



INTERCONNECTION FACILITIES STUDY REPORT

GEN-2021-041

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By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
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August 26, 2025	SPP	Final report issued.

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SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2021-041 is for a 100 MW generating facility located in Canadian, OK. The Interconnection Request was studied in the DISIS-2021-001 Impact Study for ERIS/NRIS. The Interconnection Customer's requested in-service date is 6/1/2026.

The interconnecting Transmission Owner, Oklahoma Gas & Electric (OGE), 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 thirty-two (32) 3.63 MW Power Electronics PCSM FP3510M inverters for a total generating nameplate capacity of 100 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 138 kV transformation substation with associated 34.5 kV and 138 kV switchgear;
- One 138 kV/34.5 kV 68/91/113 MVA (ONAN/ONAF/ONAF) step-up transformer to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation;
- An Approximately 0.28 mile overhead 138 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 ("Mustang 138 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 (\$)
<u>Transmission Owner's Mustang 138kV Substation GEN-2021-041 Interconnection (TOIF) (UID 157084): Interconnection upgrades and cost estimates needed to interconnect the following Interconnection Customer facility, GEN-2021-041 (100/Battery/Storage), into the Point of Interconnection (POI) at Mustang 138kV Substation. Estimated Lead Time: 24 Months</u>	\$100,000	100.00%	\$100,000
Total	\$100,000		\$100,000

Table 2: Non-Shared Network Upgrade(s)

Non-Shared Network Upgrades Description	ILTCR	Total Cost Estimate (\$)	Allocated Percent (%)	Allocated Cost Estimate (\$)
<u>Transmission Owner's Mustang 138kV Substation GEN-2021-041 Interconnection (Non-shared NU) (UID 157085): Interconnection upgrades and cost estimates needed to interconnect the following Interconnection Customer facility, GEN-2021-041 (100/Battery/Storage), into the Point of Interconnection (POI) at Mustang 138kV Substation. Estimated Lead Time: 24 Months</u>	Ineligible	\$30,000	100.00%	\$30,000

Non-Shared Network Upgrades Description	ILTCR	Total Cost Estimate (\$)	Allocated Percent (%)	Allocated Cost Estimate (\$)
<u>Transmission Owner's Rebuild SW5th4 to CLASSEN4 138 kV line 1 (UID 170657): Rebuild the SW5TH4 to CLASSEN4 138 kV line CKT1 (3.43 miles) to a standard rating of 478 MVA. Estimated Lead Time: 24 Months</u>	Eligible	\$4,887,500	100.00%	\$4,887,500
Total		\$4,917,500		\$4,917,500

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 (\$)
<u>NA</u>				
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
Transmission Owner's Council - Mustang 138 kV Ckt 1 Reconductor (UID 144280): Reconductor of Mustang to Council 138 kV transmission line.	\$0	12/6/2024
Transmission Owner's Minco - Pleasant Valley 345 kV Ckt 1 (UID 133085): Build 34.8 miles of 345 kV line from Minco to Pleasant Valley 345 kV to achieve a 1792 MVA summer emergency rating.	\$0	1/31/2025

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 (\$)
NA			
Total	\$0		\$0

CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 100 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)	\$100,000
Non-Shared Network Upgrade(s)	\$4,917,500
Shared Network Upgrade(s)	\$0
Affected System Upgrade(s)	\$0
Total	\$5,017,500

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).



FACILITY STUDY

for

Generation Interconnection Request 2021-041

100.6MW Battery/Storage Generating Facility
Canadian County
Oklahoma

August 07, 2025

Benjamin Sasu
Senior Engineer
Transmission Planning
OG&E Electric Services

Summary

Pursuant to the tariff and at the request of the Southwest Power Pool (SPP), Oklahoma Gas and Electric (OG&E) performed the following Facility Study to satisfy the Facility Study Agreement executed by the requesting customer for SPP Generation Interconnection request GEN-2021-041. The request for interconnection was placed with SPP in accordance with SPP's Open Access Transmission Tariff, which covers new generation interconnections on SPP's transmission system. GEN-2021-041 will share a gen tie with existing GEN-2018-026. The requirements for interconnection consist of network upgrades at OKGE Substation and adding revenue metering at the Interconnection Customer's collector substation for the purpose of separating the BESS resource GEN-2021-041 from the original GEN-2018-026 resource. The total cost for Network upgrades at OKGE substation, and OKGE to install meters for the BESS Generating Facility, at the customer's collector substation, is estimated at **\$130,000**.

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Introduction

The Southwest Power Pool has requested a Facility Study for the purpose of interconnecting a batter/storage generating facility within the service territory of OG&E Electric Services (OKGE) in Canadian County Oklahoma. The proposed 138kV point of interconnection is at the existing generating facility in Canadian County. This substation is owned by OKGE. The cost for network upgrades at Mustang Substation and adding meters at the Battery/Storage generating facility, is estimated at **\$130,000**.

Network Constraints in the Southwest Public Service (SPS), OKGE and Western Farmers Electric Cooperative (WFEC) systems may be verified with a transmission service request and associated studies.

Other Network Constraints in the American Electric Power West (AEPW), Southwest Public Service (SPS), OKGE and Western Farmers Electric Cooperative (WFEC) systems may be verified with a transmission service request and associated studies.

Interconnection Facilities

The primary objective of this study is to identify attachment facilities. The requirements for interconnection consist of network upgrades in OKGE Substation and adding metering to the battery/storage generating facility. This 34.5kV addition shall be constructed and maintained by OKGE.

The total cost for OKGE to add new 34.5kV meters at the generating facility and Network upgrade, is estimated at **\$130,000**.

This Facility Study does not guarantee the availability of transmission service necessary to deliver the additional generation to any specific point inside or outside the Southwest Power Pool (SPP) transmission system. The transmission network facilities may not be adequate to deliver the additional generation output to the transmission system. If the customer requests firm transmission service under the SPP Open Access Transmission Tariff at a future date, Network Upgrades or other new construction may be required to provide the service requested under the SPP OATT.

The costs of interconnecting the facility to the OKGE transmission system are listed in Table 1.

Short Circuit Fault Duty Evaluation

It is standard practice for OG&E to recommend replacing a circuit breaker when the current through the breaker for a fault exceeds 100% of its interrupting rating with re-closer de-rating applied, as determined by the ANSI/IEEE C37.5-1979, C37.010-1979 & C37.04-1979 breaker rating methods.

For this generator interconnection, no breakers were found to exceed their interrupting capability after the addition of the Customer's 100.6 MW generation and related facilities. OG&E found no breakers that exceeded their interrupting capabilities on their system. Therefore, there is no short circuit upgrade costs associated with the Gen-2021-041 interconnection.

Table 1: Required Interconnection Network Upgrade Facilities

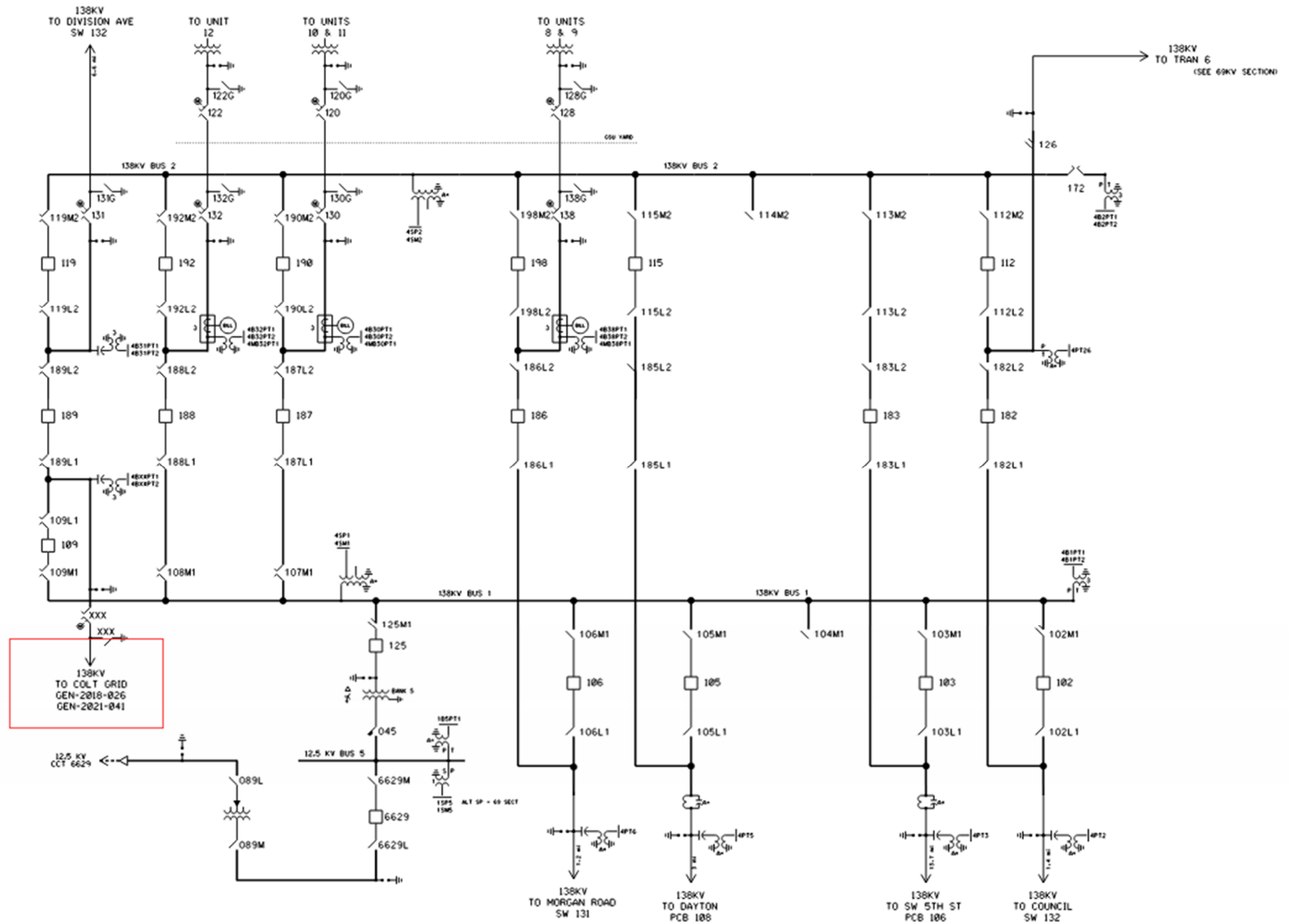
Facility	ESTIMATED COST (2025 DOLLARS)
Lead time	24 months
OKGE – Interconnection Facilities - Add revenue metering at the 34.5kV injection point for the Battery/Storage generating	\$100,000
OKGE – Network Upgrades – Settings upgrade Mustang 138kV substation	\$30,000
OKGE – Land or ROW	No Additional ROW
Total	\$130,000

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August 7, 2025

Reviewed by:
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MUSTANG SUBSTATION





FACILITY RESTUDY

for

DISIS-2021-001 Network Upgrade Request UID: 170657

Line Rebuild from SW5th4 to CLASSEN4 138kV
Oklahoma County
Oklahoma

August 7, 2025

Benjamin Sasu
Senior Engineer
Transmission Planning
OG&E Electric Services

Summary

Pursuant to the tariff and at the request of the Southwest Power Pool (SPP), Oklahoma Gas and Electric (OG&E) performed the following Facility Study to satisfy the Facility Study Agreement executed by the requesting customer for SPP DISIS-2021-001 UID 170657. The request for this study was placed with SPP in accordance with SPP's Open Access Transmission Tariff. The requirements for network upgrades and rebuilding the 3.43mile line between SW 5th 138kV and Classen to a minimum of 478MVA to be established by UID 170657. The total cost for OKGE to complete these network upgrades on the SW 5th to Classen line is estimated at **\$4,887,500.**

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Introduction

The Southwest Power Pool has requested a Facility Restudy for the purpose of rebuilding the 138kV transmission line between SW 5th and Classen Substations within the service territory of OG&E Electric Services (OKGE) in Oklahoma County Oklahoma. This 138kV line is owned by OKGE. The cost for network upgrades and rebuilding the line, and associated equipment SW 5th Substation and Classen Substation is estimated at **\$4,887,500.**

Interconnection Facilities

The primary objective of this study is to identify attachment facilities. The requirements for rebuilding the 138kV line consists of replacing existing transmission poles and installing 3.43 miles of transmission conductor. This 138kV rebuild shall be constructed and maintained by OKGE.

The total cost for OKGE to complete the work is estimated at **\$4,887,500**.

This Facility Study does not guarantee the availability of transmission service necessary to deliver the additional generation to any specific point inside or outside the Southwest Power Pool (SPP) transmission system. The transmission network facilities may not be adequate to deliver the additional generation output to the transmission system. If the customer requests firm transmission service under the SPP Open Access Transmission Tariff at a future date, Network Upgrades or other new construction may be required to provide the service requested under the SPP OATT.

The cost of network upgrades and rebuilding the 3.43 mile, 138kV line of the OKGE transmission system is listed in Table 1.

Short Circuit Fault Duty Evaluation

It is standard practice for OG&E to recommend replacing a circuit breaker when the current through the breaker for a fault exceeds 100% of its interrupting rating with re-closer de-rating applied, as determined by the ANSI/IEEE C37.5-1979, C37.010-1979 & C37.04-1979 breaker rating methods.

For this line rebuild, no breakers were found to exceed their interrupting capability after the addition of the new equipment. OG&E found no breakers that exceeded their interrupting capabilities on their system. Therefore, there is no short circuit upgrade costs associated with UID 170657 interconnection.

Table 1: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2025 DOLLARS)
Lead time	24 months
OKGE – Interconnection Facilities - No upgrades to interconnection facilities needed	\$0
OKGE – Network Upgrades rebuild 3.43 miles of 138kV transmission line from SW 5 th to Classen Substation	\$4,887,500
OKGE – Land or ROW – no new land or ROW required	\$0
Total	\$4,887,500

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August 7, 2025

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SW 5TH TO CLASSEN

