SPP Southwest Power Pool

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SPP Southwest Power Pool

RSC Training on Future Markets

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Agenda

- **Benefits of Expanding the Current Markets**
- **SPP Future Markets Design Overview**
- **Transmission Congestion Rights in SPP Future Markets**
  - **Background and Overview**
  - **Allocation/Auction Process**
- **RSC Responsibility and Next Steps**

Benefits of Expanding the Current Markets

Richard Ross

Today's Market Environment

- **The EIS Market has been successful; it:**
  - **Allows for more transparent pricing.**
  - **Permits increased opportunities for short-term economic trading.**
  - **Allows for better coordination of short-term resource plans across footprint.**
- **However, the current EIS Market also has its limitations, as:**
  - **Unit Commitment is done independently by each Member.**
  - **The use of a physical transmission rights process can constrain economics unnecessarily and is sometimes unwieldy.**
  - **There is no opportunity in the Market to gain price certainty with the current design.**

Day-Ahead Market and Unit Commitment

- **The major benefit from the Future Markets comes from the centralized unit commitment feature.**
  - **Most generators have significant lead times to get them started.**
    - **Therefore, unit commitment cannot be completed in real-time.**
- **Self-Commitment of resources and scheduling are the primary hedging instruments in current EIS market.**
  - **This hedge relationship has to be preserved or resources will not be offered for SPP commitment.**
  - **We need to make sure there is no disincentive to participants offering their resources to SPP for unit commitment.**

Congestion Hedging Task Force

- **The Congestion Hedging Task Force (CHTF) reviewed the current scheduling mechanism for use in Future Markets and determined that a change to a financial instrument independent from physical delivery was needed.**
- **Major reasons included:**
  - **More flexibility in trading and arranging for the congestion hedge.**
  - **Elimination of the need to do native load schedules.**
  - **Better support of the use of trading hubs.**
  - **No near-term curtailment of hedge so more advance certainty.**

Member Objectives from Future Markets

- **Increase Market Participant savings by moving from self-commitment to centralized unit commitment.**
- **Price assurance capability for load prior to real-time.**
- **Market-based Operating Reserves to support the Consolidated Balancing Authority (CBA).**

RSC Role in Future Markets

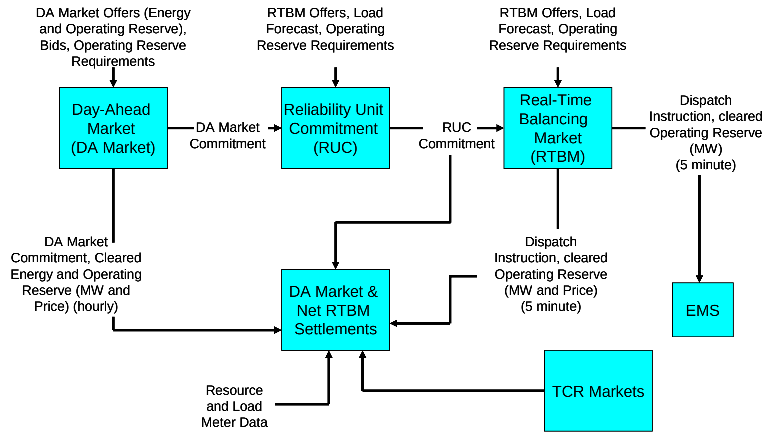
- **The RSC has a role in certain aspects of the Future Market design per its bylaws:**
  - **"…determination Financial Transmission Rights (FTRs) allocations…"**
  - **"determination of the transition mechanism to be used to assure that existing firm customers receive FTRs equivalent to the customer's existing rights;"**
- **Both of these topics are covered later in this presentation.**
- **The purpose of today is to start the discussion regarding the decision making process and timeline.**

SPP Future Markets Overview

Debbie James

SPP Future Markets – Design Overview

- **Overview of key Energy and Operating Reserve Market Functions**



Major Features of SPP Day-Ahead Market Design

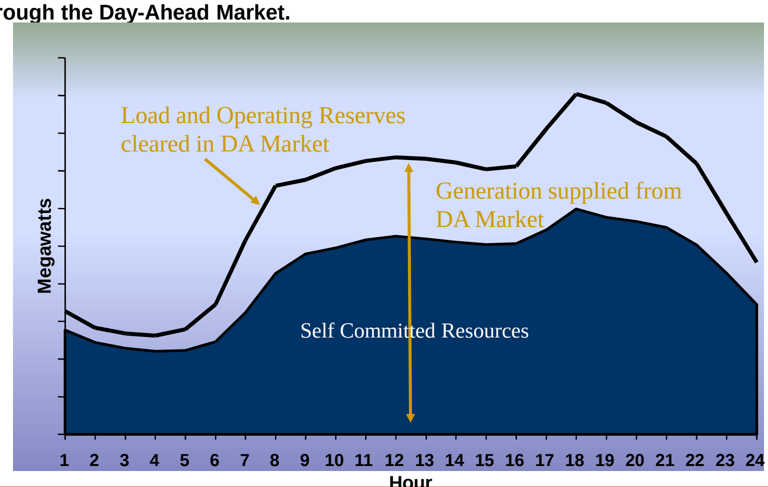
- **Day-Ahead Market (DA Market)**
  - **Voluntary participation**
  - **Financially binding markets using unit commitment style energy market**
  - **Uses security constrained unit commitment and dispatch so results are physically feasible**
  - **Financial transmission rights clear in DA Market**
  - **Settlements based on Locational Marginal Prices (LMPs) as calculated by SPP based on submitted information**
  - **Virtual bids and offers may be submitted**
  - **Reserves will be co-optimized with Energy Market**

Day-Ahead Market

- **Develop Day-Ahead clearing using least-cost Security Constrained Unit Commitment (SCUC) and Dispatch (SCED).**
  - **Full transmission model used.**
  - **Contingencies modeled and respected.**
  - **Unit commitment constraints applied.**
  - **Reserve requirements modeled.**
- **Market inputs include generation offers, demand bids, virtual bids/offers and external transaction schedules.**
- **DA Market clearing is performed for Energy, Regulation-Up, Regulation-Down, Spinning Reserve and Supplemental Reserve.**

Day-Ahead Market

Generation committed through the Day-Ahead Market is selected by the RTO in a way that results in the lowest total production cost to meet requests to serve load through the Day-Ahead Market.



Day-Ahead Market

- DA Market outputs include:
  - Locational Marginal Prices (LMPs) for Day-Ahead Energy Market Settlements.
    - ➢ Used to settle purchases and sales in the DA Market.
    - ➢ Used to settle Transmission Congestion Rights (TCRs).
  - Clearing prices and quantities for Operating Reserves.
  - Financially binding schedules for Resources.
    - ➢ Provide quantity of purchases and sales.
    - ➢ Provide estimated operating schedule for next day.

Reliability Unit Commitment (DA and RT)

- RTO performs reliability assessment after close of Day-Ahead Market:
- Assessment looks at two main areas:
  - ➢ Capacity adequacy to meet projected load forecast.
  - ➢ Transmission reliability assessment to identify potential local security problems.
- Participation in reliability assessment
  - ➢ Mandatory participation in the RUC.
  - ➢ Resource Offers may be updated.
- Assessment objectives
  - ➢ Minimize amount of additional capacity required.
  - ➢ Minimize start-up costs and costs to operate at minimum capacity.
  - ➢ Energy costs above minimum capacity are not considered.
- Costs
  - ➢ Generators guaranteed recovery of start-up and no-load costs if they are dispatched on-line by the RTO.
  - ➢ Costs are allocated to those with real-time imbalances from day-ahead schedules.

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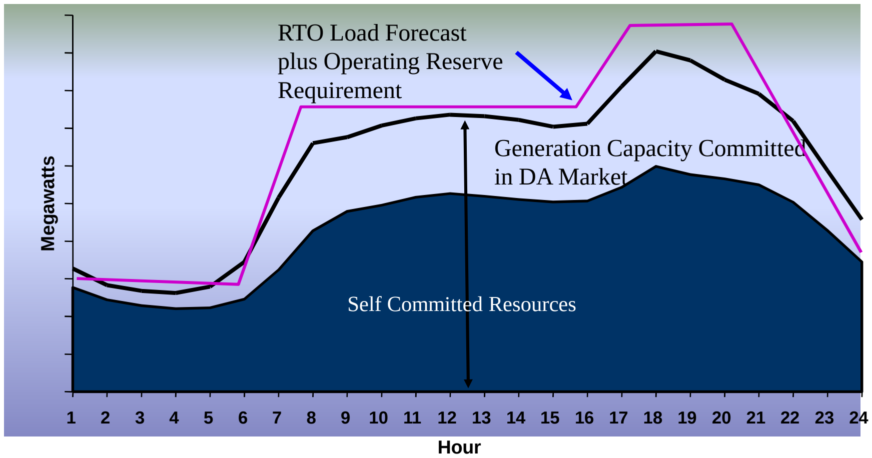
Reliability Unit Commitment

The RTO will perform a reliability assessment to compare the amount of load that cleared in the Day-Ahead Market to its load forecast.



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Major Features of Real-Time Balancing Market

- **Uses security constrained economic dispatch to ensure results are physically feasible.**
- **Operates on a continuous 5-minute basis and calculates Dispatch Instructions for Energy and clears Operating Reserve.**
- **Energy and Operating Reserve will be co-optimized .**
- **Settlements are based on the difference between the results of the RTBM process and the DA Market clearing.**
- **Charges are imposed on Market Participants for failure to deploy Energy and Operating Reserve as instructed.**

Real-Time Balancing Market

- **RTBM inputs include:**
  - **Generation offers, demand bids, external transaction schedules;**
  - **Operating Reserve requirements;**
  - **RUC Resource commitment;**
  - **SPP Short-Term Load Forecast (STLF);**
  - **Intermittent Resource output forecast.**
- **RTBM executes every 5 minutes for the next Dispatch Interval based on the inputs.**

Real-Time Balancing Market

- **RTBM outputs include:**
  - **Resource Dispatch Instructions for Energy;**
  - **Cleared Regulation-Up, Regulation-Down, Spinning Reserve and Supplemental Reserve MW amounts;**
  - **Locational Marginal Prices (LMPs) for each Settlement Location;**
  - **Market Clearing Prices (MCPs) for Operating Reserve.**

Future Market Settlements – Key Features

- **Day-Ahead Market**
  - **Resources are paid Locational Marginal Price (LMP) and Market Clearing Price (MCP) for cleared amounts of Energy and Operating Reserve.**
  - **Loads are charged LMP for cleared amounts of Energy.**
  - **The difference between charges to Load and payments to generators (congestion cost) is used to pay holders of Transmission Congestion Rights (TCRs).**
  - **Physical resources committed by SPP are guaranteed recovery of their offer costs via a make-whole payment.**
- **Reliability Unit Commitment (RUC)**
  - **Physical resources committed by SPP are guaranteed recovery of their offers cost via a make-whole payment.**

Future Market Settlements – Key Features

- **Real-Time Balancing Market (RTBM)**
  - **Resources are charged/paid real-time LMP and MCP for RT deviations from cleared DA amounts of Energy and Operating Reserve.**
  - **Loads are charged/paid real-time LMP for RT deviations from cleared DA amounts of Energy.**
  - **Loads are charged for DA and RT Operating Reserve procurement costs at the Reserve Zone level.**
- **Financial Transactions**
  - **Bilateral trading outside of the SPP Markets will still occur in order to reduce exposure to market prices in both DA and RT.**
  - **Accommodated through submittal of financial transactions Post-Operating Day.**
  - **Financial transactions do not alleviate exposure to congestion charges associated with the bilateral trade.**
  - **The location of the settlement location relative to the source and sink will determine who absorbs the congestion cost.**

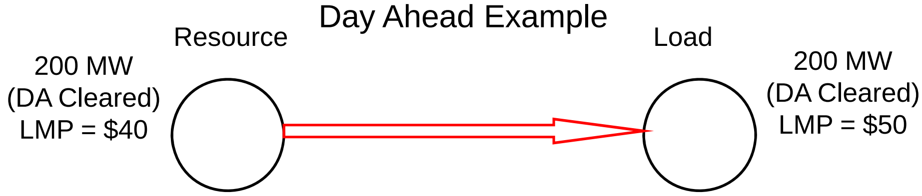
Transmission Congestion Rights in SPP Future Markets

Keith Sugg

Transmission Congestion Rights Background and Overview

Background - Congestion Cost Example

Day Ahead Example



Market Settlement pays Resource 200 MW * $40 = $8000
Market Settlement charges Load 200 MW * $50 = $10000
Congestion Cost is the difference - $2000

Introduction and Principles for TCRs

- **A TCR is a financial right that entitles the holder to a share of the congestion revenue collected in the Day-Ahead Market (DA Market).**
- **A basic premise is that those transmission customers who have paid for long-term transmission rights will receive a commensurate level of TCRs to serve their load with their resources.**
  - **There is no guarantee each TCR will be a perfect hedge**
  - **The amount of TCRs available must be simultaneously feasible to avoid "overselling" TCRs, which could create revenue shortfalls in settlements.**
- **MPs can place a value on specific TCRs through an auction**

Congestion Rights are the Rights to the Congestion Revenue

- **So who gets all that money?**
- **Congestion hedges in the form of TCR give us the mechanism to determine which parties have the rights to get that money back, and how much.**
- **TCR holders get paid a portion of the excess revenue collected based upon the differences in DA Market LMP between the TCR sink point and TCR source point, multiplied by the TCR MW.**
- **TCR provides the holder with a congestion hedge that is equivalent to the congestion hedge provided by a physical schedule in today's EIS.**

Transmission Congestion Rights Allocation/Auction Process

How Will Transmission Customers obtain TCRs under the Future Market Design?

- **Firm transmission**

⇩

- **Auction Revenue Rights (ARRs) candidate set**
  - ➢ **Simultaneous feasibility analysis and auction**

⇩

- **Transmission Congestion Rights (TCRs)**

⇩

- **Settlement**

Annual ARR Allocation

- **Candidate set of ARRs are limited to the Transmission Customer's firm transmission entitlements.**
- **Transmission Customers with these candidate ARRs determine which ones to nominate and the quantity of MW (up to their firm transmission rights).**

Annual ARR Allocation Process

- ARRs are allocated in a three-round process:
  - Up to 50% of the ARR Nomination Cap can be nominated in Round 1;
  - Up to 75% of the ARR Nomination Cap can be nominated in Round 2;
  - Up to 100% of the ARR Nomination Cap can be nominated in Round 3.
- NITS Transmission Customers nominate ARRs by specifying the Resource to Load path verified during the registration process.
- Firm PTP Transmission Customers nominate ARRs by specifying the sources and sinks associated with the reservation verified during the registration process.

Annual ARR Allocation Process

- Only 75% of the SPP Transmission System capability is made available during the annual allocation process.
- Transmission Customers may nominate ARRs up to their Nomination Cap for each month in the allocation period:
  - 24 separate transmission system models created for the annual allocation period
  - 12 monthly on-peak and 12 monthly off-peak models
  - Nominations are independent for each model.

A Simultaneous Feasibility Test is Completed After Each Round

- **If all nominated ARRs are feasible, all nominated ARRs are awarded.**
- **If nominated ARRs are not feasible, the nominated ARRs will be reduced until all ARRs are feasible prior to the award.**
- **Reductions to nominations are based on weighted impact to the affected transmission constraints.**

Annual TCR Auction

- **This process is the mechanism through which MP's may obtain annual TCRs by submitting TCR Bids and/or through direct conversion of ARRs to TCRs.**
- **Only 75% of the SPP Transmission capability is made available during the annual auction process.**
- **Any MP that has satisfied the applicable credit requirements may participate in the auction.**
- **For each month included in the auction period, MP's may submit TCR Bids and Offers separately for On-Peak and Off-Peak.**

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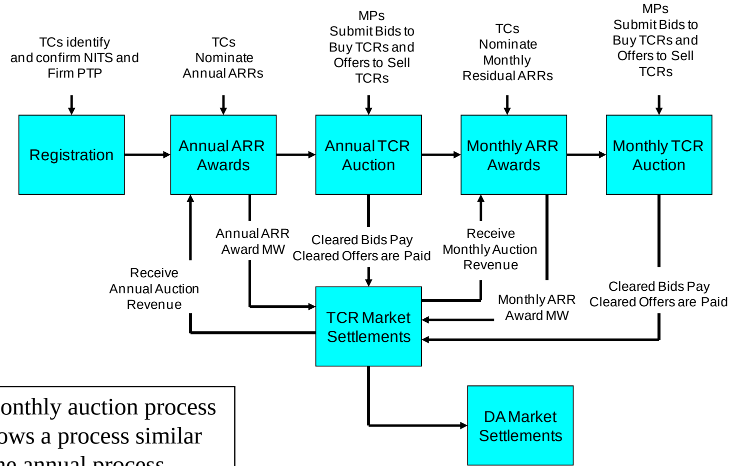
ARR and TCR Auction Processes



The monthly auction process follows a process similar to the annual process.

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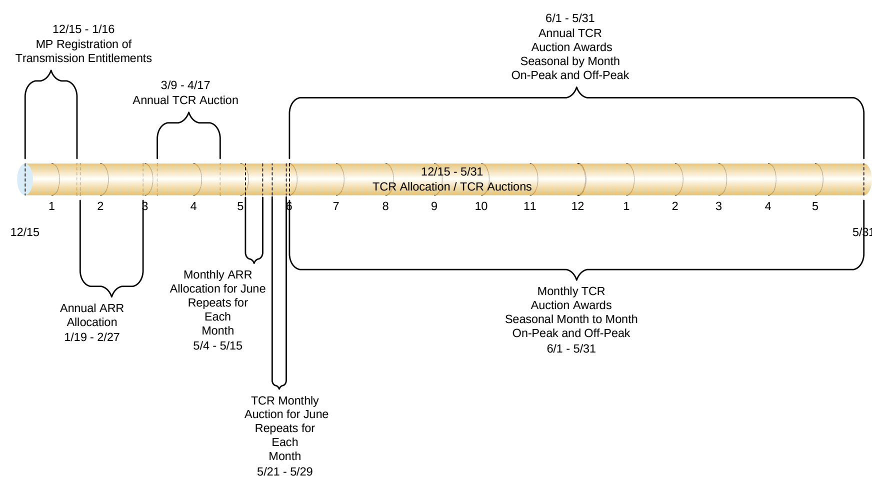
Sample Timeline to Obtain ARRs and TCRs



Who is Eligible to Obtain ARRs/TCRs?

- **It is important to distinguish between allocation of ARRs and TCR auctions .**
- **ARRs will be to transmission customers with long-term firm transmission service.**
  - **Based on existing Network or Point-to-Point service.**
  - **Rules set the Nomination Cap on the amount of ARRs that is linked to level of long-term transmission service.**
- **All Market Participants who meet credit standards may participate in the TCR auctions.**
  - **Participation expanded during MWG deliberations.**

Summary – Differences from EIS Market

- **Transmission Congestion Rights (TCRs) replace use of Energy Schedules and Native Load Schedules (NLS) as congestion hedges.**
- **Congestion Hedging process moves ahead of Real-Time and even Day-Ahead operations (annual and monthly ARR Allocation/TCR Auction processes).**
- **Congestion Hedging process eliminates need for Curtailment of current Bilateral Energy trades in Real-Time Balancing Market (RTBM).**
  - **Only Interchange schedules into, out of or through SPP BA would be subject to TLR.**
- **External Parties and those without assets in Market Footprint can participate.**

RSC Responsibility and Next Steps

Sam Loudenslager

RSC Decisions related to Future Markets

- **As noted earlier, the RSC has responsibility in two particular areas related to the Future Market design:**
  - **"…determination of Financial Transmission Rights (FTRs) allocations…"**
  - **"determination of the transition mechanism to be used to assure that existing firm customers receive FTRs equivalent to the customer's existing rights;"**
- **This means policy decisions will be needed by the RSC regarding the following:**
  - **Does the RSC support the proposed mechanism for allocating ARRs/TCRs to existing transmission customers based on their existing long-term firm transmission service?**
  - **Is the RSC satisfied that the proposed ARR nomination process allows existing customers to obtain "equivalent" rights to what they have now?**

Next Steps

- Market design being reviewed by the MOPC and Board.
- Market Working Group working towards March target date to finalize core design features.
- Important to get RSC input and approval prior to requesting final MOPC and BOD approval
  - Need time to revise design documents before final MOPC/BOD review and approval.
- Request RSC charge CAWG or other working group to review design elements related to RSC decisions and report back to RSC by end of March.
- Ideally, RSC can assess situation in April with follow-up in July, if needed.