



***Facility Study  
For  
Generation Interconnection  
Request  
GEN-2010-029***

***SPP Generation  
Interconnection Studies***

***(#GEN-2010-029)***

**March 2013**

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## Revision History

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Date	Author	Change Description
1/11/2012	SPP	Facility Study Report Issued
3/1/2013	SPP	Account for Definitive Interconnection System Impact Restudy Results (DISIS-2011-001-3)

**Summary**

Sunflower Electric Power Corporation (SUNC) performed a detailed Facility Study at the request of Southwest Power Pool (SPP) for Generation Interconnection request GEN-2010-029. 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.

**Interconnection Customer Interconnection Facilities**

The Interconnection Customer will be responsible for the 345 kV transmission line from its wind turbine Collector Substation to the Point of Interconnection (POI), the Spearville 345kV substation located in Ford County. In addition, the customer will be responsible for reactive power compensation equipment to maintain 95% lagging (providing vars) and 95% leading (absorbing vars) power factor at the point of interconnection.

**Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades**

Per the following Facility Study, the Interconnection Customer is responsible for \$8,000,000 of Transmission Owner Interconnection Facilities and non-shared network upgrades.

**Shared Network Upgrades**

The interconnection customer was studied within the DISIS-2011-001 Impact Study. At this time, the Interconnection Customer is allocated the following cost for shared network upgrades:

Upgrade Description	Allocated Cost	Total Cost
Beaver County Expansion (Tap and Tie in Hitchland – Woodward 345kV circuit #2 at Beaver County)	\$613,543.26	\$3,500,000.00
Beaver County – Buckner 345kV circuit #1 - Build approximately 90 miles of 345kV from Beaver County - Buckner (construction by OKGE)	\$18,513,063.12	\$105,609,050.00
Beaver County - Buckner 345kV circuit #1 - Build approximately 90 miles of 345kV from Beaver County - Buckner (construction by Sunflower)	\$11,324,255.61	\$64,600,000.00
Matthewson – Cimmaron 345kV circuit #2 - Build second 345kV circuit from Matthewson – Cimmaron	\$3,494,470.74	\$42,903,753.00
Mullergren – Reno 345kV double circuit - Build new double circuit 345kV transmission line from Mullergren to Circle to Reno. Includes substation work at Reno. (Construction by Westar)	\$15,545,007.51	\$53,828,328.00
Spearville – Mullergren – Reno 345kV double circuit - Build new double circuit 345kV transmission line from Spearville to Mullergren to Circle. Includes substation work at Spearville. (Construction by Sunflower)	\$102,052,999.03	\$353,383,059.00
Tatonga – Matthewson 345kV circuit #2 - Build Matthewson Substation. Build second 345kV circuit from Tatonga – Matthewson	\$7,199,022.00	\$104,260,473.00
NRIS Only upgrade: Spearville – Mullergren 230kV circuit #1 – Rebuild approximately 62 miles of 230kV line	\$24,997,576.15	\$36,107,610.00
<b>Total</b>	<b>\$183,739,937.42</b>	

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.

### **Additional Required Network Upgrades**

Certain Network Upgrades that are not the cost responsibility of the Customer are required for Interconnection. These Network Upgrades include:

1. Hitchland - Woodward 345kV double circuit transmission line, scheduled for 6/30/2014 in-service
2. Hitchland 345/230kV Autotransformer circuit #2, scheduled for 6/30/2014 in-service
3. Spearville - Clark County - Thistle - Wichita 345kV double circuit transmission line, scheduled for 12/31/2014 in-service
4. Post Rock 345/230/13.8kV Autotransformer circuit #2, assigned to DISIS-2010-001 Customers
5. Woodward transformer 345/138/13.8kV circuit #1, scheduled for 5/19/2014 in-service
6. Woodward - Thistle 345kV double circuit transmission line, scheduled for 12/31/2014 in-service
7. Woodward - Border TUCO Interchange 345kV circuit #1, scheduled for 5/19/2014 in-service

These network upgrades are not scheduled to be in service until December 31, 2014. Depending upon the status of higher or equally queued customers, the Interconnection Customer's in service date may be delayed until the in service date of these Network Upgrades.

### **Conclusion**

Interconnection Service for GEN-2010-029 will be delayed until the Transmission Owner Interconnection Facilities Shared Network Upgrades are constructed. The Customer is responsible for \$8,000,000.00 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. At this time, the Interconnection Customer is allocated \$183,739,937.42 for Shared Network Upgrades. After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 450.0 MW, as requested by GEN-2010-029, can be allowed. At this time the total allocation of costs of Interconnection Service for GEN-2010-029 are estimated at \$191,739,937.42.

## **Executive Summary**

<OMITTED TEXT> (Customer) has requested a Facility Study under the Southwest Power Pool Open Access Transmission Tariff (OATT) for interconnecting a 450 MW wind powered generation facility in Ford County, Kansas to the transmission system of Sunflower Electric Power Corporation (SUNC). The wind powered generation facility studied is comprised of two hundred and fifty two (252) Vestas 1.8 MW wind turbines. The wind powered generation facility will interconnect into the planned Spearville 345kV Substation.

SUNC will add a 345kV breaker and half leg to the ring bus at the planned Spearville substation and terminate the GEN-2010-029 wind farm. The Interconnection Customer's non shared network upgrades and interconnection facilities are estimated at \$8,000,000.

The Customer will be responsible for reactive power compensation equipment to maintain 95% lagging (providing vars) and 95% leading (absorbing vars) power factor at the point of interconnection.

## 1. Introduction

<OMITTED TEXT> (Customer) has requested a Facility Study under the Southwest Power Pool Open Access Transmission Tariff (OATT) for interconnecting a 450 MW wind powered generation facility in Ford County, Kansas to the transmission system of Sunflower Electric Power Corporation (SUNC). The wind powered generation facility studied is comprised of two hundred and fifty two (252) Vestas 1.8 MW wind turbines. The wind powered generation facility will interconnect into the planned Spearville 345kV Substation.

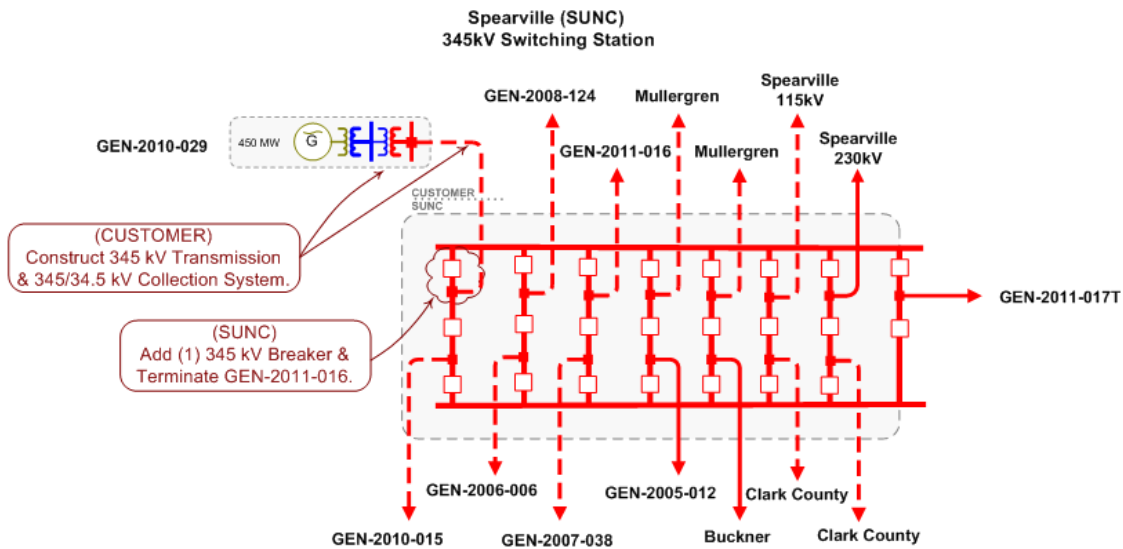
## 2. Interconnection Facilities and Network Upgrades

The cost for the Interconnection Facilities and Network Upgrades is listed below in Table 1. The one-line diagram is shown in Figure 1.

**Table 1: Required Interconnection Facilities and Non Shared Network Upgrades**

<b>Project</b>	<b>Description</b>	<b>Estimated Cost</b>
1	SUNC-add 345kV breaker and half leg to the ring bus at the planned Spearville substation and terminate GEN-2010-029 wind farm.	\$8,000,000
	<b>Total:</b>	<b>\$8,000,000</b>

**Figure 1. Interconnection Configuration for GEN-2010-029**



**2.1. Customer Facilities** – The Customer will be responsible for its Generating Facility and its 345/34.5 kV substation that will contain its 345/34.5 kV transformer(s) and wind turbine collector feeders. In addition, the Customer will be required to install the following equipment in its facilities.

**2.1.1. Reactive Power Equipment** – The Customer will be responsible for reactive power compensation equipment to maintain 95% lagging (providing vars) and 95% leading (absorbing vars) power factor at the point of interconnection. Any capacitor banks installed by the Interconnection Customer shall not cause voltage distortion in accordance with Article 9.7.4 of the standard SPP Generation Interconnection Agreement.

**3. Conclusion**

The Interconnection Customer’s interconnection facilities are estimated at \$8,000,000.