INTERCONNECTION FACILITIES STUDY REPORT

GEN-2020-057

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By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
May 6, 2025	SPP	Initial draft report issued.
May 12, 2025	SPP	Allocation percentages corrected in Tables 1 & 2. Transformer information corrected on Page 5.
May 22, 2025	SPP	Final report issued.

CONTENTS

SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2020-057 is for a 424.5 MW generating facility located in Garner, KS. The Interconnection Request was studied in the DISIS-2020-001 Impact Study for NRIS. The Interconnection Customer's requested in-service date is 6/1/2028.

The interconnecting Transmission Owner, Evergy Kansas Central, Inc. (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 ninety-three (93) Sungrow SC5000 energy storage inverters for a total generating nameplate capacity of 424.5 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;
- Three 345 kV/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 0.1 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 ("Atlantic 345 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** 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 Atlantic 345 kV GEN-2020-057 Interconnection (TOIF) (UID156880): Interconnection upgrades and cost estimates needed to interconnect the following Interconnection Customer facility, GEN-2020-057 (424.5/Battery/Storage), into the Point of Interconnection (POI) at Atlantic 345 kV. Estimated Lead Time: 56 Months	$1,550,523	100.00%	$1,550,523
Total	**$1,550,523**		**$1,550,523**

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	ILTCR	Total Cost Estimate ($)	Allocated Percent (%)	Allocated Cost Estimate ($)
Transmission Owner's Atlantic 345 kV GEN-2020-057 Interconnection (UID156879): Interconnection upgrades and cost estimates needed to interconnect the following Interconnection Customer facility, GEN-2020-057 (424.5/Battery/Storage), into the Point of Interconnection (POI) at Atlantic 345 kV. Estimated Lead Time: 56 Months	Ineligible	$3,724,978	100.00%	$3,724,978
Total		**$3,724,978**		**$3,724,978**

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 Rebuild the CRAIG 5 to LENEXA 5 161 kV line 2(UID170612): Rebuild the CRAIG 5 to LENEXA 5 161 kV line 2 (2.98 miles) to a minimum rating of 400 MVA. Estimated Lead Time: 48 Months	Eligible	$12,434,546	44.55%	$5,539,516
Transmission Owner's Rebuild the MARTCIT5 to REDEL 5 161 kV line 1 (UID170585): Rebuild the MARTCIT5 to REDEL 5 161 kV line 1 (3.86 miles) to a minimum rating of 400 MVA. Estimated Lead Time: 48 Months	Eligible	$9,036,453	19.97%	$1,804,757
Transmission Owner's Rebuild the SHWNMSN5 to LENEXA 5 161 kV line 1 (UID170586): Rebuild the SHWNMSN5 to LENEXA 5 161 kV line 1 (3.91 miles) to a minimum rating of 400 MVA. Estimated Lead Time: 48 Months	Eligible	$12,611,596	33.31%	$4,200,533
Transmission Owner's Rebuild the STILWEL5 to REDEL 5 161 kV line 1 (UID170587): Rebuild the STILWEL5 to REDEL 5 161 kV line 1 (4.22 miles) to a minimum rating of 400 MVA. Estimated Lead Time: 48 Months	Eligible	$12,994,970	19.97%	$2,595,350
Total		**$47,077,565**		**$14,140,156**

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
Line - Wolf Creek - Blackberry 345 kV (122598): Build a new 345kV line from Wolf Creek to Blackberry with a summer emergency rating of 1792 MVA.	**$0**	7/15/2025
Multi - Atlantic - Craig - West Gardener 345-115 kV (158640, 158641, 158645, 158646, 158648, 159064): Build a new 115 kV substation at the new intersection of West Gardner-Craig and Atlantic-Eudora Township. Install two new 345/115 transformers at Atlantic 115 kV substation. Extend the existing West Gardner - Craig 345 kV line 10.3 miles to intersect with the Atlantic - Eudora Township 115 kV line.	**$0**	4/1/2025

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 - Upgrade bushing CTs, breaker switchers on Sylvan-Sedalia 69 kV line (at Sedalia) to 1200 amp rating. Estimated Lead Time: 30 Months	$350,000	11.74%	$41,104
AECI - Rebuild 69 kV 6.31 mile long line from Coffman Bend - J-7 to 795 ACSR rated at 100C. Estimated Lead Time: 48 Months	$5,900,000	13.83%	$816,211
Total	**$6,250,000**		**$857,315**

CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 424.5 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)	$1,550,523
Non-Shared Network Upgrade(s)	$3,724,978
Shared Network Upgrade(s)	$14,140,156
Affected System Upgrade(s)	$857,315
Total	**$20,272,972**

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-2020-001

April 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-2020-001 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	Lead Time	DISIS Cost Estimate
Current Study	170612	Rebuild the CRAIG 5 to LENEXA 5 161 kV line 2	48	$12,434,546

Rebuild the CRAIG 5 to LENEXA 5 161 kV line 1

161kV Line

Costs for rebuilding the Craig-Lenexa 161kV Line 1 and Line 2 to at least 400 MVA. Since this line is a double circuit, both lines will be rebuilt with this project scope. Estimate assumes existing easements are adequate. Terminal upgrades are required at both Craig and Lenexa 161kV substations in order to achieve the desired 400 MVA rating. UID 170612

Total Cost

The total cost estimate for this rebuild is:

$	9,921,173	Transmission Line
$	2,370,507	Substation
$	34,224	AFUDC
$	108,640	Contingency
$	12,434,546	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	48	Months
Procurement Time	48	Months
Construction Time	48	Months
Total Project Length	48	Months

Figure 1 –Craig-Lenexa 161kV Line 1 & 2

Interconnection Facilities Study

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April 2025

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Upgrade Type	UID	Upgrade Name	Lead Time	DISIS Cost Estimate
Current Study	170585	Rebuild the MARTCIT5 to REDEL 5 161 kV line 1	48	$9,036,453

Rebuild the MARTCIT5 to REDEL 5 161 kV line 1

161kV Line

Costs for rebuilding the Martin City 5 to Redel 5 161kV Line to at least 400 MVA. Existing line, north of Redel, is already rebuilt up to structure 48. Estimate assumes that line is being rebuilt double-circuit with Hickman-Stilwell 161kV between structure 48 and structure 11 on the Martin City-Redel 161kV circuit. Terminal upgrades are required at both Martin City and Redel 161kV substations. UID 170585

Total Cost

The total cost estimate for this rebuild is:

$	5,040,000	Transmission Line
$	3,476,931	Substation
$	25,522	AFUDC
$	494,000	Contingency
$	9,036,453	Total

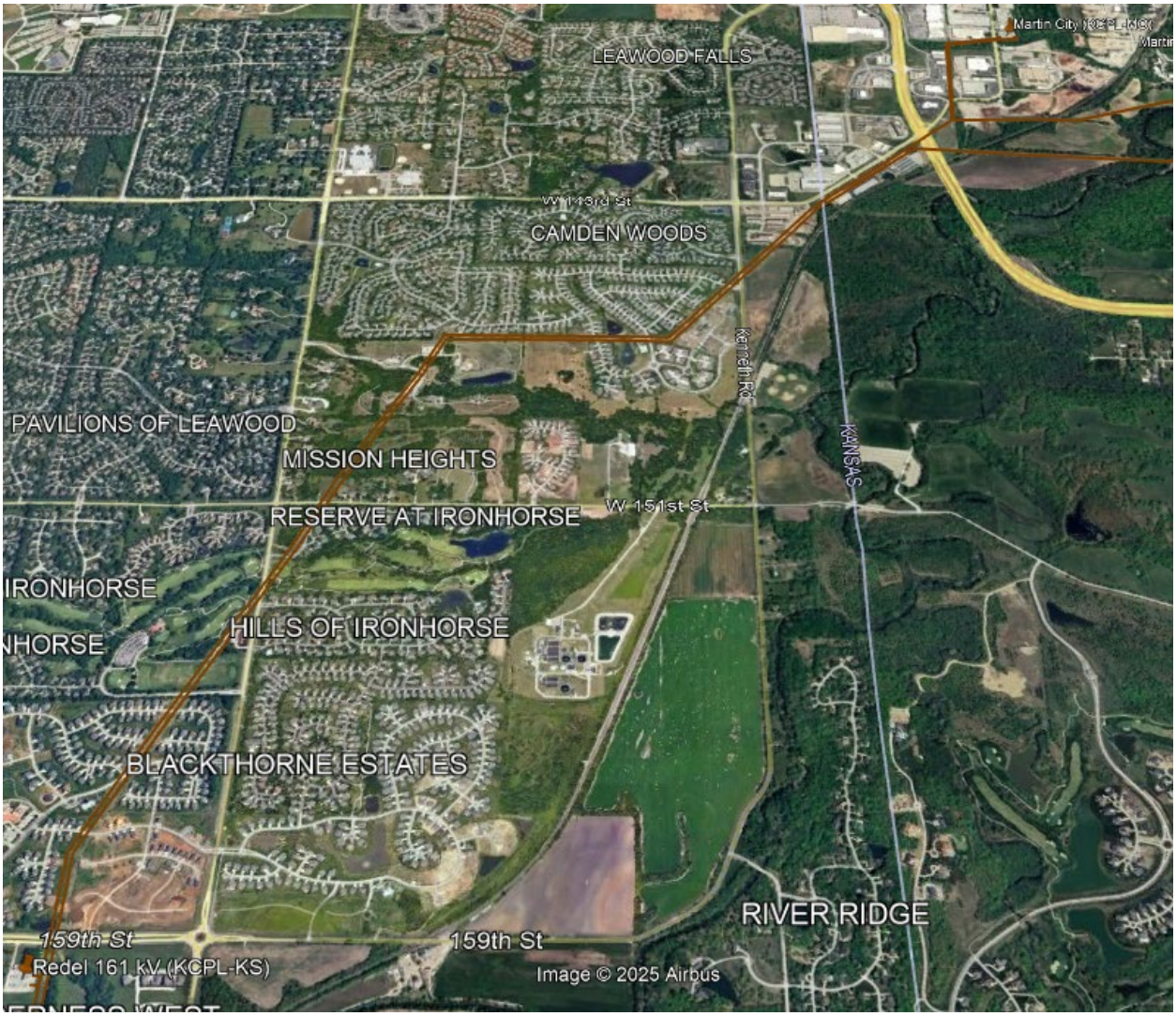
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings 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	36-48	Months
Procurement Time	36-48	Months
Construction Time	36-48	Months
Total Project Length	36-48	Months

Figure 1 –Martin City-Redel 161kV Line



Interconnection Facilities Study

Costs associated with DISIS-2020-001

April 2025

Introduction

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Upgrade Type	UID	Upgrade Name	Lead Time	DISIS Cost Estimate
Current Study	170586	Rebuild the SHWNMSN5 to LENEXA 5 161 kV line 1	48	$12,611,596

Rebuild the SHWNMSN5 to LENEXA 5 161 kV line 1

161kV Line

Costs for rebuilding the Shawnee Mission-Lenexa 161kV Line 1 to at least 400 MVA. The current line parallels the Lenexa - Reeder 161kV line for most of its length and is double circuited with the line for approximately 0.4 miles. This estimate assumes most of the line will need to be rebuilt as double circuit with the Reeder line due to spotting constraints created by Maurer Road. This estimate also assumes high costs for construction due to line being located in a developed urban area. Right of Way estimates are included. Terminal upgrades are required at both Shawnee Mission and Lenexa 161kV Substations in order to achieve the desired 400 MVA rating. UID 170586

Total Cost

The total cost estimate for this rebuild is:

$	10,319,246	Transmission Line
$	2,157,258	Substation
$	34,636	AFUDC
$	100,456	Contingency
$	12,611,596	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

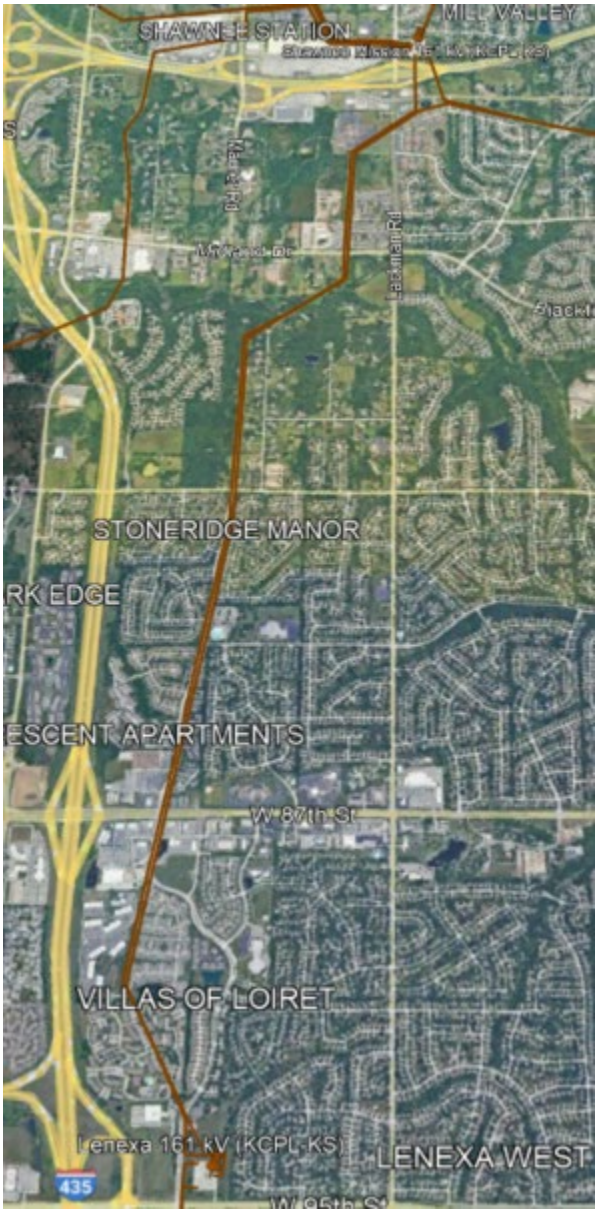
Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

Time Estimate

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

Engineering Time	48	Months
Procurement Time	48	Months
Construction Time	48	Months
Total Project Length	48	Months

Figure 1 –Lenexa-Shawnee Mission 161kV Line



Interconnection Facilities Study

Costs associated with DISIS-2020-001

April 2025

Introduction

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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	Lead Time	DISIS Cost Estimate
Current Study	170587	Rebuild the STILWEL5 to REDEL 5 161 kV line 1	48	$12,994,970

Rebuild the STILWEL5 to REDEL 5 161 kV line 1

161kV Line

Costs for rebuilding the Stilwell-Redel 161kV Line 1 to at least 400 MVA. At the time of this estimate, urban construction is not included in estimate (increased restoration costs), however development in this area appears to be coming soon. Double circuit line south of Redel SS to existing structure 42. There is one crossing of the Blue River along this circuit. Terminal upgrades are required at both Stilwell and Redel 161kV Substations in order to achieve the desired 400 MVA rating. UID 170587

Total Cost

The total cost estimate for this line rebuild is:

$	10,080,000	Transmission Line
$	2,115,206	Substation
$	697,133	AFUDC
$	102,630	Contingency
$	12,994,970	Total

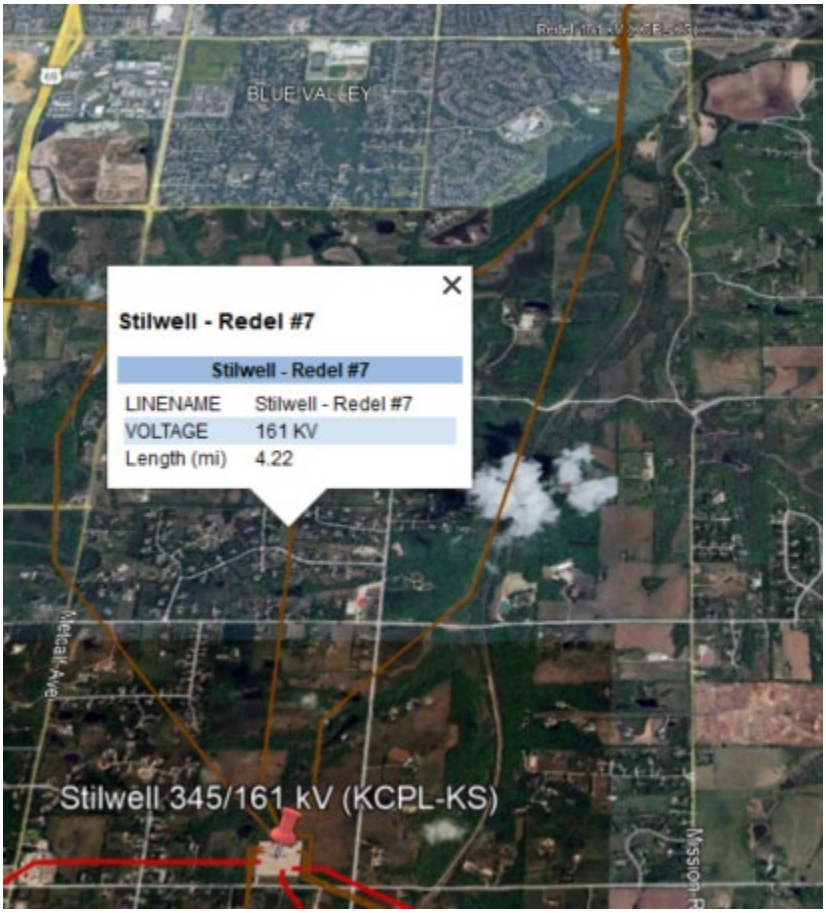
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings 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	48	Months
Procurement Time	48	Months
Construction Time	48	Months
Total Project Length	48	Months

Figure 1 –Stilwell-Redel 161kV Line



Interconnection Facilities Study

Costs associated with
DISIS-2020-001
GEN-2020-057

April 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-2020-001 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	Lead Time	DISIS Cost Estimate
Interconnection	156879	New 345 kV terminal at Atlantic 345 kV Substation (Craig-West Gardner 345kV) (GEN-2020-057) (Non-shared NU)	56	$3,724,978
Interconnection	156880	New 345 kV terminal at Atlantic 345 kV Substation (Craig-West Gardner 345kV) (GEN-2020-057) (TOIF)	56	$1,550,523

New 345kV terminal at Atlantic 345kV Substation (GEN-2020-057) TOIF

345kV Substation

TOIF costs for one 345kV line terminal for at Atlantic 345kV Substation to accommodate GEN-2020-057 (424.5 MW Solar). UID 156879

Total Cost

The total cost estimate for this TOIF is:

$	0	Transmission Line
$	1,417,380	Substation
$	4,639	AFUDC
$	128,504	Contingency
$	1,550,523	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	48-56	Months
Procurement Time	48-56	Months
Construction Time	48-56	Months
Total Project Length	48-56	Months

New 345kV terminal at Atlantic 345kV Substation (GEN-2020-057) NU

345kV Substation

Network upgrade costs for one 345kV line terminal for at Atlantic 345kV Substation to accommodate GEN-2020-057 (424.5 MW Solar). UID 156880

Total Cost

The total cost estimate for this NU is:

$	0	Transmission Line
$	3,401,603	Substation
$	11,141	AFUDC
$	312,233	Contingency
$	3,724,978	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	48-56	Months
Procurement Time	48-56	Months
Construction Time	48-56	Months
Total Project Length	48-56	Months

Figure 1 –Atlantic 345kV Substation