Southwest Power Pool, Inc. (SPP) is a Federal Energy Regulatory Commission (FERC) -
recognized regional transmission organization with a mandate to ensure reliable supplies of
power, adequate transmission infrastructure, and competitive wholesale prices of electricity.
SPP is an independent organization that does not own transmission or generation, but provides
for reliable operation of the electric grid in all or part of nine states.

SPP has 54 members:

12 - Investor-owned utilities
11 - Cooperatives
 9 - Municipals
 4 - State agencies
 2 - Independent transmission companies
 5 - Independent power producers/wholesale generation
11 - Marketers

**SPP’s Mission**

SPP’s mission statement is “Helping our members work together to keep the lights on...today
and in the future.” SPP oversees use of the wholesale transmission grid, specifically regarding
electric reliability and the provision of markets. SPP does not monitor the smaller transmission
lines that directly serve residences and businesses. Our member utilities provide that important
service and interface with retail customers.

While SPP has functional control of the grid, our members maintain operational control. SPP
doesn’t site transmission specifically. Our role is to assess the need for new transmission and
suggest that it is needed between certain points, but the exact routing is determined by our
members and state government.

If you’ve ever participated in an SPP meeting, you’ll note that we do what our mission says - we
help our members work together to reach decisions. SPP has a very deliberate and open
decision-making process in which stakeholders and state regulators determine SPP’s direction.
SPP’s focuses on current, real-time operations, but we also look years ahead to determine
future transmission needs.
SPP Footprint

This map depicts the geographical areas in which our members provide electrical service. This is a new map of the SPP system, as it now includes Nebraska. This addition of three Nebraska utilities in April 2009 expanded SPP’s electrical load by 12%, its geographic footprint by 30%, and its miles of transmission lines by 16%.
Local Imbalance Prices

This map illustrates SPP’s average 2008 local imbalance prices, which reflect the incremental cost of delivering energy to specific locations on the grid. If the transmission grid were a perfect system, we could ensure that the lowest cost energy always met everyone’s energy needs. We don’t have, nor could we afford, that perfect system.

A number of factors impact the SPP region’s wholesale prices, but wind is not a major factor in this graphic. Less than 3,000 megawatts of wind are in service across SPP today. Each utility has a unique generation and fuel mix, and maintains a different amount of reserves. However, the price differences shown here are in large part due to congestion - transmission bottlenecks that inhibit the free flow of power between areas. More transmission is needed not only for transporting wind, but to relieve congestion on the grid and improve all customers’ access to different types of generation.
Average Wind Power

This map from the National Renewable Energy Laboratory depicts average wind power across the United States. It is important to understand that the “better” wind sites really are better. For example, areas with 30% wind capacity would need 50% more turbines to achieve the same output as areas with 45% capacity. Additional transmission might increase costs by 10-20%.

While connecting wind to the grid is a major issue, there are also significant operational and market issues to consider. SPP’s summer peak load (not including Nebraska) is approximately 43,000 megawatts. SPP has 50,000 megawatts of wind proposed and under study in its generation interconnection queue. Therefore, SPP’s wind potential well exceeds its summer peak demand, and far exceeds average or minimum loads. We believe SPP could absorb only 20-30% of the wind potential in our region.

We can’t be totally dependent on wind to meet customers’ demand. The wind doesn’t blow all the time, so we have to maintain constant generation sources such as coal. When the wind does blow, we can only back down traditional generation to specific levels. Also, wind doesn’t “follow the load” as a gas-fired plant does. These are just some of the basic issues with which SPP and other regional transmission organizations are grappling.

SPP recently completed a wind penetration study for the Southwestern Public Service territory and is working on another wind integration study that considers the entire SPP footprint.
Wind in Generation Interconnection Queue

The next two maps depict where SPP is today regarding wind generation. The first map shows the almost 3,000 megawatts of wind that is interconnected and theoretically in service today. (We don’t know when wind farms will operate, which makes planning and operations more difficult.)
The following map depicts wind farms that are waiting to be connected to the grid, are under construction, or are on suspension. Over 50,000 megawatts of wind are included in this map.
When we think about transmission planning, we tend to think locally or regionally. SPP has traditionally focused on our neighbors to the north and east. However, here you can see that the huge wind potential located in the SPP footprint is as close to the west coast as to major population areas in the east.

Not only has our traditional thinking been confined to a specific region, the tendency has been to focus on a short-term planning horizon. There are now several efforts underway to think more strategically about transmission planning by considering longer-term and interregional plans.
The Joint Coordinated System Plan (JCSP) is a collaboration that began in late 2007 between the Midwest ISO, PJM Interconnection, Tennessee Valley Authority, the National Renewable Energy Laboratory, and SPP to focus on interregional transmission expansion plans to address reliability and economic needs. Evaluation of this interregional footprint is unprecedented.

The JCSP includes a 2018 reliability\(^1\) assessment, followed by a 2024 economic assessment. The economic study was performed in coordination with the Department of Energy (DOE) and has set the foundation for the ongoing Eastern Wind Integration and Transmission Study, which is looking at both 20% and 30% wind integration scenarios to determine the transmission infrastructure and operational impacts necessary to accommodate these wind levels. Existing state mandates for renewable portfolio standards were included in study assumptions.

The JCSP is a broader, more strategic view of the electric grid. It goes beyond the 10-year view we have traditionally taken with reliability and economic planning.

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\(^1\) Reliability upgrades are required to maintain reliability of the electric transmission grid. Economic upgrades have the potential to reduce costs for transmission owners. They provide access to generation options for which potential savings exceed the cost of the proposed transmission upgrades.
Major Transmission Expansion in the SPP Region

This map depicts the JCSP along with other long-range transmission expansion plans:

- The Electric Reliability Council of Texas (ERCOT) has identified Competitive Renewable Energy Zones (CREZs) as areas with wind resources that need to be efficiently collected and delivered.

- The High Plains Express Transmission Project is an effort by Xcel Energy to integrate generation from potential resource zones where large concentrations of renewable and other types of generation may be developed.

- Each year, SPP and its members publish a ten-year SPP Transmission Expansion Plan (STEP), which creates a blueprint for long-term transmission upgrades. The STEP is primarily driven by the need to maintain electric reliability, but also identifies “economic” projects that could reduce costs for transmission owners.

- SPP’s EHV Study, which assesses the region’s future reliability and capacity needs to 2026 and beyond, suggests overlaying the SPP footprint with a 500 and 765 kilovolt transmission system and integrating it with existing systems of Entergy, MISO, and PJM.

Projects shown in the map were developed independently. While there has been some coordination with these plans, particularly between SPP and ERCOT, the need for further coordination is evident, especially in New Mexico.
We spend a significant amount of time determining how costs of new transmission are allocated. Several years ago we implemented a method to share costs of upgrades needed for reliability. We are now focusing on how to spur transmission construction by allocating economic upgrade costs region-wide. We’ve established a new process for including a “Balanced Portfolio” of economic upgrades into the SPP Transmission Expansion Plan and allocating the upgrade costs regionally. Projects in the Balanced Portfolio are transmission upgrades of 345 kV or higher that will provide customers with potential savings that exceed the cost of the project.

The map above illustrates a typical portfolio that selects projects from across the footprint. The benefits of these projects exceed the costs, which would be shared by everyone in the grid. With this approach to expanding the grid, every pricing zone, utility, and state would be “winners.”
American Recovery and Reinvestment Act

We are excited about our strategic long-term plans for the future; however, our near-term future is rapidly changing. The American Recovery and Reinvestment Act of 2009 (ARRA, or the “stimulus package”), along with pending legislation from Senators Reid and Bingaman, are creating a lot of activity in the electric utility industry.

ARRA has a budget of $800 billion, with $34 billion designated to the Department of Energy, $17 billion to transmission infrastructure projects, and $17 billion for a variety of renewable energy and energy efficiency projects. At least 50% of the appropriated funds are directed toward activities that can be initiated within 120 days of February 17, 2009. Also included in the ARRA:

- $80 billion to conduct a resource assessment and analyze future demand and transmission needs;
- Technical assistance for the formation of interconnection-based transmission plans for the Eastern and Western Interconnections and ERCOT; and
- Loan guarantees for renewable energy systems, transmission upgrades and reconductoring, and biofuel projects.

We don’t know exactly what “interconnection-based transmission plans” for the Eastern and Western Interconnections and ERCOT specifically means, but it sounds as if planning across wide areas with some support at the federal level is going to become a reality.

Follow–up to the 2009 National Electric Transmission Congestion Study

The DOE is completing a National Electric Transmission Congestion Study this year. The ARRA is stipulating additional study requirements, including an analysis of renewable energy unable to reach markets due to transmission constraints, reasons for the failure to develop adequate transmission capacity, and recommendations for achieving adequate transmission capacity.

SPP’s Response to the ARRA

In response to the ARRA, SPP has compiled a short list of comments and suggestions focusing on cost allocation and technology. SPP suggests there is a need for the DOE and its National Laboratories and Technology Centers to coordinate with the Electric Power Research Institute to determine the allocation of ARRA funds. The DOE should also:

- Leverage existing technology and infrastructure to encourage the further development of renewables;
- Develop procedures to facilitate effective transmission planning on a national scale;
- Sponsor major smart grid projects; and
- Evaluate the effective use of low loss conductors and transformers, energy storage (large scale batteries and compressed air), and plug-in hybrid electric vehicles.
SPP’s Concerns re: Transmission Planning and Cost Allocation

Reliability

SPP’s first obligation is always maintaining electric reliability. Most of us can remember the blackouts of 1977 and 2003. The nation has taken many steps to avoid another widespread blackout, but we have continued to grow more dependent on electricity without corresponding attention to adding transmission and generation. Maintaining reliability and resolving operational issues associated with renewables are of primary importance.

Planning

Also of primary importance is coordinated, mandatory transmission expansion planning across the United States, or at least across each Interconnection. We cannot afford for certain utilities or agencies to avoid participating in interregional planning. We are at the point, or very near the point, where reliability planning in the traditional sense may not be enough. We need to look beyond the first contingency in planning.

We have already reached the point where least-cost planning is simply not strategic. Meeting only minimum requirements is far too short-sighted. We can’t afford a robust transmission grid that stops at some artificial or real border, whether that border is a single utility, a state, or SPP. New transmission is too expensive not to do it right. The electric grid is equivalent to the interstate highway system, and it can’t stop at state lines. We often say, ”Doing nothing has a cost, so not planning is not an option.”

While integrating more renewable energy to the grid is an important part of the solution, wind is not the total solution. I believe fossil and nuclear generation will continue to play a major role in meeting consumers’ electricity needs. Demand response, energy efficiency, and the smart grid are necessary and substantive components of future energy policy and transmission plans.

Seams Agreements and Third Party Impacts

Seams agreements determine how neighboring transmission providers interact at their borders from both an economic and operational perspective. Currently, adjacent transmission providers are not required to have seams agreements to provide for coordinated planning and cost allocation. SPP has asked FERC to encourage, if not direct, that adjacent transmission systems enter into seams agreements that address how long-distance transmission facilities are studied, constructed, and funded.

SPP has asked FERC to require that, when a need exists within one transmission provider’s area which impacts facilities in another transmission provider’s area, studies be completed to facilitate a decision as to whether or not to proceed. With major transmission projects now under construction, there will be electrical impacts on adjacent systems. SPP is willing to analyze impacted facilities for adjoining first-tier planners, and would appreciate reciprocal analysis in a timely manner.
National Leadership Needed

Who will lead these efforts to build interregional transmission, develop the smart grid, and facilitate the large-scale addition of renewable energy to the grid? If the nation adopts a new energy policy, what will it include? Will there be a national Renewable Portfolio Standard? Much of where we are going is not yet known, and there is a host of uncertainties in all these areas.

Transmission is not a local, county, state, or regional issue, but a national issue. SPP supports an immediate need for federal leadership to address and resolve issues of siting and cost allocation for the high voltage transmission needed to deliver remote renewables and baseload generation. We also need federal support of research on carbon capture and storage, integrating renewables, and efficiency/demand response.

Synergistic Planning Project

SPP conducts an annual stakeholder satisfaction survey, and stakeholders have rated SPP’s transmission planning/studies and generation interconnection services as “most important, but least satisfactory”. To address this concern, the SPP Board of Directors endorsed a Synergistic Planning Project to address gaps and conflicts between SPP’s transmission planning processes and help position the organization to respond to the Obama administration’s focus on improving our nation’s electric infrastructure.

The Synergistic Planning Project team is comprised of two state commissioners, an investor-owned utility, a cooperative, an independent power producer, a representative of a private capital group, and one SPP executive. This team will report to SPP’s Board of Directors and Regional State Committee in April 2009. This project is a clear indication that there is much work to be done regarding transmission expansion, and that we are attempting to address our concerns strategically with a cross-section of leaders.

Costs vs. Benefits

Meeting future needs comes with a cost. One of SPP’s weaknesses is conservatism when calculating the benefits of new transmission. We must broaden the benefits calculation to include the reduction in losses that will occur with new higher voltage transmission, the possible reduction in reserve margins that can be achieved with new transmission, the economic impact and jobs created through grid expansion, the benefits of a more competitive grid, and the positive environmental impacts of transmission.

According to two transmission owner’s data:

- $100 million in economic upgrades for 345 kV transmission lines would only increase residential customers’ cost by 9 cents or 0.1% per month (based on 1033 kilowatt-hour)
- $100 million in economic upgrades for 345 kV transmission lines would only increase residential customers’ cost by 8 cents or 0.1% per month (based on 1000 kilowatt-hour)
Transmission expansion to support a 20% national Renewable Portfolio Standard in the Eastern Interconnection, sourced by the best wind in the U.S., is projected to cost approximately $82 billion, which equates to a monthly charge of 90 cents per month for each and every customer. While that is an incremental cost to pay for transmission, the benefits of reduced congestion, delivery of clean, renewable energy, and a more robust transmission grid should offset the majority, if not all, of these costs.

Someone at SPP coined the phrase “a can of coke a month” to explain a retail consumer’s cost for major enhancements to the electrical grid. The benefits will far exceed the costs. We appear to be standing on the verge of a new energy policy that has transmission at its core, and we must all work together to achieve an “interstate superhighway” for electric transmission that delivers additional renewable energy.

By Les Dillahunty  
Senior Vice President, Engineering and Regulatory Policy  
Southwest Power Pool, Inc.  
501.614.3215  
lดillahunty@spp.org