



# Feasibility Cluster Study for Generation Interconnection Requests (FCS-2011-004)

December 2011

Tariff Studies – Generation Interconnection

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## Revision History

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Date or Version Number	Author	Change Description	Comments
12/16/2011	Southwest Power Pool	N/A	Report Issued

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## Executive Summary

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Generation Interconnection customers have requested a Feasibility Study under the Generation Interconnection Procedures (GIP) in the Southwest Power Pool Open Access Transmission Tariff (OATT). The Interconnection Customers' requests have been clustered together for the following Feasibility Cluster Study. This Feasibility Cluster Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling approximately 73.8 MW of new generation which would be located within the transmission system of Midwest Energy (MIDW). The various generation interconnection requests have differing proposed in-service dates<sup>1</sup>. The generation interconnection requests included in this Feasibility Cluster Study are listed in Appendix A by their queue number, amount, requested interconnection service, area, requested interconnection point, proposed interconnection point, and the requested in-service date.

Power flow analysis has indicated that for the power flow cases studied, 73.8 MW of nameplate generation may be interconnected with transmission system reinforcements within the SPP transmission system. The need for reactive compensation in accordance with Order No. 661-A for wind farm interconnection requests will be evaluated in the Interconnection System Impact Study based on the wind turbine manufacturer and type requested by the Customer. Dynamic stability studies performed as part of the System Impact Cluster Study will provide additional guidance as to whether the required reactive compensation can be static or a portion must be dynamic (such as a SVC).

The total estimated minimum cost for interconnecting the studied generation interconnection request is \$33,300,000. These costs are shown in Appendix E. These costs do not include the Interconnection Customer Interconnection Facilities as defined by the SPP Open Access Transmission Tariff (OATT). This cost does not include the possible need for reactive compensation or additional interconnection facilities or network upgrades that may be identified through additional analyses performed in the Preliminary Interconnection System Impact Study (PISIS).

Network Constraints listed in Appendix F are in the local area of the new generation when this generation is injected throughout the SPP footprint for the Energy Resource (ER) Interconnection Request. Certain interconnection requests have been studied for Network Resource (NR) Interconnection Service. Additional Network constraints will have to be verified with a Transmission Service Request (TSR) and associated studies. With a defined source and sink in a TSR, this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements.

The required interconnection costs listed in Appendix E does not include all costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer submits a Transmission Service Request through SPP's Open Access Same Time Information System (OASIS) as required by Attachment Z1 of the SPP OATT.

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<sup>1</sup> The generation interconnection requests in-service dates will need to be deferred based on the required lead time for the Network Upgrades necessary. The Interconnection Customer's that proceed to the Facility Study will be provided a new in-service date based on the competition of the Facility Study.

# Table of Contents

<b>Revision History</b> .....	<b>1</b>
<b>Executive Summary</b> .....	<b>2</b>
<b>Table of Contents</b> .....	<b>3</b>
<b>Introduction</b> .....	<b>4</b>
<b>Model Development</b> .....	<b>4</b>
Interconnection Requests Included in the Cluster .....	4
Electrically Isolated Interconnection Requests.....	4
Previous Queued Projects.....	4
Development of Base Cases .....	4
Base Case Upgrades .....	5
Contingent Upgrades .....	6
Regional Groupings.....	6
<b>Identification of Network Constraints</b> .....	<b>7</b>
<b>Determination of Cost Allocated Network Upgrades</b> .....	<b>8</b>
Credits for Amounts Advanced for Network Upgrades .....	8
<b>Interconnection Facilities</b> .....	<b>9</b>
<b>Power flow Analysis Methodology</b> .....	<b>9</b>
<b>Power flow Analysis</b> .....	<b>10</b>
<b>Conclusion</b> .....	<b>11</b>
<b>Appendix</b> .....	<b>12</b>
A: Generation Interconnection Requests Considered for Feasibility Study .....	13
B: Prior Queued Interconnection Requests .....	14
C: Study Groupings .....	18
D: Proposed Point of Interconnection One line Diagrams.....	23
E: Cost Allocation per Interconnection Request.....	24
F: FCITC Analysis (No Upgrades) .....	25

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## Introduction

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Generation Interconnection customers have requested a Feasibility Study under the Generation Interconnection Procedures (GIP) in the Southwest Power Pool Open Access Transmission Tariff (OATT). The Interconnection Customers' requests have been clustered together for the following Feasibility Cluster Study. This Feasibility Cluster Study analyzes the interconnecting of multiple generation interconnection requests associated with new generation totaling approximately 73.8 MW of new generation which would be located within the transmission system of Midwest Energy (MIDW). The various generation interconnection requests have differing proposed in-service dates<sup>2</sup>. The generation interconnection requests included in this Feasibility Cluster Study are listed in Appendix A by their queue number, amount, area, requested interconnection service, requested interconnection point, proposed interconnection point, and the requested in-service date.

The primary objective of this Feasibility Cluster Study is to identify the system constraints associated with connecting the generation to the area transmission system. The Feasibility and other subsequent Interconnection Studies are designed to identify attachment facilities, Network Upgrades and other Direct Assignment Facilities needed to accept power into the grid at each specific interconnection receipt point.

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## Model Development

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**Interconnection Requests Included in the Cluster** – SPP has included the interconnection requests listed in Appendix A to be analyzed in this cluster study. These interconnection requests represent requests with an executed Feasibility Study Agreement signed by 09/30/2011.

**Electrically Isolated Interconnection Requests** – Electrically isolated requests are discussed in the “Regional Groupings” section.

**Previous Queued Projects** - The previous queued projects included in this study are listed in Appendix B. In addition to the Base Case Upgrades, the previous queued projects were assumed to be in-service and added to the Base Case models. These projects were dispatched as Energy Resources with equal distribution across the SPP footprint.

**Development of Base Cases** - The 2010 series Transmission Service Request (TSR) Models 2012 spring, 2013 summer and winter, and 2017 summer and winter scenario 0 peak cases were used for this study. After the cases were developed, each of the control areas' resources were then redispatched using current dispatch orders.

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<sup>2</sup> The generation interconnection requests in-service dates will need to be deferred based on the required lead time for the Network Upgrades necessary. The Interconnection Customer's that proceed to the Facility Study will be provided a new in-service date based on the competition of the Facility Study.

**Base Case Upgrades** - The following facilities are part of the SPP Transmission Expansion Plan, Balanced Portfolio, or Priority Projects. These facilities have been approved or are in the construction stages and were assumed to be in-service at the time of dispatch and added to the base case models. The FCS-2011-004 Customers do not have cost for the below listed projects. **However, the FCS-2011-004 Customer Generation Facilities in service dated may need to be delayed until the completion of the following upgrades (See Appendix A for more detail).** If for some reason, construction on these projects is discontinued, additional restudies will be needed to determine the interconnection needs of the FCS-2011-003 customers.

- Hitchland 345/230/115kV upgrades to be built by SPS for 2010/2011 in-service<sup>3</sup>.
  - Hitchland – Moore County 230kV line
  - Hitchland – Perryton 230kV line
  - Hitchland – Texas County 115kV line
  - Hitchland – Hansford County 115kV line
  - Hitchland – Sherman County Tap 115kV line
- Valliant – Hugo – Sunnyside 345kV – assigned to Aggregate Study AG3-2006 Customers.
- Wichita – Reno County – Summit 345kV to be built by WERE<sup>4</sup>.
- Rose Hill – Sooner 345kV to be built by WERE/OKGE.
- Knob Hill – Steele City 115kV to be built by NPPD/WERE.
- Balanced Portfolio Projects<sup>5</sup>:
  - Gracemont 345/138/13.2kV Autotransformer
  - Woodward– Tuco 345kV line
  - Iatan– Nashua 345kV line
  - Muskogee– Seminole 345kV line
  - Post Rock – Axtell 345kV line
  - Spearville– Post Rock 345kV line
  - Tap Stillwell – Swissvale 345kV line at West Gardner
- Priority Projects<sup>6</sup>:
  - Hitchland - Woodward double circuit 345kV
  - Woodward – Medicine Lodge double circuit 345kV
  - Spearville – Comanche (Clark) double circuit 345kV
  - Comanche (Clark) – Medicine Lodge double circuit 345kV
  - Medicine Lodge – Wichita double circuit 345kV
  - Medicine Lodge 345/138kV autotransformer

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<sup>3</sup> Approved 230kV upgrades are based on SPP 2007 STEP. Upgrades may need to be re-evaluated in the system impact study.

<sup>4</sup> Approved based on an order of the Kansas Corporation Commission issued in Docket no. 07-WSEE-715-MIS

<sup>5</sup> Notice to Construct (NTC) issued June, 2009

<sup>6</sup> Notice to Construct (NTC) issued June, 2010. NTC for double circuit lines indicated that NTC may be revised at a later time to be built at a higher voltage.

**Contingent Upgrades** - The following facilities do not yet have approval. These facilities have been assigned to higher queued interconnection customers. These facilities have been included in the models for the FCS-2011-004 study and are assumed to be in service. The FCS-2011-004 Customers at this time do not have responsibility for these facilities but may later be assigned the cost of these facilities if higher queued customers terminate their GIA, withdraw from the interconnection queue, or withdraw from NRIS interconnection queue. The FCS-2011-004 Customer Generation Facilities in service dates may need to be delayed until the completion of the following upgrades.

- Finney – Holcomb 345kV ckt #2 line assigned to GEN-2006-044 interconnection customer. This customer is currently in suspension<sup>7</sup>.
- Central Plains – Setab 115kV transmission line assigned to GEN-2007-013 interconnection customer.
- Grassland 230/115kV autotransformer #2 assigned to 1<sup>st</sup> Cluster Interconnection Customers (100% to GEN-2008-016)
- Judson Large – North Judson Large – Spearville Ckt #2 assigned to DISIS-2009-001-1 Interconnection Customers (100% to GEN-2008-079)
- Hitchland – Wheeler (Border) double circuit 345kV assigned to DISIS-2010-001 Interconnection Customers
- Madison County - Hoskins 230kV Ckt #1 assigned to DISIS-2010-001 Interconnection Customers
- Washita – Gracemont 138kV circuit #2 assigned to DISIS-2010-001 Interconnection Customers
- Post Rock 345/230kV autotransformer #2 assigned to DISIS-2010-001 Interconnection Customers
- Spearville 345/115kV autotransformer #1 assigned to DISIS-2009-001 Interconnection Customers
- Beaver County – Gray County 345kV Ckt #1 assigned to DISIS-2010-002 Interconnection Customers
- St. John – St. John 115kV Ckt #1 assigned to DISIS-2010-002 Interconnection Customers
- Northwest 345/138/13.8kV autotransformer Ckt #1 assigned to DISIS-2010-002 NRIS Interconnection Customer Gen-2010-040

**Potential Upgrades Not in the Base Case** - Any potential upgrades that do not have a Notification to Construct (NTC) to construct have not been included in the base case. These upgrades include any identified in the SPP Extra-High Voltage (EHV) overlay plan, or any other SPP planning study other than the upgrades listed above in the previous section.

**Regional Groupings** - The interconnection requests listed in Appendix A were grouped together in four different regional groups based on geographical and electrical impacts. These groupings are shown in Appendix C.

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<sup>7</sup> Based on Facility Study Posting November 2008

To determine interconnection impacts, four different dispatch variations of the spring base case models were developed to accommodate the regional groupings.

For each group, the various wind generating plants were modeled at 80% nameplate of maximum generation. The wind generating plants in the other areas were modeled at 20% nameplate of maximum generation. This process created four different scenarios with each group being studied at 80% nameplate rating. These projects were dispatched as Energy Resources with equal distribution across the SPP footprint. Certain projects that requested Network Resource Interconnection Service were dispatched in an additional analysis into the balancing authority of the interconnecting transmission owner. This method allowed for the identification of network constraints that were common to the regional groupings that could then in turn have the mitigating upgrade cost allocated throughout the entire cluster. Each interconnection request was also modeled separately at 100% nameplate for certain analyses.

Peaking units were not dispatched in the 2012 spring model. To study peaking units' impacts, the 2013 and 2017 summer and winter peak models were chosen and peaking units were modeled at 100% of the nameplate rating and wind generating facilities were modeled at 10% of the nameplate rating. Each interconnection request was also modeled separately at 100% nameplate for certain analyses.

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## Identification of Network Constraints

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The initial set of network constraints were found by using PTI MUST First Contingency Incremental Transfer Capability (FCITC) analysis on the entire cluster grouping dispatched at the various levels mentioned above. These constraints were then screened to determine if any of the generation interconnection requests had at least a 20% Distribution Factor (DF) upon the constraint. Constraints that measured at least a 20% DF from at least one interconnection request were considered for mitigation. Interconnection Requests that were being studied for Network Resource Interconnection Service were studied in the additional NRIS analysis to determine if any constraint had at least a 3% DF. If so, these constraints were considered for mitigation.

Identification of Electrically Isolated Groups and Requests – From the FCITC analysis, it was determined that some of the regional groups had no common impacts with the other groups. However, this determination may change as the Interconnection Customers depending upon the time at which the interconnection customers enter either the Preliminary Interconnection System Impact Study (PISIS) or the Definitive Interconnection System Impact Study (DISIS).



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## Determination of Cost Allocated Network Upgrades

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Cost Allocated Network Upgrades of wind generation interconnection requests were determined using the 2012 spring model. Cost Allocated Network Upgrades of peaking units was determined using the 2017 summer peak model. Once a determination of the required Network Upgrades was made, a power flow model of the 2012 spring case was developed with all cost allocated Network Upgrades in-service. A MUST FCITC analysis was performed to determine the Distribution Factors (DF), a distribution factor with no contingency that each generation interconnection request had on each new upgrade. The impact each generation interconnection request had on each upgrade project was weighted by the size of each request. Finally the costs due by each request for a particular project were then determined by allocating the portion of each request's impact over the impact of all affecting requests.

For example, assume that there are three Generation Interconnection requests, X, Y, and Z that are responsible for the costs of Upgrade Project '1'. Given that their respective PTFD for the project have been determined, the cost allocation for Generation Interconnection request 'X' for Upgrade Project 1 is found by the following set of steps and formulas:

- Determine an Impact Factor on a given project for all responsible GI requests:

$$\text{Request X Impact Factor on Upgrade Project 1} = \text{DF}(\%)(X) * \text{MW}(X) = X1$$

$$\text{Request Y Impact Factor on Upgrade Project 1} = \text{DF}(\%)(Y) * \text{MW}(Y) = Y1$$

$$\text{Request Z Impact Factor on Upgrade Project 1} = \text{DF}(\%)(Z) * \text{MW}(Z) = Z1$$

- Determine each request's Allocation of Cost for that particular project:

$$\text{Request X's Project 1 Cost Allocation} (\$) = \frac{\text{Network Upgrade Project 1 Cost}(\$) * X1}{X1 + Y1 + Z1}$$

- Repeat previous for each responsible GI request for each Project

The cost allocation of each needed Network Upgrade is determined by the size of each request and its impact on the given project. This allows for the most efficient and reasonable mechanism for sharing the costs of upgrades.

**Credits for Amounts Advanced for Network Upgrades** - Interconnection Customer shall be entitled to credits 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.

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## Interconnection Facilities

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The requirement to interconnect the 73.8 MW of generation into the existing and proposed transmission systems in the affected areas of the SPP transmission footprint consist of the necessary cost allocated shared facilities listed in Appendix E with an approximate cost of \$33,300,000. Appendix E also includes Interconnection Facilities specific to each generation interconnection request.

A list of constraints with greater than or equal to a 20% DF that were identified and used for mitigation are listed in Appendix F. Other Network Constraints in the WERE and SUNC transmission systems that were identified that may be needed to deliver to load are listed in Appendix F. With a defined source and sink in a TSR, this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements.

A preliminary one-line drawing for each generation interconnection request are listed in Appendix D.

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## Power flow Analysis Methodology

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The Southwest Power Pool (SPP) Criteria states that:

“The transmission system of the SPP region shall be planned and constructed so that the contingencies as set forth in the Criteria will meet the applicable *NERC Reliability Standards* for transmission planning. All MDWG power flow models shall be tested to verify compliance with the System Performance Standards from NERC Table 1 – Category A.”

The FCITC function of MUST was used to simulate single contingencies in portions or all of the modeled control areas of AEPW, EMDE, Grand River Dam Authority (GRDA), Kansas City Power & Light (KCPL), LES, MIDW, MIPU, NPPD, OPPD, OKGE, SPS, SUNC, WERE, WFEK and other control areas were applied and the resulting scenarios analyzed. This satisfies the “more probable” contingency testing criteria mandated by NERC and the SPP criteria.

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## Power Flow Analysis

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A power flow analysis was conducted for each Interconnection Customer's facility using modified versions of the 2012 (spring, summer, and winter) peak models and the 2017 (summer and winter) peak models. The output of the Interconnection Customer's facility was offset in each model by a reduction in output of existing online SPP generation. This method allows the request to be studied as an Energy Resource (ER) Interconnection Request. The available seasonal models used were through the 2017 Winter Peak. Certain requests that requested Network Resource Interconnection Service (NRIS) had an additional analysis conducted for sinking the energy in the interconnecting Transmission Owner's balancing authority.

This analysis was conducted assuming that previous queued requests in the immediate area of these interconnect requests were in-service. The analysis of the each Customer's project indicates that additional criteria violations will occur on the SUNC transmission system under steady state and contingency conditions in the peak seasons.

The need for reactive compensation will be determined during the Interconnection System Impact Study. The need for reactive compensation will be based on the Interconnection Customer's choice of wind turbine make and manufacturer. Dynamic Stability studies performed as part of the System Impact Cluster Study will provide additional guidance as to whether the reactive compensation can be static or a portion must be dynamic (such as a SVC or STATCOM). It is possible that an SVC or STATCOM device will be required at the Customer facility because of FERC Order 661A Low Voltage Ride-Through Provisions (LVRT) which went into effect January 1, 2006. FERC Order 661A orders that wind farms stay on-line for 3-phase faults at the point of interconnection even if that requires the installation of a SVC or STATCOM device.

**Spearville Area** – In addition to the 5,773.9 MW of previously queued generation in the area, 73.8 MW of new interconnection service was studied. The constraint in this area was the St. John - Huntsville – Hutchinson Energy Center 115kV line. This determination is depended on higher queued customers paying for certain upgrades. Withdrawal of higher queued customers may change this result.

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## Conclusion

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The minimum cost of interconnecting all of the interconnection requests included in the Feasibility Cluster Study is estimated at \$33,300,000 for the Allocated Network Upgrades and Transmission Owner Interconnection Facilities are listed in Appendix E. These costs do not include the cost of upgrades of other transmission facilities listed in Appendix F which are Network Constraints.

These interconnection costs do not include any cost of Network Upgrades determined to be required by AC power flow, short circuit or transient stability analysis. These studies will be performed if the Interconnection Customer executes the appropriate Interconnection System Impact Study Agreement and provides the required data along with demonstration of Site Control and the appropriate deposit. At the time of the System Impact Cluster Study, a better determination of the interconnection facilities may be available.

The required interconnection costs listed in Appendix E, and other upgrades associated with Network Constraints do not include all costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer submits a Transmission Service Request (TSR) through SPP's Open Access Same Time Information System (OASIS) as required by Attachment Z1 of the SPP Open Access Transmission Tariff (OATT).

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# Appendix

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**A: Generation Interconnection Requests Considered for Feasibility Study**

Request	Amount	Service	Area	Requested Point of Interconnection	Proposed Point of Interconnection	Requested In-Service Date	In Service Date Delayed Until no earlier than
GEN-2011-038	73.8	ER/NR	SUNC	Kinsley 138kV	Kinsley 138kV	12/31/2013	Determined in Facility Study
<b>TOTAL</b>	<b>73.8</b>						

**B: Prior Queued Interconnection Requests**

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2001-026	74.0	WFEC	Washita 138kV	On-Line
GEN-2001-033	180.0	SPS	San Juan Mesa Tap 230kV	On-Line
GEN-2001-036	80.0	SPS	Caprock Tap 115kV	On-Line
GEN-2001-037	100.0	OKGE	Windfarm Switching 138kV	On-Line
GEN-2001-039A	105.0	MKEC	Tap Greensburg - Judson-Large 115kV	On Schedule for 2011
GEN-2001-039M	100.0	SUNC	Central Plains Tap 115kV	On-Line
GEN-2002-004	200.0	WERE	Latham 345kV	On-Line at 150MW
GEN-2002-005	120.0	WFEC	Red Hills Tap 138kV	On-Line
GEN-2002-008	240.0	SPS	Hitchland 345kV	On-Line at 120MW
GEN-2002-009	80.0	SPS	Hansford County 115kV	On-Line
GEN-2002-022	240.0	SPS	Bushland 230kV	On-Line at 160MW
GEN-2002-025A	150.0	MKEC	Spearville 230kV	On-Line at 100.5MW
GEN-2003-004	100.0	WFEC	Washita 138kV	On-Line
GEN-2003-005	100.0	WFEC	Anadarko - Paradise 138kV	On Line
GEN-2003-006A	200.0	MKEC	Elm Creek 230kV	On-Line
GEN-2003-019	250.0	MIDW	Smoky Hills Tap 230kV	On-Line
GEN-2003-020	160.0	SPS	Martin 115kV	On-Line at 80MW
GEN-2003-022	120.0	AEPW	Washita 138kV	On-Line
GEN-2004-023	20.6	WFEC	Washita 138kV	On-Line
GEN-2004-014	154.5	MKEC	Spearville 230kV	On Schedule for 2011
GEN-2004-020	27.0	AEPW	Washita 138kV	On-Line
GEN-2005-003	30.6	WFEC	Washita 138kV	On-Line
GEN-2005-005	18.0	OKGE	Windfarm Tap 138kV	IA Pending
GEN-2005-008	120.0	OKGE	Woodward 138kV	On-Line
GEN-2005-012	250.0	SUNC	Spearville 345kV	On Schedule for 2012
GEN-2005-013	201.0	WERE	Tap Latham - Neosho	On Schedule for 2012
GEN-2006-002	101.0	AEPW	Grapevine - Elk City 230kV	On-Line
GEN-2006-006	205.5	MKEC	Spearville 230kV	IA Pending
GEN-2006-014	300.0	MIPU	Tap Maryville – Clarinda and tie Midway (WFARMS) 161kV	On Suspension
GEN-2006-017	300.0	MIPU	Tap Maryville – Clarinda and tie Midway (WFARMS) 161kV	On Suspension
GEN-2006-018	170.0	SPS	Tuco 230kV	On Schedule for 2011
GEN-2006-020S	18.9	SPS	DWS Frisco Tap	On Schedule for 12/31/2011
GEN-2006-020N	42.0	NPPD	Bloomfield 115kV	On-Line
GEN-2006-021	101.0	MKEC	Flat Ridge Tap 138kV	On-Line
GEN-2006-022	150.0	MKEC	Ninnescah Tap 115kV	On Suspension
GEN-2006-024S	19.8	WFEC	South Buffalo Tap 69kV	On-Line
GEN-2006-026	502.0	SPS	Hobbs 230kV	On-Line
GEN-2006-031	75.0	MIDW	Knoll 115kV	On-Line
GEN-2006-032	200.0	MIDW	South Hays 230kV	On Suspension
GEN-2006-034	81.0	SUNC	Tap Kanarado - Sharon Springs 115kV	On Suspension
GEN-2006-035	225.0	AEPW	Tap Grapevine - Elk City 230kV	On Schedule for 2011
GEN-2006-037N1	75.0	NPPD	Broken Bow 115kV	On Suspension
GEN-2006-038N019	80.0	NPPD	Petersburg 115kV	On-Line
GEN-2006-038	750.0	WFEC	Hugo 345kV	On Suspension
GEN-2006-038N005	80.0	NPPD	Broken Bow 115kV	On-Line
GEN-2006-039	400.0	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV	On Suspension
GEN-2006-040	108.0	SUNC	Mingo 115kV	On Schedule for 2010
GEN-2006-043	99.0	AEPW	Grapevine - Elk City 230kV	On Line
GEN-2006-044	370.0	SPS	Hitchland 345kV	On Schedule for 2014
GEN-2006-044N	40.5	NPPD	Tap Neligh – Petersburg 115kV	On Schedule for 12/2011
GEN-2006-044N02	100.5	NPPD	GEN-2008-086N02 230kV	Under Study (DISIS-2010-001)
GEN-2006-045	240.0	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV	On Suspension
GEN-2006-046	131.0	OKGE	Dewey 138kV	On-Line
GEN-2006-047	240.0	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV	On Schedule for 2013
GEN-2006-049	400.0	SPS	Hitchland - Finney 345kV	On Schedule for 2014
GEN-2007-002	160.0	SPS	Grapevine 115kV	On Suspension
GEN-2007-006	160.0	OKGE	Roman Nose 138kV	On Suspension
GEN-2007-011	135.0	SUNC	Syracuse 115kV	On Schedule

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2007-011N08	81.0	NPPD	Bloomfield 115kV	On-Line
GEN-2007-013	99.0	SUNC	Selkirk 115kV	On Suspension
GEN-2007-015	135.0	WERE	Tap Humboldt – Kelly 161kV	On Suspension
GEN-2007-017	100.5	MIPU	Tap Maryville – Clarinda and tie Midway (WFARMS) 161kV	On Suspension
GEN-2007-021	201.0	OKGE	Tatonga 345kV	On Schedule for 2014
GEN-2007-025	300.0	WERE	Tap Woodring – Wichita 345kV	On Suspension
GEN-2007-032	150.0	WFEC	Tap Clinton Junction – Clinton 138kV	On Schedule for 2012
GEN-2007-038	200.0	SUNC	Spearville 345kV	On Schedule for 2015
GEN-2007-040	200.1	SUNC	Tap Holcomb – Spearville 345kV	On Schedule for 2012
GEN-2007-043	200.0	OKGE	Tap Lawton Eastside – Cimarron 345kV	On-Line (100MW)
GEN-2007-044	300.0	OKGE	Tatonga 345kV	On Schedule for 2014
GEN-2007-046	199.5	SPS	Tap & Tie Texas County – Hitchland & DWS Frisco Tap – Hitchland 115kV	On Schedule for 2014
GEN-2007-048	400.0	SPS	Tap Amarillo South – Swisher 230kV	On Schedule for 2014
GEN-2007-050	170.0	OKGE	Woodward 138kV	On-Line
GEN-2007-051	200.0	WFEC	Mooreland 138kV	On Schedule for 2014
GEN-2007-052	150.0	WFEC	Anadarko 138kV	On-Line
GEN-2007-053	110.0	MIPU	Tap Maryville – Clarinda and tie Midway (WFARMS) 161kV	On Schedule for 2013
GEN-2007-057	34.5	SPS	Moore County East 115kV	On Schedule for 2014
GEN-2007-062	765.0	OKGE	Woodward 345kV	On Schedule for 2014
GEN-2008-003	101.0	OKGE	Woodward EHV 138kV	On-Line
GEN-2008-008	60.0	SPS	Graham 115kV	On Schedule for 2014
GEN-2008-009	60.0	SPS	San Juan Mesa Tap 230kV	On Schedule for 2014
GEN-2008-013	300.0	OKGE	Tap Woodring – Wichita 345kV	On Schedule for 2013
GEN-2008-014	150.0	SPS	Tap Tuco – Oklaunion 345kV	On Schedule for 2014
GEN-2008-016	248.0	SPS	Grassland 230kV	IA Pending
GEN-2008-017	300.0	SUNC	Setab 345kV	On Schedule for 2012
GEN-2008-018	405.0	SPS	Finney 345kV	IA Pending
GEN-2008-019	300.0	OKGE	Tatonga 345kV	On Schedule for 2015
GEN-2008-021	42.0	WERE	Wolf Creek 345kV	IA Pending
GEN-2008-022	300.0	SPS	Tap Eddy – Tolk 345kV	IA Pending
GEN-2008-023	150.0	AEPW	Hobart Junction 138kV	On Schedule for 2012
GEN-2008-025	101.2	SUNC	Ruleton 115kV	On Schedule for 2015
GEN-2008-029	250.5	OKGE	Woodward EHV 138kV	On Schedule for 2014
GEN-2008-037	101.0	WFEC	Tap Washita – Blue Canyon 138kV	IA Pending
GEN-2008-044	197.8	OKGE	Tatonga 345kV	IA Pending
GEN-2008-046	200.0	OKGE	Sunnyside 345kV	IA Pending
GEN-2008-047	300.0	SPS	Tap Hitchland - Woodward 345kV	IA Pending
GEN-2008-051	322.0	SPS	Potter 345kV	On Schedule for 2014
GEN-2008-071	76.8	OKGE	Newkirk 138kV	IA Pending
GEN-2008-079	100.5	MKEC	Tap Judson Large – Cudahy 115kV	On Schedule for 2012
GEN-2008-086N02	200.0	NPPD	Tap Ft. Randall – Columbus 230kV	On Schedule for 2014
GEN-2008-088	50.6	SPS	Vega 69kV	IA Pending
GEN-2008-092	201.0	MIDW	Knoll 115kV	IA Pending
GEN-2008-098	100.8	WERE	Tap Wolf Creek – LaCygne 345kV	IA Pending
GEN-2008-119O	60.0	OPPD	Tap Humboldt – Kelly 161kV	On-Line
GEN-2008-123N	89.7	NPPD	Tap Guide - Pauline 115kV	IA Pending
GEN-2008-124	200.1	SUNC	Spearville 345kV	On Schedule for 2014
GEN-2008-127	200.1	WERE	Tap Sooner – Rose Hill 345kV	On Schedule for 2012
GEN-2008-129	80.0	MIPU	Pleasant Hill 161kV	On-Line
GEN-2009-008	199.5	SUNC	South Hays 230kV	IA Pending
GEN-2009-011	50.0	MKEC	Tap Plainville – Phillipsburg 115kV	On Schedule for 2014
GEN-2009-016	141.0	AEPW	Falcon Road 138kV	On Schedule for 2012
GEN-2009-020	48.6	MIDW	Tap Bazine – Nekoma 69kV	IA Pending
GEN-2009-025	60.0	OKGE	Tap Deer Creek – Sinclair 69kV	On Suspension
GEN-2009-040	73.8	WERE	Tap Smittyville - Knob Hill 115kV	On Schedule for 2012
GEN-2009-067S	20.0	SPS	7 Rivers 69kV	IA Pending
GEN-2010-001	300.0	OKGE	Tap Hitchland – Woodward 345kV	IA Pending
GEN-2010-003	100.8	WERE	GEN-2008-098 345kV	IA Pending
GEN-2010-005	300.0	WERE	GEN-2007-025 345kV	IA Pending
GEN-2010-006	205.0	SPS	Jones 230kV	On-Line
GEN-2010-007	73.8	SPS	Tap Pringle - Riverview 115kV	IA Pending
GEN-2010-008	64.4	WFEC	Fargo 69kV	IA Pending
GEN-2010-009	165.6	SUNC	Gray County 345kV	IA Pending
GEN-2010-011	29.7	OKGE	Tatonga 345kV	On Schedule for 2011
GEN-2010-014	360.0	SPS	Hitchland 345kV	IA Pending
GEN-2010-015	200.1	SUNC	Spearville 345kV	IA Pending



Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN-2010-020	20.0	SPS	Roswell 115kV	Under Study (DISIS-2011-001)
GEN-2010-029	450.0	SUNC	Spearville 345kV	Under Study (DISIS-2011-001)
GEN-2010-036	4.6	WERE	6 <sup>th</sup> Street 115kV	IA Pending
GEN-2010-040	300.0	OKGE	Cimarron 345kV	On Schedule for
GEN-2010-041	10.5	OPPD	S 1399 161kV	Under Study (DISIS-2010-002)
GEN-2010-043	320.0	WFEC	Mooreland 138kV	Under Study (DISIS-2010-002)
GEN-2010-045	197.8	SUNC	Tap Holcomb – Spearville 345kV	IA Pending
GEN-2010-046	56.0	SPS	Tuco 230kV	IA Pending
GEN-2010-048	70.0	MIDW	Tap Beach Station – Redline 115kV	IA Pending
GEN-2010-049	49.6	SUNC	Pratt 115kV	IA Pending
GEN-2010-051	200.0	NPPD	TAP TWIN CHURCH – HOSKINS 230kV	On Schedule for 2012
GEN-2010-052	301.3	SUNC	FINNEY 345kV	IA Pending
GEN-2010-053	199.8	SUNC	COMANCHE 345kV	Under Study (DISIS-2010-002)
GEN-2010-055	4.5	AEPW	Wekiwa 138kV	Under Study (DISIS-2011-001)
GEN-2010-056	151.2	MIPU	Tap Saint Joseph – Cooper 345kV	Under Study (DISIS-2011-001)
GEN-2010-057	201.0	MIDW	Rice County 230kV	Under Study (DISIS-2011-001)
GEN-2010-058	20.0	SPS	Chaves County 115kV	Under Study (DISIS-2011-001)
GEN-2011-007	250.0	OKGE	Tap Cimarron – Woodring 345kV (Matthewson 345kV)	Under Study (DISIS-2011-001)
GEN-2011-008	600.0	SUNC	Clark County 345kV	Under Study (DISIS-2011-001)
GEN-2011-010	100.8	OKGE	Minco 345kV	Under Study (DISIS-2011-001)
GEN-2011-011	50.0	KCPL	Iatan 345kV	Under Study (DISIS-2011-001)
GEN-2011-012	104.5	SPS	Tap Moore County – Hitchland 230kV	Under Study (DISIS-2011-001)
GEN-2011-014	201.0	OKGE	Tap Hitchland – Woodward 345kV	Under Study (DISIS-2011-001)
GEN-2011-016	200.1	SUNC	Spearville 345kV	Under Study (DISIS-2011-001)
GEN-2011-017	299.0	SUNC	Tap Spearville – Knoll 345kV	Under Study (DISIS-2011-001)
GEN-2011-018	73.6	NPPD	Steele City 115kV	Under Study (DISIS-2011-001)
GEN-2011-019	299.0	OKGE	Woodward 345kV	Under Study (DISIS-2011-001)
GEN-2011-020	299.0	OKGE	Woodward 345kV	Under Study (DISIS-2011-001)
GEN-2011-021	299.0	SPS	Tap Hitchland – Woodward 345kV	Under Study (DISIS-2011-001)
GEN-2011-022	299.0	SPS	Hitchland 345kV	Under Study (DISIS-2011-001)
GEN-2011-023	299.0	SUNC	Tap Clark – Spearville 345kV	Under Study (DISIS-2011-001)
GEN-2011-024	299.0	OKGE	Tatonga 345kV	Under Study (DISIS-2011-001)
GEN-2011-025	82.3	SPS	Tap Floyd County – Crosby County 115kV	Under Study (DISIS-2011-001)
GEN-2011-027	120.0	NPPD	Tap Twin Church – Hoskins 230kV	Under Study (DISIS-2011-001)
GEN-2011-037	7.0	WFEC	Blue Canyon 5 138kV	Under Study (DISIS-2011-002)
GEN 2011-040	111	OKGE	Pooleville 138kV	Under Study (DISIS-2011-002)
GEN-2011-041	150.0	WERE	GEN-2007-025 tap 345kV	Under Study (DISIS-2011-002)
GEN-2011-042	150.0	WERE	GEN-2007-025 tap 345kV	Under Study (DISIS-2011-002)
GEN-2011-043	150.0	WERE	Thistle 345kV	Under Study (DISIS-2011-002)

Request	Amount	Area	Requested/Proposed Point of Interconnection	Status or In-Service Date
GEN 2011-044	150.0	WERE	Thistle 345kV	Under Study (DISIS-2011-002)
GEN 2011-045	205.0	SPS	Jones 230kV	Under Study (DISIS-2011-002)
GEN 2011-046	27.0	SPS	Tucumari 115kV	Under Study (DISIS-2011-002)
GEN 2011-047	22.5	SUNC	Hugoton 115kV	Under Study (DISIS-2011-002)
GEN 2011-048	165.0	SPS	Mustang 115kV	Under Study (DISIS-2011-002)
GEN 2011-049	250.0	OKGE	Border 345kV	Under Study (DISIS-2011-002)
GEN 2011-050	109.8	WFEC	Tap Rush Springs - Marlow	Under Study (DISIS-2011-002)
GEN 2011-051	104.4	OKGE	Tatonga – Woodward 345kV	Under Study (DISIS-2011-002)
GEN 2011-054	300	OKGE	Cimarron 345kV	Under Study (DISIS-2011-002)
GEN 2011-055	52.8	OPPD	South Sterling 69kV	Under Study (DISIS-2011-002)
GEN 2011-056	11.7	NPPD		Under Study (DISIS-2011-002)
GEN 2011-057	150.4	WERE	Creswell 138kV	Under Study (DISIS-2011-002)
GEN 2011-058	200.0	SPS	Tap Grassland – Borden 230kV	Under Study (DISIS-2011-002)
Broken Bow	8.3	NPPD	Genoa 115kV	On-Line
Ord	10.8	NPPD	Bloomfield 115kV	On-Line
Stuart	2.1	NPPD	Petersburg 115kV	On-Line
Ainsworth	75.0	NPPD	Ainsworth Wind Tap 115kV	On-Line
Rosebud	30.0	NPPD	St. Francis 115kV	On-Line
Wolf Creek	1,170.0	WERE	Wolf Creek 345kV	On-Line
Genoa	4.0	NPPD	Genoa 115kV	On-Line
ASGI-2010-001	400.0	AECI	Tap Cooper – Fairport 345kV	AECI queue Affected Study
ASGI-2010-002	201.0	AECI	Lathrop 161kV	AECI queue Affected Study
ASGI-2010-003	300.0	AECI	Maryville 161kV	AECI queue Affected Study
ASGI-2010-004	50.0	AECI	Tap Queen City – Lancaster 69kV	AECI queue Affected Study
ASGI-2010-005	99.0	AECI	Lathrop 161kV	AECI queue Affected Study
ASGI-2010-006	150.0	AECI	Tap Fairfax – Fairfax Tap 138kV	AECI queue Affected Study
ASGI-2010-007	150.0	AECI	Tap Fairfax – Fairfax Tap 138kV	AECI queue Affected Study
ASGI-2010-008	100.0	AECI	Maryville 161kV	AECI queue Affected Study
ASGI-2010-009	201.0	AECI	Osborn 161kV	AECI queue Affected Study
ASGI-2010-010	42.0	SPS	Lovington 115kV	Affected Study
ASGI-2010-011	48.0	SPS	Texas County 69kV	Affected Study
ASGI-2010-020	50.0	SPS	Tap (LE) Tatum – (LE) Crossroads 69kV	Under Study (DISIS-2010-002)
ASGI-2010-021	36.6	SPS	Tap (LE) Saunders Tap – (LE) Anderson 69kV	Under Study (DISIS-2010-002)
ASGI-2011-001	28.8	SPS	LE-Lovington 115kV	Affected Study
ASGI-2011-002	10.0	SPS	Herring 115kV	Affected Study
ASGI-2011-003	10.0	SPS	Hendricks 115kV	Affected Study
ASGI-2011-004	20.0	SPS	Pleasant Hill 69kV	Under Study (DISIS 2011-002)
Llano Estacado	80.0	SPS	Llano Wind Farm Tap 115kV	On-Line
SPS DISTRIBUTED	90.0	SPS	Dumas_19ST 115kV	On-Line
			Etter 115kV	On-Line
			Sherman 115kV	On-Line
			Spearman 115kV	On-Line
			Texas County 115kV	On-Line
Montezuma	110.0	MKEC	Haggard 115kV	On-Line
<b>TOTAL</b>	<b>33,223.1</b>			

### C: Study Groupings

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	GEN-2001-014	96.0	WFEC	Fort Supply 138kV
	GEN-2001-037	100.0	OKGE	Windfarm Switching 138kV
	GEN-2005-005	18.0	OKGE	Windfarm Tap 138kV
	GEN-2005-008	120.0	OKGE	Woodward 138kV
	GEN-2006-024S	20.0	WFEC	South Buffalo Tap 69kV
	GEN-2006-046	131.0	OKGE	Dewey 138kV
	GEN-2007-006	160.0	OKGE	Roman Nose 138kV
	GEN-2007-021	201.0	OKGE	Tatonga 345kV
	GEN-2007-044	300.0	OKGE	Tatonga 345kV
	GEN-2007-050	170.0	OKGE	Woodward 138kV
	GEN-2007-051	200.0	WFEC	Mooreland 138kV
	GEN-2007-062	765.0	OKGE	Woodward 345kV
	GEN-2008-003	101.0	OKGE	Woodward EHV 138kV
	GEN-2008-019	300.0	OKGE	Tatonga 345kV
	GEN-2008-029	250.5	OKGE	Woodward EHV 138kV
	GEN-2008-044	197.8	OKGE	Tatonga 345kV
	GEN-2010-008	64.4	WFEC	Fargo 69kV
	GEN-2010-011	29.7	OKGE	Tatonga 345kV
	GEN-2010-043	320.0	WFEC	Mooreland 138kV
	GEN-2011-019	299.0	OKGE	Woodward 345kV
GEN-2011-020	299.0	OKGE	Woodward 345kV	
GEN-2011-024	299.0	OKGE	Tatonga 345kV	
GEN-2011-051	104.4	OKGE	Tap Woodward – Tatonga 345kV	
GEN-2011-054	300.0	OKGE	Cimarron 345kV	
<b>PRIOR QUEUED SUBTOTAL</b>		<b>4845.8</b>		
<b>Group 1 WOODWARD SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>4845.8</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	SPS Distribution	90.0	SPS	Various
	ASGI-2010-011	48.0	SPS	Texas County 69kV
	ASGI-2011-002	10.0	SPS	Herring 115kV
	GEN-2002-008	240.0	SPS	Hitchland 345kV
	GEN-2002-009	80.0	SPS	Hansford County 115kV
	GEN-2003-020	160.0	SPS	Martin 115kV
	GEN-2006-020S	20.0	SPS	DWS Frisco Tap
	GEN-2006-044	370.0	SPS	Hitchland 345kV
	GEN-2006-049	400.0	SPS	Tap Hitchland - Finney 345kV
	GEN-2007-046	200.0	SPS	Tap & Tie Texas County – Hitchland & DWS Frisco Tap – Hitchland 115kV
	GEN-2007-057	35.0	SPS	Moore County East 115kV
	GEN-2008-047	300.0	SPS	Tap Hitchland - Woodward 345kV
	GEN-2010-001	300.0	WFEC	GEN-2008-047 Tap 345kV
	GEN-2010-007	73.8	SPS	Tap Pringle – Riverview 115kV
	GEN-2010-014	358.8	SPS	Hitchland 345kV
	GEN-2011-012	104.5	SPS	Tap Moore County - Hitchland 230kV
	GEN-2011-014	201.0	SPS	Tap Hitchland - Woodward 345kV
	GEN-2011-021	299.0	SPS	Tap Hitchland - Woodward 345kV
	GEN-2011-022	299.0	SPS	Hitchland 345kV
	<b>PRIOR QUEUED SUBTOTAL</b>		<b>3589.1</b>	
<b>Group 2 HITCHLAND SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>3589.1</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	Montezuma	110.0	MKEC	Haggard 115kV
	GEN-2001-039A	105.0	MKEC	Tap Greensburg - Judson-Large 115kV
	GEN-2002-025A	150.0	MKEC	Spearville 230kV
	GEN-2004-014	154.5	MKEC	Spearville 230kV
	GEN-2005-012	250.0	SUNC	Spearville 345kV
	GEN-2006-006	205.5	MKEC	Spearville 230kV
	GEN-2006-021	101.0	MKEC	Flat Ridge Tap 138kV
	GEN-2006-022	150.0	MKEC	Ninnescah Tap 115kV
	GEN-2007-038	200.0	SUNC	Spearville 345kV
	GEN-2007-040	200.0	SUNC	Tap Holcomb – Spearville 345kV
	GEN-2008-018	405.0	SUNC	Finney 345kV
	GEN-2008-079	100.5	MKEC	Tap Fort Dodge – Cudahy 115kV
	GEN-2008-124	200.1	SUNC	Spearville 345kV
	GEN-2010-009	165.6	SUNC	Gray County 345kV
	GEN-2010-015	200.1	SUNC	Spearville 345kV
	GEN-2010-029	450.0	SUNC	Spearville 345kV
	GEN-2010-045	197.8	SUNC	Tap Holcomb – Spearville 345kV
	GEN-2010-049	49.6	MKEC	Pratt 115kV
	GEN-2010-052	301.3	SPS	Finney 345kV
	GEN-2010-053	199.8	SUNC	Comanche 345kV
GEN-2010-061	180	SUNC	Tap Post Rock – Spearville 345kV	
GEN-2011-008	600.0	WFEC	Clark County 345kV	
GEN-2011-016	200.1	SUNC	Spearville 345kV	
GEN-2011-017	299.0	SUNC	Tap Spearville - Knoll 345kV	
GEN-2011-023	299.0	SUNC	Tap Clark - Spearville 345kV	
GEN-2011-043	150.0	WERE	Thistle 345kV	
GEN 2011-044	150.0	WERE	Thistle 345kV	
<b>PRIOR QUEUED SUBTOTAL</b>		<b>5773.9</b>		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
Spearville	GEN-2011-038	73.8	SUNC	Kinsley 115kV
<b>Group 3 SPEARVILLE SUBTOTAL</b>		<b>73.8</b>		
<b>AREA TOTAL</b>		<b>5847.7</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	GEN-2001-039M	100.0	SUNC	Central Plains Tap 115kV
	GEN-2006-034	81.0	SUNC	Tap Kanarado - Sharon Springs 115kV
	GEN-2006-040	108.0	SUNC	Mingo 115kV
	GEN-2007-011	135.0	SUNC	Syracuse 115kV
	GEN-2007-013	99.0	SUNC	Selkirk 115kV
	GEN-2008-017	300.0	SUNC	Setab 345kV
	GEN-2008-025	101.2	SUNC	Ruleton 115kV
GEN 2011-047	22.5	SUNC	Hugoton 115kV	
<b>PRIOR QUEUED SUBTOTAL</b>		<b>946.7</b>		
<b>Group 4 MINGO/NW KANSAS SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>946.7</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	Llano Estacado	80.0	SPS	Llano Estacado Tap 115kV
	GEN-2002-022	240.0	SPS	Bushland 230kV
	GEN-2006-039	400.0	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV
	GEN-2006-045	240.0	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV
	GEN-2006-047	240.0	SPS	Tap and Tie both Potter County - Plant X 230kV and Bushland - Deaf Smith 230kV
	GEN-2007-002	160.0	SPS	Grapevine 115kV
	GEN-2007-048	400.0	SPS	Tap Amarillo South – Swisher 230kV
	GEN-2008-051	322.0	SPS	Potter 345kV
GEN-2008-088	50.6	SPS	Vega 69kV	
<b>PRIOR QUEUED SUBTOTAL</b>		<b>2,132.6</b>		
Cluster	Request	Amount	Area	Proposed Point of Interconnection
<b>Group 5 AMARILLO SUBTOTAL</b>		<b>0</b>		
<b>AREA TOTAL</b>		<b>2132.6</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	ASGI-2010-010	42.0	SPS	Lovington 115kV
	ASGI-2010-020	50.0	SPS	Tap (LE) Tatum – (LE) Crossroads 69kV
	ASGI-2010-021	36.6	SPS	Tap (LE) Saunders Tap – (LE) Anderson 69kV
	ASGI-2011-001	28.8	SPS	LE-Lovington 115kV
	ASGI-2011-003	10.0	SPS	Hendricks 115kV
	GEN-2001-033	180.0	SPS	San Juan Mesa Tap 230kV
	GEN-2001-036	80.0	SPS	Caprock Tap 115kV
	GEN-2006-018	170.0	SPS	Tuco 230kV
	GEN-2006-026	502.0	SPS	Hobbs 230kV
	GEN-2008-008	60.0	SPS	Graham 115kV
	GEN-2008-009	60.0	SPS	San Juan Mesa Tap 230kV
	GEN-2008-014	150.0	SPS	Tap Tuco – Oklaunion 345kV
	GEN-2008-016	248.0	SPS	Grassland 230kV
	GEN-2008-022	300.0	SPS	Tap Eddy – Tolk 345kV
	GEN-2009-067S	20.0	SPS	7 Rivers 69kV
	GEN-2010-006	205.0	SPS	Jones 230kV
	GEN-2010-020	20.0	SPS	Roswell 115kV
	GEN-2010-046	56.0	SPS	Tuco 230kV
	GEN-2010-058	20.0	SPS	Chaves County 115kV
	GEN-2011-025	82.3	SPS	Tap Floyd County - Crosby County 115kV
	GEN-2011-045	205.0	SPS	Jones 230kV
GEN-2011-046	27.0	SPS	Tucumcari 115kV	
GEN-2011-047	165.0	SPS	Mustang 115kV	
GEN-2011-049	250.0	SPS	Border 345kV	
GEN-2011-058	200.0	SPS	Tap Grassland – Borden 230kV	
<b>PRIOR QUEUED SUBTOTAL</b>		<b>3167.7</b>		
<b>Group 6 S-TX Panhandle/NM SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>3167.7</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	GEN-2001-026	74.0	WFEC	Washita 138kV
	GEN-2002-005	120.0	WFEC	Red Hills Tap 138kV
	GEN-2003-004	101.0	WFEC	Washita 138kV
	GEN-2003-005	100.0	WFEC	Anadarko - Paradise 138kV
	GEN-2003-022	120.0	AEPW	Washita 138kV
	GEN-2004-020	27.0	AEPW	Washita 138kV
	GEN-2004-023	21.0	WFEC	Washita 138kV
	GEN-2005-003	31.0	WFEC	Washita 138kV
	GEN-2006-002	101.0	AEPW	Grapevine - Elk City 230kV
	GEN-2006-035	225.0	AEPW	Grapevine - Elk City 230kV
	GEN-2006-043	99.0	AEPW	Grapevine - Elk City 230kV
	GEN-2007-032	150.0	WFEC	Tap Clinton Junction – Clinton 138kV
	GEN-2007-043	200.0	OKGE	Tap Lawton Eastside – Cimarron 345kV
	GEN-2007-052	150.0	WFEC	Anadarko 138kV
	GEN-2008-023	150.0	AEPW	Hobart Junction 138kV
	GEN-2008-037	100.8	WFEC	Tap Washita – Blue Canyon 138kV
	GEN-2009-016	140.0	AEPW	Falcon Road 138kV
	GEN-2009-030	100.8	WFEC	Weatherford 138kV
	GEN-2009-060	84.0	WFEC	Gotebo 69kV
	GEN-2010-040	300.0	OKGE	Cimarron 345kV
GEN-2011-007	250.0	OKGE	Tap Cimarron - Woodring 345kV (Matthewson 345kV)	
GEN-2011-010	100.8	OKGE	Minco 345kV	
GEN-2011-037	7.0	WFEC	Anadarko - Paradise 138kV	
<b>PRIOR QUEUED SUBTOTAL</b>		<b>2752.4</b>		
<b>Group 7 SW OKLAHOMA SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>2752.4</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	Wolf Creek	1,170.0	WERE	Wolf Creek 345kV
	ASGI-2010-006	150.0	AECI	Tap Fairfax – Fairfax Tap 138kV
	ASGI-2010-007	150.0	AECI	Tap Fairfax – Fairfax Tap 138kV
	GEN-2002-004	200.0	WERE	Latham 345kV

	GEN-2005-013	201.0	WERE	Tap Latham - Neosho
	GEN-2007-025	300.0	WERE	Tap Woodring – Wichita 345kV
	GEN-2008-013	300.0	OKGE	Tap Woodring – Wichita 345kV
	GEN-2008-021	42.0	WERE	Wolf Creek 25kV
	GEN-2008-071	76.8	OKGE	Newkirk 138kV
	GEN-2008-098	100.8	WERE	Tap Wolf Creek – LaCygne 345kV
	GEN-2008-127	200.1	WERE	Tap Sooner – Rose Hill 345kV
	GEN-2009-025	60.0	OKGE	Tap Deer Creek – Sinclair 69kV
	GEN-2010-003	100.8	WERE	GEN-2008-098 345kV
	GEN-2010-005	300.0	WERE	GEN-2007-025 345kV
	GEN-2010-055	4.5	AEPW	Wekiwa 138kV
	GEN-2011-041	150	WERE	Tap Woodring – Wichita 345kV
	GEN-2011-042	150	WERE	Tap Woodring – Wichita 345kV
	GEN-2011-057	150.4	WERE	Creswell 138kV
<b>PRIOR QUEUED SUBTOTAL</b>		<b>3806.4</b>		
<b>Group 8 N-OK/S-KS SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>3806.4</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	Genoa	4.0	NPPD	Genoa 115kV
	Ainsworth	75.0	NPPD	Ainsworth Wind Tap 115kV
	Rosebud Project	30.0	NPPD	St. Francis 115kV
	Broken Bow	8.3	NPPD	Genoa 115kV
	Ord	10.8	NPPD	Bloomfield 115kV
	Stuart	2.1	NPPD	Petersburg 115kV
	GEN-2006-020N	42.0	NPPD	Bloomfield 115kV
	GEN-2006-037N1	75.0	NPPD	Broken Bow 115kV
	GEN-2006-038N005	80.0	NPPD	Broken Bow 115kV
	GEN-2006-038N019	80.0	NPPD	Petersburg 115kV
	GEN-2006-044N	40.5	NPPD	Tap Neligh – Petersburg 115kV
	GEN-2006-044N02	100.5	NPPD	GEN-2008-086N02 230kV
	GEN-2007-011N08	81.0	NPPD	Bloomfield 115kV
	GEN-2008-086N02	200.0	NPPD	Tap Ft. Randall – Columbus 230kV
	GEN-2010-051	200.0	NPPD	Tap Twin Church – Hoskins 230kV
	GEN-2011-027	120.0	NPPD	Tap Twin Church - Hoskins 230kV
	GEN-2008-123N	89.7	NPPD	Tap Guide – Pauline 115kV
	GEN-2010-044	99.0	NPPD	Harbine 115kV
GEN-2011-055	50	OPPD	South Sterling 69kV	
GEN-2011-056	11.7	NPPD		
<b>PRIOR QUEUED SUBTOTAL</b>		<b>1399.6</b>		
<b>Group 9 N NEBRASKA SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>1399.6</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
Prior Queued	GEN-2003-006A	200.0	MKEC	Elm Creek 230kV
	GEN-2003-019	250.0	MIDW	Smoky Hills Tap 230kV
	GEN-2006-031	75.0	MIDW	Knoll 115kV
	GEN-2006-032	200.0	MIDW	South Hays 230kV
	GEN-2008-092	201.0	MIDW	Knoll 115kV
	GEN-2009-008	199.5	SUNC	South Hays 230kV
	GEN-2009-011	50.0	MKEC	Tap Plainville – Phillipsburg 115kV
	GEN-2009-020	48.6	MIDW	Tap Bazine – Nekoma 69kV
	GEN-2010-048	70.0	MIDW	Tap Beach Station – Redline 115kV
GEN-2010-057	201.0	MIDW	Rice County 230kV	
<b>PRIOR QUEUED SUBTOTAL</b>		<b>1,495.1</b>		
<b>Group 11 NORTH KANSAS SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>1,495.1</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
<b>PRIOR QUEUED SUBTOTAL</b>		<b>0.0</b>		
<b>Group 12 NW AR SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>0.0</b>		

Cluster	Request	Amount	Area	Proposed Point of Interconnection
<b>Prior Queued</b>	ASGI-2010-001	400.0	AECI	Tap Cooper – Fairport 345kV
	ASGI-2010-002	201.0	AECI	Lathrop 161kV
	ASGI-2010-003	300.0	AECI	Maryville 161kV
	ASGI-2010-004	50.0	AECI	Tap Queen City – Lancaster 69kV
	ASGI-2010-005	99.0	AECI	Lathrop 161kV
	ASGI-2010-008	100.0	AECI	Maryville 161kV
	ASGI-2010-009	201.0	AECI	Osborn 161kV
	GEN-2006-014	300.0	MIPU	Tap Maryville – Clarinda 161kV & Tie to Midway 161kV
	GEN-2006-017	300.0	MIPU	Tap Maryville – Clarinda 161kV & Tie to Midway 161kV
	GEN-2007-015	135.0	WERE	Tap Humboldt – Kelly 161kV
	GEN-2007-017	100.5	MIPU	Tap Maryville – Clarinda 161kV & Tie to Midway 161kV
	GEN-2007-053	110.0	MIPU	Tap Maryville – Clarinda 161kV & Tie to Midway 161kV
	GEN-2008-1190	60.0	OPPD	Tap Humboldt – Kelly 161kV
	GEN-2008-129	80.0	MIPU	Pleasant Hill 161kV
	GEN-2009-040	73.8	WERE	Tap Smittyville – Knob Hill 115kV
	GEN-2010-036	4.6	WERE	6 <sup>th</sup> Street 115kV
	GEN-2010-041	10.5	OPPD	S 1399 161kV
	GEN-2010-056	151.0	MIPU	Tap Saint Joseph - Cooper 345kV
GEN-2011-011	50.0	KCPL	Iatan 345kV	
GEN-2011-018	73.6	NPPD	Steele City 115kV	
<b>PRIOR QUEUED SUBTOTAL</b>		<b>2800.0</b>		
<b>Group 13 NORTHWEST MISSOURI SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>2800.0</b>		

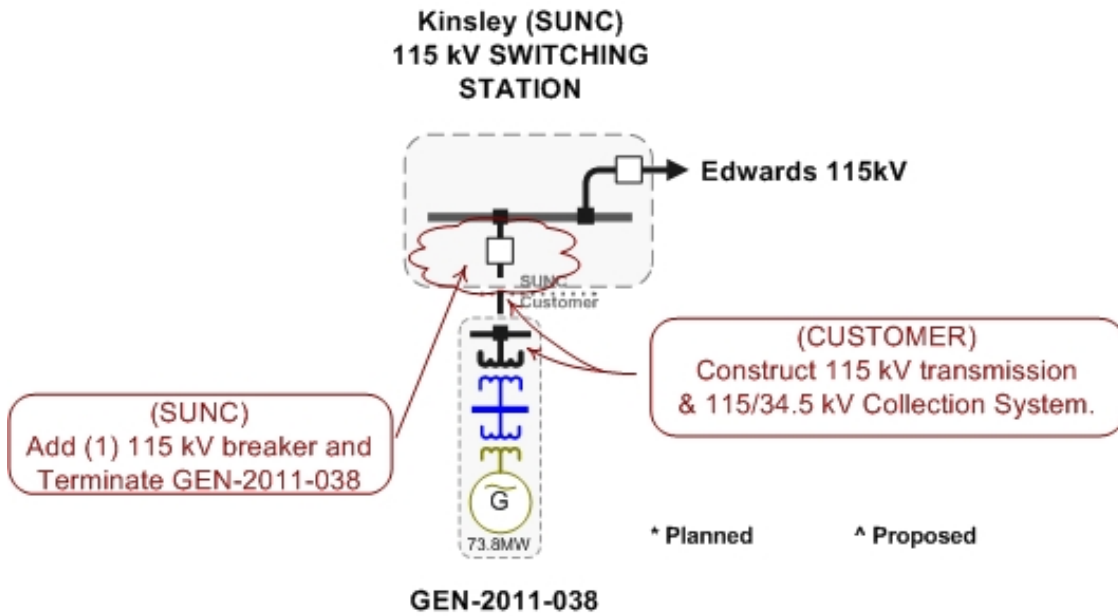
Cluster	Request	Amount	Area	Proposed Point of Interconnection
<b>Prior Queued</b>	GEN-2006-038	750.0	WFEC	Hugo 345kV
	GEN-2008-046	200.0	OKGE	Sunnyside 345kV
	GEN-2011-013	101.7	OKGE	Sunnyside 345kV
	GEN-2011-040	111	WFEC	Pooleville 138kV
	GEN-2011-050	109.8	AEPW	Tap Rush Springs Natural gas – Rush Springs Marlow 115kV
<b>PRIOR QUEUED SUBTOTAL</b>		<b>1272.5</b>		
<b>Group 14 SOUTH OKLAHOMA SUBTOTAL</b>		<b>0.0</b>		
<b>AREA TOTAL</b>		<b>1272.5</b>		

<b>CLUSTER TOTAL (CURRENT STUDY)</b>	<b>73.8MW</b>
<b>CLUSTER TOTAL (INCLUDING PRIOR QUEUED)</b>	<b>34055.6MW</b>

### **D: Proposed Point of Interconnection One line Diagrams**

Gen-2011-038

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## **E: Cost Allocation per Interconnection Request**

# E. Cost Allocation Per Request

(Including Previously Allocated Network Upgrades\*)

Interconnection Request and Upgrades	Upgrade Type	Allocated Cost	Upgrade Cost
<b>GEN-2011-038</b>			
GEN 2011-038 Interconnection Costs See Online Diagram.	Current Study	\$3,000,000.00	\$3,000,000.00
Huntsville - Hutchinson 115kV Rebuild approximately 29 miles of 115kV line	Current Study	\$15,000,000.00	\$15,000,000.00
Huntsville - St. John 115kV Rebuild approximately 26.5 miles of 115kV from Huntsville - St. John	Current Study	\$12,300,000.00	\$12,300,000.00
Mound Ridge 115/138/13.8kV Transformer CKT 2 NRIS Install 2nd 115/138kV transformer at Mound ridge substation	Current Study	\$3,000,000.00	\$3,000,000.00
Axtell - PostRock 345KV CKT 1 Balanced Portfolio: Spearville - PostRock - Axtell 345kV CKT (Total Project E&C Cost Shown)	Previously Allocated		\$112,700,000.00
Beaver County - Gray County 345kV Build approximately 90 miles of 345kV from Beaver County - Gray County	Previously Allocated		\$196,609,050.00
Benton - Wichita 345kV NRIS upgrade: Replace terminal equipment at Benton and Wichita	Previously Allocated		\$1,183,000.00
Matthewson - Cimarron 345kV CKT 2 Build second 345kV circuit from Matthewson - Cimarron	Previously Allocated		\$20,000,000.00
Medicine Lodge 345/115kV transformer Install new 345/115kV transformer at Medicine Lodge	Previously Allocated		\$10,000,000.00
St.John - St. John 115kV CKT 1 Rebuild 115kV tie between St. John - St. John	Previously Allocated		\$500,000.00
Tatonga - Matthewson 345kV CKT 2 Build second 345kV circuit from Tatonga - Matthewson	Previously Allocated		\$60,000,000.00
Thistle - Wichita 345KV Dbl CKT Priority Project: Spearville - Clark - Thistle - Wichita Dbl 345kV CKT (Total Project E&C Cost Shown.)	Previously Allocated		\$356,300,000.00
Tuco Interchange 345/230/13.2KV Autotransformer CKT 2 Balanced Portfolio: Tuco 345/230 kV Transformer CKT 2 (Total Project E&C Cost Shown)	Previously Allocated		\$11,250,000.00
	<b>Current Study Total</b>	\$33,300,000.00	
<b>TOTAL CURRENT STUDY COSTS:</b>		<b>\$33,300,000.00</b>	

\* Withdrawal of higher queued projects will cause a restudy and may result in higher costs

## **F: FCITC Analysis (No Upgrades)**

GROUP	SCENARIO	SEASON	SOURCE	DIRECTION	MONITORED ELEMENT COMMON NAME	RATEB	TDF	TC%LOADING	CONTINGENCY NAME
3	0	12G	G11_038	TO->FROM	'HUNTSVILLE - ST_JOHN 115KV CKT 1'	99	0.38959	107.0046	'ALEXANDER - PRATT 115KV CKT 1'
3	0	12G	G11_038	TO->FROM	'HUNTSVILLE - ST_JOHN 115KV CKT 1'	99	0.38959	106.8997	'ALEXANDER - SAWYER 3 115.00 115KV CKT 1'
3	0	12G	G11_038	TO->FROM	'HUNTSVILLE - ST_JOHN 115KV CKT 1'	99	0.38959	106.375	'MEDICINE LODGE - SAWYER 3 115.00 115KV CKT 1'
3	0	12G	G11_038	FROM->TO	'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	99	0.38959	102.734	'ALEXANDER - PRATT 115KV CKT 1'
3	0	12G	G11_038	FROM->TO	'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	99	0.38959	102.734	'ALEXANDER - SAWYER 3 115.00 115KV CKT 1'
3	0	12G	G11_038	FROM->TO	'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	99	0.38959	102.097	'MEDICINE LODGE - SAWYER 3 115.00 115KV CKT 1'
03G11_038	0	12G	G11_038	TO->FROM	'HUNTSVILLE - ST_JOHN 115KV CKT 1'	99	0.38959	112.7279	'ALEXANDER - PRATT 115KV CKT 1'
03G11_038	0	12G	G11_038	TO->FROM	'HUNTSVILLE - ST_JOHN 115KV CKT 1'	99	0.38959	112.6229	'ALEXANDER - SAWYER 3 115.00 115KV CKT 1'
03G11_038	0	12G	G11_038	TO->FROM	'HUNTSVILLE - ST_JOHN 115KV CKT 1'	99	0.38959	112.0983	'MEDICINE LODGE - SAWYER 3 115.00 115KV CKT 1'
03G11_038	0	12G	G11_038	FROM->TO	'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	99	0.38959	108.5241	'ALEXANDER - PRATT 115KV CKT 1'
03G11_038	0	12G	G11_038	FROM->TO	'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	99	0.38959	108.5241	'ALEXANDER - SAWYER 3 115.00 115KV CKT 1'
03G11_038	0	12G	G11_038	FROM->TO	'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	99	0.38959	107.8871	'MEDICINE LODGE - SAWYER 3 115.00 115KV CKT 1'
03G11_038NR	0	12G	G11_038	TO->FROM	'HUNTSVILLE - ST_JOHN 115KV CKT 1'	99	0.38337	112.2449	'ALEXANDER - PRATT 115KV CKT 1'
03G11_038NR	0	12G	G11_038	TO->FROM	'HUNTSVILLE - ST_JOHN 115KV CKT 1'	99	0.38337	112.14	'ALEXANDER - SAWYER 3 115.00 115KV CKT 1'
03G11_038NR	0	12G	G11_038	TO->FROM	'HUNTSVILLE - ST_JOHN 115KV CKT 1'	99	0.38337	111.6153	'MEDICINE LODGE - SAWYER 3 115.00 115KV CKT 1'
03G11_038NR	0	12G	G11_038	FROM->TO	'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	99	0.38337	108.0354	'ALEXANDER - PRATT 115KV CKT 1'
03G11_038NR	0	12G	G11_038	FROM->TO	'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	99	0.38337	108.0354	'ALEXANDER - SAWYER 3 115.00 115KV CKT 1'
03G11_038NR	0	12G	G11_038	FROM->TO	'HUNTSVILLE - HUTCHINSON ENERGY CENTER 115KV CKT 1'	99	0.38337	107.3985	'MEDICINE LODGE - SAWYER 3 115.00 115KV CKT 1'
03G11_038NR	2	12G	G11_038	FROM->TO	'MOUNDRIDGE (MOUND10X) 138/115/13.8KV TRANSFORMER CKT 1'	108.3	0.03353	171.2661	'RENO COUNTY - WICHITA 345KV CKT 1'