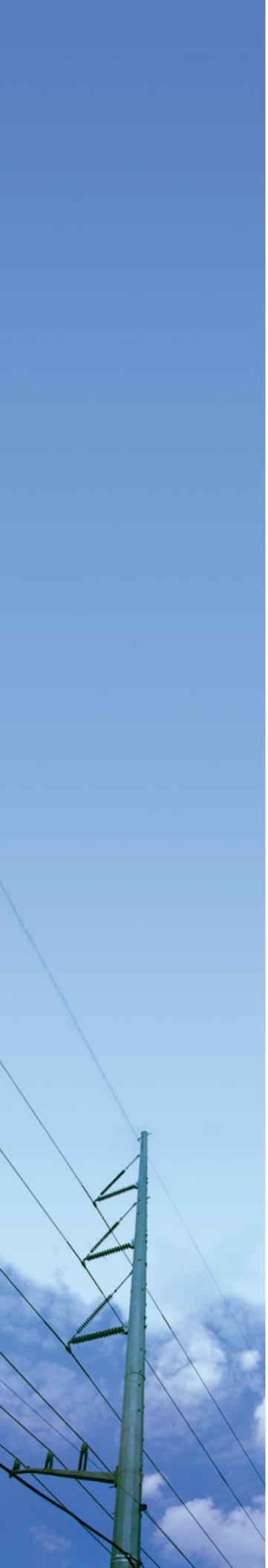

SPP 2010

NERC Long Term Reliability Assessment

Published July15th, 2010
Created by: Chris Haley

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Southwest Power Pool

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Executive Summary

The Southwest Power Pool, Inc. Regional Entity's (SPP RE) year-by-year demand for the 2010-2019 assessment period is projected to be approximately 3 percent lower than the 2009-2018 assessment period. For 2019, the SPP RE's Total Internal Demand is projected to be 49,739 MW, with Total Internal Capacity resources of 63,118 MW. Approximately 4,800 MW of Existing, Certain resources were added since the last reporting year. The SPP RE expects to add 5,794 MW of Future, Planned resources during the assessment timeframe. Although no significant variable capacity additions or unit retirements were reported, the SPP RTO currently has approximately 37,000 MW of generation (mostly wind) in the Generation Interconnection queue.

The SPP RE's minimum capacity margin requirement is 12 percent, which translates to a reserve margin of 13.6 percent[1]. For 2010-2019 assessment period, the reserve margin for the SPP RE Region - based on Existing, Certain and Net Firm Transactions - is 25.2 percent in 2010, which drops to 7.9 percent in 2019. After considering Deliverable Capacity Resources, the SPP RE's reserve margin is 28.3 percent in 2010, which drops to 19.7 percent in 2019. With the addition of Prospective Capacity Resources, the SPP RE's reserve margin is 38.9 percent in 2010 and drops to 28.9 percent in 2019. No known reliability concerns are identified for the 2010-2019 assessment period, as the targeted reserve margin is above the required level.

Four major transmission projects have gone into service since the 2009 LTRA. Three of the four projects are lines operated at 230 kV and one is 345 kV; the 345 kV project is in Oklahoma and the Texas Panhandle. A number of 115–345 kV transmission lines are projected to be added to the SPP RTO grid during the assessment timeframe: seven are under construction, 61 planned, and 22 conceptual. There are no known transmission reliability concerns with these projects in service.

In anticipation of a surge in renewable resources on the western part of its grid, the SPP RTO completed the Wind Integration Task Force Study in early 2010. This study reinforced the criticality of coordinating transmission expansion plans with plans for building infrastructure to accommodate wind energy. Study recommendations will allow SPP to prepare for continued growth in the region's renewable wind resources. The study recommended significant bulk EHV transmission additions (230 kV, 345 kV and/or 765 kV) for a high wind scenario. If the needed transmission upgrades were completed, there would be no significant technical barriers or reliability impacts to integrating wind energy levels up to 20 percent. For the near-term, the study identified the need to develop a process for determining what generating units are utilized throughout the region, explicitly addressing the uncertainty associated with wind forecast errors. The implementation of a centralized wind energy forecasting system was also recommended.

In April 2010 the SPP Board of Directors and Members Committee approved for construction five "priority" high voltage electric transmission projects estimated to bring benefits of at least $3.7 billion to the SPP region over 40 years. The projects will improve the regional electric grid by reducing congestion, better integrating SPP's east and west regions, improving SPP members' ability to deliver power to customers, and facilitating the addition of new renewable and non-renewable generation to the electric grid. [2] The Priority Projects were approved pending a favorable ruling by FERC on SPP's new Highway/Byway cost allocation methodology, which was approved by FERC in June 2010[3].

[1] The SPP Criteria are in the Governing Documents folder of the SPP.org *Documents and Filings* library. A link is at the top of the Org Groups page.
[2] A Priority Projects webpage is in the Engineering and Planning section of SPP.org.
[3] Visit the About Us page of SPP.org and open the Newsroom to read the June 17 Highway/Byway news release.

Introduction

Southwest Power Pool, Inc. (SPP) operates and oversees the electric grid in the southwestern quadrant of the Eastern Interconnection. In addition to serving as a NERC Regional Entity, SPP is a FERC-recognized Regional Transmission Organization (RTO). The SPP RTO footprint includes all or part of nine states[4]. In April 2009, Nebraska Public Power District, Omaha Public Power District, and Lincoln Electric System became members of the SPP RTO. The entities are now participating in SPP's wholesale energy market, and SPP performs services for them including transmission planning, reliability coordination, and tariff administration. The Nebraska organizations still belong to the Midwest Reliability Organization Regional Entity, which will continue to perform their Reliability Assessments.

The SPP RTO anticipates consistent but slow growth, compared to the base forecast, in demand and energy consumption over the next ten years. Significant generation capacity using Uncertain resources is forecasted to be available in SPP throughout the planning horizon to meet native network load needs, with Certain generation resources meeting minimum reserve margins until 2015.

Demand

According to the most recent forecasted data, the projected compound annual rate of growth for peak demand in the SPP RE region over the next ten years is 1.3 percent. In the 2009 LTRA report, the projected annual growth rate for the SPP region over the ten year period was 1.1 percent; there has been a slight increase in the demand growth forecast. The SPP RTO has 21 reporting members who annually provide a ten–year forecast of peak demand and net energy requirements. These forecasts are used to develop an overall non-coincident SPP RTO forecast. The forecasts are developed in accordance with generally recognized methodologies and in accordance with the following principles:

- Each member selects its own demand forecasting methodology and establishes its own forecast.
- Each member forecasts demand based on expected weather conditions.
- Methods used, factors considered, and assumptions made are submitted to the SPP RTO, along with the annual forecast.
- Economic, technological, sociological, demographic, and any other significant factors are considered when producing the forecast.

Although actual demand is very dependent on weather conditions and typically includes interruptible loads, forecasted Net Internal Demands are based on 10-year average summer weather, or 50/50 weather. Some SPP RE members determine peak forecast based on a 50 percent confidence level, as approved by their respective state commission(s). This means the actual weather on the peak summer day is expected to have a 50 percent likelihood of being hotter or a 50 percent likelihood of being cooler than the weather assumed in deriving the load forecast. The SPP RTO does not develop load forecasts based on a 90/10 weather scenario, but has a 13.6 percent reserve margin requirement to address this uncertainty.

To quantify peak demand uncertainty and variability due to extreme weather, economic conditions, and other variables, the SPP RTO formed a Bandwidth Working Group. This group produced the Demand and Energy Bandwidth Report[5], which supports the current predicted growth rates and

[4] To read more about the differences between the SPP RE and SPP RTO footprints, open the Footprints document on the SPP.org Fast Facts page.

[5] spp.org/publications/BWG_Report_2003.pdf

allows for up to a 1.2 percent variation from the base demand forecast in current and future predictions through the year 2012. The report also determined the 13.6 percent reserve margin is adequate to cover any extreme load for the SPP RE footprint. SPP anticipates this trend will continue for the remaining study period, and is continuing analysis for predictions beyond 2012.

These capacity or reserve margin projections include the effects of demand–side response programs, such as direct–control load management and interruptible demand. The SPP RTO does not have an organized demand response program at this time, but it is expected that over the next ten years, interruptible demand relief will increase from 418 MW to 492 MW. These demand response values are based on predictions using historical data and trends; they do not reflect increased demand response as directed by FERC in the evolution of SPP's market design.

Generation

For the 2010-2019 assessment period, the SPP RTO projects to have 52,489 MW Existing, Certain Capacity; 4,546 MW Existing, Other Capacity; 289 MW Existing, Inoperable; 5,793 MW Future Capacity; and 29,243 MW Conceptual resources in service or expected to be in service during the assessment timeframe. The Existing, Certain Capacity amount from renewable plants is 237 MW (wind), 2,335 MW (hydro), and 5 MW (biomass). Existing, Other Capacity from renewable plants (mostly wind) is 2,547 MW. Planned Capacity for 2019 from renewable plants is 119 MW. These reported renewable resource additions in the SPP RTO do not reflect: merchant wind farm development in process within SPP, incremental needs which may result from Renewable Electricity Standard mandates within the SPP region, or public pronouncements for additional renewable expansion by SPP RTO members. The SPP RTO has requests to connect approximately 37,000 MW of generation (mostly wind) to the SPP RTO grid via the Generation Interconnection queue; 28,507 MW are Conceptual.

Conceptual capacity resources forecasted for 2010-2019 are projected to be 29,243 MW. Variable generation of 28,807 MW nameplate capacity composes the majority of the Conceptual resources. The other 436 MW are listed as gas, oil, or undetermined. SPP Criteria Section 12.0 discusses capacity values and how they are calculated for the Region based on a wind farm's historical performance. The SPP RE applies a 10 percent confidence level to all conceptual capacity unless otherwise reported by SPP members.

For Future and Conceptual capacity resources, the SPP RTO uses the Generation Interconnection and Transmission Service Request study processes as defined in the SPP Open Access Transmission Tariff [6] (OATT). According to the OATT, when the interconnection request is submitted, the interconnection customer must request either energy resource interconnection service or Network Resource interconnection service. Any interconnection customer requesting Network Resource interconnection service may also request that it be concurrently studied for energy resource interconnection service, up to the point when an interconnection facility study agreement is executed. Interconnection customers may then elect to proceed with Network Resource interconnection service or to proceed under a lower level of interconnection service to the extent that only certain upgrades will be completed. Members that report to the SPP RE are reporting their Future, Planned, and Conceptual resources; however, SPP is including active requests that are currently in the generation queue to be studied.

[6] The Open Access Transmission Tariff is in the Governing Documents folder of the SPP.org *Documents and Filings* library. A link is at the top of the Org Groups page.

Capacity Transactions on Peak

A small portion of SPP RE capacity or reserve margin depends on purchases external to the SPP RE region. For 2010-2019 there are 1,976 MW (ten-year average) of transactions purchased external to the SPP RE region; these are backed by firm generation and transmission reservations. There are 105 MW of firm delivery service from Western Electricity Coordinating Council, administered under Xcel Energy's OATT.

The SPP RE has 1,148 MW of firm sales external to the SPP RE region based on a ten-year average; these are backed by firm generation and transmission reservations. SPP does not have expected or provisional transactions for neither imports nor exports. All external transactions are firm transactions.

Transmission

The SPP Transmission Expansion Plan (STEP)'s 10-year reliability assessment establishes transmission needed to meet forecasted load and all firm long-term transmission service for the next ten years. The STEP includes a reliability assessment with different scenarios of firm transmission being sold in various directions. In addition to the STEP, the SPP RTO performs various other analyses to comply with NERC Transmission Planning standards.

The SPP RTO is transitioning from the STEP planning process to a new Integrated Transmission Planning (ITP) process, which will improve and integrate several existing processes. The EHV Overlay, Balanced Portfolio, and Reliability Assessment processes will transition to the ITP. The Generation Interconnection and Aggregate Study processes will not be integrated into the ITP, but are expected to be simplified. The ITP will determine what transmission is needed to maintain electric reliability and provide near- and long-term economic benefits to the SPP region. The ITP is an iterative three-year process that includes 20-Year, 10-Year, and Near-Term Assessments.

There are no known concerns about meeting target in-service dates for reliability projects that have been approved by the SPP Board. Assuming these projects come on line as scheduled, there are no known transmission constraints that could impact the reliability of the SPP transmission grid. The SPP RTO relies heavily on its Project Tracking process[7] to track projects and ensure they meet their issued timelines. If a project's timeline is extended, the SPP RTO will conduct a study to address any reliability issues associated the extension.

The Woodward District EHV to Tuco 345 kV line from Oklahoma to the Texas Panhandle, scheduled to be in service in 2014, will address some of the reliability issues in the local area as discussed in last year's LTRA. There is no significant substation equipment listed at this time.

In April 2010 the SPP Board approved for construction $1.14 billion worth of Priority Projects[8] to be constructed during the assessment timeframe. These projects will improve the regional electric grid by reducing congestion, better integrating SPP's east and west regions, improving SPP members' ability to deliver power to customers, and facilitating the addition of new renewable and non-renewable generation to the electric grid.

Following is a list of economic and reliability transmission projects from the 2009 STEP approved by the SPP Board.

[7] The Engineering and Planning section of SPP.org has a page on Project Tracking
[8] Visit the About Us page of SPP.org and open the Newsroom to read the April 27 Priority Projects news release

Under Construction: (as of March 2010)

Transmission Status (Choose One)	Terminal From Location	Terminal To Location	Line Length in Circuit Miles	Voltage Design (kV)	Original In-Service Month (MM)	Original In-Service Year (YYYY)	Expected In-Service Month (MM)	Expected In-Service Year (YYYY)
Under Construction	Chiloco	OG&E 138	3.5	138	12	2010	12	2010
Under Construction	Lane Substation	PSO Atoka Substation	6.5	138	6	2010	6	2010
Under Construction	Reno County	Summit	53.4	345	10	2010	10	2010
Under Construction	Richard	Sellers Road	32	230	1	2012	1	2012
Under Construction	Sellers Road	Segura	19	230	1	2012	1	2012
Under Construction	Tatonga	Northwest*	71.5	345	3	2010	3	2010
Under Construction	Woodward EHV	Tatonga*	48.6	345	3	2010	3	2010

* These lines went in service on 3/31/2010

Planned: (as of March 2010)

Transmission Status (Choose One)	Terminal From Location	Terminal To Location	Line Length in Circuit Miles	Voltage Design (kV)	Original In-Service Month (MM)	Original In-Service Year (YYYY)	Expected In-Service Month (MM)	Expected In-Service Year (YYYY)
Planned	Anadarko SW	Georgia Tap	5	138	6	2010	6	2010
Planned	Anadarko SW	Washita	1	138	12	2011	12	2011
Planned	Bellcow	Warwick	7	138	6	2011	6	2011
Planned	Bentley West	Bentley East	4	138	3	2011	3	2011
Planned	Bonin 6	Labbe	1.4	230	6	2012	6	2012
Planned	Burns Tap	TC-Burns	13	138	7	2011	7	2011
Planned	Cache Substation	Grandfield Switchyard	18	138	6	2012	6	2012
Planned	Caney Creek	Johnston County	25	138	5	2011	5	2011
Planned	Clay Center Junction	Riley Pump Station	7	115	10	2012	10	2012
Planned	Comanche Co	Woodward**	55	DC 345	12	2014	12	2014
Planned	Comanche Co.	Medicine Lodge**	55	DC 345	12	2014	12	2014
Planned	Cushing	PS32	7.4	138	4	2011	4	2011
Planned	Dallam	NW Intg.	70	230	6	2010	12	2011
Planned	Dover Switchyard	Cashion Substation	35	138	6	2011	6	2011

Planned	E. Rogers	Osage	32	345	6	2016	6	2016
Planned	Flint Creek	Shipe Road	21	345	6	2014	6	2014
Planned	Franklin Switchyard	OU Switchyard	22	138	6	2011	6	2011
Planned	Heizer	Mullegren	0.3	115	6	2011	6	2011
Planned	Hitchland	Moore County	50	230	6	2010	6	2011
Planned	Hitchland	Ochiltree Intg.	32	230	6	2011	12	2011
Planned	Hitchland	Pringle Intg.	35	230	12	2011	12	2011
Planned	Hitchland	Texas County (1)	1	115	6	2010	12	2010
Planned	Hitchland	Texas County (2)	8	115	6	2010	12	2010
Planned	Hitchland	Sherman Tap	8	115	6	2010	6	2011
Planned	Hitchland	Spearman	1	115	6	2010	6	2011
Planned	Hitchland	Woodward**	122	DC 345	6	2014	6	2014
Planned	Hugo	Valiant	19	345	1	2012	1	2012
Planned	Iatan	Nashua*	30	345	1	2015	1	2015
Planned	Knoll	Axtell*	125	345	1	2013	1	2013
Planned	Loco SW	Healdton-Butler Jct.	13	138	12	2013	12	2013
Planned	Maryville	Sibley**	105	345	6	2017	6	2017
Planned	Medicine Lodge	Wichita**	70	DC 345	12	2014	12	2014
Planned	Meeker Switchyard	Hammett Substation	10	138	6	2011	6	2011
Planned	Nebraska City	Maryville**	70	345	6	2017	6	2017
Planned	OU Switchyard	Canadian Switchyard	11	138	6	2010	6	2010
Planned	OW Switchyard	Colde Substation	4	138	12	2015	12	2015
Planned	Piper Substation	Wolcott Substation	7	161	4	2011	4	2011
Planned	Reeding	Twin Lakes Switchyard	7	138	12	2013	12	2013
Planned	Rhoades 115kV Sub	Phillipsburg 115kV Sub	34	115	8	2011	8	2011
Planned	Rose Hill	Sooner	43	345	6	2012	6	2012
Planned	Seminole	Muskogee*	100	345	12	2013	12	2013
Planned	Seminole	Hobbs Plt	43	230	6	2015	6	2015
Planned	Sherman	Dallam	35	115	6	2010	6	2011
Planned	Shipe Road	E. Rogers	9	345	6	2016	6	2016
Planned	Sooner	Cleveland*	35.2	345	12	2012	12	2012
Planned	Sooner	Rose Hill	50	345	6	2012	6	2012
Planned	Spearville	Knoll*	90	345	1	2012	1	2012

Planned	Spearville	Comanche Co.**	55	DC 345	12	2014	12	2014
Planned	Sportsman Acres	GRDA (constructed by AECI)	3	345	2	2011	2	2011
Planned	Sumner County	TC-Rock	10	138	7	2010	7	2010
Planned	Sunnyside	Hugo	120	345	4	2012	4	2012
Planned	Tonnece Substation	Siloam Springs Substation	6.7	161	12	2011	12	2011
Planned	Tuco	Stateline*	175	345	1	2014	1	2014
Planned	Turk	NW Texarkana	34	345	6	2011	6	2011
Planned	Turk	Sugar Hill	24	138	12	2011	12	2011
Planned	Turk	SE Texarkana	34	138	12	2011	12	2011
Planned	Twin Lakes Switchyard	OG&E Crescent Substation	7	138	6	2011	6	2011
Planned	Union Ridge	TC-Hope	4	115	7	2010	7	2010
Planned	Valiant	NW Texarkana**	76	DC 345	11	2014	11	2014
Planned	Wells	Labbe	30	230	1	2013	1	2013
Planned	WFEC Snyder Switchyard	AEP Snyder Substation	4	138	6	2010	6	2010
Planned	Wheeler Intg.	Grave	8	115	6	2010	6	2010
Planned	Woodward EHV	State Line*	72	345	5	2014	5	2014
Planned	Wynnewood Tap	Wynnewood	3.8	138	10	2010	10	2010

* These projects are part of the Balanced Portfolio that was approved by the SPP Board in 2009
** These projects are part of the Priority Projects
DC = Double Circuit

Conceptual: (as of March 2010)

Transmission Status (Choose One)	Terminal From Location	Terminal To Location	Line Length in Circuit Miles	Voltage Design (kV)	Original In-Service Month (MM)	Original In-Service Year (YYYY)	Expected In-Service Month (MM)	Expected In-Service Year (YYYY)
Conceptual	Anadarko Switchyard	Paradise Substation	40	138	12	2018	12	2018
Conceptual	Anadarko Switchyard	OU Switchyard	11.1	138	12	2016	12	2016
Conceptual	Cache Switchyard	Grandfield Switchyard	58	138	6	2018	6	2018

Conceptual	East-FairFax Substation	Fairfax Substation	0.1	161	6	2011	6	2011
Conceptual	East-FairFax Substation	GM Substation	0.1	161	6	2011	6	2011
Conceptual	Elk City Substation	Russell Switchyard	46	138	6	2016	6	2016
Conceptual	Evans Energy Center	Goddard	19	138	6	2012	6	2012
Conceptual	Everett Substation	Quindaro Substation	4.5	161	12	2017	12	2017
Conceptual	Fisher Substation	Barber Substation	2.5	161	12	2014	12	2014
Conceptual	Kaw Substation	Barber Substation	2	161	12	2016	12	2016
Conceptual	Kaw-West Sub	Speaker Sub	4	161	12	2015	12	2015
Conceptual	Kinsley	various options	35	115	1	2015	1	2015
Conceptual	Monett Sub #383	South of Monett, MO	9.2	161	6	2015	6	2015
Conceptual	Muncie Substation	Center City Substation	0.1	161	12	2011	12	2011
Conceptual	Muncie Substation	Armourdale Substation	0.1	161	12	2011	12	2011
Conceptual	Quindaro Substation	Nearman Substation	4	161	12	2011	12	2011
Conceptual	Snyder Switchyard	Paradise Substation	9.9	138	12	2016	12	2016
Conceptual	Snyder Switchyard	Russell Switchyard	44	138	12	2017	12	2017
Conceptual	Speaker Substation	Kaw Substation	3	161	12	2016	12	2016
Conceptual	Speaker Substation	Everett Substation	3	161	12	2017	12	2017
Conceptual	Sub A	Sub M	5	161	5	2011	5	2011
Conceptual	Wolcott Substation	Nearman Substation	5	161	12	2011	12	2011

Operational Issues

In the near term, SPP is coordinating the mitigation of operating concerns in an area of southern Louisiana called the Acadiana Load Pocket. This area has constraints on the transmission system, and the local utilities have fewer options for managing constraints due to transmission and generation limitations. In its role as Reliability Coordinator, SPP is closely coordinating emergency operating plans and transmission system maintenance among all affected Balancing Authorities, Transmission Operators, and Load Serving Entities. Construction is underway on additional transmission into the Acadiana Load Pocket area, which is scheduled to be completed by 2012.

As more wind generation is built in the western part of the SPP RTO grid, the organization will continue to implement operating procedures to address any reliability issues. Due to wind's variable nature, the penetration of wind generation in the western half of the SPP footprint could have a significant impact on operations. Several avenues are being explored to provide transmission outlets for this wind energy during the next ten years, including SPP's Wind Integration Task Force and Priority Projects. However, the operational impacts of wind generation to regulation and control performance are still unknown. As the penetration rate of variable generation grows, further study will be required to mitigate any issues that arise. The SPP RTO is investigating mitigation measures for integrating more wind into the SPP RE footprint, such as increasing operating reserves and implementing regional variable resource forecasting. Operating procedures specific to individual variable resources are developed when such a need is identified due to transmission constraints.

Additional data collection and situational awareness has been implemented to begin assessing regulation and spinning reserve needs. The SPP RTO completed the Wind Integration Task Force Study[9] in January 2010, indicating that the SPP RTO would need significant transmission addition to accommodate 10 percent or higher wind capacity. The SPP RE projects to have approximately four percent of installed wind capacity on the grid for the assessment timeframe that can be counted towards the reserve margin. A significantly large percentage of wind is available in the SPP wholesale energy market for energy only purchase.

Individual Balancing Authorities in the SPP Region can take measures to decrease demand. Such measures may include but are not limited to: interruptible load, curtailment of exports, and public appeals.

The SPP RTO worked with AMEC and Southwestern Public Service (SPS)/Xcel Energy staff to investigate the operational impacts of increased wind penetration to secure reliable operations within the SPS area. Due to significant existing, approved, and requested wind farm development, constraints must be resolved in the near-term before major transmission capability can be installed to improve internal and interface capabilities. The recently-completed AMEC study for spring 2010 conditions focused on operations and reliability, and did not investigate the economics associated with planned and potential wind development within and surrounding the SPS Balancing Authority. The study leveraged the National Renewable Energy Lab's wind data for 2004-2006 to simulate future scenarios for 2010. Without considering proactive wind curtailments as an option, the study concluded that operating margins within SPS would be jeopardized as wind farm development approached 1,100 - 1,200 MW. This is only slightly above existing wind farm levels, with more being built and another 2,000 MW of approved wind Interconnection Agreements. SPS is working with SPP to finalize operating procedures and communicate them to wind developers as a near-term solution. Consolidating the SPP RTO's Balancing Authorities will help facilitate wind integration in the region, but additional changes to the SPP OATT, interconnection agreements, operating procedures, and market design may be required to maintain adequate operating margins within SPS and other portions of SPP as wind development continues.

According to SPP RTO operational staff, there are no known operational changes/concerns resulting from distributed resource integration, and SPP does not anticipate any reliability concerns as a result of demand response resources.

SPP RTO operations staff noted that carbon emission limitations would drastically change day-to-day generation dispatch and reduce the capability margin within SPP. Currently, the SPP RTO has a

[9] Access the Wind Integration Study from the Org Groups page of SPP.org, Wind Integration Task Force section

substantially diverse mix of generation capacity and a sufficient expected reserve margin such that no reliability impacts are foreseen.

Reliability Assessment Analysis

For 2010–2019, the forecasted reserve margin based on Existing, Certain capacity for 2010 is 23.1 percent; it drops to 10.7 percent in 2019. SPP Criteria requires SPP members to meet a 12 percent capacity margin, which translates to a 13.6 percent reserve margin. These margins are also expected to cover a 90/10 weather scenario.

The SPP RE annual reserve margin, based on Existing, Certain and Net Firm Transactions, is projected to be above the target margin of 13.6 percent until 2015, when the reserve margin will drop to 12 percent. For 2015-2019, the SPP RE is expecting to meet the required reserve margin through resources that are currently reported as anticipated capacity resources.

The SPP RTO is performing a Loss-of-Load Expectation (LOLE) and Expected, Unserved Energy study for 2016. Results of this study are expected during summer 2010. The study will evaluate the need to adjust SPP's 12 percent regional capacity margin or 13.6 percent reserve margin, and will estimate the reserve margin required to achieve an LOLE of no more than one occurrence in 10 years. Based on the LOLE study performed by SPP RTO staff in 2009 for summer 2010, the capacity or reserve margin requirement for the SPP RTO remained unchanged. The 12 percent capacity margin and 13.6 percent reserve margin requirements are also checked annually in the EIA-411 reporting, as well as through supply adequacy audits of regional members conducted every five years by the SPP RTO. The last supply adequacy audit was conducted in 2007, with the next audit planned for 2012.

SPP defines firm deliverability as electric power intended to be continuously available to buyers even under adverse conditions; i.e., power for which the seller assumes the obligation to provide capacity (including SPP-defined capacity margin) and energy. Such power must meet the same standards of reliability and availability as that delivered to native load customers. Power purchased can be considered firm only if firm transmission service is in place to deliver the power to the load serving member. SPP does not include financial firm contracts in this category. Existing long-term firm delivery is ensured by provisions in the SPP Transmission Expansion Plan, while new long-term firm delivery is ensured by Aggregate Transmission Service Studies. These procedures are included in attachments O and Z1 in the SPP OATT.

SPP RTO members, along with neighboring members such as Entergy from the SERC region, have formed a Reserve Sharing Group. Members of this group receive contingency reserve assistance from other SPP Reserve Sharing Group members. SPP's Operating Reliability Working Group sets the minimum daily contingency reserve requirement for the SPP Reserve Sharing Group. The SPP Reserve Sharing Group maintains a minimum first contingency reserve equal to the generating capacity of the largest unit scheduled to be online.

SPP RTO does not treat short and long term reserve margin requirements differently.

Due to the SPP RTO's diverse generation portfolio, there is no concern about the fuel supply being impacted by the extremes of summer weather during peak conditions. If a fuel shortage is expected, SPP RE members are expected to communicate with SPP operations staff in advance so they can take the appropriate measures. The SPP RTO would assess if capacity or reserves would become insufficient due to the unavailable generation. If so, the SPP RTO would declare either an Energy

Emergency Alert or Other Extreme Contingency and post as needed on the Reliability Coordinator Information System. The SPP RTO does not conduct operations planning studies to evaluate extreme hot weather conditions; capacity margin criteria are intended to address load forecast uncertainty.

Significant deliverability problems due to transmission limitations are not expected, assuming all projected projects are completed as scheduled. The SPP RTO will continue to closely monitor the issue of deliverability through the Flowgate assessment analysis[10], and will address any reliability constraints. This analysis validates the list of flowgates the SPP RTO monitors on a short-term basis, using scenario models developed by SPP RTO staff. These scenario models reflect all the potential transactions in various directions that are requested on the SPP RTO system. The results of this study are reviewed and approved by SPP's Transmission Working Group prior to summer and winter of each study year.

The SPP RTO monitors potential fuel supply limitations by consulting with its generation-owning and generation-controlling members at the beginning of each year. There are no known infrastructure issues which could impact deliverability, as the SPP region is blanketed by major pipelines and railroads to provide an adequate fuel supply. Coal–fired and natural gas power plants, which make up approximately 48 percent and 44 percent of total generation respectively, are required by SPP RTO Criteria to keep sufficient quantities of standby fuel in case of deliverability issues. Because hydro capacity is a small fraction of capacity for the region, run–of–river hydro issues brought about by extreme weather are not expected to be critical.

Energy-only resources, uncommitted resources, and transmission–limited resources are not used in calculating net capacity margin. The EIA–411 data does not include the 4,546 MW of uncommitted resources located within the SPP RTO footprint. These are reflected in the total potential resources capacity or reserve margin, which is considerably greater than the net capacity margin. The SPP RTO has plans to assess the highest short circuit levels that have been forecasted on its 230 kV+ transmission system; short circuit model development will begin in 2011. No reliability impacts have been addressed due to aging infrastructure or economic conditions, and at this time the SPP RTO does not have any guideline for on-site, spare-generator step-up and auto transformers.

The SPP RTO anticipates a significant amount of wind capacity to be added in the western part of the SPP footprint. Although these are predominantly energy-only resources and only a small portion of this capacity (according to SPP Criteria 12.3.5.g) will be counted as certain based on the historical trend, it would be sufficient to meet SPP's capacity or reserve margin requirement. No major unit retirements are planned within the next ten years.

States in the SPP RE footprint that have a Renewable Portfolio Standard are Oklahoma, Kansas, Missouri, New Mexico, and Texas. The impact of these portfolio standards were included in the Wind Integration Task Force and Priority Projects analysis.

Demand Response programs in the SPP RTO footprint are voluntary and because the amount is so miniscule it is not included in the planning process.

[10] See sections 4.1 and 4.2 of the SPP Criteria, which are in the Governing Documents folder of the SPP.org *Documents and Filings* library.

There are no known unit retirements during the assessment timeframe which will impact reliability in the SPP RTO footprint. The SPP RTO has an under-voltage load shedding program in western Arkansas within the AEP-West footprint. This program targets about 180 MW of load shed during the peak summer conditions to protect the bulk power system against under-voltage events.

The SPP RTO has some temporary Special Protection Systems that are approved to be in place from 18 months to 5 years based on the reliability need. All Special Protection System requests are approved by the SPP's System Protection and Control Working Group. The SPP RTO does not have any special protection systems or remedial actions schemes to be to be installed in place of planned bulk power transmission facilities.

The SPP RTO develops an annual SPP Transmission Expansion Plan (STEP) that includes a group of projects to address regional reliability needs for the next 10 years (2010 through 2019). The 2009 STEP was approved by the SPP Board of Directors in January 2010[11]. In addition to the STEP, and as a part of compliance assessment process, the SPP RTO also performs a dynamic stability analysis. The dynamic study completed for 2010 operating conditions did not indicate any dynamic stability issues for the SPP RTO region. The SPP RTO also performs an annual review of reactive reserve requirements for load pockets within the region. The SPP RTO does not have specific criteria for maintaining minimum dynamic reactive requirement or transient voltage dip criteria. However, according to the reactive requirement study scope, which was completed as a STEP process in 2009, each load pocket or constrained area was studied to verify that sufficient reactive reserves are available to cover the loss of the largest unit. The annual STEP process did not indicate limited dynamic and static reactive power areas on the bulk power system.

In October 2009 the SPP Board of Directors approved a new Integrated Transmission Planning (ITP) process that will determine what transmission is needed to maintain electric reliability and provide near- and long-term economic benefits to the SPP RE region. Successful implementation of the ITP will result in a list of transmission expansion projects and completion dates that facilitate the creation of a reliable, robust, flexible, and cost-effective transmission network that improves access to the SPP RE region's diverse resources, including its vast potential for renewable energy. The ITP is an iterative three-year process that includes 20-Year, 10-Year, and Near-Term Assessments.

Principles of the ITP:

- Focus on regional needs, while integrating local needs
- Plan will be updated every 3 years
- Goal is to build a robust grid to meet near- and long-term needs
- Will result in comprehensive list of needed projects for SPP region over next 20 years
- Plan the transmission backbone to connect known load centers to known or expected larger generation sites
- EHV transmission backbone should connect transmission between SPP's west and east regions and strengthen existing ties to the Eastern Interconnection, with options for interconnecting to the Western grid
- Planning horizons will be 4, 10, and 20 years

[8]Download the 2009 STEP from the Engineering and Planning section of SPP.org

- Will position SPP to proactively prepare and quickly respond to national priorities that may require additional consideration

The SPP RTO is developing a transmission portfolio for a 20-year planning horizon. The results of this analysis are expected by the end of 2010.

The SPP RTO conducted a Power-Voltage analysis study for the nine potential load pockets within the SPP RTO footprint based on a 2014 summer peak load condition. SPP RTO staff will coordinate any potential reactive reserve issues and associated mitigation plans during its annual reliability assessment effort.

As a part of the interregional transmission transfer capability study, the SPP RE participates in the Eastern Interconnection Reliability Assessment Group seasonal study group (comprised of MRO, RFC, SERC West, and SPP), which produces an upcoming summer, winter, and long term summer operating condition transfer limitation forecast. Simultaneous transfers are also performed as part of this study. The results of the recently completed studies did not indicate any reliability issues for the SPP area.

As a Planning Authority, the SPP RE conducts reliability assessments to comply with NERC TPL standards:

- TPL-001 – The SPP Model Development Working Group (MDWG) ensures that all base case violations are addressed during Base Case development.
- TPL-002 - Using the SPP MDWG Models, Near and Long Term Analysis for N-1 contingencies are performed by SPP staff.
- TPL-003 - SPP staff performs automatic N-2 contingencies along with selected N-2 contingencies submitted by SPP members.
- TPL-004 - SPP periodically conducts reactive reserve and stability studies that address the key requirement in this standard. This standard covers the requirements of the SPP region's planning process concerning selected catastrophic events.

Based on these studies, the SPP RE does not anticipate any near-term or long-term reliability issues that have not addressed by mitigation plans or with local operating guides.

In March 2010, SPP RE member Oklahoma Gas and Electric (OG&E) installed approximately 42,000 smart meters on customer homes in Norman, Oklahoma, along with the information delivery infrastructure to carry the information to and from the customers and OG&E. An estimated 3,000 Norman customers will be asked to participate in a study in the summer of 2010 and 2011 using the in-home devices and/or Internet portals as a means to get electricity pricing and usage information.

There are no known project slow-downs, deferrals, cancellations, or other issues at this time that will impact the reliability of the SPP RTO footprint.

Other region-specific issues that were not mentioned above?

There are no other region-specific issues other than the one described above for SPP at this time.

Region Description

The Southwest Power Pool, Inc. Regional Transmission Organization (SPP RTO) region covers a geographic area of 370,000 square miles and has members in nine[12] states: Arkansas, Kansas, Louisiana, Missouri, Mississippi, Nebraska, New Mexico, Oklahoma, and Texas. SPP's footprint includes 29 Balancing Authorities and over 50,000 miles of transmission lines. SPP typically experiences peak demand in the summer months.

SPP has 58 members that serve over 5 million customers. SPP's membership consists of 14 investor–owned utilities, 11 generation and transmission cooperatives, 10 power marketers, 9 municipal systems, 7 independent power producers, 4 state authorities, and 3 independent transmission companies. SPP was a founding member of the North American Electric Reliability Corporation in 1968, and was designated by the Federal Energy Regulatory Commission as an RTO in 2004 and a Regional Entity (RE) in 2007. As an RTO, SPP ensures reliable supplies of power, adequate transmission infrastructure, and competitive wholesale prices of electricity. The SPP RE oversees compliance enforcement and reliability standards development. Additional information can be found on SPP.org.

[12] The SPP RE footprint does not include Nebraska