



# Interconnection Facilities Study

**GEN-2015-004  
(IFS-2015-001-13)**

**April 2016**

**Generator Interconnection**



**SPP** *Southwest  
Power Pool*

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## Revision History

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Date	Author	Change Description
3/10/2016	SPP	Draft Interconnection Facilities Study Report Revision 0 Issued
4/11/16	SPP	Final Interconnection Facilities Study Report Revision 0 Issued

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# Interconnection Facilities Study Summary

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## Interconnection Facilities Study Introduction

This Interconnection Facilities Study (IFS) for GEN-2015-004/IFS-2015-001-13 is for a 52.9 MW wind farm facility uprate to GEN-2011-049 located in Beckham County, Oklahoma. The Interconnection Request was studied in the DISIS-2015-001 Impact Study 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 (IFS) at the request of SPP for the Interconnection Request. The Interconnection Customer's original proposed in-service date for the Interconnection Request is June 15, 2017. SPP has proposed that full Interconnection Service will be available after the Interconnection Request and GEN-2011-049 assigned Interconnection Facilities, Non-Shared Network Upgrade(s), and 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 is currently proposed to consist of adding twenty-three (23) 2.3MW Siemens wind turbines for a total generating nameplate of 52.90 MW. The twenty-three (23) 2.3MW Siemens wind turbines are to be integrated into the GEN-2011-049 wind turbine layout. Eleven (11) of the twenty-three (23) Interconnection Request's wind turbines

will connect to the GEN-2011-049 34.5kV collector system that is planned to connect to GEN-2011-049 345/34.5kV owned and maintained transformer circuit #1. The other twelve (12) of the twenty-three (23) Interconnection Request’s wind turbines will connect to the GEN-2011-049 34.5kV collector system that is planned to connect to GEN-2011-049 345/34.5kV owned and maintained transformer circuit #2. The Interconnection Request and GEN-2011-049 combined will have an Interconnection Service amount totaling to 303.6 MW. The Point of Change of Ownership (PCO) with GEN-2011-049 will be at the location of the Interconnection Request’s wind turbines connect to the GEN-2011-049 34.5kV collector system. An eight (8) mile overhead 345kV transmission circuit will connect the Interconnection Request from the Interconnection Customer owned substation to the OKGE owned and maintained Border 345kV bus at the Border Substation located in Beckham County, Oklahoma. The Interconnection Customer will be responsible for all of the transmission facilities connecting the Interconnection Customer owned substation to the Point of Interconnection (POI) at Border 345kV.

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 21.0 Mvar<sup>1</sup> of reactors to compensate for injection of reactive power into the transmission system under 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, has verified that GEN-2011-049 assigned upgrades are suffice for the acceptance of the Interconnection Customer’s Interconnection Facilities.

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 (\$)
<u>Interconnection Substation: Transmission Owner Interconnection Facilities</u>	\$0	N/A	\$0
<u>Interconnection Substation - Non-Shared Network Upgrades</u>	\$0	N/A	\$0
Total	\$0	N/A	\$0

<sup>1</sup> This approximate minimum reactor amount is needed for the current configuration of the wind farm as studied in the DISIS-2015-001 Impact Study.

A Shared Facilities Usage Agreement for the shared facilities with GEN-2011-049 shall be required for Generator Interconnection Service. Shared Facilities Usage Agreement details will be determined during the negotiation phase of the GIA.

If GEN-2011-049 withdraws or terminates its Generator Interconnection Request (GIR), Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s) and total cost of \$3,654,353 for GEN-2011-049 shall be the cost allocation responsibility of the Interconnection Customer.

### Shared Network Upgrade(s)

The Interconnection Request was studied in the DISIS-2015-001 Impact Study as an Energy Resource Interconnection Service (ERIS) only request. At this time, the Interconnection Customer is allocated \$3,193,214 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 (\$)
Oklaunion 345kV Reactive Power Support – Install two (2) – 130Mvar of capacitor bank(s) at Oklaunion	\$3,193,214	31.93	\$10,000,000
Total	\$3,193,214	31.93	\$10,000,000

### 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.

Currently, no Other Network Upgrades are assigned.

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, Non-Shared Network Upgrades, and Shared Network Upgrades are constructed. The Interconnection Customer is responsible for \$0 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. If GEN-2011-049 withdraws or terminates its Generator Interconnection Request (GIR), Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s) and total cost of \$3,654,353 for GEN-2011-049 shall be the cost allocation responsibility of the Interconnection Customer. At this time, the

Interconnection Customer is allocated \$3,193,214 for Shared Network Upgrades. After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 52.9 MW, as requested by Interconnection Request can be allowed.

At this time the total allocation of costs assigned to Interconnection Customer for interconnection Service are estimated at \$3,193,214.

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# Appendices

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## **A: OKGE Transmission Owner Interconnection Facilities Study Report**

See next page for OKGE Interconnection Facilities Study Report.



## **FACILITY STUDY**

**for**

### **Generation Interconnection Request 2015-004**

52.9 MW Addition to Existing Wind Generating Facility  
In Beckham County  
Near  
Eric, Oklahoma

October 20, 2015

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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-2015-004. 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 52.9 MW to an existing Point of Interconnection. There are no requirements for addition of 52.9 MW to the existing Point of Interconnection. No new or additional facilities are necessary to accommodate the additional generation.

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## **Introduction**

The Southwest Power Pool has requested a Facility Study for the purpose of interconnecting an additional 52.9 MW of wind generation to an existing Point of Interconnection within the service territory of OG&E Electric Services (OKGE) in Beckham County Oklahoma. The proposed 345kV point of interconnection is at the existing Border Substation in Beckham 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 Border 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 52.9 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-2015-004 interconnection.

**Table 1: Required Interconnection Network Upgrade Facilities**

Facility	ESTIMATED COST (2015 DOLLARS)
OKGE – <b>Interconnection Facilities</b> - No new interconnection facilities necessary	<b>\$0</b>
OKGE – <b>Network Upgrades</b> No new network upgrades necessary	<b>\$0</b>
OKGE - Right-of-Way for 345kV terminal addition	No Additional ROW
<b>Total</b>	<b>\$0</b>

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October 20, 2015

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# Border Substation

