Southwest Power Pool

Facility Study
For
Generator Interconnection Request
GEN-2013-034

SPP Generator Interconnection Studies

(#GEN-2013-034)

June 2014

Revision History

Date	Author	Change Description
06/13/2014	SPP	Facility Study Report Issued

Summary
Oklahoma Gas and Electric (OKGE) performed a detailed Facility Study at the request of Southwest Power Pool (SPP) for Generation Interconnection request GEN-2013-034 (73.6 MW/Wind) located in Ellis County, Oklahoma. SPP has proposed the in-service date will be after the assigned Interconnection Facilities and Non-Shared Network Upgrades are constructed. Full Interconnection Service will require the Network Upgrades listed in the "Other Network Upgrades" section. 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 in 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), at a new Oklahoma Gas and Electric (OKGE) owned 345kV bus and substation. This new OKGE 345kV substation is tapping both Hitchland – Woodward 345kV transmission lines in Ellis County, Oklahoma. The Interconnection 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. Additionally, reactive power analysis within the DISIS-2013-002 study shows the need for approximately 2.5Mvar of reactors to compensate for reactive injection into the transmission system.

Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades
To allow interconnection the Transmission Owner will need construct a new 5 breaker ring and new 345kV substation with associated terminal equipment that is acceptable for the addition of the Interconnection Customer's Interconnection Facilities. At this time GEN-2013-034 is responsible for $18,487,859 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades.

Shared Network Upgrades
The Interconnection Customer was studied within the DISIS-2013-002 Impact Study. At this time, the Interconnection Customer is allocated $0.00 for Shared Network Upgrades. 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. At this time, the Interconnection Customer is allocated the following cost for Shared Network Upgrade:

Share Network Upgrade Description	Allocated Cost	Total Cost
None	$0.00	$0.00
Total	$0.00	

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

1. Woodward – Border – TUCO 345 kV, scheduled for 9/30/2014 in-service
2. Woodward - Thistle – Wichita 345kV double circuit, scheduled for 12/31/2014 in-service
3. Thistle – Flat Ridge 138kV circuit #1, scheduled for 12/31/2014 in-service
4. Thistle 345/138/13kV Transformer circuit #1, scheduled for 12/31/2014 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-2013-034 will be delayed until the Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades are constructed. The Interconnection Customer is responsible for $18,487,859 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. At this time, the Interconnection Customer is allocated $0.00 for Shared Network Upgrades. After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 73.6 MW, as requested by GEN-2013-034, can be allowed. At this time the total allocation of costs assigned to GEN-2013-034 for Interconnection Service are estimated at $18,487,859.

FACILITY STUDY

for

Generation Interconnection Request 2013-034

Wind Generating Facility
In Ellis County
Oklahoma

May 29, 2014

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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-2013-034. 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 five 345kV breakers and a terminal in a new substation. The total cost for OKGE to add five new 345kV breakers and a terminal for the wind farm interconnection in the new substation, the interconnection facility, is estimated at $18,487,859.

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Introduction

The Southwest Power Pool has requested a Facility Study for the purpose of interconnecting a wind generating facility within the service territory of OG&E Electric Services (OKGE) in Ellis County Oklahoma. The proposed 345kV point of interconnection will be at a new substation on Hitchland to Woodward District EHV 345kV transmission line#1 and line#2 in Ellis County Oklahoma. This substation will be owned by OKGE.

The cost for adding a new 345kV terminal to the Substation, the required interconnection facility, is estimated at $1,099,958. Other 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.

Interconnection Facilities

The primary objective of this study is to identify attachment facilities. The requirements for interconnection consist of building a new 345kV 5 breaker ring in a new 345kV substation. This 345kV substation shall be constructed and maintained by OKGE. The Customer did not propose a route of its 345kV line to serve its 345kV facilities. It is assumed that obtaining all necessary right-of-way for the line into the new OKGE 345kV substation facilities will not be a significant expense.

The total cost for OKGE to build a new 345kV substation, the interconnection facility, is estimated at $18,487,859. This cost does not include building the 345kV line from the Customer substation into the new EHV 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.

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 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-2013-034 interconnection.

Table 1: Required Interconnection Network Upgrade Facilities

Facility	ESTIMATED COST (2014 DOLLARS)
OKGE – **Interconnection Facilities**- Add a single 345kV line terminal to a new EHV Substation. Dead end structure, line switch, line relaying, revenue metering including CTs and PTs	**$1,099,958**
OKGE – **Network Upgrades** at a new EHV sub, Install 5-345kV 5000A breakers, line relaying, disconnect switches, and associated equipment	**$16,887,901**
OKGE – Property for new 345kV substation	**$500,000**
Total	**$18,487,859**

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New 345kV substation for GEN-2013-034