



***Facility Study  
For  
Generation Interconnection  
Request  
GEN-2007-013***

***SPP Tariff Studies***

***(#GEN-2007-013)***

**March 2009**

## **Executive Summary**

<OMITTED TEXT> (Customer) has requested a Facility Study under the Southwest Power Pool Open Access Transmission Tariff for the purpose of interconnecting 99 MW of wind generation into the transmission facilities of Sunflower Electric Power Corporation (SUNC) located in Wichita County, Kansas. The proposed in-service date of the generation is December 31, 2009.

The proposed method of interconnection is a new three breaker 115 kV substation along the Tribune – GEN-2001-039M wind farm 115 kV line. Also, a new 115 kV transmission line from Setab – GEN-2001-039M is required for the interconnection of this generation. The total cost of the interconnection facilities for this interconnection request is approximately \$8,900,000.

The Impact Study for GEN-2007-013 shows that a 115 kV transmission line is needed between Setab and GEN-2001-039M in order for the transmission system to remain stable for certain contingencies. The Impact Study determined that the Customer will need to be able to provide unity power factor at the point of interconnection for any system configuration. With the new 115kV transmission line in service, additional capacitor banks will not be necessary for the GE or the Clipper turbines.

Additionally, the Impact Study has shown that the Clipper wind turbines will meet FERC Order 661A low voltage ride through (LVRT) requirements with the Setab – GEN-2001-039M transmission line in service. For the GE turbines to meet the LVRT requirements, the turbines will need to be purchased with the manufacturer's LVRTII package.

## 1. Introduction

<OMITTED TEXT> (Customer) has requested a Facility Study under the Southwest Power Pool Open Access Transmission Tariff for the purpose of interconnecting 99 MW of wind generation into the transmission facilities of Sunflower Electric Power Corporation (SUNC) located in Wichita County, Kansas. The proposed in-service date of the generation is December 31, 2009.

## 2. Facilities

Figure 1 shows the interconnection facilities for this project, and Figure 2 shows the approximate location of the interconnection facility substation.

### 2.1. Interconnection Facilities

Table 1 shows the required interconnection facilities and the estimated cost for those facilities. The interconnection facilities will be constructed using the applicable SUNC engineering and construction standards. The Customer will be responsible for the costs as shown in Table 1.

**Table 1: Required Interconnection Facilities**

<b>Facility</b>	<b>ESTIMATED COST (2008 DOLLARS)</b>
SUNC – Build new three terminal 115 kV switching station on the Tribune – Setab 115 kV line.	<b>\$3,300,000</b>
SUNC – 115 kV transmission line from GEN-2001-039M wind farm to Setab (11.25 miles)	<b>\$3,900,000</b>
SUNC – Substation work at Setab and GEN-2001-039M	<b>\$1,700,000</b>
<b>Total</b>	<b>\$8,900,000</b>

### 2.2. Other Network Facilities

As indicated in the Impact Study for GEN-2007-013, certain contingencies will cause the voltage to collapse on the transmission system. The mitigation recommended is to construct a new 115kV line from the GEN-2001-039M wind farm to the SUNC Setab 115kV substation bus. All voltage and dynamic stability issues are resolved with the addition of this new transmission line.

### 2.3. Customer Facilities

Table 2 shows direct assignment facilities for which the Customer is responsible. These facilities include the Generating Facility and its 115/34.5

kV substation which will contain its 115/34.5 kV transformer and wind turbine collector feeders.

The Impact Study for GEN-2007-013 has determined that the Customer will need to be able to provide unity power factor at the point of interconnection for any system configuration. With the new 115kV transmission line in service, additional capacitor banks will not be necessary for the GE or the Clipper turbines.

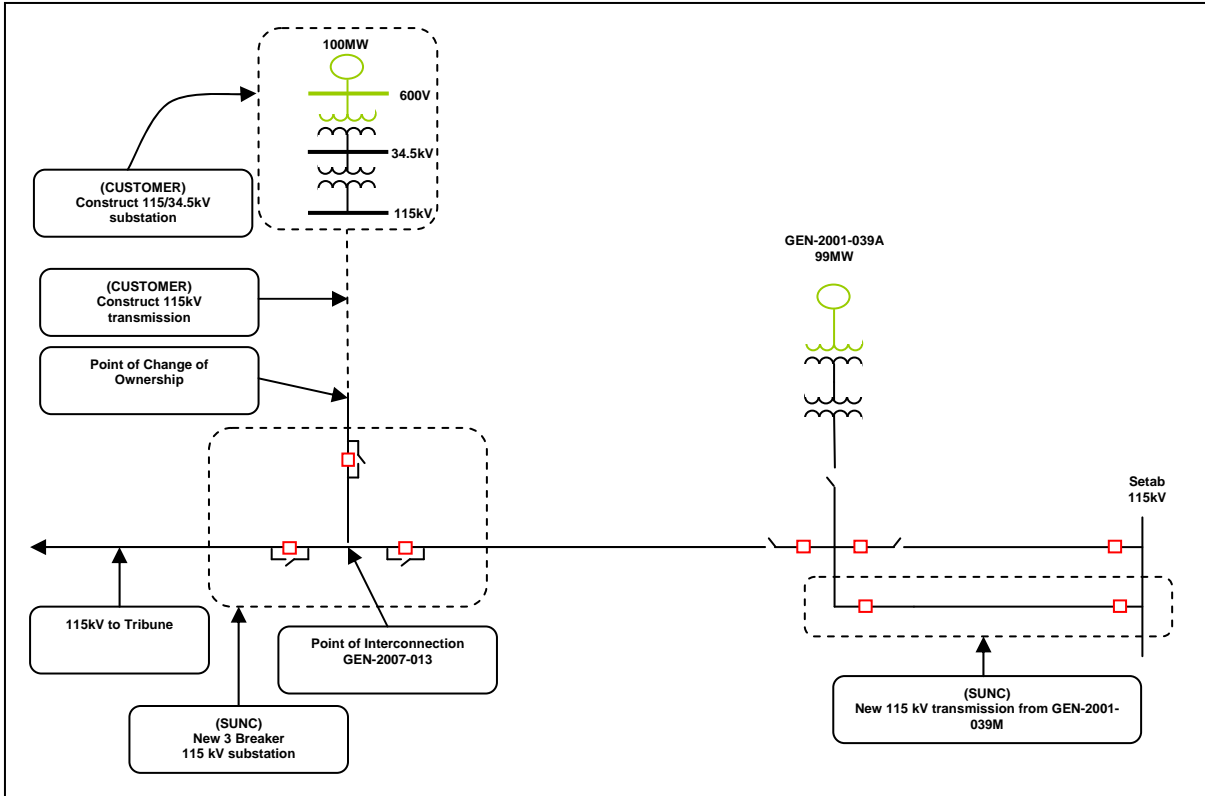
Additionally, the Impact Study has shown that the Clipper wind turbines will meet FERC Order 661A low voltage ride through (LVRT) requirements with the Setab – GEN-2001-039M transmission line in service. For the GE turbines to meet the LVRT requirements, the turbines will need to be purchased with the manufacturer’s LVRTII package.

The cost of the direct assignment facilities is to be determined by the Customer.

**Table 2: Direct Assignment Facilities**

Facility	ESTIMATED COST (2008 DOLLARS)
Customer – (1) 115/34.5 kV Customer collector substation facilities.	*
Customer – (1) 115 kV transmission line from Customer collector substation to the proposed point of interconnection	*
Customer - Right-of-Way for Customer facilities.	*
<b>Total</b>	*

Note: \*Estimates of cost to be determined by the Customer



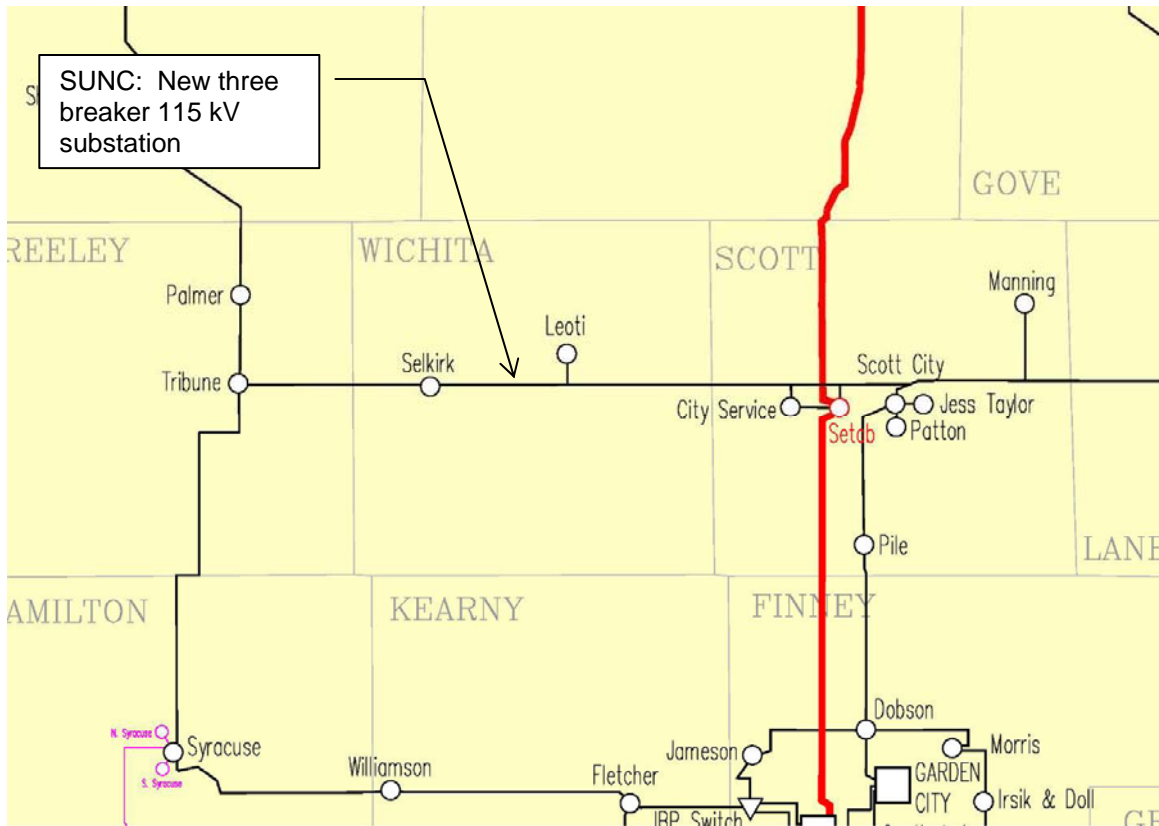
**Figure 1: Proposed Method of Interconnection  
(Final design to be determined)**

### 3. Short Circuit Study

SUNC has indicated that no SUNC facilities will be affected due to short circuit contribution by the interconnection of GEN-2007-013.

### 4. Conclusion

The cost to interconnect the GEN-2007-013 generation interconnection request for 99 MW is estimated by this Facility Study to be \$8,900,000. The cost of the Customer facilities is to be determined by the Customer. The Clipper wind turbines will meet FERC Order 661A low voltage ride through (LVRT) requirements with the Setab – GEN-2001-039M transmission line in service. For the GE turbines to meet the LVRT requirements, the turbines will need to be purchased with the manufacturer's LVRTII package. The Impact Study determined that the Customer will need to be able to provide unity power factor at the point of interconnection for any system configuration. With the new 115kV transmission line in service, additional capacitor banks will not be necessary for the GE or the Clipper turbines



**Figure 2: Point of Interconnection Area Map**