MEMBER VALUE

SPP'S MEMBER VALUE STATEMENT AND METHODOLOGY

By SPP Staff

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OVERVIEW: SPP'S VALUE

INTRODUCTION

What does SPP do for its members?

SPP oversees the bulk electric system and administers a wholesale power market in the central United States on behalf of a diverse group of electric utilities in 14 states. SPP is one of nine independent system operators/regional transmission organizations (ISO/RTO). SPP is mandated by the Federal Energy Regulatory Commission (FERC) to ensure reliable supplies of power, adequate transmission infrastructure and competitive wholesale prices of electricity.

ISO/RTOs do not own any assets that comprise the power grid; they independently plan and operate the grid to ensure affordable power gets to customers and to avoid power shortages. Planning and operating the grid are two key elements of SPP's robust portfolio of services.

What would the world look like without SPP?

If SPP did not operate the grid and provide centralized core services of reliability coordination, tariff administration, scheduling, transmission expansion planning, market operations and training services, its members would have to individually secure staff, expertise and technology necessary to perform these functions. Members are unable to perform these functions as cost effectively due to SPP's ability to achieve economies of scale. SPP's performance of these functions across a larger region leverages a broader, deeper pool of resources and provides additional benefits that cannot be replicated by members operating independently.

The benefits of SPP's services include reducing the number of required full time equivalent (FTE) staff, optimizing generation siting, regionally prioritizing transmission and running markets as a consolidated Balancing Authority (BA).

Without SPP, we would have:

- ☑ Distributed reliability coordination and planning functions
- ☑ Independent operation of legacy balancing authorities (BA)
- ☑ Independently-conducted wind interconnection

However, without SPP, we would lose:

- ☒ Regional transmission organization
- ☒ Integrated market and consolidated BA
- ☒ Reserve sharing group
- ☒ Regional transmission expansion
- ☒ Facilitated stakeholder process

CALCULATING THE VALUE OF SPP

To calculate our value to members, SPP quantifies the benefits we provide for four key functions: operations and reliability, markets, transmission and professional services.

Operations & Reliability	Markets	Transmission	Professional Services
• Reliability • Reserve Margin	• Markets • Regulation	• Robust transmission • Wind integration • Planning Margin	• Compliance • Settlements • Engineering • Tariff & scheduling • Training

Staff use both quantitative and qualitative estimated values of various areas of SPP's services to calculate the value provided to members through enhanced reliability; increased efficiencies and economics; consolidated functions that reduced resources; and improved environmental, public policy and local economic impacts. This methodology captures benefits both to SPP's members and the region of the RTO's bulk electric system produced by regional planning and operation.

METHODOLOGY

OVERALL METHODOLOGY

Staff use both quantitative and qualitative estimated values of various areas of services to calculate the value of SPP. Staff measure the value its services provide to members through:

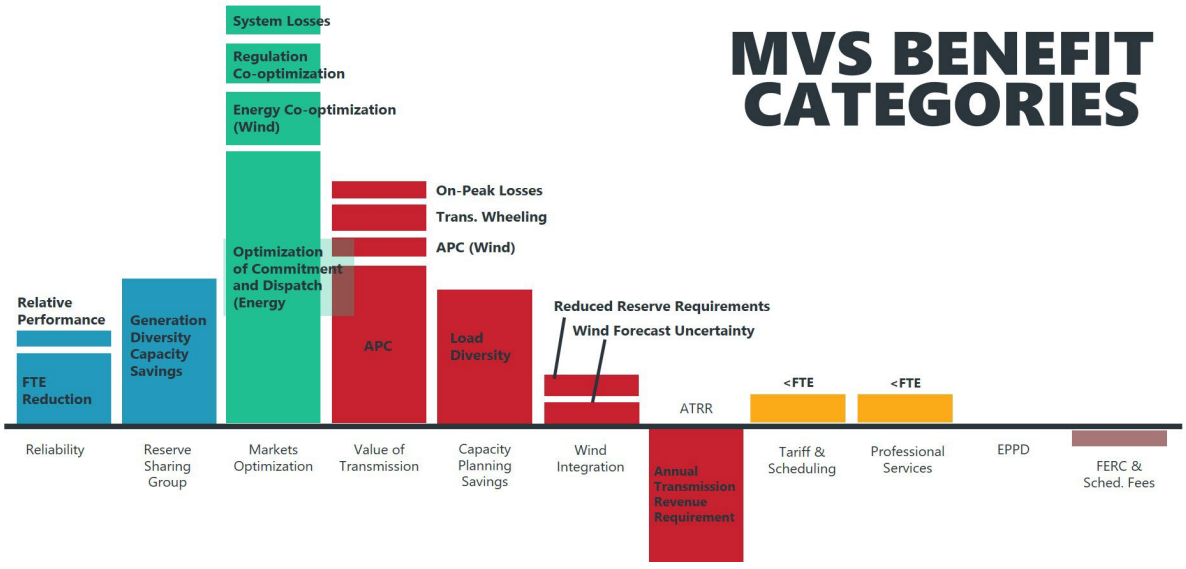
- Enhanced reliability
- Increased efficiencies and economics
- Consolidated functions that reduced staffing and/or technical requirements
- Improved environmental, public policy and local economic impacts

The member value statement (MVS) methodology captures benefits both to SPP's members and to the SPP region. SPP defines RTO benefits as efficiencies gained through RTO services, including reduction in staffing for members, and increased efficiencies of regional operation.

These calculations take care to avoid overlaps in quantified benefits across service categories. SPP calculated the MVS at the regional level; benefits to individual members or market participants are not included in this study. SPP can use the foundational methodologies of this study to calculate individual member benefits if the necessary supporting data is available.

Figure 2 shows the factors considered by SPP's MVS methodology.

Figure 2: MVS Benefit Categories[1]



[1] *Blocks in Figure 2 are not to exact scale and are for illustrative purposes only*

RELIABILITY

SPP provides its members the following reliability services as it performs its reliability coordination (RC) function:

- Wide-area overview of the bulk electric system
- Increased system monitoring
- Improved congestion management
- Shared situational awareness application
- Alternative source of monitoring
- Improved coordination between entities internal and external to SPP

SPP quantifies the benefits of providing these RC services to its members as follows:

- **FTE reduction:** this component of the reliability services benefits reflects the reduction in full-time employees (FTE) staffing requirements resulting from consolidating the reliability functions and services that all SPP's legacy balancing authorities (LBA) would otherwise have to perform individually. To calculate this value, SPP estimates the cost for each LBA to perform these reliability functions with its own reliability coordinators. SPP estimates 29 FTE positions[2] (in Operations and IT departments) per LBA at an average cost of $125,000 per FTE, across 17 LBA.

- **[QUALITATIVE] Relative performance[3]:** SPP estimates that during extreme events, like 2021's Winter Storm Uri or 2022's Winter Storm Elliott, the consolidated BA load interrupted less load than what each legacy BA would have needed to interrupt. The RTO was able to coordinate real-time interchange transfer between SPP entities. SPP's market was able to reflect the need for energy through scarcity pricing and LMPs that reflected the value of demand relative to the margin supply. Appropriate price formation on the seams was essential to minimize load interruptions. SPP coordinated energy transfer between members within the SPP RTO and with other RTOs and neighboring BAs.

Note: Not included in these benefits are avoided costs of systems and applications that each LBA would likely need to add or upsize in order to increase wide-area overview capability necessary to perform RC functions, such as bigger energy management system (EMS) models, increased Inter-control Center Communications Protocol (ICCP) links, voltage security tools and various other applications SPP utilizes as the RC.

[2] SPP estimates it eliminates the need for the following staff positions per LBA: two internal reliability coordination trainers, one administrator, one IT manager, one IT hardware staff, two IT applications staff, one IT network staff, two IT CIP staff, two operations managers, three operations engineers, 6 reliability coordinators, two operations analysis ATF review analysts, two EMS engineers, one ICCP engineer, two day support engineers and one operator in training.

[3] In future MVS calculations, SPP may calculate a quantitative value of relative performance: the reduced expectation of loss of load derived from participation in an RTO.

RESERVE SHARING

SPP provides reserve sharing services to its members through its administration of the SPP Reserve Sharing Group (RSG). In addition to the SPP balancing authority, the Southwestern Power Administration (SPA) and Associated Electric Cooperative, Inc. (AECI) balancing authorities participate in the SPP RSG. Participants in the RSG leverage generation diversity across a larger geographical region to reduce reserve capacity needed to address unexpected losses of power.

To determine the value of participating in SPP's RSG, staff performs three separate calculations:

- **Generation diversity capacity savings:** SPP's criteria requires the RSG to carry enough operating reserve capacity to account for the group's most severe single contingency (MSSC) and half the second largest contingency. This reserve capacity requirement is shared among the participants. Without SPP's RSG, North American Electric Reliability Corporation (NERC) Standards would require each LBA to provide, at a minimum, sufficient reserves to meet its MSSC. To independently satisfy NERC Standards without participating in the RSG, each legacy balancing authority (LBA) would need more reserve capacity and would have to build new generation, purchase reserves from another entity, or carry the added reserves on their units (and withhold them from energy dispatch).

- **Loss of opportunity for energy sales:** if an LBA is required to carry an increased amount of reserves, a portion of that LBA's capacity is estimated to be withheld from energy sales opportunities at a value to be estimated based on resource offers compared to marginal energy costs.

- **Required capacity margin for reserves:** staff estimated the costs for an LBA with insufficient capacity assuming that 50% of needed capacity will be imported and 50% will be built. Imported capacity includes firm transmission service costs.[4] [5]

These calculations show the sum of individual LBA's operating reserve requirements (necessary on a stand-alone basis) are much larger than the requirements of the SPP RSG. SPP calculates the benefits of RSG participation as the cost to build and import additional capacity needed for each LBA to supply the reserves needed to meet its stand-alone requirement. SPP also includes the loss of opportunity for energy arbitrage if the LBA needed to withhold capacity for reserves.

[4] Cost to import includes cost of transmission.

[5] Cost to build and run capacity needed for added reserve requirement per LBA beyond the PRM. In the calculation, it assumed that **67% of PRM** may be used for CR. The discount is due to estimated operational needs to allow for a 5% generator outage rate. The EIA report used includes capital cost, fixed operations & maintenance (O&M) and variable O&M. We estimate O&M at 30% of EIA reported with 30% run time using a Combined Cycle plant estimate model.

MARKETS OPTIMIZATION

SPP's market system relies on centralized security constrained unit commitment (SCUC) and security constrained economic dispatch (SCED) algorithms to serve load in the BA utilizing the most economical generation while respecting transmission system limitations. SPP's market system co-optimizes energy and reserve products with consideration to deliverability and losses on the transmission system. Staff analysis determines savings and quantifiable benefits of SPP's market to members through:

- **Energy and regulation:**
  - Run SCUC/SCED for each LBA
  - Convert all units to "Market Status"
  - Build transactions if virtual bids or offers exist in current market
  - Co-optimize regulation with energy
  - Changed to assign each LBA a regulation amount equal to SPP's
- **Contingency reserves:** Co-optimize benefit of SPP's RSG share of CR across multiple LBAs. This is different from RSG benefits.
- **System losses:** compare losses for non-market reference cases to losses in RTO market
- **[FUTURE UPDATE] Interchange between LBAs:** In future versions of the MVS, SPP will simulate interchange between LBAs utilizing bilateral settlement schedules (BSS) and existence of virtual bids or offers existing in current market database.

Note: SPP's value for contingency reserves reduction is included in the Reserve Sharing category. Co-optimization benefits of existing reserves are included in Markets & Regulation.

For the MVS, staff use nearly every hour and day of the market for the year to calculate benefits. Some days may be excluded due extreme events with abnormal offers and repricing. SPP modifies the models to reflect each LBA's balancing area, load and resources. Using the Market Clearing Engine, staff dispatches each LBA's balancing area to serve its load and procure its required reserves independently. Staff then sums the cost of performing the balancing responsibility for each LBA and compares the cost to the production market.

Unquantified benefits: SPP and Midcontinent Independent System Operator (MISO) use a market-to-market coordination agreement to coordinate congestion on transmission constraints that are known to be impacted by both markets. This helps the markets more economically resolve that congestion than they could otherwise achieve on their own. Settlement processes are utilized, after-the-fact, to compensate for assistance provided by one market to the other.

Through this agreement, SPP has been able to increase revenues for its members by protecting members' transmission rights and providing compensation for any utilization of the SPP transmission system in excess of allocated rights during congestion periods. At this time, this benefit is not included in the calculation of total MVS due to the need for additional analysis of some offsetting costs.

Additionally, SPP's market provides added pricing transparency that may facilitate increased market activity, efficiencies, and appropriately signal to potential generation and transmission developers the opportunity that may exist to resolve any transmission system limitations to meet future energy needs. This benefit is not included in MVS calculations.

WIND INTEGRATION

SPP facilitates the integration of wind resources to the grid through its generation interconnection studies, transmission planning, consolidated balancing authority and the Integrated Marketplace. To quantify SPP's contribution to wind integration, SPP estimates that the Market & Regulation and Value of Transmission calculations capture the RTO services that facilitate an increased amount of wind integration. Other benefits that SPP, as the BA, provide include geographical siting, wind uncertainty forecast and regulation reserves requirements:

- **Geographical siting:** Good siting avoids unnecessary wind investment costs by locating resources at wind-rich sites. This reduces installed capacity requirements to meet the same renewable energy requirements. SPP calculates the reduced requirement of installed capacity by comparing capacity at wind-rich sites and at load centers, and assuming $1,400/kW for installed wind capacity. By locating wind at more attractive locations, rather than load centers, the costs of interconnecting generation at these load centers is avoided. SPP's wind integration services, primarily Balanced Portfolio and Priority Projects, result in fewer, but higher quality, wind resources built in the region:
    - SPP assumes $180/kW in costs of local transmission facilities to integrate wind.
    - SPP assumes 10% improvement in output from "mediocre" to "good" wind siting, saving 500 megawatts (MW) of wind per 5 gigawatts (GW) of optimal wind
    - SPP staff believe the majority of siting benefits are captured in the Market and Value of Transmission studies.

- **Wind forecast uncertainty:** Captures the capacity cost reduction in procuring reliability safety margin MWs needed to wind forecast uncertainty
- **Regulation reserves requirements:** Estimates the avoided cost due to reduction in required regulation reserves due to consolidated interconnected system.

VALUE OF TRANSMISSION

SPP's centralized transmission studies facilitate construction of transmission projects that improve reliability and deliverability of least cost generation to load centers, and increase the capacity factor of renewable and other low-cost generation.

Staff use SPP's 2021 Value of Transmission Study to inform calculations for this category. That study evaluated 348 projects from 2015-2019, representing $3.4 billion of transmission investment. To calculate value of transmission for the MVS, SPP considers three key benefits:

- **Adjusted production cost (APC):** Savings are estimated by simulating the impact of added transmission on production costs, using operational models that capture actual prices from SPP's Integrated Marketplace.
- **Transmission wheeling revenues:** SPP estimates increased wheeling revenues resulting from additional point-to-point transmission service sold beyond what would have occurred without the RTO's directed transmission expansion.
- **On-peak losses:** SPP estimates capacity savings from reduced losses during peak consumption due to transmission expansion directed by SPP.

Note: the MVS calculation excludes other benefits outlined in our Value Transmission report: reliability benefits and optimal wind benefits. These exclusions are to prevent overlap with other calculations of reliability and wind integration benefits made in this report.

CAPACITY PLANNING SAVINGS

SPP determines resource adequacy requirements for the SPP balancing authority. SPP specifies a minimum planning reserve margin that each load-responsible entity must maintain in order to assure adequate resource capacity is planned to meet reliability thresholds. SPP's administration of regional resource adequacy allows for recognition of load diversity benefits available through participation in a geographically diverse market supported by a robust transmission network. SPP uses the following measures to determine savings of capacity needs:

- **Planning reserve margin (PRM):** a function of peak demand for the entire region and an agreed upon percentage of required margin.
- **Capacity savings due to load diversity:** SPP measures the peak demand for individual Load serving entities (LSEs) that, in SPP's consolidated footprint, is reduced by load diversity in regional coincident peak, resulting in lower capacity requirements.
- **Capacity savings due to generation diversity:** SPP measures the reduction in capacity needs achieved through the diversity of its BA's generation fleet. These resources are better equipped than the resources of a single LBA to respond to a generator loss.

SPP calculates the reduction in capacity and planning reserve margin requirements based on benefits realized due to load diversity, which compares SPP's coincident peak versus the sum of each load-serving entity's singular peak.

Note: SPP does not calculate generation diversity capacity savings separately here. The benefit measured by the Reserve Sharing category provides a similar benefit. To avoid double counting, all diversity of generation savings are forgone in this section.

TRANSMISSION REVENUE REQUIREMENT

For many members, SPP's annual net revenue requirement (NRR) represents only part of the costs they incur because of their membership in SPP. The benefits they receive from transmission upgrades and SPP's regional planning processes are offset by costs of annual transmission revenue requirements (ATRR) for certain projects.

SPP's Value of Transmission report calculates the benefits and savings our members receive from transmission, and the costs of ATRR for projects. Though the ATRR is paid to SPP, it is passed through to transmission owners. The MVS study calculates the annual value for the current year of some of the Value of Transmission benefits, and the annual ATRR for those same projects from the Value of Transmission study from that same period.

TARIFF & SCHEDULING

SPP's Tariff Administration group provides a centralized reservations "one-stop shop" for reserving transmission on the power grid. In addition to administering and maintaining open access same time information systems (OASIS) reservations, SPP provides engineering staff to assure that requests for transmission are valid and will not compromise power grid integrity.

SPP's administration of tariff and scheduling services allows centralized transmission service coordination and procurement. SPP also administers and maintains tools and applications used by transmission customers.

If SPP did not exist, LBAs and transmission owners would provide these functions for themselves. There would also be a greater number of bilateral transmission agreements which would be more difficult to administer. SPP calculates the value of Tariff and Scheduling based on the assumption that, absent SPP, the collective LBAs would need to staff 96 FTEs (engineering and reservation handling).

Without SPP, each legacy balancing authority or transmission service provider would need to maintain OASIS software for Tariff and Scheduling, with significant yearly maintenance fees.

PROFESSIONAL SERVICES

Professional Services includes two categories of benefits: engineering, and training. SPP quantifies these benefits as the reduction in FTEs resulting from consolidating the functions and services that all SPP's LBAs would have had to staff and perform independently. Previous MVS calculations also included compliance and settlements. Since the dissolution of the SPP Regional Entity, compliance cost avoidance has diminished. An increase in FTEs for market settlement functions is offset by decrease in FTEs for transmission settlements, resulting in no additional reportable costs or savings.

ENGINEERING SERVICES

SPP's engineering department provides a series of independent studies to assure that planned member actions (generation interconnection, transmission construction, etc.) will not create issues when integrated into the power grid. SPP serves as the unbiased "protector" of the integrity of the grid and its operation. When regulatory authorities review and approve requested actions, SPP's studies fulfill the role of "objective, unbiased, expert witness."

Without SPP, individual utilities would need to conduct the expert witness and the objective study functions. These functions would most likely require a combination of consultants and engineering staff from the requesting utility.

SPP calculates engineering services benefits as the reduction in 67 FTEs resulting from consolidating the engineering services that all SPP's LBAs would have staffed and performed independently:

- Planning coordination
- Resource adequacy
- Generator interconnection
- Transmission services

TRAINING SERVICES

SPP provides Training Services as a centralized service for its members. SPP acquires resources and equipment for shared use and develops training programs and curricula centrally to share with members. Depending on the specific training, if SPP did not exist as a leveraged resource, the alternative solutions for member training would come from three sources:

- Training and/or certification procured from training consultants or vendors
- Training developed by each of the 17 LBAs in the SPP footprint
- Training developed by each member organization.

SPP bases its valuation of Training Services on cost avoidance associated with centralized development and reduction in number of FTE training staff.

The value of training services includes cost-avoidance provided by:

- NERC credential maintenance courses
- Train-the-trainer courses
- Incorporation of power simulation technology per PER005

SPP's calculated Training Services benefits are based on Chapman Alliance research, quantifying the benefit of consolidating the training functions and services that all SPP's LBAs would have had to staff and perform independently.

FERC FEES

SPP analyzes FERC administrative fees as they apply to SPP members. This analysis addresses:

- Fees assessed by FERC to cover its administrative costs, which apply to all transmission service under an RTO
- FERC policy that categorizes transmission utilization differently in an RTO since *all* energy is considered interstate transmission
- Partial offset of the incremental cost, which results from increased through-and-out transmission service provided by the RTO

Total FERC fees paid by SPP members have historically exceeded what members would have paid if they were not part of an RTO. This is primarily because SPP members' native load is considered to be served by transmission in interstate commerce since it is under the RTO.

For the MVS, SPP captures these costs as:

- Increase in MWh considered "wholesale" energy because of RTO participation. For FERC-jurisdictional members, this is native load energy quantified in members' FERC Form 1 submittals. For non-jurisdictional members, this is all the energy each member serves.
- Point-to-point transmission service offset: this is based on the MWh of service through and out of the SPP transmission system, which provides some offset because it spreads FERC's fixed administrative cost over a greater number of billing units.

ENVIRONMENTAL, PUBLIC POLICY, AND ECONOMIC DEVELOPMENT (EPPED)

SPP's services contribute to a reduction in environmental impact, improvement of public policies and an increase in economic stimulus in the region.

ENVIRONMENTAL

SPP members creates an environmental impact that SPP measures as three separate benefits:

- **Renewable penetration:** The factor of improved renewable penetration due to SPP's transmission expansion and centralized market.
- **CO_2 reduction:** Carbon reduction as a result of SPP's services contribution emissions reduction, defined as the difference in wind generation with and without SPP. SPP's centralized market and transmission expansion have improved access to renewables and reduced CO_2 emissions by 23.9% between 2014 and 2021.
- **Reduced upgrades**: This qualitative measure looks at the reduction in transmission upgrades that occurs through more regional planning

PUBLIC POLICY

Membership in SPP results in improves public policy outcomes:

- **Renewable goals** at the state level are met more efficiently and competitively
- **Society benefits** from cleaner electricity and lower electricity rates
- **Deferred cost and construction** of new facilities
- **Alternatives** to new right-of-way acquisitions
- **Equitable and participatory** stakeholder processes for collective decision-making

ECONOMIC DEVELOPMENT

Membership in SPP creates an economic development impact on the region that staff have measured as one quantitative and one qualitative benefit:

- **Investment:** SPP enables capital investment through upgrades and increased wind integration resulting in economic investments throughout the SPP footprint. As an example, from the period 2008 through 2019 SPP added 24.4 GW of wind capacity.

  The state taxes associated with this added capacity is calculated as $157 million per year. Land leases for these wind farms is calculated as $73.5 million per year. The associated transmission investment associated with these capacity additions are not included in these amounts but also contribute to additional revenues and taxes in the SPP region.

- **Increased competitiveness:** Wholesale electricity rates in SPP remain among the lowest in the United States, which when combined with the high availability of renewables, are attracting and retaining investment in the region.

BENEFIT-TO-COST RATIO

SPP's members realize billions in total savings and benefits each year. Each year, members and market participants fund the operations of SPP through a Net Revenue Requirement (NRR). The NRR is comprised of operating expenses (excluding depreciation and FERC assessment), principal payments on loans for capital expenditures and a capital reserve fund intended to partially offset future borrowings. Miscellaneous revenues provide a reduction in the NRR calculation and include reimbursements for engineering studies.

SPP compares the net savings and benefits of membership to total NRR paid by members and market participants to calculate the benefit-to-cost ratio of participation in SPP.

CONCLUSION

SPP continues to provide significant, measurable value to its members. The Member Value Statement Strike Team, formed in 2020 to re-evaluate and refine valuation SPP's methodology, confirmed this through its efforts. The valuation updates undertaken by the strike team:

- Considered SPP's previous calculation approaches as well as approaches taken by other entities
- Considered SPP and industry changes since initial development of metrics
- Focused on quantifiable benefits estimated utilizing avoided costs and increased efficiencies
- Added new considerations for qualitative benefits, including those achieved through EPPED
- Emphasized avoiding overlaps in benefit calculations
- Standardized FTE cost for all areas considered
- Reassessed, added and removed categories, as appropriate, based on SPP's estimated added value.
- Allow members to consider value on an area-by-area basis, as applicable

SPP benefits continue to fall within the four key functions: operations and reliability, markets, transmission and professional services. The benefits can be measured both quantitatively and qualitatively.

Quantitatively, the updated methodology continues to clearly show the value provided by SPP. Qualitative measurements include considerations of market-to-market coordination, environmental, public policy, and economic development value provided by SPP in the region and to the bulk electric system as a whole. These services enhance the SPP member experience and benefits to the region. **SPP's value to members and the region continues to grow.**