



**Southwest Power Pool
FINANCE COMMITTEE MEETING**

September 27, 2016

Dallas, TX

• M I N U T E S •

Administrative Items

SPP Chair Harry Skilton called the meeting to order at 8:30 a.m. The following members of the Finance Committee participated:

Harry Skilton	SPP Director
Larry Altenbaumer	SPP Director
Kelly Harrison	Westar Energy
Sandra Bennett (phone)	AEP
Laura Kapustka	Lincoln Electric
Mike Wise	Golden Spread Electric Cooperative
Tom Dunn	SPP

Others attending included:

Bruce Scherr	SPP Director
Jim Eckelberger	SPP Director
Phyllis Bernard	SPP Director
Julian Brix	SPP Director
Josh Martin	SPP Director
Traci Bender	NPPD
Denise Buffington	KCPL
Bill Grant	SPS
Carl Monroe	SPP
Carson Hampson	SPP
Dennis Florom	Lincoln Electric
Jake Langthorn	OG&E
Jerry Peace	OG&E
Kelly Walters	Empire District
Michael Desselle	SPP
Mike Risan	Basin
Noman Williams	SouthCentral MCN
Paul Suskie	SPP
Rob Janssen	Dogwood Energy
Bruce Cude	SPS
Les Evans	Kansas Electric Power Coop
Venita McCellon-Allen	AEP
Ray Wahle	Missouri River Energy

The meeting was scheduled to provide an opportunity for Finance Committee members to review SPP staff's work on documenting an Operating Plan for 2017. Members of SPP's Strategic Planning Committee were invited to attend so they may be able to share their insights on the alignment of the draft Operating Plan with the 2014 SPP Strategic Plan.

Major discussion topics included:

- Sources of strategic inputs and regulatory drivers
 - Suggested SPP should provide a clear description of the value of initiatives prior to decisions to move forward with the initiative
 - Lack of clarity around how cost uncertainty is captured when evaluating initiatives

Finance Committee
September 27, 2016

- Status of Strategic Plan Initiatives
 - Should SPP address inequities within transmission zones,
 - Consider MOPC discussion of Stakeholder Prioritization work at each regular Board of Director meeting,
 - Consider SPP staff identifying work that would need to be discontinued in order to perform work on new initiatives without an increase in overall spending
- Operating Plan
 - Document anticipated spending levels with initiatives and department level priorities
- Linkage of Strategic Plan strategies to Operating Plan initiatives
- Determination of Operating Plan consistency with strategic direction
 - The 2017 Operating Plan is consistent with the 2014 Strategic Plan

Future Meetings

The next meeting of the Finance Committee is scheduled for October 25, 2016 as a teleconference beginning at 3pm

There being no further business, Harry Skilton adjourned the meeting at 2:00 pm.

Respectfully Submitted,

Thomas P. Dunn
Secretary

Southwest Power Pool, Inc.
FINANCE COMMITTEE
Pending Action Items Status Report
September 29, 2015

	Action Item	Date Originated	Status	Comments
1.	Establish a scorecard for presentation to MOPC, SPC, and BOD indicating costs associated with member required projects/services.	10/11/2012	incomplete	Absence of member required projects during Integrated Marketplace development and implementation
2.	Develop schedule of items that require Committee approval, items that require Committee monitoring, and items that require Committee input.	12/20/2013	complete	Presented at 7/09/15 meeting
3.	Create comparison of level of financial disclosures contained in RTO annual reports	7/10/2014	complete	Presented at 7/09/15 meeting
4.	Develop schedule for review of annual operating plan	4/2/2015	complete	Presented at 7/09/15 meeting
5.	Update financial models	4/2/2015	complete	Presented at 7/09/15 meeting
6.	Prepare new financial models with different load growth assumptions	7/09/2015	complete	Presented at 7/17/15 meeting
7.	Advise on appropriate metrics for evaluating success of business process improvement program	7/09/2015	incomplete	
8.	Evaluate passive investment management option for post-retirement healthcare fund	7/09/2015	incomplete	
9.	Obtain quarterly written report from investment manager of pension plan	7/09/2015	incomplete	
10.	Add more granularity and detail to future meeting schedule	7/09/2015	incomplete	
11.	Create checklist of committee duties	7/09/2015	incomplete	
12.	Prepare schedule of current year load	7/09/2015	incomplete	
13.	Prepare document outlining capital expenditures and funding options	7/17/2015	New	



**Southwest Power Pool, Inc.
FINANCE COMMITTEE MEETING
September 27, 2016
DFW Hyatt Regency Hotel
Dallas, TX**

• A G E N D A •

8:30 a.m. – 2:00 p.m.

1. Introduction (30 minutes)..... Harry Skilton
 - a. Sources of Strategic Input (15 Minutes)..... Michael Desselle
 - b. Regulatory Drivers (15 minutes) Paul Suskie
2. Strategic Plan Status – Initiatives/Priorities (60 Minutes)..... Mike Wise
 - a. Maturity Timeline Chart/Priorities (60 Minutes)..... Michael Desselle
3. 2017 Operating Plan (60 minutes)..... Tom Dunn
4. Strategic Plan Near-term Linkage to Operating Plan (45 minutes) Michael Desselle
5. Determination of Operating Plan Consistency with Strategic Direction (30 Minutes) Mike Wise
6. Future Meetings (5 Minutes)..... Tom Dunn
7. Adjourn Harry Skilton



SPP 2017 Operating Plan

September 27, 2016

Finance



Table of Contents

Background Information	2
Purpose of SPP.....	2
Regulatory.....	3
Governing Documents	3
Open Access Transmission Tariff (“OATT”).....	3
Membership Agreement (“MA”).....	3
Bylaws.....	4
Protocols and Business Practices	4
Organization Structure	4
Funding	5
2017 Expected Business Environment.....	5
Major 2017 Project Investments.....	7
Settlement System Replacement.....	7
Benefits	7
Strategic Plan Linkage	7
Investment and Timeline.....	8
Risks.....	8
Phasor Measurement Unit Data Exchange and Analysis (“PMU”).....	8
Benefits	9
Strategic Plan Linkage	9
Investment and Timeline.....	9
Risks.....	10
Voltage Security Assessment Tool (“VSAT”)	10
Benefits	10
Strategic Plan Linkage	10
Investment and Timeline.....	10
Risks.....	10
Governance, Risk, and Compliance Tool (“GRC”).....	11
Benefits	11
Strategic Plan Linkage	11

Investment and Timeline.....	11
Risks.....	11
Deferred or Declined Projects.....	12
2017 Major Technology Investments	12
Systems Administration.....	12
Technology/Server Refresh.....	12
Data Storage.....	13
Network/Telecom	13
IT Architecture.....	13
Data-Lake and Big Data.....	13
Data Security.....	14
Mobile and Cloud.....	14
Cyber Security	14
Keeping The Lights On	14
Internal Work Groups	14
Operations	15
Engineering	16
Information Technology.....	17
Corporate.....	19
Process Integrity.....	20
Appendix A.....	22
Appendix B.....	24

Background Information

Purpose of SPP

SPP’s mission is “Helping our members work together to keep the lights on...today and in the future.” All the services that SPP performs are provided on a regional basis, independently, focused on reliability and cost effectiveness. The benefits of SPP are derived from this mission and the diligence to bring value to SPP members and their customers. SPP administers reliability coordination, transmission services and wholesale markets for the benefit of all electric utility operations in the region SPP serves that use members’ transmission systems. As a Regional Transmission Organization, SPP is mandated by the Federal Energy Regulatory Commission to ensure reliable supplies of power, adequate transmission infrastructure, and a competitive wholesale electricity marketplace. Regional Transmission Organizations

are like “air-traffic controllers” of the electric power grid. They do not own the power grid, but independently operate the grid minute-by-minute to ensure reliable delivery of power to end users. SPP also serves as a Regional Entity of the North American Electric Reliability Corporation.

SPP’s primary services provided to members and customers include:

- Facilitation
- Reliability Coordination
- Tariff Administration
- Transmission Planning
- Market Operations
- Compliance
- Training

Regulatory

SPP is directly regulated by the Federal Energy Regulatory Commission (“FERC”). All changes to the SPP regional tariff must be filed with, and approved by, the FERC prior to implementation. Failure by SPP to comply with the provisions of the tariff and/or any directive received from the FERC must be reported to the FERC and may be subject to penalties and fines.

Governing Documents

Open Access Transmission Tariff (“OATT”)

The SPP OATT delineates the majority of the required workload for SPP’s operations and engineering departments. Significant duties include, but are not limited to, the following:

- Tariff administration services, including scheduling
- Ancillary service provisions
- Market operations
- Balancing authority operations
- Settlement of all transactions under the OATT
- Administration of credit services for OATT customers
- Complete system impact studies
- Completion of the annual SPP Transmission Expansion Plan
- Study generation interconnection requests
- Evaluate long-term transmission service requests
- Administer the competitive process for transmission expansion
- Administer the Southwestern Power Administration transmission system beyond their tariff
- Monitor activities in SPP’s energy markets and exercise plans to mitigate market power

Membership Agreement (“MA”)

The MA is an agreement between each individual member and SPP. The MA obligates SPP to perform the services outlined including those in the OATT. Additionally, the MA describes other significant duties which include, but are not limited to, the following:

- Act as the reliability coordinator for the bulk electric transmission system

- Develop regional reliability plans and emergency procedures
- Review and approve all planned maintenance of the bulk electric transmission system
- Coordinate the maintenance of generation units
- Administer an Open Access Same Time Information System

Bylaws

The Bylaws describe the organizational operation of SPP, specifically outlining the duties of the Board of Directors and Committees advising the Board of Directors. SPP has a responsibility to facilitate meetings of each and every organizational group. Currently, the scope of the organizational structure is as follows:

- Board of Directors (1)
- Regional State Committee (1)
- Members Committee (1)
- Board level committees (6)
- Working Groups (19)
- Task Forces, Subcommittees, Strike Teams (35+)

Additionally, the Bylaws describe SPP's responsibilities as a Regional Entity. Duties associated with being the Regional Entity include, but are not limited to, the following:

- Investigate all reports or discoveries of non-compliance with ERO standards
- Perform reviews in conjunction with the Compliance Monitoring and Enforcement Program
- Recommend financial penalties and sanctions for non-compliance
- Administer the process for regional reliability standards

Protocols and Business Practices

SPP has well documented business practices which detail the administrative practices SPP will follow in administering the OATT including coordinating the sale of transmission service. SPP also has well documented market protocols which detail how customers will interact with SPP and how SPP will interact with customers. These documents are developed through SPP's stakeholder process.

Organization Structure

SPP operates via two distinct organizational structures. The first, which we'll refer to as the governance structure (Group Organizational Chart). It begins with the SPP board of directors and cascades into board level committees and then to working groups. This organizational structure is populated largely with representatives from SPP's member companies. The output from this structure is generally directives on what work SPP is expected to accomplish.

The second organizational structure, which we'll refer to as the internal staff (SPP Organizational Chart), is the typical organizational chart illustrating reporting relationships between employees. The staff structure begins with the SPP president and cascades into vice presidents, departmental directors/managers, etc. The staff structure is generally aligned based on functional responsibilities.

This structure receives the directives from the external structure and then goes forward in acting on the directives.

Copies of the organizational structures can be found in Appendix A.

Funding

SPP funds its ongoing operating costs through charges to customers under the tariff and customers of specific non-tariff services. SPP's operating costs are inclusive of scheduled principal and interest payments on its outstanding debt but are exclusive of depreciation and amortization expenses incurred. SPP is able to collect up to 100% of its operating costs from charges to transmission customers up to a cap of 39¢/MWh¹. SPP is charging customers 37¢/MWh for service in 2016.

SPP's capital expenditures are funded with borrowings from periodic debt issuances and with 20% equity allocation included in the transmission service charge referenced above. SPP's debt issuances are generally unsecured, have a 1 to 2 year interest only payment period and then fully amortize by the maturity of the notes. SPP is required to obtain regulatory approvals prior to issuing new debt. SPP carries an A rating from Fitch Ratings which was last affirmed in August 2016. SPP staff believes SPP will need to issue new notes in 2017 to fund capital expenditures.

Short-term liquidity is provided by managing SPP's cash float. SPP has an agreement, in principle, with a financial institution to put in place a \$30 million revolving credit facility to provide additional liquidity support. SPP is waiting on approval from the FERC in order to execute agreements with the financial institution.

2017 Expected Business Environment

Implementation of the EPA's Clean Power Plan ("CPP") was stayed earlier in 2016 by the U.S. Supreme Court with final legal determinations expected in mid-2017. If the CPP is ultimately upheld, it is expected to have significant impacts in the near term and well into the future. The CPP establishes the first-ever national standards to limit carbon pollution from power plants. The plan sets standards to reduce carbon dioxide emissions by 32% from 2005 levels by 2030. The current rule requires final compliance plans to be submitted by states in 2018 and measurement against 2005 CO₂ levels begins in 2022 and will increase to final compliance by 2030.

Several states within the SPP region have ceased efforts to develop compliance plans while the stay is in effect. A few state jurisdictions within SPP and across the nation are continuing to develop plans despite the CPP's stay. The current rule's uncertain legal status creates uncertainty regarding the timing and significance of future impacts to the industry's generation mix and transmission expansion needs.

Gas electric coordination continues to be a focus at the national level. SPP has filed in compliance and is in the implementation phase to comply with FERC's directive to align electricity markets with

¹ SPP's Board of Directors voted to increase the rate cap to 43¢/MWh at its July 2016 meeting. This change will require approval from the FERC prior to implementation.

natural gas markets. SPP will move its day-ahead market to close earlier in the day and shorten the solution time for posting results. This requires system changes and improved processing speed to reduce the solution time by 30 minutes. SPP's members are divided on the benefits of the approach SPP has filed to comply with the FERC directive.

Another major impact on SPP includes the cyber security threat landscape that is evolving to become more advanced, persistent and dynamic in nature. While the intent of the NERC CIP v6 standards is to address these issues, adherence to the standards alone is not sufficient. This will require SPP to continually assess and increase its cyber security capabilities and posture, by investing in the people, tools, processes and infrastructure required to adequately combat this threat. Cyber threats on utilities and energy companies are a growing threat with over 43% of companies in this space being attacked at least once each year according to a study published by Symantec.

There has been an almost 50% growth of electric cars sales in the United States year over year (source CleanTechnica, July 2015/July 2016). With the desire to reduce carbon emissions from automobiles, electric vehicle usage will begin to have a major impact on electricity sales and usage despite the current trend of flat or reduced demand. Electric vehicle usage in the SPP footprint will continue to grow and become part of the baseline electricity demand. Improved ranges and reduced costs to consumers will allow for greater penetration of electric vehicles in the central United States.

SPP expects continued growth in wind generation on our system. The region we serve is home to some of the highest on-shore wind potential in the Eastern Interconnection. By the end of 2016, we expect over 14 GW of wind generation installed in SPP. Nearly 8 GW of new wind generation is on schedule to be added by the end of 2018. In the 2016 GI cluster study windows, SPP received the two largest sets of GI requests ever and has another nearly 21 GW of new wind generation in our GI queue under various stages of study and/or development. New processes and/or study approaches will need to be developed in order to effectively study these large amounts of potential new generation, most of which are renewables. With this kind of growth in renewable resources, SPP will soon reach a point at which those resources will need to be delivered to other regions since we can no longer reliably utilize them for SPP's internal demand needs, even with additional transmission infrastructure.

The SPP region has seen limited growth in solar but has areas that are prime for development. Solar generation in the United States has been developed in the regions with the highest solar potential. Solar potential for SPP's region is just below the prime areas and we expect development in the near future. SPP's interconnection queue over the past year received nearly 3,000 MW of new solar generation requests. The prime solar areas are in regions with transmission and we expect a potential rapid development of solar. The expected growth in solar generation, coupled with over 14 GW of installed wind generation expected by year end 2016, will further task voltage stability in the footprint.

2016 will conclude a full year of operations with the Integrated System participating in SPP. SPP fully integrated the Integrated System in October of 2015. The Integrated System presented numerous new challenges for operations including managing a winter peaking system; significant hydro generation facilities, increased seams coordination; and a much larger geographic area to

monitor for reliability impacts. The addition of the Integrated System into SPP has also opened opportunities to expand SPP's services to affiliated entities in the western interconnect. There has been a real growth in the interest in the West for organized markets. Any future additions, either through membership or contracted services, will have a visible impact on SPP's operation. This is independent of whether SPP is the provider or it creates another complex seam to manage. There are studies underway to determine if more interactions would be beneficial across the East/West seam.

Consolidation, principally in the investor-owned utility space, is expected to occur in the SPP region in 2017. Empire Electric is being acquired by Algonquin Power & Utilities Corp in a transaction valued at \$1.49 billion. This transaction is expected to close in the first quarter of 2017. Westar Energy agreed to be acquired by Great Plains Energy in a deal valued at \$12.2 billion that is expected to close in the spring of 2017. Nationwide, utility consolidation has accelerated largely due to the increased cost of regulation, low or declining demand, and a lack of growth opportunities. Utilities are consolidating to create scale to address regulation in a cost effective manner and to unlock growth either through synergies or expansion into related utility operations.

Low electricity demand and low interest rates are creating economic pressure for utilities throughout the U.S. In the SPP region, these pressures are hitting while the cost of transmission is rising and is forecast to continue to rise due to new transmission and upgrade costs being included in the rate base. The allowed return on transmission investment is being impacted by overall low interest rates. Low return on capital investments, increased costs for transmission, and lower demand all adversely impact SPP members. SPP's services help offset these pressures by ensuring ratepayers receive cost effective and reliable electric services; with a benefits-to-cost ratio of more than 10 to 1, conservatively calculated.

Major 2017 Project Investments

Settlement System Replacement

Replace the current market and transmission settlement systems with a custom designed, single, high-performance, scalable system solution.

Benefits

Expand automation of the settlements processes to improve accuracy, timeliness, and auditability of the processes. Expect significant reduction in long-term support costs for the settlement function.

Strategic Plan Linkage

Maintain an economical, optimized transmission system
Enhance member value and affordability

Investment and Timeline

The project initiated in 2016 and is expected to complete in 1Q'19. Significant milestones are projected as follows:

- 2016: Initial scope, issue request for quote, interview vendors, and finalize project approach
- 2017: Engage vendor, finalize design, and begin system construction
- 2018: System testing
- 2019: Implementation

Capital expenditures are forecast at \$5.1 million and will be incurred during 2017 and 2018. Internal SPP staff dedicated to the project are projected to cost \$3.2 million through project completion. SPP expects to add 3 incremental IT positions during the construction phase of the project. These positions will continue post implementation as SPP will support the system without an external support or maintenance agreement. Currently, SPP's engages external support for its settlements systems at a cost of \$1.4 million/year. SPP also expects to eliminate its usage of Oracle databases in the settlements system which will reduce Oracle expenditures by nearly \$3.0 million/year.

Risks

Two significant risks have been identified.

- 1) New solution requires internal ownership for IT support and development of future enhancements. There is a risk internal IT would not be staffed appropriately to facilitate this required support and cost savings anticipated would not be realized.
- 2) Settlement system solution represents a paradigm shift in the Settlement and IT process including system approach and data base approach. Cost savings are dependent on a successful shift in data gathering and processing.

Phasor Measurement Unit Data Exchange and Analysis ("PMU")

The PMU Data Exchange and Analysis project will equip SPP with the capability to enhance both current operations and after-the-fact event analysis as well as system model validation efforts. Additionally, PMU data can assist in real-time situational awareness with measurement based dynamic voltage stability monitoring, detection of oscillatory modes, real-time tracking of phase angles to assess stress on the grid, identifying generator trips, island situations, and enhance State Estimator accuracy.

The initiative will progress in three distinct phases, as follows:

- Phase I (started in 2016) – Installation of systems to provide capability to send and receive and archive synchrophasor data, perform after the fact analysis, deploy real-time analytics engine for use in real-time operations as a non-critical informational tool in 2017. Setup Synchrophasor Strike Team to engage stakeholders, apply lessons learned, and develop business case for members. Support Department of Energy funded Open and Extensible Control and Analytics (openECA) Platform for Phasor Data project where SPP staff will deploy, test, and demonstrate the application being developed.
- Phase II (starting in 2018) – development of a member facing PMU portal to facilitate collaboration between SPP and members. Enhancing member's access to PMUs throughout the SPP footprint is expected to provide new and enhanced capabilities to all members.

- Phase III (starting in 2018) – Integrate PMU data collection and analytics into SPP’s secure data network for use with State Estimator and classifying PMU applications as a critical tool for real-time operations in 2019.

Benefits

The use of synchrophasor data in event analysis and real-time monitoring is expected to enhance SPP’s knowledge of the electric system stability which will result in improved system operations and planning. The initial phase is expected to help increase SPP’s situational awareness, assist in monitoring real-time voltage stability, track oscillations, and other key factors in calculating grid stress. The second phase is focused on increasing members’ situational awareness through the creation of a PMU portal enabling member access to PMU data throughout the SPP footprint. The third phase is focused on creating a highly available PMU system that is integrated with SPP’s energy management system allowing for additional operational uses that are expected to equip SPP with predictive capabilities to identify system disturbances before they occur and allow SPP and affected utilities to take action prior to an event occurring.

Strategic Plan Linkage

- Reliability assurance
 - Integration of variable energy resources
 - Event analysis

Investment and Timeline

The project consists of 3 phases; currently Phase I is in-flight:

- Phase I – capital expenditures of \$2.0 million (\$0.8 million spent in 2016), operating costs of \$2.0 million through 2019;
- Phase II – capital expenditure of \$0.3 million; operating cost of \$0.5 million through 2019;
- Phase III – capital expenditure of \$1.1 million, operating cost of \$1.4 million through 2019

Incremental staff additions associated with the PMU project are needed to support this new and complex technology across IT environments. This includes a senior engineer and a programmer/analyst in 2016, a programmer/analyst in 2017, a database administrator in 2018, and an additional programmer/analyst in 2019.

SPP would incur ongoing operating costs beyond 2018 which would be approximately \$0.7 million for Phase 1, \$0.2 million for Phase 2, and \$0.8 million for Phase 3 and would expect to incur capital costs to replace hardware and upgrade software every 3 to 5 years for all phases.

SPP believes its investment in PMU technology represents a fairly conservative approach. More ambitious approaches were evaluated but did not provide a compelling enough benefit to justify adoption.

Risks

While the use of PMU data in model validation and post-event analysis is generally considered a best practice the use of PMU data for real-time system monitoring is gaining traction but is not universally adopted. The systems utilized to analyze the data are in their infancy and may require several years to significantly improve system operation, design or monitoring.

There is a possibility that the investment in PMU capabilities may require a few years to yield long-term benefits. Additionally, a more robust solution will require SPP utilities as well as neighboring regions to share synchrophasor data with SPP. These utilities/systems may need to invest in communication infrastructure to be capable of transmitting the data.

Voltage Security Assessment Tool (“VSAT”)

The online VSAT tool will identify constraints on the transmission system that real time operators will be able to mitigate using current congestion management tools. The VSAT tool will enable real time operators and operational planning engineers to prepare for and react to stability concerns in order to maintain reliable operation of the Bulk Electric System.

Benefits

The most significant goal of this project is to identify areas of voltage concerns with real time and near term data. This can be done more efficiently using the VSAT’s ability to construct a Power-Voltage curve with multiple defined contingencies. With the increase in wind generation and future investments in solar energy within SPP footprints, power transfers and supply variability will become increasingly less predictable. VSAT will equip SPP to better predict the state of the system in order to facilitate reliable outage coordination, forward unit commitment, reliability assessments, and general reliable operation of the Bulk Electric System. VSAT will bolster SPP’s compliance with NERC standards FAC-011-2, IRO-005-3.1a, IRO-008-2, IRO-009-2, and IRO-101-2.

Strategic Plan Linkage

- Reliability Assurance

Investment and Timeline

Work on implementing VSAT will begin in 2017 and complete before the end of 2018. Initial capital costs include purchase of software, purchase of computer hardware, and new functionality added to the energy management system software to facilitate the export of data. Total capital investment to bring the VSAT project to functional status is expected to be \$1.6 million.

Risks

VSAT has been implemented at other RTOs that utilize an energy management system on the Alstom (now GE) platform. Their implementations have been very straightforward. We anticipate a similar implementation at SPP since we are using a proven application and proven architecture. Internal resource constraints may impact the timeline for implementation but are not expected to be a factor.

Governance, Risk, and Compliance Tool (“GRC”)

A governance, risk, and compliance tool will: 1) assist in the identification of job tasks that have compliance or risk management obligations, 2) provide mapping and workflows to support performance of those obligations, and 3) assist staff in managing their responsibilities in a timely, effective, efficient manner.

Benefits

In order to manage the risk associated with non-compliance for regulatory and reliability standards, it is imperative that SPP staff be afforded an opportunity to properly assess all job tasks upon which there may reside a regulatory or compliance obligation. In addition, the current management of those obligations are primarily manual process, which inherently increases risk of human error, exacerbated when the compliance obligation overlaps several departments within SPP, as is often the case. SPP staff are asked to shoulder the burden of those compliance obligations, often without sufficient time or experience to have knowledge or awareness that the obligation exists. This limits their ability to properly manage the risk associated with that obligation and errors are bound to happen. The GRC tool typically provides a mechanism to properly identify and track those obligations, to identify and assess risk throughout the organization relative to those obligations, and to provide the documentation and systematic controls management that goes a long way in reducing the non-compliance risks.

With regards to quality and reliability enhancement, a GRC tool provides more robust coverage of the compliance obligations, and provides a hedge against the errors typically manifested with multiple, overlapping responsibilities in a complex regulatory environment. Efficiency will be positively impacted, as the manual processes and control activities are replaced with more robust, systematic means to identify and track risks across the organization.

Strategic Plan Linkage

- Reliability Assurance

Investment and Timeline

Full implementation of the GRC tool will take 12 months. Capital investment for purchase of software and hardware, and consulting is \$0.9 million, non-capital investment for SPP staff time is estimated at \$0.2 million. Ongoing maintenance expense is estimated at \$0.0 million/year.

Risks

Two significant unknowns exist that will impact the timeliness and budget for the project. Most significantly is understanding the scope of SPP’s compliance requirements. The existing compliance process is manual and spans most departments within SPP. Successful implementation will require thorough and accurate mapping and identification of all touchpoints in the process. Full understanding of the scope of compliance may impact the robustness of the GRC tool that is selected.

Deferred or Declined Projects

There are many project proposals SPP considers when determining its plan for the upcoming year. Numerous of these projects are not approved to begin work during the year due to i) a lack of staff resources to accomplish the work; ii) lack of funding to pay for the project; or iii) the project lacks sufficient detail to warrant moving forward at this time.

Appendix B summarizes all of the projects reviewed by SPP for the 2017 fiscal year.

2017 Major Technology Investments

SPP's ability to provide the vast majority of its services is contingent on employing a robust and resilient technology infrastructure. SPP operates two data center facilities with full fail-over capacity in the event a single data center is unavailable. Within the data centers exist over 1,700 physical and virtual servers across multiple environments interconnected by a high availability network. Significant investments are made annually to not only maintain the existing capabilities of the technology infrastructure but to also enhance the structure to address new demands on the system, cyber security requirements, and incremental additions to SPP's service menu.

Systems Administration

The major initiatives in the 2017 fiscal year include:

- Technology refresh of aged server systems (*based on IT's lifecycle policy*)
- Additional data storage for both data center sites (*production and backup capacity*)
- Incremental licenses for server security
- Incremental licenses for deployment and availability of virtualized hosts
- Additional licenses to support various corporate applications (i.e. Outlook, Enhanced File Transfer and CyberArk password safes)

Technology/Server Refresh

The Systems Administration team manages approximately 450 physical servers, along with roughly 1400 virtual servers. Generally speaking, it is the policy of IT to replace physical hardware after a five-year useful life based on exposure to increased failure rates, discontinued or unaffordable vendor support, operating system incompatibility, and the need for faster application performance and connectivity requirements.

SPP has approximately 101 physical servers (dedicated and virtualized) that are targeted for replacement during 2017 at a total expected replacement cost of \$2.6 million. In concert with the server refresh, SPP will continue to deploy and expand virtualization technology to maximize the utilization of computer hardware and software wherever possible.

Data Storage

SPP utilizes multiple storage technologies to manage data based on the speed, confidentiality, and frequency of use characteristics of the stored data. Across all storage platforms and technologies currently in place at SPP, total capacity is 1.5 petabytes. SPP's need for additional storage grows annually based on years of Integrated Marketplace data that must be retained as well as due to additional entrants to SPP's transmission and market services. SPP expects to increase total storage capacity by 20% in 2017 to comply with its data storage requirements.

Network/Telecom

As part of a three-year upgrade project that began in 2015, SPP will continue an overhaul to the core network infrastructure that includes 40 gigabyte capacity for core switch modules, firewall modules, cabinet switch technology, and data-center cabling infrastructure. This project, which encompasses over 350 routers/switches/firewalls, will alleviate existing network performance bottlenecks and well-position SPP to absorb additional data traffic/processing anticipated in upcoming years. Spending on this initiative is expected to top \$1.7 million in 2017.

Other network systems slated for upgrades or enhancements in 2017 include Voice-over-IP (VoIP), Firewall Management, Load Balancing, and Wireless Lan technologies.

IT Architecture

SPP maintains an architectural roadmap to guide its evaluation of and evolution to emerging technologies. The 2017 initiatives aligning with the architectural roadmap include the following:

- Data-Lake and Big Data infrastructure foundation
- Data security
- Mobile and Cloud-based Infrastructure

Data-Lake and Big Data

SPP business owners and stakeholders require access to many years of historical data to perform data analysis, data mining, and analytics. As a result, the amount of stored data continues to increase. SPP's growth has resulted in much of this data being stored in traditional high performance databases and appliance. These environments are costly, and require significant dollars to add incremental capacity or upgrade/replace the hardware.

The vision is to create a Data-Lake infrastructure that can store vast amounts of historical data using cost-economical storage and compute capacity, which can grow incrementally as needed. The vision includes providing traditional tools to allow SQL access to the data to enable data validation, data analysis, data mining, and analytics capabilities. During 2016, SPP began a project known as "SQL Virtualization", which is the 1st phase of the Data-Lake project. The SQL Virtualization project is estimated to offload approximately 60 terabytes of data from production high performance appliances by the end of 2016, thereby improving the high performance appliance performance and longevity while still providing SQL access to the offloaded data through traditional database tools.

Data Security

As more and more data is offloaded from the historical data stores into the Data-Lake/SQL Virtualization infrastructure, data security becomes very important. The goal is to provide role based security access controls and logging capabilities to meet SPP's auditable controls requirements.

Mobile and Cloud

Mobile applications are rapidly replacing browser based applications. A mobile authentication infrastructure is critical to enable SPP teams to build mobile applications in the future in a cost-effective, secure, and consistent manner.

Automation is a key initiative within IT to facilitate productivity, consistency, and a reduced need for incremental headcount while maintaining ongoing growth in infrastructure. Cloud-based infrastructure enables automation through automated provisioning, patching, and better management of the infrastructure along with show-back reports and capacity planning.

Cyber Security

SPP management has identified the risk of a cyber intrusion or hack as the risk having the highest probability of occurrence and highest impact when it does occur. SPP added additional approved staff in 2016 to provide greater focus on not just prevention of the cyber event but addressing the event once it is known. A new process being rolled out in early 2017 is application whitelisting. As opposed to an approach that attempts to identify and block all malicious files and activity, application whitelisting will only permit known, secure programs. Essentially, whitelisting flips the traditional antivirus model from a "default allow" to a "default deny" for all executable files, resulting in a considerably more effective solution.

Keeping The Lights On

Reliability is job #1 at SPP. It is the central focus of every decision and action undertaken within the organization. Internally, this is known as "keeping the lights on" or "KTLO". It is the central theme of the organization's mission statement "Helping our Members work together to **keep the lights on**...today and in the future". SPP's responsibility toward reliability, and other important services, is delineated in numerous agreements, contracts, tariff, protocols, standards, etc. Significant resources are dedicated directly to fulfilling these obligations and significant support resources are invested in helping the direct satisfaction of these obligations.

Internal Work Groups

SPP's internal organization structure is designed to ensure appropriate focus and leadership is deployed to address the KTLO work described above. Many groups have direct responsibilities to accomplish the work while others are available to provide necessary support.

Operations

Operations Department Investment and Resources					
Salary & Benefits	Travel	Services	Other	CapEx	Approved Staff
\$ 20.9	\$ 0.4	\$ 0.3	\$ 0.1	\$ 8.7	161

SPP's Operations Department is responsible for many of the duties and responsibilities outlined in the OATT and MA. Operations staff are the front line employees who engage real-time in the reliability and market aspects of SPP on a 24 hour a day, 7 days a week basis. Staff consists of engineers, certified system operators and specialized support personnel. The department is organized across three distinct subgroups:

1. System Operations
2. Markets
3. Operations Support

Significant duties include: regional reliability coordination, tariff administration, transmission service, real-time and day-ahead market operations, maintain the models for the state estimator and the commercial modeling tools, training, and balancing authority operations. Additionally, staff from this group work with numerous stakeholder groups including; MOPC, Business Practices WG, Balancing Authority Operating Committee, Generation WG, Operating Reliability WG, and Operations Training WG. Finally, staff represents SPP and its members at numerous NERC working groups.

2017 Priorities

Wind Study – Continue efforts of evaluating the impact of increased wind integration and solar integration to the reliability and efficiency of the SPP footprint and timely identify areas of concerns that need to be addressed through expanded technical requirements for the control systems of those resources or other requirements enforced through market protocols, tariff or SPP Criteria.

Enhance operator tools – Improve the types of information utilized by the operations staff in monitoring system stability and voltage status.

Enhance operations' capabilities - Continue efforts of gathering PMU data from SPP members, filtering out abnormalities and make results available to real-time operations.

Market to Market – Continue efforts to work with MISO to improve the utilization of Market to Market and make Market to Market settlements more reflective of the efficiencies gained by both markets.

Strategic Plan Linkage

- Reliability Assurance
- Optimize Interdependent Systems

- Reliability Assurance

- Reliability Assurance

- Optimize Interdependent Systems

Gas Coordination – participate in advancing solution to extend a gas pipeline as an alternative to construction of new generation to eliminate electric system contingency.

- Optimize Interdependent Systems

Engineering

Engineering Department Investment and Resources					
Salary & Benefits	Travel	Services	Other	CapEx	Approved Staff
\$ 9.4	\$ 0.3	\$ 2.8	\$ 0.6	\$ 0.5	76

Principal duties of SPP’s engineering department include planning SPP’s transmission system necessary to meet future regional reliability, economic, and public policy needs in an optimized manner; tracking progress and costs of approved transmission expansion projects; and performing longer term (longer than one year) studies necessary to process requests for generation interconnection, transmission service, and transmission congestion rights. The department also performs data gathering and reliability assessment responsibilities in support of the Regional Entity. The predominance of these duties are required by SPP’s OATT and business practices, the Membership Agreement, NERC Reliability Standards, and SPP Criteria.

2017 Priorities

Increased Compliance – Continue efforts to meet new compliance requirements resulting from changes to MOD-033 standards and improve existing compliance processes and assurance

Planning Studies – Perform required transmission planning studies that will include completion of the 2017 ITPNT assessment, initiation of the 2018 ITPNT assessment, and a coordinated study with ERCOT as requested by the Texas PUC to evaluate Lubbock Power’s desired transition into ERCOT. The 2018 ITPNT assessment will include new efforts to leverage SPP’s planning process for improved ability to comply with NERC TPL standards

Customer Initiated Service Studies – Perform GI, TSR, and congestion hedging studies per customer requests. SPP received the two largest sets of GI requests during its 2016 cluster study window; similar volumes are expected in 2017. New approaches need to be developed to effectively study this volume of potential new generation (primarily renewables).

Strategic Plan Linkage

- Reliability Assurance
- Reliability Assurance
- Maintain Economical, Optimized Transmission System
- Reliability Assurance

Capacity Margin Refinement – Implement new data collection and evaluation processes necessary to support the LRE, reserve margin assurance, and deliverability policies that were approved in 2016. Support the newly formed Supply Adequacy WG which is expected to discuss additional refinements.

- Reliability Assurance
- Enhance Member Value

Transmission Planning Improvements – Develop detailed processes, business practices, and tariff language needed to implement the TPITF-recommended and Board of Director approved transmission planning improvements.

- Reliability Assurance
- Maintain Economical, Optimized Transmission System

Eastern Interconnection WECC Study – Provide technical review and research guidance to facilitate completion of a DOE-funded study evaluating opportunities to increase electricity transfers between the eastern and western interconnections.

- Maintain Economical, Optimized Transmission System
- Optimize Interdependent Systems

Export Pricing – Support the Export Pricing Task Force; provide technical analysis of available transfer capability and the economic viability of the transfer capability between SPP and its neighbors. This effort will provide insights into pricing necessary to recoup transmission expansion costs as well as revenues benefitting the SPP region.

- Maintain Economical, Optimized Transmission System

Next Generation of Z2 – Support the development of improvements or replacement of current Z2 crediting process.

- Enhance Member Value

Efficiency Improvements – Develop and implement automation of toolsets.

- Enhance Member Value

Staff Development – Implement programs for growth and retention of key employees to reduce the need for contracting key skillsets and mitigate the risk and cost of transitional staff and loss of knowledge and expertise from the organization.

- Enhance Member Value

Information Technology

Information Technology Department Investment and Resources						
Salary & Benefits	Travel	Services	Other	CapEx	Approved Staff	
\$ 18.0	\$ 0.1	\$ 3.5	\$ 20.9	\$ 11.6	146	

The primary mission of IT is to develop, deploy, integrate and support the applications and infrastructure that supply SPP's operational and corporate systems. IT is divided into five primary

groups (IT-Enterprise Operations, IT-Applications, IT-Sourcing Strategy, IT-Quality Control, and IT-Cyber Security), along with a Chief Architect.

The IT-Enterprise Operations department provides 24x7-support for all communications and networking systems, and all computer hardware and environmental needs for the SPP data centers. Each of these activities is critical to SPP's transmission, market, reliability and business processes. IT-Operations also provides technical direction, leadership, and architectural design for the communications, network, storage, backup/recovery, and computing platforms for all aspects of the IT infrastructure utilized within SPP.

The IT-Applications department provides 24x7-support for existing systems including transmission, reliability, and Integrated Marketplace. The department is responsible for coordinating all software development efforts related to these key business systems, as well as planning and supporting the integration of new members/market participants such as Integrated Systems. IT-Applications plays an integral role in nearly all new projects, including the creation of requirements/test/rollback plans; developing software; providing technical leadership; defining, implementing and reviewing architecture; and providing ongoing maintenance and support for systems.

The IT-Sourcing Strategy team has responsibility for managing the IT budget and facilitating/negotiating business activities with major IT vendors. The team works closely with the other IT departments to incorporate an appropriate short and long-term budget and acquisition philosophy, which incorporates vendor leveraging/relationships, asset lifecycles, and adequate maintenance coverage.

The IT-Quality Control team works to identify and implement risk mitigation strategies to assist in compliance and protection of SPP's assets. The team is responsible for conducting timely internal reviews of evidence to ensure ongoing compliance obligations are met. The team owns and maintains the documentation of all processes and procedures related to compliance for IT and select non-IT departments, including the associated and applicable Reliability Standard Audit Worksheets (RSAWs). The team also plays a significant role in IT EMBC/Recovery Planning, owning and facilitating applicable processes, procedures, and testing activities.

The IT-Cyber Security team was enhanced and consolidated in 2016 to ensure SPP is complying with all requirements of the FERC approved NERC Cyber Security Standards. Additionally, the team proactively evaluates and employs best practices to ensure SPP's overall IT security is at optimal levels. The team works closely with IT and SPP's Compliance departments to ensure security measures are adopted, implemented and followed according to SPP policies.

2017 Priorities

Automation – Areas of opportunity include patch management, CIP documentation and compliance activities,

Strategic Plan Linkage

- Enhance Member Value

virtual server provisioning, and other internal testing and integration processes.

Reduce 3rd Party consultant engagements – increased and aligned skills of internal staff to become more self-sufficient in supporting SPP’s infrastructure and applications, as well as better positioned to assume support for enterprise projects (e.g., Z2 and Settlements replacement). Going forward, the team will continue to focus on maximizing existing resources in an effort to minimize costly external vendor augmentation

- Reliability Assurance
- Enhanced Member Value

CIP compliance and cyber-security focus - focus on refinement of CIP and cyber processes and seek opportunities to increase efficiency with ongoing tasks, documentation requirements, and procedures.

- Reliability Assurance
- Enhance Member Value

IT compute and data infrastructure – evaluate various server/compute architectures, including consolidated/converged platforms and cloud computing (internal and external). Balance data-storage requirements with lower cost platforms, and continue pursuit of a big data architecture to manage and provide large quantities of data for analytics.

- Enhance Member Value

Cost Management – substantiate the accuracy and validity of SPP’s asset inventory (hardware and software), including a focus on software licenses and maintenance agreements. This will allow for prudent and non-duplicate software purchases, as well as compliancy with software usage in accordance with vendor software agreements.

- Enhance Member Value

Corporate

Corporate Department Investment and Resources					
Salary & Benefits	Travel	Services	Other	CapEx	Approved Staff
\$ 20.8	\$ 0.6	\$ 6.4	\$ 5.3	\$ 1.1	118

The corporate group has responsibility for many broad aspects of the organization. The group encompasses the following support areas:

- | | | |
|------------------|-------------------|---------------------|
| • Executive | • Legal | • Settlements |
| • Communications | • Human Resources | • Facilities |
| • Accounting | • Regulatory | • Credit |
| • Gov’t Affairs | • Administration | • Market Monitoring |

Additionally, this group holds the budget for several expenses which are not allocated across the company such as, pension expense, corporate liability insurance, and board of director compensation.

2017 Priorities

Membership expansion – expect clear indications of some new member consideration in late 2016 or early 2017; continue discussions with other prospects

Settlements – Settlements is the #2 identified risk (medium probability/high impact) for SPP. Efforts include complete replacement of existing systems, analysis of upstream data feeds to ensure consistent format, efforts to eliminate one-off settlement processes (i.e. uniform settlement processes)

Government affairs - Increase interactions with legislators, policymakers and agencies at both the state and federal level to develop relationships and further their understanding of SPP and the role of RTOs. This is particularly important in light of congress considering changes to the Federal Power Act as well as recent activities by the Environmental Protection Agency and Commodity Futures Trading Commission.

NERC Compliance – Strengthen SPP’s culture of compliance in response to several issues identified recently. Efforts include allocation of additional resources for corporate wide compliance as well as compliance efforts areas susceptible to compliance failures.

Strategic Plan Linkage

- Optimize Interdependent Systems
- Enhance Member Value
- None
- Reliability Assurance

Process Integrity

Process Integrity Department Investment and Resources					
<u>Salary & Benefits</u>	<u>Travel</u>	<u>Services</u>	<u>Other</u>	<u>CapEx</u>	<u>Approved Staff</u>
\$ 7.8	\$ 0.3	\$ 0.4	\$ 0.1	\$ 0.5	58

Primary responsibilities within the Process Integrity group include internal audit, reliability standards compliance, Stakeholder services including external member training and customer service, corporate project management, and interregional activities. Departments within this group work closely with the SPP Oversight Committee.

2017 Priorities

Compliance – Continue to strengthen SPP’s overall compliance posture, both in Operations/Planning and cybersecurity, while ensuring an active role in development and implementation of future standards. Continue to provide support to ensure audits without unmitigated exceptions or qualifications

Stakeholder Project Prioritization – Mature the stakeholder process that prioritizes the project work SPP undertakes

Distributed Process Improvement – Mature the distributed process that empowers the Business Units and their respective staff to engage in process improvement development and implementation

Stakeholder Engagement – Continue to assist stakeholders in onboarding, training, problem resolution and engagement

Strategic Plan Linkage

- Reliability Assurance
- Enhance Member Value

- Enhance Member Value

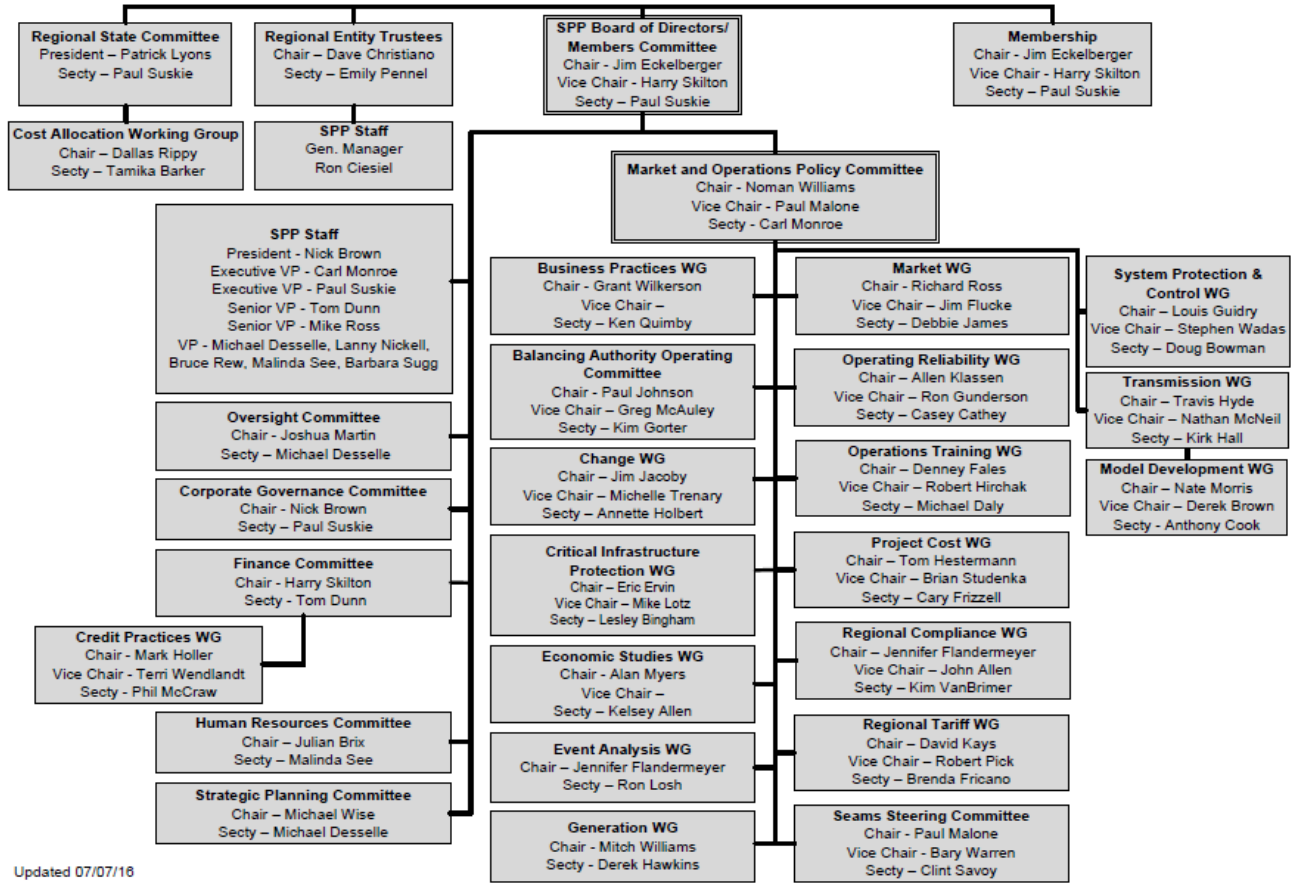
- Enhance Member Value

- Enhance Member Value

Appendix A

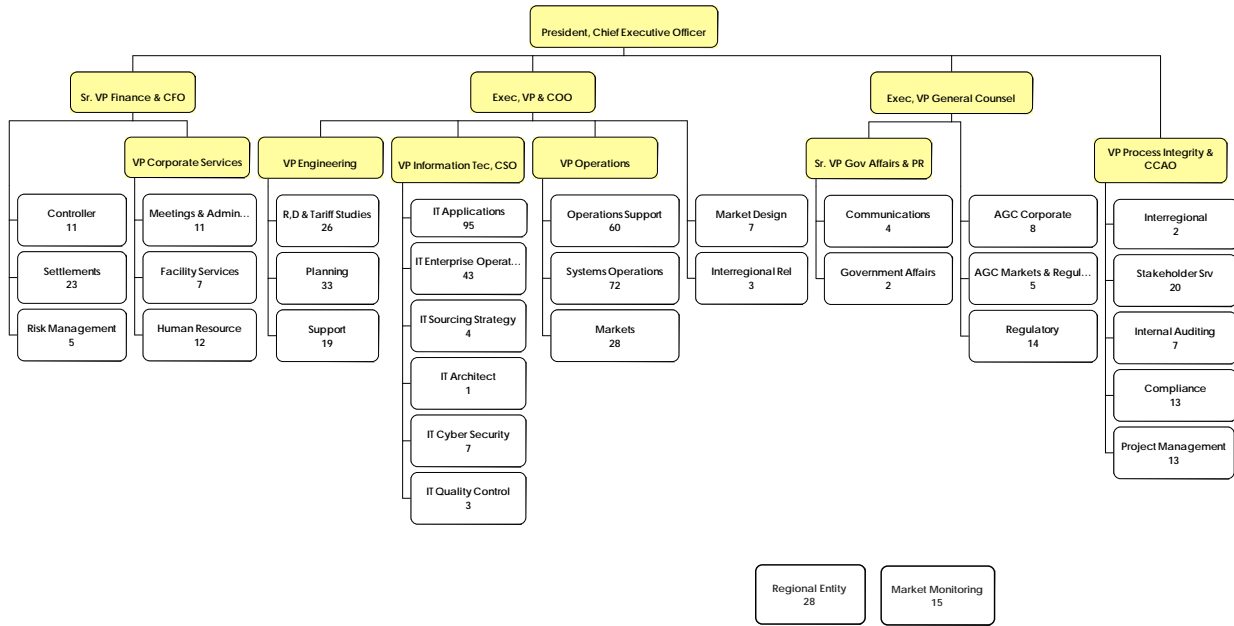


Group Organizational Chart



Updated 07/07/16

SPP Organizational Chart - September 8, 2016
Officers with detailed headcount
Full Headcount 611



Appendix B

2017 Projects	Capital	Investment	Operating	Total	Project Source	Owner	Strategic Plan Linkage
	2017	Total	Expense	Investment			
APPROVED							
Settlement Systems Replacement Project	2.1	5.1	0.0	5.1	Staff	Staff	
GRC Tool	1.0	1.0	0.4	1.4	Staff	Staff	Reliability Assurance
Online VSAT	0.8	1.5	0.2	1.7	Staff	Staff	Reliability Assurance
PMU Data Exchange - Phase 1	0.7	2.0	0.1	2.1	Staff	Staff	Reliability Assurance
Enhanced Combined Cycle - Gas Day	0.6	7.0	-	7.0	FERC/MOPC	GECTF/MWG	Enhance & Optimize Interdependent Systems
Engineering Hub	0.4	0.6	-	0.6	Staff	Staff	
Identity and Access Management System	0.4	0.7	-	0.7	IT Mandatory	Staff	Reliability Assurance
TTSE Dispatcher Training Simulator - DTS Upgrade	0.4	3.6	0.2	3.8	Staff	Staff	Reliability Assurance
EMS, CMT, and Markets Software & OS Upgrades	0.2	0.2	0.0	0.2	IT Mandatory	Staff	Reliability Assurance
Enhanced Public Data (2019)	0.0	0.1	0.0	0.1	Staff	Staff	Enhance and Optimize Interdependent Systems
Shadow Allocation Calculator	0.1	0.1	0.0	0.1	Staff	Staff	Enhance and Optimize Interdependent Systems
ZZ Crediting P2 and P3	0.1	0.5	-	0.5	FERC	Staff	Economical, Optimized Transmission System; Enhance Member Value and Affordability
Circuit Redesign	0.0	0.1	0.0	0.1	Staff	Staff	Enhance Member Value and Affordability
ICCP Software & OS Upgrade	0.1	0.1	0.0	0.1	IT Mandatory	Staff	Reliability Assurance
Interface Pricing	0.1	0.1	0.0	0.1	Mandatory	Staff	Enhance and Optimize Interdependent Systems
Liferay Portal Replacement	0.0	0.1	-	0.1	Staff	Staff	Enhance Member Value and Affordability
ZZ Crediting P1	-	1.8	-	1.8	FERC	Staff	Economical, Optimized Transmission System; Enhance Member Value and Affordability
Day Ahead FFE Data Exchange	-	0.3	0.1	0.4	FERC	Staff	Enhance and Optimize Interdependent Systems
2-Factor Authentication (Part 2 of 2 - SW Dev)	-	0.2	-	0.2	Staff	Staff	Reliability Assurance, Optimize Interdependent Systems
TOTAL	7.0	25.2	1.0	26.2			
DEFERRED/DELAYED							
PMU Data Exchange - Phase 3	-	1.1	0.1	1.2	Staff	Staff	Reliability Assurance
PMU Data Exchange - Phase 2	-	0.3	0.0	0.0	Staff	Staff	Reliability Assurance
Reliability Communications Tool	-	1.0	0.0	1.0	Staff	Staff	Reliability Assurance; Enhance and Optimize Interdependent Systems
Online TSAT	-	0.6	0.1	0.7	Staff	Staff	Reliability Assurance
Freeze Date Replacement Allocation Calculator	-	0.3	0.1	0.4	CMPWG	Staff	
Coordinated Transaction Scheduling (2017)	0.4	0.4	-	0.4	Staff	Staff	Enhance and Optimize Interdependent Systems

Memorandum

To: **Finance Committee Members**
 From: **Tom Dunn**
 CC: **Shaun Scott**
 Date: **October 4, 2016**
 Re: **2016 - 17 Meeting Schedule**

Detailed below is a schedule for face-to-face meetings of the Finance Committee for 2016/2017 along with suggested agenda items to be covered at the meetings.

<u>Meeting Date</u>	<u>Time</u>	<u>Meeting Location</u>	<u>Major Agenda Item</u>
October 25, 2016	3:00	Teleconference	Preliminary 2017 Budget Review
November 10, 2016	7:30	Dallas, TX	2017 Budget Review (dinner 11/9)
November 22, 2016	10:30	Dallas, TX	2017 Budget
December 5, 2016	2:00	Little Rock, AR	SSAE-16 Audit Report, BPI Review Corporate Insurance Review, Authority Review, Actuary Assumption Review
February 22, 2017	10:00	Dallas, TX	2016 Investment Manager performance
April 4, 2017	7:30	Dallas, TX	Financial Audit Review (dinner 4/3) 2017 New Debt Issuance Ongoing Auditor Engagement Process
July 6, 2017	7:30	Dallas, TX	BPI Review (dinner 7/5) Mid-Year Review 2018 Admin Fee Forecast Financial Audit Engagement
August 23, 2017	10:00	Dallas, TX	FC, SPC, & MOPC Chair meeting
September 26, 2017	8:30	Dallas, TX	Joint FC/SPC Meeting to review 2018 Operating Plan
October 31, 2017	3:00	Teleconference	Preliminary 2018 Budget Review
November 9, 2017	7:30	Dallas, TX	2018 Budget Review (dinner 11/8)
November 21, 2017	10:30	Dallas, TX	2018 Budget
December 4, 2017	2:00	Little Rock, AR	SSAE-16 Audit Report, BPI Review Corporate Insurance Review, Authority Review, Actuary Assumption Review