



SPP *Southwest
Power Pool*

**OKGE Facility Study
For
Generation Interconnection
Request
GEN-2011-049**

*SPP Generation
Interconnection Studies*

(#GEN-2011-049)

June 2012

Summary

OG&E Electric Services (OKGE) performed a detailed Facility Study at the request of Southwest Power Pool (SPP) for Generation Interconnection request GEN-2011-049 (250 MW/Wind). The originally proposed in-service date was December 31, 2013, however the customer has proposed a new in-service date of September 15, 2014. 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.

Phases of Interconnection Service

It is not expected that interconnection service will require phases however, interconnection service will not be available until all interconnection facilities and network upgrades can be placed into service.

Interconnection Customer Interconnection Facilities

The Interconnection Customer will be responsible for all of the transmission facilities connecting the customer owned substation to the Point of Interconnection (POI), the OKGE 345 kV Border substation to be located on the TUCO (SPS) – Woodward (OKGE) 345 kV transmission line. The Customer will also 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.

Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades

To allow interconnection the Transmission Owner will need to add a new 345 kV line terminal, breaker and associated equipment to the OKGE Border substation for acceptance of the Interconnection Customer's Interconnection Facilities. Interconnection may also require resizing of the proposed line reactors planned for installation at the Border substation. Should line reactors need resizing, the Customer will have to bear the cost of changing the reactors. Additionally the Customer will also be charged the cost of an EMTP study, should one be required by the Transmission Owner. The estimated in-service date for these Interconnection Facilities is unknown but not expected to delay the newly proposed in-service date of September 15, 2014. At this time the Customer is responsible for \$3,654,353 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades.

Shared Network Upgrades

The interconnection customer was studied within the DIS-2011-002 Impact Study. At this time, the Interconnection Customer is allocated \$11,559,251.68 for Shared Network Upgrades, as listed below:

1. Glass Mountain – Mooreland 138kV Rebuild (NRIS only)

If higher queued interconnection customers 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 requests and the upgrades associated with those higher queued interconnection requests being placed in service.

Other Network Upgrades

Certain Other Network Upgrades are not currently the cost responsibility of the Customer but will be required for full Interconnection Service. Withdrawal of higher queued projects will require a restudy and these cost responsibilities may change. These Network Upgrades include:

1. Woodward – Border - TUCO 345kV, scheduled for 5/19/2014 in-service
2. Hitchland - Beaver 345kV double circuit, scheduled for 6/30/2014 in-service
3. TUCO 345/230/13.2kV Autotransformer circuit 2, scheduled for 5/19/2014 in-service
4. Beaver County – Gray County (Buckner) 345kV, assigned to DIS-2011-001 Customers
5. Benton - Wichita 345kV terminal equipment, assigned to DIS-2011-001 Customers
6. Evans Energy Center – Maize terminal equipment, assigned to DIS-2011-001 Customers
7. Chisolm – Maize 138kV terminal equipment, assigned to DIS-2011-001 Customers
8. FPL Switch – Woodward – Mooreland 138kV rebuild, assigned to DIS-2011-001 Customers
9. Matthewson – Cimarron 345kV circuit 2, assigned to DIS-2011-001 Customers
10. Spearville – Mullergren – Reno 345kV double circuit, assigned to DIS-2011-001 Customers
11. Tatonga - Matthewson 345kV circuit 2, assigned to DIS-2011-001 Customers
12. Woodward 345/138/13.8 Transformer circuit 2, scheduled for 5/19/2014 in-service

Depending upon the status of higher or equally queued customers, the Interconnection Customer'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 GEN-2011-049 will be delayed until the Transmission Owner Interconnection Facilities and Network Upgrades are constructed, estimated at September 15, 2014. The Customer is responsible for \$3,654,353 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. At this time, the Interconnection Customer is also allocated \$11,559,251.68 for Shared Network Upgrades. After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 250 MW, as requested by GEN-2011-049, can be allowed. There is also a Network Upgrade located on SPS, the costs of which are allocated to GEN-2011-049 but be detailed within a separate Facility Study. At this time the total allocation of costs of Interconnection Service for GEN-2011-049 are estimated at \$15,213,604.68.



FACILITY STUDY

for

Generation Interconnection Request 2011-049

250 MW Wind Generating Facility
In Beckham County
Near
Eric, Oklahoma

May 15, 2012

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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-2011-049. 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 requirements for interconnection consist of adding a new 345kV breaker and a terminal in the proposed OG&E Border Substation. The total cost for OKGE to add a new 345kV breaker and a terminal for the wind farm line into the proposed Border Substation, is estimated at \$3,654,353.

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Introduction

The Southwest Power Pool has requested a Facility Study for the purpose of interconnecting 250MW of wind generation within the service territory of OG&E Electric Services (OKGE) in Beckham County Oklahoma. The proposed 345kV point of interconnection is at the proposed OG&E Border Substation in Beckham County. The proposed in-service date is September 15, 2014.

Power flow analysis has indicated that for the power flow cases studied, it is possible to interconnect the 250MW of generation within the local transmission system. Given the Point of Interconnection at an existing substation, there are additional requirements for interconnection including bus, breakers, switches, relaying, metering, etc.

The cost for adding a new 345kV terminal to the proposed Border Substation, the required interconnection facility, is estimated at \$1,099,958. Other 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. The requirements for interconnection consist of adding a new 345kV terminal in the Border Substation. This 345kV addition shall be constructed and maintained by OKGE. The Customer did not propose a route of its 345kV line to serve its 345-34.5kV facilities. It is assumed that obtaining all necessary right-of-way for the new OKGE 345kV substation facilities will not be a significant expense.

The total cost for OKGE to add a new 345kV terminal in the Border substation, the interconnection facility, is estimated at \$1,099,958. This cost does not include building 345kV line from the Customer substation into the Border Substation. The Customer is responsible for this 345kV line up to the point of interconnection. This cost does not include the Customer's 345-34.5kV substation and the cost estimate should be determined by the Customer.

It is possible line reactors would have to be resized at Border substation once the wind farm is interconnected. An EMTP study may be required to determine the impact. If an EMTP study is required, it will be at the expense of the wind farm developer. If reactors must be resized due to the outcome of the study, the cost of changing the reactors will be at the expense of the wind farm developer.

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 250 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-2011-049 interconnection.

Table 1: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2012 DOLLARS)
OKGE – Interconnection Facilities - Add a single 345kV line terminal to the Border Substation. Dead end structure, line switches, line relaying, revenue metering including CTs and PTs	\$1,099,958
OKGE – Network Upgrades At Border sub add 1-345kV breaker, line relaying, disconnect switches, and associated equipment.	\$2,554,395
OKGE - Right-of-Way for 345kV terminal addition	No Additional ROW
Total	\$3,654,353

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Border Substation

