

A PROPOSAL FOR THE SOUTHWEST POWER POOL WESTERN ENERGY IMBALANCE SERVICE MARKET (WEIS)

*Part of SPP's Western Energy Services
family of products*



Southwest Power Pool
**WESTERN
ENERGY
SERVICES**

CONTENTS

Introduction: SPP and Energy Markets	1
A Legacy of Trustworthiness.....	1
Our Value Proposition: Experience and Customer Service Set SPP Apart.....	1
SPP’s History of Successful Market Development.....	2
Why SPP?	3
The SPP Advantage.....	3
SPP’s Western Energy Imbalance Service Market (WEIS).....	5
WEIS Market Design.....	5
Resource Registration Types	6
Overview of Market Participant Responsibilities.....	7
Market Operator Responsibilities	11
Scheduling Activities: Bilateral Transactions.....	12
Congestion Management	12
Metering Requirements.....	13
Governance.....	14
The Western Joint Dispatch Agreement.....	14
Role of the Western Markets Executive Committee and SPP Board of Directors	14
The WEIS Tariff and Market Participant Agreement.....	14
Market Settlements.....	15
Market Monitoring.....	17
Potential Future Market Enhancements.....	19
Dispatchable Dynamic Schedules	19
Ramping Capability Product.....	19
Trading Hubs	19
Energy Storage Resource.....	19
Quick-Start Resource Logic.....	20
Transmission in the Market	21
Market Participant Onboarding	22
Training	23

A Proposal for the SPP Western Energy Imbalance Service Market

Implementation 24
 Development and Launch Timeline 24
Other Potential Service Offerings 25

Utilities have the daunting task of ensuring electric reliability and affordability for their customers. Southwest Power Pool (SPP) has proven energy imbalance markets make this task easier and more successful. We have years of experience and a customer-centric approach to market development. We provide more than just market administration services. We provide peace of mind.

SPP is pleased to present this proposal for our Western Energy Imbalance Service market (WEIS), provided as part of our portfolio of contract-based Western Energy Services. We have made an earnest attempt to accurately estimate and clearly state the anticipated costs and obligations of designing, implementing, and administering the WEIS. We've based the market's design on both our own experience and the expressed wishes of you, our customer.

We look forward to continuing to work with you in developing a mutually beneficial relationship that will bring financial benefits and enhance electric reliability for your customers for years to come.

INTRODUCTION: SPP AND ENERGY MARKETS

A Legacy of Trustworthiness

SPP has coordinated the reliability of the bulk electric grid for more than 75 years. We were founded in 1941, incorporated in 1994, approved by the Federal Energy Regulatory Commission (FERC) as a regional transmission organization (RTO) in 2004 and have grown and matured steadily throughout our history, constantly expanding our service offerings and territory to provide greater value to more and more customers.

Even as our services, responsibilities and staff size have grown, particularly in the last two decades, our values and commitment to serving customers have remained the same. We believe in doing the right thing for the right reason in the right way, and we've managed to stay true to those values even as we've expanded our RTO footprint from eight to 14 states and will soon expand our reliability oversight to include all or part of seven states in the Western Interconnection.

Our annual stakeholder satisfaction surveys regularly return superbly favorable results among our stakeholders, and our employee engagement surveys consistently show phenomenal levels of satisfaction, motivation and effectiveness among our highly qualified, dedicated and professional staff of nearly 600 employees. All of the above is proof: Our strategy is built to last.

Our Value Proposition: Experience and Customer Service Set SPP Apart

Our value is based, among other things, on complimentary principles of maintaining independence through diversity and a commitment to being stakeholder-driven. We are facilitators, helping our stakeholders work together to keep the lights on today and in the future.

We don't tell our stakeholders what to do. We facilitate dialogue among them, ensuring every voice is heard regardless of size.

SPP's approach to business is creating and maintaining a strong, unique culture in which our staff and stakeholders collaborate to be as effective and efficient as possible.

We share your values. We understand equally the challenges of managing transmission in rural areas and the importance of maintaining reliability in large population centers. SPP serves seven of the one hundred largest cities in the U.S. and has a keen understanding of rural America, too: after all, it's where we call home and is the area we have primarily served for the past 75 years.

We hire career employees and invest in them as people first and employees second. We give back to our community. We value transparency in our actions and communications, flexibility in our approach to customer service and response to industry trends, and integrity and trust in everything we do. We consider ourselves partners with our stakeholders and stewards of their valuable resources.

We are proud that SPP today – having grown from 11 members in 1941 to 98 in 2019, spanning all or parts of 14 states and soon to provide service to even more in the west – still reflects our early principles of collaboration with an unwavering commitment to remain customer-focused.

SPP has a proven record of creating value for the companies we serve, who are as diverse as the services we offer. Our customers include investor-owned utilities, rural electric cooperatives, municipalities, public power, large retail customers and state and federal agencies. In fact, we are the only RTO to count among its members a federal agency: Western Area Power Administration, Upper Great Plains Region.

The relationships we've forged and maintained not only serve as a testament to the integrity and strength of our business model but also as a foundation on which to build the next step in SPP's evolution.

SPP's History of Successful Market Development

SPP launched its first energy imbalance services (EIS) market in 2007. With it, we set a precedent for huge returns on market-development investments. The EIS market's total implementation costs were approximately \$33 million, and in its first year alone it provided participants \$103 million in benefits.

Our 2007 EIS market was a real-time balancing market that dispatched participating generating resources to meet load every five minutes. Our members and market participants quickly saw additional reliability and economic opportunity in consolidating our 16 balancing-authority areas and expanding our market to perform day-ahead unit commitment. We began designing and implementing what would become our Integrated Marketplace.

In 2014, we launched the Integrated Marketplace. We did so on time and under budget with the highest degree of quality, something no other RTO in the world has accomplished. In its first

year of operation, our expanded market delivered \$380 million in net savings to our members and their customers, paying for itself in just four months.

SPP-administered markets save money and enhance reliability. In testimony to the House Subcommittee on Energy and Mineral Resources, Western Area Power Administration Administrator and CEO Mark Gabriel said of his organization's participation in SPP's markets, "Our participation in energy and transmission market initiatives has delivered greater benefits than we anticipated ... In addition to experiencing financial and operational benefits exceeding our conservative assumptions, above-average water conditions resulted in surplus generation sales into Southwest Power Pool (SPP) that accrued more than \$48 million of additional net market revenue. These surplus sales help put downward pressure on firm power rates."

We also have a long and successful history of providing contract services to non-members of the SPP RTO. We've provided tariff administration, reliability coordination, reserve sharing and planning authority services to 24 entities.

It's on this foundation of success that we propose to build the WEIS and bring time-tested benefits to customers in the Western Interconnection.

The SPP Advantage

SPP has worked for several years already with utilities in the west to understand their needs and design solutions to ensure the highest levels of reliability while keeping rates as low as possible for customers. SPP understands that western utilities place high value on having a voice in helping shape the ever-changing energy landscape, and that the western utility landscape represents many diverse interests that must be balanced in every decision.

These objectives are at the heart of who SPP is and how we do what we do. Our customer-driven approach will ensure western customers get the products and services they need at affordable rates they help control. Our strength is in our ability to facilitate effective discussions of complex issues

Why SPP?

- Strong customer involvement and transparent governance that balances the interests of all states and all participants
- Demonstrated customer-driven approach to decision-making
- Long-term cost certainty through customer-driven changes to service
- Efficient market operation and flow-based internal congestion management
- Future optionality for long-term market evolution
- Lower up-front and on-going costs for participating balancing authorities thanks to the market's direct interaction with embedded entities
- High utilization of legacy metering requirements
- No long-term commitments and low up-front and on-going costs for market administration

among diverse stakeholders while balancing impacts to the inseparable ideals of reliability and economics.

Our industry is undergoing transformational shifts in generation technologies, customer demands, environmental considerations and political expectations. SPP has more than 75 years of experience using a relationship-based business model to help customers meet their challenges in a way that fits the needs of their business, customers, stakeholders and regulators. We know you have a choice when considering your market options, and we believe after reviewing our proposal you'll agree our approach of providing a customer-driven energy imbalance market is the right choice for you and your customers.

SPP'S WESTERN ENERGY IMBALANCE SERVICE MARKET (WEIS)

SPP's WEIS will create opportunities for participants to take advantage of diverse generating resources, optimize their use of the Western Interconnection's transmission system and minimize overall costs to their end-use customers.

This section describes the scope and design of the WEIS. SPP believes this design will:

- Reduce capacity and energy costs to customers as much as reliably possible while respecting existing resource-adequacy requirements and existing requirements for reserving firm transmission service
- Provide price transparency for wholesale energy
- Ensure efficient use of the transmission system and help participants identify appropriate incentives to transmission expansion
- Provide a framework for efficient and equitable congestion management among market participants and with non-participants
- Allow parties in the WEIS to continue to trade bilaterally while respecting existing transmission service rights
- Provide a hedge against congestion to the owners of transmission service rights through existing rights to schedule their transmission service
- Preserve long-term transmission service rights held by customers today
- Preserve existing Federal Power Marketing Administration statutory obligations to schedule federal resources to their preference customers
- Take advantage of synergies and cost savings to the greatest extent possible through the use of existing SPP systems and processes for market implementation and operations

WEIS Market Design

In designing the WEIS, SPP has leveraged both its experience successfully building and operating an energy imbalance market from 2007-2014 and foundational systems, processes and agreements already in place in the west like the Joint Dispatch Agreement¹ (JDA) operated in the Public Service Company of Colorado (PSCo) balancing-authority area. As is common among many energy imbalance markets, the WEIS's central feature is an intra-hour, centralized dispatch of energy from participating resources. This centralized dispatch more efficiently ensures the reliability of the transmission system and minimizes the production costs of satisfying load's resource obligations.

¹ See *Order Accepting Joint Dispatch Agreement and Tariff Revisions*: <https://www.ferc.gov/whats-new/comm-meet/2016/021816/E-5.pdf>.

Table 1 summarizes key features of the WEIS which are described in greater detail on the following pages.

Resource Registration Types

The WEIS will accommodate a diverse set of resource types. This helps ensure the market operates as efficiently as possible and can take advantage of the capabilities of different resources. SPP will facilitate resource registration as part of the market-participant onboarding process.

Generating Units and Plants

A registered resource must meet the minimum requirements and functions defined in the WEIS market rules. Individual market participants will register resources on a nodal basis at settlement locations. Resources at the same physical and electrically equivalent injection point to the transmission system may register individually as generating units or collectively as a plant, affording market participants the flexibility to decide which option works best for them for each resource.

Dispatchable Demand Response Resources

A dispatchable demand response resource is a special type of resource created to model demand reductions associated with controllable load and/or behind-the-meter generation that is dispatchable by the market on a five-minute basis.

PRODUCTS, PRICING AND DISPATCH	
Design Component	DESCRIPTION
Market Product	Energy imbalance (five-minute)
Supply Adequacy	Supply adequacy checked day-ahead and before each operating hour
Pricing Mechanism	Locational Marginal Prices (LMP)
Dispatch	SPP sends resources real-time security constrained dispatch signals calculated by its market clearing engine (MCE).
Unit Commitment	Each entity is responsible for commitment of generation to meet its real-time obligation.
SETTLEMENTS	
Design Component	DESCRIPTION
Settlement Responsibilities	SPP provides centralized calculation, collection and distribution of market settlements.
Settlement Granularity	Five-minute
Settlement Timeline	Daily settlements statements
TRANSMISSION	
Design Component	DESCRIPTION
Transmission Service	Regional JDTS used as non-firm, "as-available" service with lowest priority offered at zero cost.
PARTICIPATION	
Design Component	DESCRIPTION
Participation	Participation open to entities with load or generation in or pseudo-tied into a participating BA.

Table 1: Key features of the SPP WEIS.

Jointly Owned Unit Resources

Market participants may model each ownership share as a separate resource under the Individual Resource modeling option for jointly-owned unit resources (JOU). Under the Individual Resource option, each ownership share is modeled as a separate resource for the purposes of dispatch, and each resource is offered and cleared independent of other resource shares. A JOU is not required to register under the Individual Resource option and may instead register under a single market participant using any other appropriate resource-registration type.

Dispatchable Variable Energy Resources

A variable-energy resource able to be incrementally dispatched down by the market may register as a Dispatchable Variable Energy Resource (DVER). DVERs must have a zero-megawatt (MW) minimum economic-operating limit. To ensure the WEIS does not negatively impact the participating balancing authorities' ability to comply with North American Electric Reliability Corporation (NERC) balancing standards, DVER ramp rates will be limited to reduce interval-to-interval swings in generator output.

For DVERs with a maximum economic-operating limit less than 200 MW, the maximum ramp rate cannot exceed 8 MW/min. For DVERs with a maximum economic-operating limit greater than or equal to 200 MW, the MW ramp rate per minute cannot exceed 4% of the maximum economic-operating limit. For example, a DVER with maximum economic-operating limit of 300 MW cannot exceed 12 MW/min.

External Resources

External resources wishing to participate in the SPP WEIS must pseudo-tie into a balancing authority (BA) that participates in the WEIS in accordance with any agreements and requirements of the participating BA. External resources will be responsible for registering and performing all responsibilities required of a resource registered in the WEIS.

Overview of Market Participant Responsibilities

Asset Registration

All loads and resources in each participating BA, excluding behind-the-meter generation less than 10 MW, must be registered in the WEIS. Participating balancing authorities with embedded load or generation that elects not to participate in the WEIS should register the embedded load or generation and arrange to submit schedules representing their expected activity in the market. Asset registration identifies each load and resource to an associated settlement location, the entity responsible for submitting meter data for market settlements and the entity responsible for market-settlement activities. A market participant may appoint a designated agent to perform its functions in the WEIS.

In the case of a Qualifying Facility exercising its rights under the Public Utility Regulatory Policies Act to deliver its net output to its host utility, registration will not require the Qualifying Facility to participate in the WEIS or subject it to any charges or payments related to the WEIS. The host utility must arrange to submit schedules representing the Qualifying Facility's output.

Resource Plans

Market participants with registered resources will submit operating information (e.g., on, off, outage, etc.) to enable SPP to assess resource- and ancillary-service adequacy for the WEIS, each participating BA and each market participant. The operator of the BA remains ultimately responsible to balance load and resources in their respective balancing-authority area. The WEIS will provide information that will assist the BA with these responsibilities.

Ancillary Service Plans

Market participants will submit their Ancillary Service Plan so that SPP can confirm each participant is satisfying its ancillary-service obligations. Ancillary Service Plans indicate transfers of energy obligations between market participants and, when self-provided, which resources provide these services. As part of the Ancillary Service Plan, participants may also designate reserves and regulation in excess of their energy obligations for reliability purposes, information that will be important to the responsible BA.

Offer Submittal

Beginning seven days prior to each operating day, market participants may submit offers for each registered resource for use by the WEIS. The WEIS's security-constrained economic dispatch (SCED) will dispatch available resources based on economic offers submitted for each resource while honoring submitted resource parameters and transmission limitations. Market participants may update offers 30 minutes prior to each operating hour. Submitted resource offers roll forward hour-to-hour if a participant has not submitted a resource offer for a particular hour. Market participants may submit separate resource-offer parameters for each hour of the operating day.

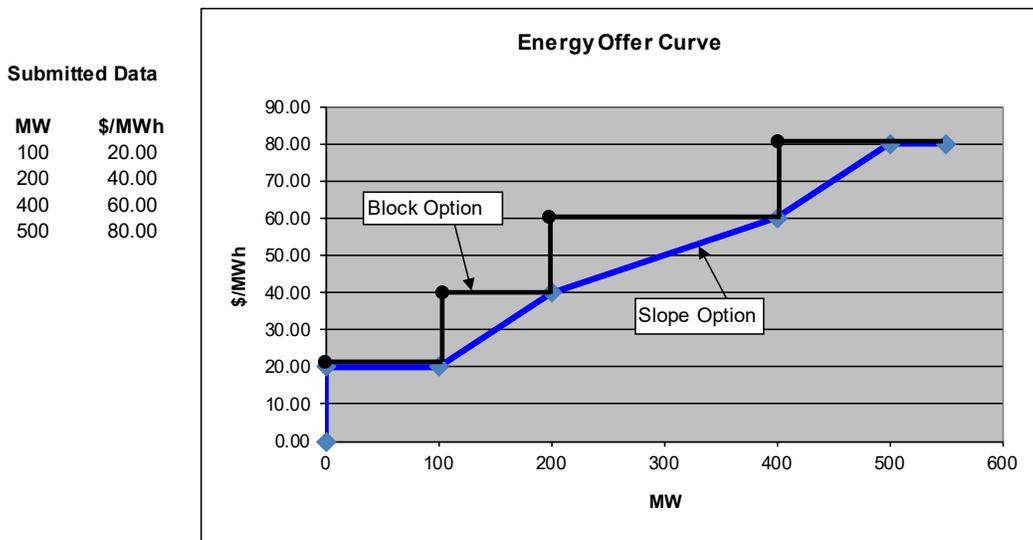
WEIS resource-offer parameters include:

1. **Resource Name**, as specified during market registration. This cannot be changed as part of resource-offer submittal.
2. **Energy Offer Curve (MW, \$/MWh, up to 10 price/quantity pairs, monotonically non-decreasing \$/MWh, increasing MW and slope or block option)**
 - a. Block and slope pairs may not coexist. The resource offer in effect for any given period of time must be comprised by all block or all slope price/quantity pairs.
 - b. The price of all megawatt-hours (MWh) below the first submitted pricing-point MWh is equal to the first pricing-point price. The price of all MWhs above the last submitted pricing point MWh is equal to the last pricing-point price.

- c. Under the slope option, the set of submitted price points are used as the beginning and ending values for calculating a linear slope for each set of beginning and ending values. Therefore, each MW between the two price points has a different price due to the interpolation of the submitted price points. Under the block option, each MW between the two MW points is offered at the price of the larger MW point. Figure 1 illustrates an energy-offer curve developed from submitted price/MWh pairs for both the slope and block options.
3. **Mitigated Energy Offer Curve (MW, \$/MWh, up to 10 price/quantity pairs, monotonically non-decreasing \$/MWh, increasing MW and slope or block option)**
 - a. Block and slope pairs may not coexist. The resource offer in effect for any given period of time must contain all block or all slope price/quantity pairs.
 4. **Minimum Economic Capacity Operating Limit (MW)**
 5. **Minimum Regulation Capacity Operating Limit (MW)**
 6. **Maximum Regulation Capacity Operating Limit (MW)**
 7. **Maximum Economic Capacity Operating Limit (MW)**
 8. **Maximum Normal Capacity Operating Limit (MW)**
 9. **Ramp-Rate-Up (curve, MW/Minute).** Ramp-Rate-Up will be submitted through a segmented profile as follows: Each profile will require at least one segment and may have up to n segments where SPP will define n, initially set to 10.
 10. **Ramp-Rate-Down (curve, MW).** Ramp-Rate-Down will be submitted through a segmented profile as follows: Each profile will require at least one segment and may

Figure 1: Energy-offer curves illustrating slope and block options.

have up to n segments where SPP will define n, initially set to 10.



11. Turn-Around Ramp Rate Factor (a value between 0.01 and 1.00)

12. Resource Dispatch Status

The following graphic illustrates how the WEIS uses the above resource parameters to dispatch energy and verify supply adequacy.

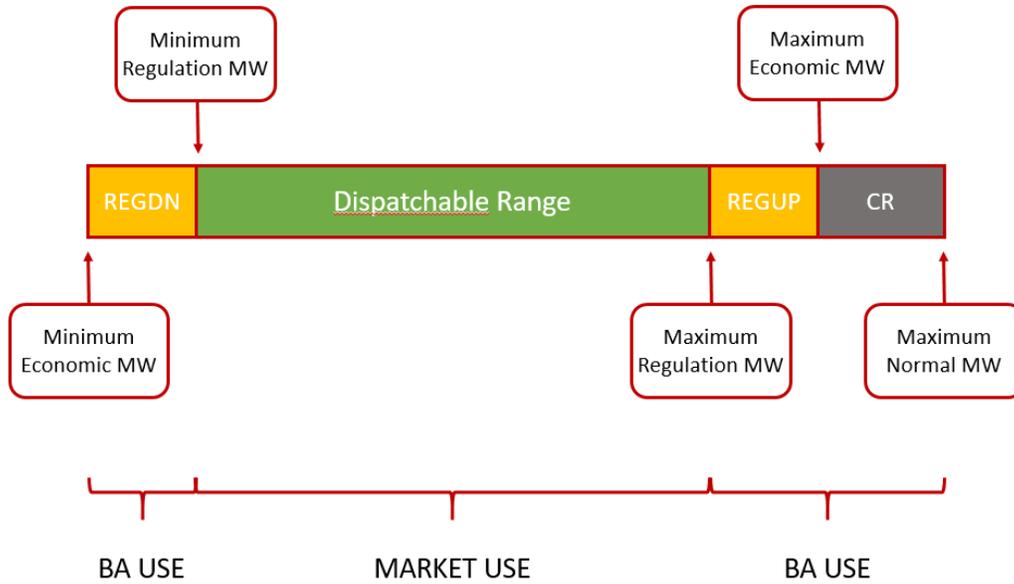


Figure 2: Use of resource-offer parameters in energy dispatch and supply-adequacy verification.

Market Operator Responsibilities

Supply Adequacy Analysis

In its role as the market operator, SPP will perform analysis to ensure each balancing authority and market participant in each balancing authority's boundaries have enough generation in their operating plan to satisfy the load and obligations for that market participant and balancing authority. Supply adequacy analysis will occur day-ahead prior to each operating day and hour-ahead within each operating day. Supply adequacy calculations will use the balancing-authority load forecast. SPP will analyze supply adequacy in both directions to ensure the WEIS is neither under- or over-supplied. Over-supply occurs when minimum generation is greater than load and purchases minus sales. Under-supply occurs when maximum generation is less than load and purchases minus sales. In the event of either over- or under-supply, the market participant will be deemed supply-inadequate.

Given the number of potential registration configurations, a market participant could be supply-inadequate regardless of how they offer into the WEIS. For example, a market participant with only generation would always be deemed to have over-supply. Given this, SPP will ultimately measure and provide information on supply adequacy at the balancing-authority level.

If, after aggregating individual market participant's supply and obligations, the balancing authority is still supply-inadequate, SPP will notify both the supply-inadequate market participants and the associated balancing authority of supply inadequacy in that area. The market participant must resolve this energy supply inadequacy by modifying its resource plan and/or schedules and must make appropriate modifications by 1700 of the day prior to the operating day for any energy-supply inadequacy revealed by the daily study. The market participant must make the appropriate modifications no later than 45 minutes prior to the operating hour for any energy supply inadequacy revealed by the hourly study.

Real-Time Balancing Market

SPP will operate the real-time balancing market (RTBM) on a continuous five-minute basis. SPP will clear the RTBM by determining the SCED that is the lowest-cost means of balancing generation and load (i.e., supply and demand) based on actual conditions, forecasted conditions and submitted offers. The RTBM uses the same network model SPP uses to perform Reliability Coordinator responsibilities in the Western Interconnection. All RTBM network configurations and transmission constraints are determined from the most recent state-estimator results.

The SCED algorithm clears offered and self-dispatched resources, when present, to minimize total production costs while maintaining reliable transmission-system operations. For each five-minute increment, the SCED algorithm will calculate nodal prices (i.e., locational marginal prices or LMPs) and quantities at each resource and load aggregation location (i.e., settlement location or SL) based on the energy imbalance between their expected operations and actual metered values in the hour.

Native Load Hedge Calculation

To calculate energy imbalance, SPP will stack the actual dispatched output of network resources and interchange after-the-fact to represent native load hedges. First, the load obligation is calculated as the submitted load values metered for each market interval plus any exports from the use of network resources in aggregate (i.e., "slice of system"). Second, the network resources and imports to serve network load are economically stacked to determine supply. At the bottom of the stack will be all imports to serve network load plus network resources self-scheduled in the WEIS and the portion of any network resources that represent their economic minimum. The rest of the actual dispatched output of each network resource is stacked based on demand-bid segments submitted in the WEIS, from lowest bid to highest.

The settlement of energy imbalance for each five-minute market interval will be based on the difference between obligation and supply. If the obligation is larger than the supply, the difference is network load energy imbalance and the market participant will pay that quantity of energy imbalance multiplied by the LMP as calculated at the respective load settlement location. If the supply is larger than the obligation, each quantity block of each network resource above the obligation would be paid its dispatched output above the obligation multiplied by that network resource's LMP.

Scheduling Activities: Bilateral Transactions

Market participants will submit energy schedules reflecting all bilateral and self-dispatched activities. The schedules' source and sink information must match the NERC Registry. For proper settlement to occur, schedules that source or sink in the WEIS must be submitted with an appropriate source and/or sink mapped to a settlement location.

SPP will allow real-time injections and withdrawals from the market as a price taker. SPP will settle these transactions with the schedule and at real-time prices.

Congestion Management

Internal Congestion management

Power-flows along parallel paths are dictated by the current, physical state of the transmission system rather than contract paths of corresponding transmission service. Because of this, SPP will use a flow-based congestion management process, including for schedule curtailment and re-dispatch, to ensure the most efficient use of the transmission system as the WEIS optimizes resource dispatch in real-time.

External Congestion Management

External to the WEIS footprint, congestion management will occur as it does today. Each external area is primarily responsible for resolving congestion management on their respective portions of the transmission system, and multi-party congestion management will occur under the Western Interconnection Unscheduled Flow Mitigation Plan (WIUFMP). The WIUFMP is a four-step coordinated process to reduce flows on qualified paths to reliable levels during real-time operations.

Coordinated Congestion Management

Currently, the WIUFMP represents the only process for coordinated congestion management in the Western Interconnection. As part of the WIUFMP, parties participating in the WEIS may receive curtailments to mitigate unscheduled flows on a qualified path. The WEIS also must ensure curtailed schedules are not back-filled inadvertently to ensure anticipated flow reduction on the qualified path occurs.

Similarly, when re-dispatching for underlying flow-based congestion issues where the congestion's primary cause is unscheduled flow on a qualified path, it is important that the market does so equitably with external parties. As the market operator, SPP has dealt with similar issues by monitoring external impacts on SPP-monitored constraints and balancing reliability with all parties contributing their "fair share" of providing relief.

The Enhanced Curtailment Calculator (ECC) continues to mature in the Western Interconnection and may allow for more equitable coordinated congestion management on constraints beyond qualified paths. SPP will continue to participate in the ECC's development or the development of other coordinated congestion management processes.

Metering Requirements

As part of its 2007 EIS market, SPP developed metering requirements to be used as a basis for market metering requirements, as most of that market's participants already had sufficient metering to meet the requirements. Similarly, in development of the WEIS it may prove acceptable to grandfather existing metering infrastructure if impacted parties agree. SPP anticipates that customers of its western RC service will meet real-time metering requirements.

Governance

The Western Joint Dispatch Agreement

SPP will administer the WEIS as a contract service separate and distinct from its role as an RTO. To participate in the WEIS, entities must execute a pro-forma Western Joint Dispatch Agreement (WJDA). The WJDA establishes a legal relationship between SPP and customers taking WEIS market administration services. The WJDA describes the administration of the WEIS by SPP and the payment obligations of customers to fund the administrative costs of WEIS implementation and operation. A draft pro-forma WJDA is available to interested customers on request by contacting customerrelations@spp.org.

Role of the Western Markets Executive Committee and SPP Board of Directors

Participants of the WEIS will have significant input and authority over its administration. SPP will establish a Western Markets Executive Committee (WMEC) comprising representatives of each non-affiliated signatory to the WJDA. Initially, the WMEC will provide a forum in which SPP and market participants can collaborate to finalize market rules for the WEIS's implementation. After market go-live, the WMEC will have authority to:

- Approve or reject proposed amendments to the WEIS Tariff
- Establish detailed WEIS Market Protocols to support the filed tariff
- Provide consultation to SPP in determining the administrative rate charged to participants of the WEIS market
- Recommend proposed amendments to the WJDA

The WMEC may establish working groups and task forces as needed to facilitate its authorities under its Charter, a draft of which is available to interested customers on request by contacting customerrelations@spp.org.

As with other contract services, SPP's independent board of directors will provide ultimate oversight of SPP's administration of the WEIS under the WJDA. The board will give significant recognition to the WMEC's decision-making role. Action taken by the WMEC under the authorities defined in its charter will be deemed to be approved by the board, and SPP will be authorized to submit requisite regulatory filings to implement the WMEC's decision. Any action or inaction taken by the WMEC may be appealed to the SPP board of directors for final resolution.

The WEIS Tariff and Market Participant Agreement

SPP will file with FERC a tariff defining the rates, terms and conditions for the WEIS and will administer the WEIS Tariff separate from its Open Access Transmission Tariff. The WEIS Tariff defines the market's rules and obligations of market participants and SPP as market operator. The WEIS Tariff will include a Market Participant Agreement that will be effective on the date each market participant begins participating in the WEIS. The Market Participant Agreement obligates each market participant to adhere to the rules and requirements of the WEIS Tariff. A

draft of the WEIS Tariff is available to interested customers on request by contacting customerrelations@spp.org. SPP intends to work with the initial WEIS customers to finalize the tariff in advance of filing it at FERC.

Market Settlements

To enable SPP to settle market activities, market participants must declare an entity designation (e.g., Market Participant, Asset-Owner and/or Meter Agent) and provide register assets (e.g., generation resources and load assets) so that SPP may account for them in its commercial model and implement them in WEIS architecture. Market participants will do this as part of their onboarding process. SPP's market clearing engine will determine data points such as LMPs, energy, and out-of-merit energy (OOME) dispatch instructions and curtailments.

SPP's Settlement Management System (SMS) calculates the financial settlement of real-time imbalance market charges and payments including:

- Energy Imbalance: accounts for MWs of energy differences between total load obligations and total resource supply
- Uninstructed Resource Deviation Charge (URD): Differences between dispatched and actual amounts of energy
- Revenue Neutrality Uplift (RNU): Net differences between all charges and credits calculated in the SMS for WEIS activity. These amounts are allocated as charges or credits to all market participants.
- Miscellaneous charges: Charges or credits to market participants for activity that cannot be adjusted by changing the billing determinants.

The SMS uses data from upstream systems including the market clearing engine, schedule data, bilateral settlement schedules (BSS), meter submittal and others. Market participants can submit metered MWhs as hourly or five-minute values. In the case of hourly values, SPP allocates submitted hourly meter data for resources and loads in five-minute values using five-minute telemetered or state estimator profiles for the corresponding hour.

On a daily basis, SPP will post validated settlement reports on a web-based portal accessible by market participants. The preliminary scheduled settlement date occurs seven calendar days after the operating date (S7). The secondary scheduled settlement date occurs 53 calendar days after the operating date (S53) and identifies differences from the preliminary settlement for that same operating date. The final scheduled settlement will occur 120 calendar days after the operating date (S120) and will include subsequent differences between the secondary and final settlement. Resettlements are used as necessary to resolve disputes and correct errors that occur on an ad hoc basis. Each posting date contains settled market activity for preliminary (S7), secondary (S53) and final (S120) dates and, if necessary, resettlement activity for a given set of operating dates.

Market participants with certificate-based access may view settlement reports on the portal. Reports contain granular data used in market settlements that enable the participants to perform shadow settlement activities. For convenience, the portal is compatible with movement of data via application programming interface.

SPP offers a settlements dispute process for resolving questions regarding any billed amount. Participants can challenge or seek clarity regarding any scenario or circumstance leading to a charge or credit on their invoice. Disputes submitted through this process must adhere to timelines outlined in the WEIS Tariff, can be granted or denied, and can lead to resettlement for one or more market participants for any operating day's activities in the stated timelines.

SPP will invoice cumulative market activity for each market participant on a weekly basis. Invoices will be prepared and made available on the portal by 8:00 a.m. Central Prevailing Time (CPT) on Thursdays with exceptions for holidays. Payments are due from market participants by 5:00 p.m. CPT on the fourth business day following the day the invoice was issued. SPP will make payments to market participants no later than 5:00 pm CPT on the sixth business day following the day of the invoice. A market settlement calendar will also be provided on the web-based portal, detailing all dates and settlement activities for upcoming periods.

Market Monitoring

Market monitors ensure a fair and competitive market for all participants. To that end, the mission of the WEIS Market Monitor will be to (a) monitor and report to FERC on possible abuses of horizontal and vertical market power and gaming in the WEIS by any market participant; (b) identify market design flaws and recommend to SPP any changes in design to improve the operation of the WEIS for the benefit of consumers and market participants; and (c) monitor market participants' compliance with market rules. While fulfilling its mission, the market monitor's scope of monitoring encompasses all aspects of transmission and operations activities which may impact the competitiveness of the WEIS.

SPP's independent Market Monitoring Unit (MMU) will perform monitoring oversight for the WEIS. To perform the activities necessary to provide impartial and effective market monitoring in the scope of the Market Monitoring Plan (documented in Attachment C of the WEIS Tariff), the MMU will remain independent from market participants and SPP management, reporting directly to the Oversight Committee of SPP's board of directors.

As the WEIS Market Monitor, the MMU will work to protect and foster competition while minimizing interference with open and competitive markets. The market monitor prefers to minimize opportunities for participants to exercise market power by making recommendations to improve the operation of markets in advance rather than taking corrective measures after-the-fact.

The market monitor will hold an advisory role in stakeholder processes. As part of that role and in this advisory capacity, the independent MMU will participate in working group and internal SPP efforts, providing opinions and recommendations to improve market design and operations as necessary. Additionally, the market monitor will hold training sessions during the onboarding process to educate market participants about its role and functions.

The MMU will ensure a fair and competitive market by monitoring the WEIS for potential market manipulation, including:

- Withholding of generation capacity or uneconomic generation to manipulate price.
- Withholding by both energy-offer manipulation (economic withholding) and physical-generator or transmission-parameter manipulation (physical withholding)
- Potential uneconomic generation to manipulate price (uneconomic production).

Economic withholding is described in Attachment B of the WEIS Tariff, while physical withholding and uneconomic production are described in Attachment C.

In the process of monitoring for market manipulation, the market monitor may request data from market participants and will maintain a secure, confidential web portal through which to collect information. For other information, the Market Monitor may contact market participants to request information or ask for an explanation of unusual behavior. The Market Monitor has a 24/7 on-call support number.

As part of its responsibilities, the market monitor must also refer to FERC any suspected market violations including, but not limited to, suspected exercise of market power or behaviors resulting in manipulation of the market. All such referrals by the market monitor to FERC will be confidential. Both single events and sustained ongoing issues may require referral to FERC.

The market monitor will perform annual and quarterly reviews of the state of the WEIS and provide a report of those reviews to FERC, SPP, the SPP board, state commissions, market participants and other interested entities.

Potential Future Market Enhancements

The WEIS design described above represents a robust, efficient market solution for energy imbalance, though SPP appreciates that market participants likely will consider future enhancements that could lead to greater efficiencies or take advantage of new technologies. After the WEIS is implemented, SPP is committed to collaboratively working with participants to continually evaluate the costs and benefits of potential market enhancements. Based on past experience and understanding of its western customers' goals, SPP believes the following potential enhancements could eventually augment the WEIS's functionality and value.

Dispatchable Dynamic Schedules

Dispatchable dynamic schedules could increase external parties' (i.e., those that lack assets in the market) participation in and access to the WEIS. Parties with necessary transmission service could submit dispatchable dynamic schedule offers to either import into the WEIS market from an external boundary settlement location or to export from the market to an external boundary settlement location. Parties would submit schedules with an associated price for the MW amount on the tag or schedule. When the market runs its SCED, it would consider each schedule as an offer or bid at that settlement location. If the dispatchable dynamic schedule clears, based on the submitted offer and calculated price at the settlement location, the energy settlement would reflect the schedule's impact. The market participant submitting the schedule would pay or receive the LMP at the associated boundary settlement location. The designated responsible party or parties on the schedule would pay congestion charges for the LMP differential between the source and the sink.

Ramping Capability Product

SPP and its members are developing a ramping capability product that will allow the Integrated Marketplace to account for short-term fluctuations in its net-load obligations. These net-load deviations can be caused by differences in load forecast, renewable energy forecasts and fluctuations in generator availability. The ramping capability product will ensure the Integrated Marketplace has the appropriate amount of ramping capability for future intervals. It will also enable more transparent pricing of the ramping capability resources make available to the market.

Trading Hubs

The WEIS may benefit from the ability to define one or more trading hubs to help facilitate bilateral trading between parties. Bilateral schedules, including transmission service requirements, would use the hub(s) as a settlement location. Market participants or other appropriate groups would analyze market behaviors and seek input from stakeholders to identify potential hubs.

Energy Storage Resource

SPP is developing market policy to comply with FERC Order 841 (Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators).

As energy storage resources proliferate in the Western Interconnection, the WEIS could be enhanced to take advantage of their unique physical and operating characteristics.

Quick-Start Resource Logic

SPP continues to work on appropriately valuing and incenting market participation by quick-start resources. As SPP develops logic to address the operating characteristics of these resources, the WEIS may benefit from adopting it as well.

Transmission in the Market

SPP will deliver energy between participating generators and load in the WEIS² using regional Joint Dispatch Transmission Service (JDTS), a form of intra-hour, non-firm transmission service. To produce the most efficient market solution, the WEIS's SCED will use JDTS to make use of all unscheduled transmission capacity in the market footprint to redispatch participating generators. As the lowest priority transmission service, JDTS will not consume marketable available transfer capability or displace other forms of firm or non-firm transmission service offered by a participating transmission provider. Instead, JDTS makes intra-hour use of otherwise-unsold transmission capacity and the non-firm redirect of existing network and point-to-point transmission service that has already been procured by transmission customers.

Load-serving entities may use JDTS only to serve their native load in one of the balancing authorities participating in the WEIS. JDTS cannot be used as a substitute for point-to-point or network integration transmission service or for off-system sales of capacity or energy to provide direct or indirect transmission service to a third party. For off-system purchases and sales, customers must ensure point-to-point transmission service has been obtained from the applicable transmission service providers, as needed, to import purchases from outside the market footprint or to export off-system sales, in accordance with FERC regulations.

An attachment to the WEIS Tariff will describe the rates, terms and conditions for JDTS. Any transmission provider participating in the WEIS will need to amend its tariff to allow for SPP's administration of JDTS. As the WEIS uses unreserved and the non-firm redirect of reserved transmission capacity already paid for by load, there will be no additional charge assessed to load for JDTS. The rate for both on-peak and off-peak JDTS will be zero.

As the lowest priority non-firm transmission service, the market will curtail JDTS prior to curtailing other types of higher priority service. The market will use SCED to accomplish this curtailment of JDTS up to the point where the impact of imbalance energy on a constrained element has been reduced to zero. It will then take action to curtail other schedules in, entering or exiting the market. The reduction of economic imbalance energy will be reflected in the calculation of LMPs between constrained nodes on the transmission system.

SPP will not separately calculate or settle JDTS losses in the market. LMP calculations for the settlement of imbalance energy inherently include the impact of serving load plus losses. Market resources will thus be paid for providing energy to serve losses caused by imbalance, and load will pay for the energy necessary to supply losses. Transmission customers with short- or long-term transmission service from transmission providers participating in the WEIS will continue to compensate them for losses according to the terms of service offered by those providers.

² JDTS was filed by PSCo as part of the Joint Dispatch Agreement in Docket Nos. ER16-178 and ER16-180. As relevant here, JDTS will be expanded to include the use of all unscheduled transmission capability plus the non-firm redirect of existing scheduled capability.

Market Participant Onboarding

SPP will strive to ensure all market participants' readiness to participate in the WEIS, and its onboarding process is a key component of the readiness plan. Onboarding will guide market participants and their designated agents through the process of completing all required contractual documentation, establishing connectivity with market systems and providing necessary information regarding generation and load to be registered in the WEIS. Onboarding is facilitated by an SPP onboarding specialist who serves as a project manager to ensure each market participant is smoothly and successfully integrated into the WEIS.

Market participant readiness is measured in terms of key deliverables per a project timeline and will include frequent communication among the participant and all impacted SPP departments according to the WEIS implementation program hierarchy. If situations arise in which market participants lag in meeting key program milestones, SPP will initiate outreach activities to ensure success for each individual market participant and the overall program. This process entails meeting with the market participant to determine the cause of the delay and implement a plan to address deficiencies.

Once WEIS implementation begins, SPP will initiate onboarding activities with each market participant early in the program schedule. Some key deliverables of the onboarding process include:

- Signing the Market Participant Agreement and all addendums
- Signing the Meter Agent Agreement
- Providing Assurances of Creditworthiness
- Submitting Local Security Administrator form(s)
- Establishing communication links between SPP and the market participant

After the WEIS is implemented, SPP will follow its current and ongoing market participant onboarding process and timelines. The onboarding process for *new* WEIS market participants will support the registration of new asset-owning market participants three times per year.

The registration deadline and implementation dates are listed in the table below.

REGISTRATION DEADLINE	IMPLEMENTATION DATE
February 1	August 1
June 1	December 1
October 1	April 1

Table 1: Registration deadlines and implementation dates for market-participant onboarding

Existing market participants must submit modifications to their registration of assets to SPP with at least 45 days advance notice. Changes to SPP's commercial and network models will occur monthly and will be effective on the first day of the month.

Training

SPP’s stakeholders consistently rank its customer training services as one of the most valuable services it provides. The WEIS training program gives market participants opportunities to not only become efficient and confident participants but also to increase effective participation in the energy imbalance market. All training sessions will be offered multiple times to ensure all interested parties can participate. Table 3 describes trainings that will be available to market participants leading up to and after the WEIS’s implementation.

NAME	DESCRIPTION	TIMEFRAME	TYPE	TARGET AUDIENCE
Introduction to the WEIS	Two-hour introduction to SPP’s WEIS. This course provides an overview of the fundamental concepts for operating and participating in an energy market.	Spring 2020	Virtual Instructor-led Training (VILT)	Personnel interested in understanding the components of an energy imbalance market.
WEIS Fundamentals In-Depth Clinic	This 12-hour course details the specific functions and features of market operations that ensure effective participation in SPP’s WEIS.	Three months prior to market trials	Instructor-led course to be hosted in a central location	Personnel tasked with performing or supporting market activities
Ad-hoc, hot-topic training	These courses will cover specific topics and will be determined based on stakeholder need and/or test results from market trials.	From the start of market trials through parallel operations	VILT or performance support material	Market-support staff
Post Go-Live Training	SPP Customer training provides on-going education post go-live based on market enhancements, NERC/FERC orders and stakeholder identified needs			

Table 2: WEIS Training Deliverables

IMPLEMENTATION

Development and Launch Timeline

SPP expects implementation of the WEIS will take approximately 16 months to complete and anticipates a go-live date of December 1, 2020. This assumes SPP receives signed agreements from a sufficient number of customers by August 1, 2019 to ensure funding of implementation costs. The development and launch schedule, illustrated below, takes into account estimated timelines for state and federal regulatory proceedings, establishing connectivity and data exchange, modifications to SPP’s market and settlements systems and market participant onboarding and training.

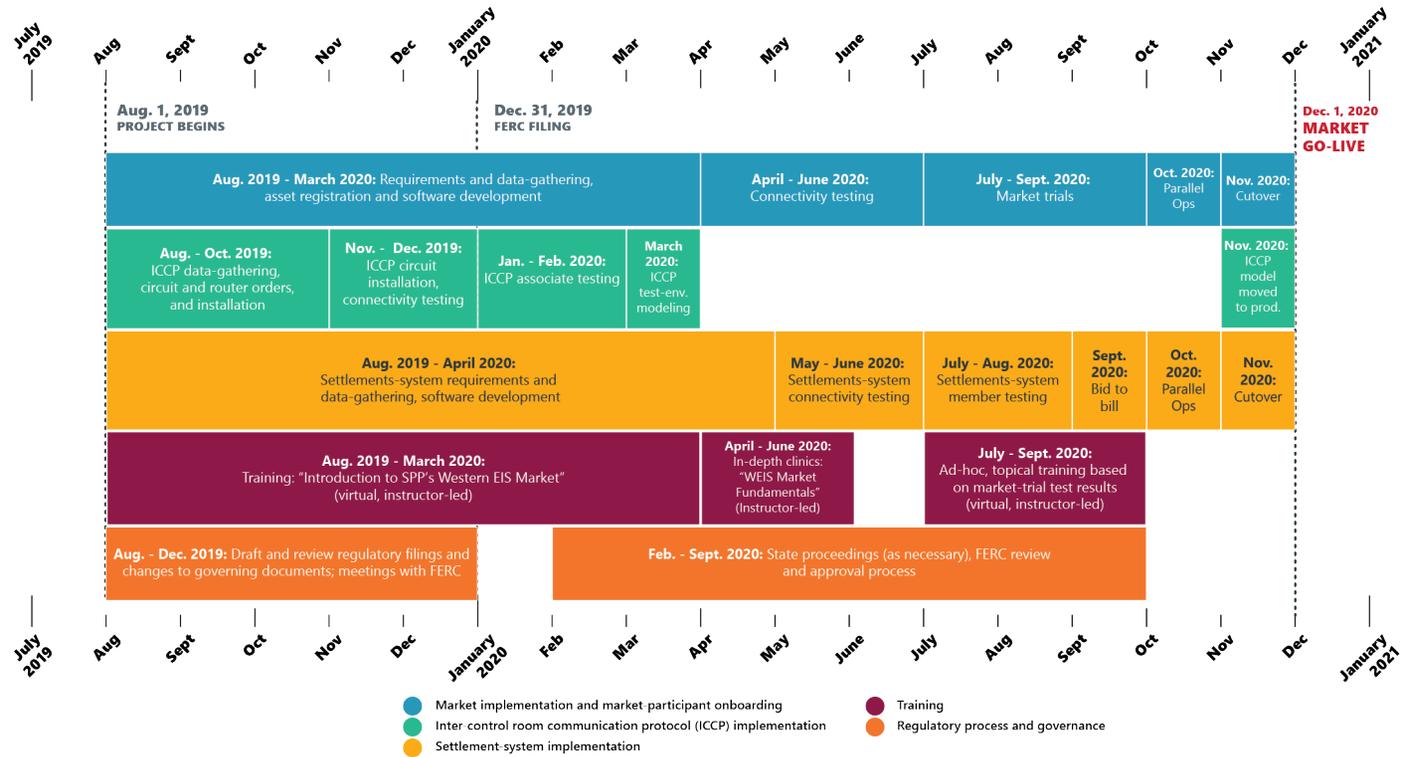


Figure 3: WEIS Implementation Timeline

OTHER POTENTIAL SERVICE OFFERINGS

While this document describes SPP's proposed Western Energy Imbalance Service market, SPP also provides a number of other services on a contract basis. Beginning December 2019, SPP will serve as Reliability Coordinator for fourteen utilities in the west.

We have a long and successful history of providing contract services to non-members of the SPP RTO. We've provided tariff administration, reliability coordination, reserve sharing and planning authority services to 24 entities. We can also provide training on a broad range of topics including markets, settlements, compliance, and transmission planning.

If your company is interested in discussing any of these other services, please contact our Customer Relations department at customerrelations@spp.org or [submit a request using our Request Management System](#) and a representative will contact you to discuss your needs and options.