation ("Wolf Creek - Benton 345 kV") 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** list 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 ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
Transmission Owner's Wolf Creek to Benton 345 kV Line GEN-2021-096 Interconnection (TOIF) (UID 157167): Interconnection upgrades and cost estimates needed to interconnect the following IC facility, GEN-2021-096 (500/Solar), into the Point of Interconnection (POI) at Wolf Creek to Benton 345 kV Line. Estimated Lead Time: 56 Months	$1,619,188	100.00%	$1,619,188
Total	**$1,619,188**		**$1,619,188**

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	ILTCR	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
Transmission Owner's Wolf Creek - Benton 345 kV GEN-2021-096 Interconnection (Non-shared NU) (UID 157168): Interconnection upgrades and cost estimates needed to interconnect the following IC facility, GEN-2021-096 (500/Solar), into the Point of Interconnection (POI) at Wolf Creek to Benton 345 kV Line. Estimated Lead Time: 56 Months	Ineligible	$30,248,412	100.00%	$30,248,412
Total		**$30,248,412**		**$30,248,412**

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 ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
Transmission Owner's Build a new 50 MVAR cap bank at Viola 138 kV (UID 170643): Build a new 50 MVAR cap bank at VIOLA 138 kV. Estimated Lead Time: 48 Months	Eligible	$1,270,333	9.21%	$116,981
Transmission Owner's PECULR 7 to PHILL 7 345 kV Ckt 1 Terminal Upgrade (UID 170646): Upgrade Terminal Equipment at PHILL 7 345 kV to achieve a minimum rating of 880 MVA. Estimated Lead Time: 36 Months	Eligible	$233,358	19.69%	$45,943
Transmission Owner's PHILL 7 to SIBLEY 7 345 kV Ckt 1 Terminal Upgrade (UID 170647): Upgrade Terminal Equipment at PHILL 7 345 kV to achieve a minimum rating of 760 MVA. Estimated Lead Time: 36 Months	Eligible	$233,358	19.47%	$45,446
Total		**$1,737,049**		**$208,370**

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
NEET's Line - Wolf Creek - Blackberry 345 kV (NTC 112509, 122598): "Build a new 345kV line from Wolf Creek to Blackberry with a summer emergency rating of 1792 MVA Install terminal equipment at Wolf Creek and re-terminate Wolf Creek - Waverly 345 kV line to support 345kV line from Wolf Creek to Blackberry rated at 1792 MVA"	**$0**	7/15/2025

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 ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
AECI's NU01 Upgrade separately mounted bushing CTs on Morgan-Dadeville 161 kV line (at Morgan) to 2,000 amp rating. Estimated Lead Time: 36 Months	$500,000	20.45%	$102,265
AECI's NU02 Rebuild 26.5 mile long line from Morgan-Brookline 161 kV to 1192 ACSR, rated at 100C. Estimated Lead Time: 48 Months	$20,352,000	16.26%	$3,309,045
AECI's NU03 Rebuild 1.2 mile long line from Lamar City North-Lamar Rural South 69 kV to 336 ACSR, rated at 100C. Estimated Lead Time: 36 Months	$ 1,000,000	22.26%	$222,564
AECI's NU04 Rebuild 4.5 mile long line from Lamar-Jackson Street 69 kV to 795 ACSR, rated at 100C. Estimated Lead Time: 36 Months	$3,456,000	24.23%	$837,337
AECI's NU05 Rebuild 0.3 mile long line from Lamar City North-Jackson Street 69 kV to 336 ACSR, rated at 100C. Estimated Lead Time: 36 Months	$500,000	21.62%	$108,087
AECI's NU06 Rebuild 2.4 mile long line from Richland-Boston 69 kV (AECI owned portion) to 336 ACSR, rated at 100C. Estimated Lead Time: 36 Months	$1,740,000	22.26%	$387,261
Total	**$27,548,000**		**$4,966,559**

CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 500 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)	$1,619,188
Non-Shared Network Upgrade(s)	$30,248,412
Shared Network Upgrade(s)	$208,370
Affected System Upgrade(s)	$4,966,559
Total	**$37,042,529**

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).

Interconnection Facilities Study

Costs associated with DISIS-2021-001 GEN-2021-096

August 2025

Introduction

This report summarizes the scope of the Interconnection Facilities Analysis for Network Upgrade(s) to determine costs related to the addition of the SPP-GI DISIS-2021-001 Interconnection Request(s). Evergy, as a TO, is receiving an unprecedented amount of GI interconnect requests. The cost estimates and interconnect information supplied are based on current system configuration. There are many cases of multiple GI's requesting POIs at the same substation. Ongoing changes in Evergy's transmission system configuration could affect the required system upgrades and costs necessary to meet any particular GI interconnect request in the future.

Southwest Power Pool Generation Interconnection Request:

Per the SPP Generator Interconnection Procedures (GIP), SPP has requested that Evergy perform an Interconnection Facilities Study (IFS) for Network Upgrade(s) in accordance with the Scope of Interconnection Facilities Study GIP Section 8.10 and the Interconnection Facilities Study Procedures in accordance with GIP Section 8.11 for the following Interconnection Request(s):

Upgrade Type	UID	Upgrade Name	DISIS Cost Estimate	DISIS Lead Time
Interconnection	157167	Wolf Creek - Benton 345 kV GEN-2021-096 Interconnection (TOIF) (EKC)	$ 1,619,188.00	56 Months
Interconnection	157168	Wolf Creek - Benton 345 kV GEN-2021-096 Interconnection (Non - shared NU) (EKC)	$ 30,248,412.00	56 Months

Wolf Creek-Benton 345 kV GEN-2021-096 Interconnection (TOIF) (EKC)

345 kV Substation

TOIF for connecting to the Wolf Creek-Benton 345kV line to accommodate Hecate Energy LLC GEN-2021-096 (503.5MW of Solar). This estimate is the cost associated with the Transmission Owner Interconnection Facilities for a greenfield sub on the Wolf Creek-Benton 345kV line, for the GEN-2021-096 line terminal. The estimate assumes there is an existing 345kV ring bus substation with existing control enclosure. Estimate includes line, steel, and equipment, which includes three VT's, three CT's and dead end. Cost is for one 345kV line terminal. UID 157167

Total Cost

The total cost estimate for this TOIF is:

$	1,544,499	Substation
$	4,843	AFUDC
$	69,846	Contingency
$	1,619,188	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 estimates are based on current version of the project schedule and some processes of each category run concurrently.

Engineering Time	12-18	Months
Procurement Time	48-56	Months
Construction Time	48-56	Months
Total Project Length	48-56	Months

Wolf Creek-Benton 345 kV GEN-2021-096 Interconnection (Non - shared NU) (EKC)

345 kV Substation

Non-shared Network Upgrades for connecting to the Wolf Creek-Benton 345kV line to accommodate Hecate Energy GEN-2021-096 (503.5MW of Solar). Construct a green field substation on the Wolf Creek-Benton 345kV line. Substation will be a 345kV ring bus, with three-line terminals. New sub site is assumed to be adjacent to the existing line at least 5 miles from an existing substation to eliminate the need for OPGW. Estimate assumes cut-in will require a single span of wire into the new substation deadends. Includes two tangent structures in case adjacent structures to the cut-in need to be replaced. Special Studies will be required, since this tie is near Wolf Creek Nuclear, prior to entering any agreement. Study costs are included below. UID 157168

Total Cost

The total cost estimate for this Network Upgrade is:

$	2,442,014	Transmission Line
$	25,341,540	Substation
$	89,099	AFUDC
$	2,375,759	Contingency
$	30,248,412	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.

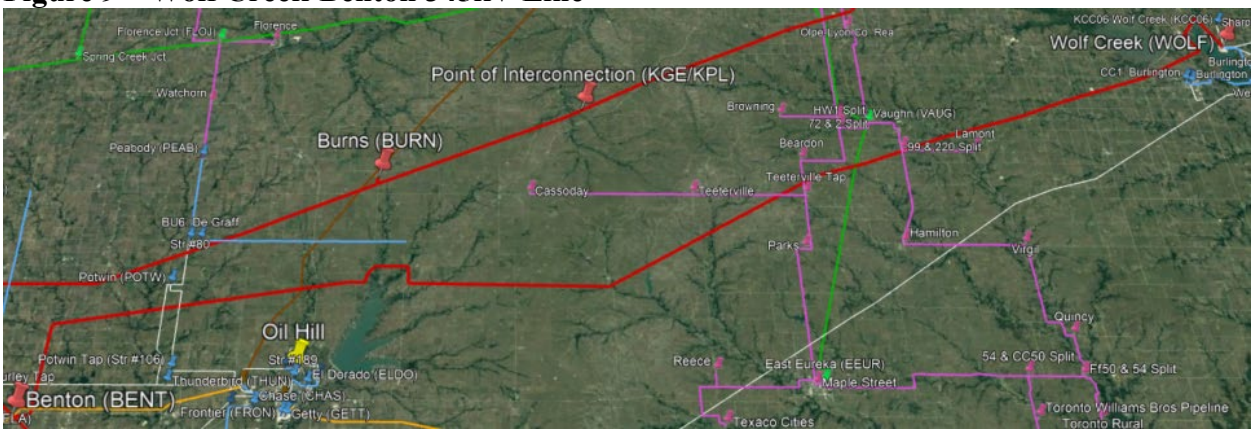
Time Estimate

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

Engineering Time	12-18	Months

Procurement Time	48-56	Months
Construction Time	48-56	Months
Total Project Length	48-56	Months

Figure 9 – Wolf Creek-Benton 345kV Line



Interconnection Facilities Study

Costs associated with DISIS-2021-001 Build a new 50 MVAR cap bank at Viola 138kV August 2025

Introduction

This report summarizes the scope of the Interconnection Facilities Analysis for Network Upgrade(s) to determine costs related to the addition of the SPP-GI DISIS-2021-001 Interconnection Request(s). Evergy, as a TO, is receiving an unprecedented amount of GI interconnect requests. The cost estimates and interconnect information supplied are based on current system configuration. There are many cases of multiple GI's requesting POIs at the same substation. Ongoing changes in Evergy's transmission system configuration could affect the required system upgrades and costs necessary to meet any particular GI interconnect request in the future.

Southwest Power Pool Generation Interconnection Request:

Per the SPP Generator Interconnection Procedures (GIP), SPP has requested that Evergy perform an Interconnection Facilities Study (IFS) for Network Upgrade(s) in accordance with the Scope of Interconnection Facilities Study GIP Section 8.10 and the Interconnection Facilities Study Procedures in accordance with GIP Section 8.11 for the following Interconnection Request(s):

Upgrade Type	UID	Upgrade Name	DISIS Cost Estimate	DISIS Lead Time
Current Study	170643	Build a new 50 MVAR cap bank at Viola 138kV	$ 1,270,333.00	48 Months

Build a new 50 MVAR cap bank at Viola 138kV

138kV Substation

Network Upgrades to add a new 50 MVAR cap bank at Viola 138kV. This upgrade includes installation of a new 50 MVAR capacitor bank on the 138kV bus at Viola. UID 170643

Total Cost

The total cost estimate for this Network Upgrade is:

$	0	Transmission Line
$	1,161,332	Substation
$	3,800	AFUDC
$	105,201	Contingency
$	1,270,333	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 estimates are based on current version of the project schedule and some processes of each category run concurrently.

Engineering Time	12-18	Months
Procurement Time	48	Months
Construction Time	48	Months
Total Project Length	48	Months

Figure 1 –Viola 138kV substation

Interconnection Facilities Study

Costs associated with DISIS-2021-001 Peculiar-Pleasant Hill 345kV Ckt 1 Terminal Upgrade to a minimum of 880 MVA

August 2025

Introduction

This report summarizes the scope of the Interconnection Facilities Analysis for Network Upgrade(s) to determine costs related to the addition of the SPP-GI DISIS-2021-001 Interconnection Request(s). Evergy, as a TO, is receiving an unprecedented amount of GI interconnect requests. The cost estimates and interconnect information supplied are based on current system configuration. There are many cases of multiple GI's requesting POIs at the same substation. Ongoing changes in Evergy's transmission system configuration could affect the required system upgrades and costs necessary to meet any particular GI interconnect request in the future.

Southwest Power Pool Generation Interconnection Request:

Per the SPP Generator Interconnection Procedures (GIP), SPP has requested that Evergy perform an Interconnection Facilities Study (IFS) for Network Upgrade(s) in accordance with the Scope of Interconnection Facilities Study GIP Section 8.10 and the Interconnection Facilities Study Procedures in accordance with GIP Section 8.11 for the following Interconnection Request(s):

Upgrade Type	UID	Upgrade Name	DISIS Cost Estimate	DISIS Lead Time
Current Study	170646	Peculiar-Pleasant Hill 345kV Ckt 1 Terminal Upgrade to a minimum of 880 MVA	$ 233,358.00	36 Months

Peculiar-Pleasant Hill 345kV Ckt 1 Terminal Upgrade to a minimum of 880 MVA

345kV Substation

Network Upgrades to upgrade the Peculiar-Pleasant Hill 345kV Ckt 1 Terminal Upgrade to a minimum of 880 MVA. This upgrade includes replacing both wavetraps at the Pleasant Hill 345kV substation. UID 170646

Total Cost

The total cost estimate for this Network Upgrade is:

$	0	Transmission Line
$	222,359	Substation
$	699	AFUDC
$	10,300	Contingency
$	233,358	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 estimates are based on current version of the project schedule and some processes of each category run concurrently.

Engineering Time	12-18	Months
Procurement Time	24-36	Months
Construction Time	24-36	Months
Total Project Length	24-36	Months

Figure 1 – Peculiar-Pleasant Hill 345kV Ckt 1

Interconnection Facilities Study

Costs associated with DISIS-2021-001 Pleasant Hill-Sibley 345kV Ckt 1 Terminal Upgrade to a minimum of 760 MVA

August 2025

Introduction

This report summarizes the scope of the Interconnection Facilities Analysis for Network Upgrade(s) to determine costs related to the addition of the SPP-GI DISIS-2021-001 Interconnection Request(s). Evergy, as a TO, is receiving an unprecedented amount of GI interconnect requests. The cost estimates and interconnect information supplied are based on current system configuration. There are many cases of multiple GI's requesting POIs at the same substation. Ongoing changes in Evergy's transmission system configuration could affect the required system upgrades and costs necessary to meet any particular GI interconnect request in the future.

Southwest Power Pool Generation Interconnection Request:

Per the SPP Generator Interconnection Procedures (GIP), SPP has requested that Evergy perform an Interconnection Facilities Study (IFS) for Network Upgrade(s) in accordance with the Scope of Interconnection Facilities Study GIP Section 8.10 and the Interconnection Facilities Study Procedures in accordance with GIP Section 8.11 for the following Interconnection Request(s):

Upgrade Type	UID	Upgrade Name	DISIS Cost Estimate	DISIS Lead Time
Current Study	170647	Pleasant Hill-Sibley 345kV Ckt 1 Terminal Upgrade to a minimum of 760 MVA	$ 233,358.00	36 Months

Pleasant Hill-Sibley 345kV Ckt 1 Terminal Upgrade to a minimum of 760 MVA

345kV Substation

Network Upgrades to upgrade Pleasant Hill-Sibley 345kV Ckt 1 Terminal Upgrade to a minimum of 760 MVA. This upgrade includes replacing a wavetrap at the Pleasant Hill 345kV substation. UID 170647

Total Cost

The total cost estimate for this Network Upgrade is:

$	0	Transmission Line
$	222,359	Substation
$	697	AFUDC
$	10,300	Contingency
$	233,358	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 estimates are based on current version of the project schedule and some processes of each category run concurrently.

Engineering Time	12-18	Months
Procurement Time	24-36	Months
Construction Time	24-36	Months
Total Project Length	24-36	Months

Figure 1 – Pleasant Hill-Sibley 345kV Ckt 1