



Interconnection Facilities Study

**GEN-2015-028
(IFS-2015-001-10)**

March 2016

Generator Interconnection



SPP *Southwest
Power Pool*

Revision History

Date	Author	Change Description
2/24/2016	SPP	Draft Interconnection Facilities Study Report Revision 0 Issued
3/30/2016	SPP	Final Interconnection Facilities Study Report Revision 0 Issued

Table of Contents

Revision History	ii
Table of Contents	iii
Interconnection Facilities Study Summary	1
Interconnection Facilities Study Introduction.....	1
Phase(s) of Interconnection Service.....	1
Credits/Compensation for Amounts Advanced for Network Upgrade(s).....	1
Interconnection Customer Interconnection Facilities	1
Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s)	2
Shared Network Upgrade(s).....	2
Other Network Upgrade(s).....	3
Conclusion	3
Appendices	4
A : Low Wind Analysis.....	A-0
B : OKGE Transmission Owner Interconnection Facilities Study Report	B-0

Interconnection Facilities Study Summary

Interconnection Facilities Study Introduction

This Interconnection Facilities Study for GEN-2015-028/IFS-2015-001-10 (Interconnection Request) is for a 2.99 MW uprate to the GEN-2009-025 (59.8MW) wind farm facility located in Kay County, Oklahoma. The Interconnection Request was studied in the DISIS-2015-001 Impact Study and DISIS-2015-001-1 Impact Restudy as an Energy Resource Interconnection Service (ERIS) only request. Since the posting of the DISIS-2015-001 Impact Study the Interconnection Customer has executed the Interconnection Facilities Study Agreement per Appendix 4 or Appendix 4A and provided deposit securities as required by the Section 8.9 of the Generator Interconnection Produce (GIP) to proceed to the Interconnection Facilities Study. The GIP is covered under Attachment V of the Southwest Power Pool (SPP) Open Access Transmission Tariff (OATT). The request for interconnection was placed with SPP by the requesting customer (Interconnection Customer) in accordance with OATT, which covers new generation interconnections on SPP's transmission system.

Oklahoma Gas and Electric Company (OKGE) performed a detailed Interconnection Facilities Study at the request of SPP for the Interconnection Request. Interconnection Customer's original in service date for the Interconnection Request is March 1, 2016. SPP has proposed the full Interconnection Service will be available after the assigned Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s) are completed. Full interconnection service will require Network Upgrade(s) listed in the "Other Network Upgrade(s)" section.

The primary objective of the Interconnection Facilities Study (IFS) is to identify necessary Transmission Owner Interconnection Facilities, network upgrade(s), other direct assigned upgrade(s), and associated upgrade lead times needed for the additional of the requested Interconnection Service into the SPP Transmission System at the specific Point of Interconnection (POI).

Phase(s) of Interconnection Service

It is not expected that Interconnection Service will occur in phases. However, Interconnection Service will not be available until all Interconnection Facilities and Network Upgrade(s) can be placed in service.

Credits/Compensation for Amounts Advanced for Network Upgrade(s)

Interconnection Customer shall be entitled to either credits or potentially Long Term Congestion Rights (LTCR), otherwise known as compensation, in accordance with Attachment Z2 of the SPP Tariff for any Network Upgrades, including any tax gross-up or any other tax-related payments associated with the Network Upgrades, and not refunded to the Interconnection Customer.

Interconnection Customer Interconnection Facilities

The Interconnection Request's Generation Facility consists of twenty-six (26) Siemens 2.3MW wind generators for a total of 59.8MW. The GEN-2015-028 Interconnection Request uprates the generators to twenty-six (26) Siemens 2.415MW wind generators with "Wind Boost" for a total of 62.79MW. The existing wind farm is interconnected into the Nardin 69kV Substation. The

Interconnection Customer will be responsible for all of the transmission facilities connecting the Interconnection Customer owned substation to the Point of Interconnection (POI).

The Interconnection Customer will be responsible for any equipment located at the Customer substation necessary to maintain a power factor of 0.95 lagging to 0.95 leading at the POI including approximately 1.66Mvars of reactors or install and utilize an equivalent means to compensate for injection of reactive power into the transmission system under no/light wind conditions. Also, the Interconnection Customer will need to coordinate with the Transmission Owner for relay, protection, control, and communication system configurations.

Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s)

To facilitate interconnection, the interconnecting Transmission Owner, OKGE, will not require and additional Transmission Owner Interconnection Facilities or Network Upgrades.

At this time, Interconnection Customer is responsible for \$0 of OKGE Transmission Owner Interconnection Facilities (TOIF) and Non-Shared Network Upgrade(s). **Table 1** displays the estimated costs for TOIF and Non-Shared Network Upgrade(s).

Table 1: Interconnection Customer TOIF and Non-Shared Network Upgrade(s)

TOIF and Non-Shared Network Upgrades Description	Allocated Cost (\$)	Allocated Percent (%)	Total Cost (\$)
OKGE Interconnection Substation: Transmission Owner Interconnection Facilities –No new Transmission Owner Interconnection Facilities	\$0		\$0
OKGE Interconnection Substation - Non-Shared Network Upgrades – No new Network Upgrades	\$0		\$0
Total	\$0		\$0

Shared Network Upgrade(s)

The Interconnection Request was studied in the DISIS-2015-001 Impact Study and DISIS-2015-001-1 Impact Restudy as an Energy Resource Interconnection Service (ERIS) only request. At this time, the Interconnection Customer is allocated \$0 for Shared Network Upgrades. If higher queued Interconnection Request(s) withdraw from the queue, suspend or terminate their GIA, restudies will have to be conducted to determine the Interconnection Customers’ allocation of Shared Network Upgrades. All studies have been conducted on the basis of higher queued Interconnection Request(s) and the Network Upgrade(s) associated with those higher queued Interconnection Requests being placed in service. At this time, the Interconnection Customer is allocated the following cost listed in **Table 2** for Shared Network Upgrade.

Table 2: Interconnection Customer Shared Network Upgrades

Shared Network Upgrades Description	Allocated Cost (\$)	Allocated Percent (%)	Total Cost (\$)
Currently not allocated Shared Network Upgrades	\$0	n/a	\$0

Total	\$0	n/a	\$0
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Other Network Upgrade(s)

Certain Other Network Upgrades are currently not the cost responsibility of the Interconnection Customer but will be required for full Interconnection Service.

- 1) None

Depending upon the status of higher or equally queued customers, the Interconnection Request’s in-service date is at risk of being delayed or their Interconnection Service is at risk of being reduced until the in-service date of these Other Network Upgrades.

Conclusion

Interconnection Service for the Interconnection Request will be delayed until the Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades are constructed. The Interconnection Customer is responsible for \$0 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. At this time, the Interconnection Customer is allocated \$0 for Shared Network Upgrades. After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 62.79 MW, as requested by the Interconnection Customer can be allowed.

At this time the total allocation of costs assigned to Interconnection Customer for interconnection Service are estimated at \$0.

Appendices

A: Low Wind Analysis

A low wind analysis has been performed for the GEN-2015-028 Interconnection Request (2.99 MW uprate to the GEN-2009-025 59.8MW wind generation facility) Interconnection Request. SPP performed this low wind analysis for excessive capacitive charging current for the addition of the GEN-2015-028 facilities.

The project generators and capacitors (if any) were turned off in the base case. The resulting reactive power injection into the transmission network comes from the capacitance of the project’s transmission lines and collector cables.

Shunt reactors were added at the study project substation 34.5 kV bus to bring the Mvar flow into the POI down to approximately zero. Final shunt reactor requirement for GEN-2015-028 is approximately 1.66Mvars.

Table 1: Low Wind/No Wind Analysis

Request	Size (MW)	Point of Interconnection	Shunt Reactive Mvar Requirement
GEN-2015-028/GEN-2009-025	62.79	Nardin 69kV	1.66

B: OKGE Transmission Owner Interconnection Facilities Study Report

See next page for OKGE Interconnection Facilities Study Report.



FACILITY STUDY

for

Generation Interconnection Request 2015-028

2.99 MW Addition to Existing Wind Generating Facility
In Kay County
Near
Blackwell, Oklahoma

July 2, 2015

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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-2015-028. The request for interconnection was placed with SPP in accordance SPP's Open Access Transmission Tariff, which covers new generation interconnections on SPP's transmission system. The request is for adding 2.99 MW to an existing Point of Interconnection. There are no requirements for addition of 2.99 MW to the existing Point of Interconnection. No new or additional facilities are necessary to accommodate the additional generation.

Table of Contents

Table of Contents	3
Introduction	4
Interconnection Facilities	5
Interconnection Costs	6
One-Line diagram of Interconnection	7

Introduction

The Southwest Power Pool has requested a Facility Study for the purpose of interconnecting an additional 2.99 MW of wind generation to an existing Point of Interconnection within the service territory of OG&E Electric Services (OKGE) in Kay County Oklahoma. The proposed 69kV point of interconnection is at the existing Nardin Substation in Kay County. This substation is owned by OKGE. The proposed in-service date for the additional generation is unknown.

Network Constraints in the American Electric Power West (AEPW), 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. There are no requirements for additional interconnection facilities at the existing Tatonga Substation.

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 recloser 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 2.99 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-2015-028 interconnection.

Table 1: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2015 DOLLARS)
OKGE – Interconnection Facilities - No new interconnection facilities necessary	\$0
OKGE – Network Upgrades No new network upgrades necessary	\$0
OKGE - Right-of-Way for 69kV terminal addition	No Additional ROW
Total	\$0

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July 2, 2015

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Nardin 69kV Substation

