MARKETS

Denver, CO Meeting

June 1, 2022
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:30-9:30</td>
<td>General Session I – Design Team Updates</td>
</tr>
<tr>
<td>9:30-10:00</td>
<td>Break</td>
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<tr>
<td>10:00-11:00</td>
<td>General Session II – Market Monitor Panel</td>
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<tr>
<td>11:00-12:30</td>
<td>General Session III – Transmission Topics</td>
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<tr>
<td>12:30-1:30</td>
<td>Lunch</td>
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<tr>
<td>1:30-3:00</td>
<td>Breakout Sessions</td>
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<tr>
<td></td>
<td>Governance Design Team (Room: HQ-101)</td>
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<tr>
<td></td>
<td>Joint Transmission and Market Design Teams</td>
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<tr>
<td>3:00-3:30</td>
<td>Break</td>
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<tr>
<td>3:30-5:00</td>
<td>General Session IV – Congestion Rent Allocation</td>
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<tr>
<td>5:30-6:30</td>
<td>Reception – Double Tree Hotel</td>
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</table>
GENERAL SESSION I
DESIGN TEAM UPDATES
## AGENDA – GENERAL SESSION I
### DESIGN TEAM UPDATES

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<tr>
<th>Topic</th>
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<tbody>
<tr>
<td>Opening Remarks</td>
<td>Barbara Sugg</td>
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<tr>
<td>Participants Introductions</td>
<td></td>
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<tr>
<td>SPP’s Vision for Western Markets</td>
<td>Bruce Rew</td>
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<tr>
<td>Governance Design Team Update</td>
<td>Kara Fornstrom</td>
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<tr>
<td>Transmission Availability Design Team Update</td>
<td>Steve Johnson</td>
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<tr>
<td>Market Products/Price Formation Design Team Update</td>
<td>Jim Gonzalez</td>
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<tr>
<td>GHG Tracking Update</td>
<td>Kara Fornstrom</td>
</tr>
<tr>
<td>Market Monitoring Update</td>
<td>Kara Fornstrom</td>
</tr>
<tr>
<td>Meeting Goals and Expectations</td>
<td>Bruce Rew</td>
</tr>
</tbody>
</table>
PARTICIPANTS
INTRODUCTION
SPP’S VISION FOR WESTERN MARKETS

BRUCE REW
SPP SR. VP, OPERATIONS
RTO West

- 7 organizations joining RTO in 2024; expected $49M annual savings for new & existing members

Western Energy Imbalance Service (WEIS) Market

- Launched Feb. 2021; 3 new members joining in 2023 bringing load to 13.5GW

Markets+

- New real-time/day-ahead market in development with western parties (will replace WEIS)

Western Reliability Coordination Service

- Maintaining reliability for 13 western transmission operators

Western Interconnection Unscheduled Flow Mitigation Plan

- Helping western organizations manage grid congestion

Western Resource Adequacy Program Operator

- Partnering with Western Power Pool to ensure resource adequacy

Achieve clean energy goals

Reinforce system reliability

Provide economic benefits

New opportunities to trade low-cost power

Maintain resource adequacy
SPP’S MARKETS VISION

• WEIS continues for period of time
  • Imbalance market a great introduction to markets
  • Short-term solution for market participants

• RTO development
  • Provides long-term solution to market needs
  • Consolidated BA, Regional Planning, Unit Commitment

• Markets+ development
  • Possible long-term solution to meet some market needs
2022 MARKETS+ GOAL AND SCHEDULE

• Draft Service Offering – End of September
  • Written Comment Period

• Final Service Offering – Mid-November
  • Will Not Include: Market Protocols and Tariff Language

• Commitment to Investigate – Q1 2023
  • Financially Binding to Scope Implementation

• Stakeholder Process to Develop Market Protocols and Tariff Language

• Participant Agreement Execution – Fund Implementation
GOVERNANCE
DESIGN TEAM UPDATE

KARA FORNSTROM, SPP
# Governance Design Team

## Stakeholder Leads

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aly Koslow</td>
<td>Director, Federal Regulatory Affairs and Compliance</td>
<td>Arizona Public Service</td>
</tr>
<tr>
<td>David Rubin</td>
<td>Federal Energy Policy Director</td>
<td>NV Energy</td>
</tr>
<tr>
<td>Joe Fina</td>
<td>Assistant General Counsel</td>
<td>Snohomish County Public Utility District No. 1</td>
</tr>
<tr>
<td>Lea Fisher</td>
<td>Senior Policy Analyst</td>
<td>Public Generating Pool</td>
</tr>
</tbody>
</table>

## SPP Support Team

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paul Suskie</td>
<td>General Counsel &amp; EVP Regulatory Policy</td>
</tr>
<tr>
<td>Kara Fornstrom</td>
<td>Director, State Regulatory Policy</td>
</tr>
<tr>
<td>Mike Riley</td>
<td>Associate General Counsel</td>
</tr>
<tr>
<td>Britney Lloyd</td>
<td>Attorney</td>
</tr>
<tr>
<td>Nicole Wagner</td>
<td>Manager, Regulatory Policy</td>
</tr>
<tr>
<td>Patti Kelly</td>
<td>Lead Regulatory Analyst</td>
</tr>
</tbody>
</table>
GOVERNANCE DESIGN TEAM ACTIVITY

- March 29-30: Developed Matrices for Governance Options
- April 1: Issued Request for Written Comments
- April 13: WIEB Webinar I – State Representatives
- April 20: Written Comments were Due
- April 25: SPP Webinar – Summary of Written Comments
- May 13: WIEB Webinar II – State Representatives
- May 23: SPP Webinar – Overview of Governance Straw Proposal
  SPP Issued Governance Straw Proposal
STRAW PROPOSAL – BALANCING INTERESTS

• Include consensus views from meetings and written comment responses to the maximum extent possible
• What FERC will approve
• SPP best practices
• Minimize impacts to SPP, Inc.
GROUP CATEGORIES - DEFINITIONS

Markets+ Market Participant (MMP)
- Executed Participant Agreement
- Contributes generation and/or load to market

Markets+ Market Stakeholder (MMS)
- Executed Stakeholder Agreement
- Does not contribute generation or load
- Voting rights: MIP Selection Forum
  - Eligible for voting seat on MIP Nominating Committee, Working Groups & Task Forces
  - Annual fee of $5,000

Markets+ Non-Voting Stakeholder (MNVS)
- Provide input at all stakeholder meetings
- No voting rights
- No annual fee
GOVERNANCE DESIGN TEAM FUTURE MEETINGS

• Webinar: June 24  10:00 am – Noon Mountain

• Webinar: July 22  10:00 am – Noon Mountain

*April 25th Webinar Slide Deck Updated and Posted
QUESTIONS/DISCUSSION
TRANSMISSION AVAILABILITY
DESIGN TEAM UPDATE

STEVE JOHNSON, SPP
# Transmission Availability Team

## Stakeholder Leads

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe Taylor</td>
<td>Manager, Transmission Access</td>
<td>Xcel Energy</td>
</tr>
<tr>
<td>Chris Hofmann</td>
<td>Director Transmission &amp; Generation Operations</td>
<td>Salt River Project</td>
</tr>
<tr>
<td>Mike Linn</td>
<td>Director, Market Analytics</td>
<td>Public Power Council</td>
</tr>
<tr>
<td>Bri Allen</td>
<td>Regional and Market Initiatives Lead</td>
<td>Bonneville Power Administration</td>
</tr>
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## SPP Support Team

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Steve Johnson</td>
<td>Principal Operations Specialist</td>
</tr>
<tr>
<td>Hamilton Bitely</td>
<td>Senior Operations Analyst</td>
</tr>
<tr>
<td>Shari Brown</td>
<td>Manager, Tariff Administration</td>
</tr>
</tbody>
</table>
TRANSMISSION AVAILABILITY
DESIGN TEAM ACTIVITY

• March 29-30 Phoenix Meetings
  • Flow-based Operations in a Path Based World
  • Joint: Base Schedules
  • Joint: Congestion Rents
  • General Session: Seams

• April 13 Webinar
  • Market Efficiency Use
  • ATRR Recovery

• May 11 Webinar
  • Powerex Presentation
  • Initial Data Results
  • Revenue Recovery Proposals
TRANSMISSION DATA

• Nine Companies Provided Initial ATRR Data
  • Arizona Public Service
  • Avista
  • Bonneville Power Administration
  • Grant County PUD
  • Idaho Power
  • Portland General Electric
  • Public Service Colorado
  • Salt River Project
  • Tacoma Power

• Two others provided partial data (not currently included in charts)
  • Northwestern Energy
  • Puget Sound Energy
$2.21B total ATRR
$66.7M STF (3%)
$50.4M NF (2%)

$1.2B ATRR w/o BPA
$38M STF (3%)
$32.7M NF (3%)
TADT DASHBOARD

Revenue Recovery Amount

Revenue Recovery mechanism (load vs. market based)

Revenue distribution methodology

All transmission in, out by exception

TSP data collection and analysis

Working draft of design document

TSP and Planning functions retained, OATT rights respected

Base Schedule support

Flow-based operations DA and RT

Ongoing Discussions

In Process

General Agreement

Ready for comment

Ready for Offering
TRANSMISSION AVAILABILITY DESIGN TEAM
FUTURE WEBINARS

• June 15 10:00 am – Noon Mountain
• June 29 10:00 am – Noon Mountain
• July 20 10:00 am – Noon Mountain
• August 3 10:00 am – Noon Mountain
QUESTIONS/DISCUSSION
MARKET PRODUCTS
PRICE FORMATION
DESIGN TEAM UPDATE

JIM GONZALEZ, SPP
# Market Products and Price Formation Design Team

## Stakeholder Leads

<table>
<thead>
<tr>
<th>Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Jeff Spires</td>
<td>Director, Power</td>
<td>Powerex</td>
</tr>
<tr>
<td>Carrie Simpson</td>
<td>Director, Western Markets</td>
<td>Xcel Energy</td>
</tr>
<tr>
<td>Brian Cole</td>
<td>General Manager, Resource Management</td>
<td>Arizona Public Service</td>
</tr>
<tr>
<td>Laura Trolese</td>
<td>Senior Market Design &amp; Policy Advisor</td>
<td>The Energy Authority</td>
</tr>
<tr>
<td>Russ Mantifel</td>
<td>Director of Market Initiatives</td>
<td>Bonneville Power</td>
</tr>
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<tbody>
<tr>
<td>Jim Gonzalez</td>
<td>Manager, Real Time Markets</td>
</tr>
<tr>
<td>Micha Bailey</td>
<td>Supervisor, Congesting Hedging</td>
</tr>
</tbody>
</table>
MP/PF DESIGN TEAM ACTIVITY

• March 29-30  Phoenix Discussions
  • Understanding Markets
  • Joint Session: Base Schedules
  • Joint Session: Congestion Rents
  • General Session: Seams
• April 26 Webinar
  • Day-Ahead Timeline Survey Report
  • High-level Market Objectives and Timelines
  • Ensuring Physical Capacity
  • Flexible Reserve/Market Product
  • Unit Commitment
• May 17 Webinar
  • Progress Scorecard and Proposal/Comment Cycle
  • Pricing Presentation
  • Resource Adequacy/Resource Sufficiency
MARKETS+ MARKET DESIGN

Regional Cost Savings

• **Commit Least Cost** Fleet of Resources cable of meeting reliability needs
• **Minimize Production Cost** of generating resources serving net obligation
• **Maximize Capabilities** of Transmission System

How?

• **Centralize Unit Commitment** in Day-Ahead
• **Centralized Dispatch** in Real-time
• **Flow-based** Congestion Management

Market Design Mechanics

• **Transparency**
  • Pricing
  • Market Operations
• **Equitable Treatment**
  • Cost-causation for ‘who pays’
  • Comprehensive, net-settlement
• **Compatible** with existing constructs
  • Recognize rights and investment in transmission system
  • Bilateral Transactions
DECISION SCORECARD – PHOENIX (03/30/2022)

- Market Timelines
- Losses
- Congestion Hedge
- Market Products

- Congestion Management
- Dispatch
- Unit Commitment
- Physical Sufficiency

- Uplifts
- Bilateral Transactions
- Physical Deliverability
- Mitigation

- Participation Models
- Price Formation
- Virtuals
- GHG/Carb

Legend:
- Ongoing Discussions
- Future Discussion
- Nearing Comment Form
- Comment Form Out
- Ready for Offering
DECISION SCORECARD
CURRENT

- Market Timelines
- Losses
- Congestion Hedge
- Market Products

- Congestion Management
- Dispatch
- Unit Commitment
- Physical Sufficiency

- Uplifts
- Bilateral Transactions
- Physical Deliverability
- Mitigation

- Participation Models
- Price Formation
- Virtuals
- GHG/Carb

Legend:
- Ongoing Discussions
- Future Discussion
- Nearing Comment Form
- Comment Form Out
- Ready for Offering
PRELIMINARY COMMENT FORM

• SPP and Industry Leads want to solicit feedback from participants

• Focused form for each ‘Decision Box’
  • 2-3 week turnaround
  • Not last chance to comment
  • Contains questions and background to help with feedback

• More to come
LAST MEETING - PRICE FORMATION OVERVIEW

• Purpose is to discuss concepts at a higher level, with more detailed design sessions when necessary

• General Pricing Concepts
  • Locational Marginal Pricing
  • Ex-Ante vs Ex-Post
  • Product Pricing and Scarcity
  • Co-optimization
  • Fast Start
  • Transparency and Accuracy
PRICE FORMATION NEXT STEPS

• Schedule focused, technical deep dives:
  • Co-optimization
  • Fast Start Pricing
  • Convergence Biding (Virtuals)
MP/PF DESIGN TEAM FUTURE MEETINGS

• Webinar: June 28, 2022 9:00-11:00 Mountain
  • Targeting July for price formation deep dive meetings

• Webinar: July 19, 2022 9:00-11:00 Mountain
QUESTIONS/DISCUSSION
GHG TRACKING UPDATE

KARA FORNSTROM, SPP
GHG DESIGN ELEMENT

• Leverage existing work by numerous parties in the West

• Invitations to Present Concepts
  • April 20: 11:00-1:00 (Pacific)
  • May 17: 11:00-1:00 (Pacific)

• Denver Meeting: June 2\textsuperscript{nd} General Session

• Written Comment Opportunity
QUESTIONS/DISCUSSION
MARKET MONITORING – UPDATE SLIDE

- SPP Webinar – April
  - Presentation by Barbara Stroope, Ph.D., Manager, Day-Ahead Markets
- Denver Meeting: June 1st General Session
- Written Comment Opportunity – June 17
  - Comments Due July 15
QUESTIONS/DISCUSSION
MEETING GOALS AND EXPECTATIONS

BRUCE REW
Foster engaging discussions
Understand and give voice to diverse perspectives
Develop cohesive vision for Markets+
Recognize Markets+ role in benefitting market evolution in the Western Interconnection
Enjoy personal interaction and Have Fun!
MARKETS

Morning Break
9:30-10:00
GENERAL SESSION II
MARKET MONITOR PANEL
# AGENDA – GENERAL SESSION II
## MARKET MONITOR PANEL

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<td>Panelists Opening Remarks</td>
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<td>Moderator Questions</td>
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<tr>
<td>Audience Questions</td>
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<td>In-Person Attendees</td>
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<td>Virtual Attendees</td>
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<tr>
<td>Panelists Closing Remarks</td>
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MARKET MONITOR PANEL

MODERATOR: PAUL SUSKIE, SPP

PANELISTS: KEITH COLLINS, SPP VP MARKET MONITORING
JEFF MCDONALD, PH.D., LIBERTAS MARKET ANALYTICS
DAVID PATTON, PH.D., POTOMAC ECONOMICS
NEXT STEPS
SCHEDULE

KARA FORNSTROM, SPP
MARKET MONITORING – UPDATE SLIDE

• Denver Meeting: June 1\textsuperscript{st} General Session
• Written Comment Opportunity – June 17
  • Comments Due July 15
MARKETS

Working together to responsibly and economically keep the lights on today and in the future.
GENERAL SESSION III
TRANSMISSION TOPICS
### AGENDA – GENERAL SESSION III

#### TRANSMISSION TOPICS

<table>
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<tr>
<td>Base Scheduling – Overview, Value and Application in Markets+</td>
<td>Bri Allen, BPA</td>
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<td>Import/Export Wheel Through</td>
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<td>Markets+ System Operations Impact to Tag Transactions</td>
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<tr>
<td>TSP Data Review and Rate Examples</td>
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<tr>
<td>Questions/Discussion</td>
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<tr>
<td>Next Steps</td>
<td>Steve Johnson, SPP</td>
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</table>
BASE SCHEDULING
OVERVIEW, VALUE, AND APPLICATION IN MARKETS+
OVERVIEW OF BASE SCHEDULING CONCEPT

• Base Schedules represent an important bridge between a centralized market and existing commercial and operational paradigms.

• Base Schedules provide a clear tool to demonstrate compliance with important legal, regulatory, and reliability requirements, for example:
  • Environmental attributes, such as GHG
  • Resource adequacy and/or sufficiency
  • Statutory preference - Bonneville Power has statutory obligations to meet the firm power loads of consumer owned utilities when requested by the utility.
    • This includes giving preference and priority at all times to public bodies and cooperatives in disposing of electric energy generated by the Federal projects (i.e. Federal Columbia River Power System).
Generation and load are independently awarded and settled through the market. Generation bids to sell into the market, and Load bids to purchase out of the market.

Relationship between generation and load becomes “financial.” Congestion differences are hedged through financial transmission rights i.e. CRRs.
Base Schedule, supported by OATT transmission, establishes a relationship between resource and load prior to the optimization.

Base Schedules are not equivalent to “self-scheduled”. Depending on bidding behavior, the base schedule can ensure the underlying resource is delivered (price taker) or it can be optimized by the market (resource can submit a bid range around its base scheduling point).

Congestion revenue between load and generation is allocated based on transmission reservation, not base schedule.
A Base Schedule with an economic bid does not undermine the efficiency of the market solution.
VALUE - REINFORCES PRIORITY

• The Base Schedule can reinforce priority and determine who flows when a constraint cannot be resolved economically.

• Base Schedules that are tied to e-Tags with OATT transmission can provide a simple, clear link to curtailment priority when a Transmission Service Provider needs to curtail under its OATT.

• This is especially important in the Pacific Northwest where deliveries that source/sink inside one BAA can cross multiple TSPs/BAAs on Firm transmission.

• Base Schedules can help differentiate priority of exports from the market footprint. They can be used to establish high priority for RA delivery over an economic market schedule when both cannot be supported simultaneously.
SUMMARY

• The Base Schedule documents the relationship between resources and load without harming the efficiency of the market optimization.

• The Base Schedule can be used to demonstrate compliance with important legal, regulatory requirements.
IMPORT/EXPORT WHEEL THROUGH
MARKETS+ NERC ENTITY OPERATIONS

Normal WECC tagging processes are a completely separate activity from market tag processes

• Transmission Footprint (TSP)
  • No changes to the current TSP TSR processes and operations
  • No change to tags or TSRs for real time operations

• Balancing Authority Footprints (BA)
  • No changes to the current BA processes and operations
  • No change to tags or TSRs for real time operations

• Reliability Coordinator (RC)
  • No required changes

• Markets+ Footprint (MO)
  • SPP will become the Market Operator for the entire joint Markets+ footprint
  • All energy deliveries within the Markets+ footprint will become market flow
Current Integrated Marketplace Business Rules

- Integrated Marketplace systems use only specific information from a tag
  - “Interface Point” is the POR/POD where the energy enters or leaves the Marketplace footprint
  - “Scheduling Entity” is used to allow proper accounting for imports and exports for BA NSI
  - Market Participant (MP) will be derived from the tag data (to be determined)
  - TAG sources or sinks are mapped to “settlement locations in the SPP CMT depending upon the type of tag.
  - All Markets+ tags are settled at the LMP for the “interface Point”

- “External” (to Integrated Marketplace) tag sources and sinks are not used in Integrated Marketplace operations or settlements.

- “Internal” (to Integrated Marketplace) tag sources and sinks are mapped to “Settlement Locations” in the SPP Commercial Model

Current Integrated Marketplace business rules are being used in this presentation to provide a common starting point for discussion of Markets+ design
Current Integrated Market Business Rules (cont.)

- Market system designs intend for all tag transactions to be settled as market dispatch (Flow).
- Current Integrated Marketplace systems do not make a distinction between “Energy Only” tag transactions and “Bilateral Contractual/Base” schedules.
- Energy only tags “buy” from a market (no specific source generator) and then sell to external market or BA (no particular load).
- Bilateral contractual/Base Schedule tag transactions include previous contractual obligations for the customer and are usually sold from a particular generator and to a particular load.
- Both types of tag transactions are treated the same in real time market system and settlements.
Current Integrated Market Business Rules (cont.)

• The Integrated Marketplace uses a Bilateral Scheduling System (BSS) in the settlements process to account for out of market bilateral transactions without “carving” wholesale energy settlements out of the market.

• A similar type of system could be implemented for the Markets+ processes

• In the current BSS design the “settlement” location used for where the transfer of Energy obligation occurs determines which market entity is exposed to deliverability (congestion and losses) costs.

• A presentation on BSS is available for market entities to review.
Note: Markets+ design will have different definitions for Import, Export and Wheel Through tag transactions.
MARKETS+ MULTI-BA FOOTPRINT EXAMPLES

For Illustration purposes with scenarios
MARKETS+ TAG SCENARIOS

• Scenario 1 – Tag Imports to Markets+
• Scenario 2 – Tag Exports from Markets+
• Scenario 3 – Tag Wheel Through for Markets+
• Scenario 4 – Tags Internal to Markets+
• Scenario 5 – Tags In and Out of Markets+
• These scenarios are only looking at traditional bilateral transactions in the west
• SPP anticipates incremental tagging to represent centralized dispatch between participating BAs for transparency (data artifact)

Current Integrated Marketplace business rules are being used in this presentation to provide a common starting point for discussion of Markets+ design
SCENARIO 1 – IMPORT TAG TRANSACTION

For Illustration purposes with scenarios
SCENARIO 1 – IMPORT TAG TRANSACTION

- Markets+ import tags only describe those tags that come into the Markets+ footprint from an external entity (ex. CAISO). Can sink in any Markets+ BA.

- Import tags are identified to the market system by the first scheduling entity that is a Markets+ BA.

- The interface point at the Markets+ border is used to determine the LMP to settle the import tag.

- The Markets+ system does not recognize or use generation that originates outside of Markets+ for systems or settlements.

- The Markets+ system does not deliver external generation to a specific load inside of the footprint. The load is served by market dispatch.

- The Markets+ systems use the “Sink” on the tag as a reference to determine the Market Participant for settlements.
SCENARIO 2 – EXPORT TAG TRANSACTION

For Illustration purposes with scenarios
SCENARIO 2 – EXPORT TAG TRANSACTION

• Markets+ export tags only describe those tags that leave the Markets+ footprint from an internal entity. Can source from any Markets+ BA.

• Markets+ export tags are identified to the system by the last scheduling entity that is a Markets+ BA.

• The interface point at the Markets+ border is used to determine the LMP to settle the export tag.

• The Markets+ system does not recognize or use loads that receive generation from Markets+ for systems or settlements (Markets+ will not settle with external parties).

• The Markets+ systems use the “Source” on the tag as a reference to determine the Market Participant for settlement.

• The export tag does not directly impact the commitment or dispatch of an individual generator/resource.
SCENARIO 3 – WHEEL THROUGH TRANSACTION

For Illustration purposes with scenarios
SCENARIO 3 – WHEEL THROUGH TRANSACTION

- Markets+ wheel through tags originate and terminate external to the Markets+ footprint but cross boundaries between BAs and TSPs inside Markets+

- Markets+ systems do not use external sources or sinks on wheel through tags

- The interface point for the entry of the tag and the exit of the tag (Markets+ footprint) are used to determine the LMP difference as needed for settlements
SCENARIO 4 – INTERNAL TRANSACTIONS
SCENARIO 4 – INTERNAL TRANSACTIONS

• Markets+ internal tags include all tags wholly within the Markets+ footprint even if they cross boundaries between BAs inside Markets+

• Markets+ will acknowledge internal tags for normal operations

• Markets+ would ignore these tags for market system processing

• Internal transactions settle as market flow

• Markets+ entities need to determine if internal tags would use a system design similar to BSS
Scenario 5 – In and Out Tag Transactions

For illustration purposes with scenarios
SCENARIO 5 – IN AND OUT TAG TRANSACTIONS

• The current Integrated Marketplace does not have any in and out tags.

• In and out tags could be treated as individual import/export tags for settlement.
MARKETS+ SYSTEM OPERATIONS IMPACT TO TAG TRANSACTIONS
Tags can be used to bid or offer into the DA market.

Additional data is needed by the DA market for the bid or offer that is not included on a normal tag.

The Integrated Marketplace had a special Market section added to e-tag Vendor systems.

Otherwise tags are processed by the scenarios described in the previous slides.

DA market does not make changes to TSR on the tag.

DA clearing process makes automatic “market adjustments” to the e-tag as the market operator. DA market adjustments are not curtailments to tags.

Market adjustments require approval of PSE, TSP and BA on the tag.
Example new market section for tag template

<table>
<thead>
<tr>
<th>Market Date</th>
<th>Market Date</th>
<th>Market Date</th>
<th>Market Date</th>
<th>Market Date</th>
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<tbody>
<tr>
<td>HE01</td>
<td>HE05</td>
<td>HE09</td>
<td>HE13</td>
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<td>HE21</td>
</tr>
<tr>
<td>HE02</td>
<td>HE06</td>
<td>HE10</td>
<td>HE14</td>
<td>HE18</td>
<td>HE22</td>
</tr>
<tr>
<td>HE03</td>
<td>HE07</td>
<td>HE11</td>
<td>HE15</td>
<td>HE19</td>
<td>HE23</td>
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<tr>
<td>HE04</td>
<td>HE08</td>
<td>HE12</td>
<td>HE16</td>
<td>HE20</td>
<td>HE24</td>
</tr>
</tbody>
</table>

SPP Market Information (all times in CPT)

- **Trans Type**: Dispatchable
- **Day-Ahead**
• Integrated Marketplace Real Time Balancing Market (RTBM) does not use individual tags in system processing

• Integrated Marketplace RTBM does not make changes to individual tags or TSRs

• Markets+ RTBM will use the NSI for each Balancing Authority internal to the Markets+ footprint for system processing
TSP DATA REVIEW AND RATE EXAMPLES
TRANSMISSION DATA

• 11 Companies Provided Initial Data
  • Arizona Public Service
  • Avista
  • Bonneville Power Administration
  • Grant County PUD
  • Idaho Power
  • Northwestern Energy
  • Portland General Electric
  • Puget Sound Energy
  • Public Service Colorado
  • Salt River Project
  • Tacoma Power
## TRANSMISSION REVENUE DATA

<table>
<thead>
<tr>
<th>Transmission Product</th>
<th>Totals</th>
<th>Totals less BPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total affiliate and third party</td>
<td>$1,224,638,779</td>
<td>$440,304,345</td>
</tr>
<tr>
<td>STF+NF percentage of total affiliate and third party</td>
<td>12%</td>
<td>23%</td>
</tr>
<tr>
<td>Short-term Firm</td>
<td>$88,091,387</td>
<td>$59,339,042</td>
</tr>
<tr>
<td>Non-Firm</td>
<td>$60,442,798</td>
<td>$42,742,574</td>
</tr>
<tr>
<td>Total STF+NF</td>
<td>$148,534,185</td>
<td>$102,081,615</td>
</tr>
<tr>
<td>Total ATRR</td>
<td>$2,211,887,206</td>
<td>$1,201,167,300</td>
</tr>
<tr>
<td>STF+NF Percentage of total ATRR</td>
<td>5%</td>
<td>6%</td>
</tr>
</tbody>
</table>
TOTAL AFFILIATE AND THIRD PARTY REVENUE

Affiliate and Third Party Revenue

- APS
- Avista
- BPA
- Grant County PUD
- Idaho Power
- Northwestern
- PGE
- PSCO
- Puget
- SRP
- Tacoma
AFFILIATE AND THIRD PARTY SHORT-TERM FIRM+NON-FIRM REVENUE

Affiliate and Third Party STF+NF

- APS
- Avista
- BPA
- Grant County PUD
- Idaho Power
- Northwestern
- PGE
- PSCO
- Puget
- SRP
- Tacoma
ENTITY’S PERCENTAGE OF SHORT-TERM FIRM AND NON-FIRM IN THEIR TOTAL AFFILIATE AND 3RD PARTY REVENUE

<table>
<thead>
<tr>
<th>Entity</th>
<th>STF and NF Revenue Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS</td>
<td>13%</td>
</tr>
<tr>
<td>Avista</td>
<td>50%</td>
</tr>
<tr>
<td>BPA</td>
<td>6%</td>
</tr>
<tr>
<td>Grant County PUD</td>
<td>8%</td>
</tr>
<tr>
<td>Idaho Power</td>
<td>30%</td>
</tr>
<tr>
<td>Northwestern</td>
<td>32%</td>
</tr>
<tr>
<td>PGE</td>
<td>25%</td>
</tr>
<tr>
<td>PSCO</td>
<td>12%</td>
</tr>
<tr>
<td>Puget</td>
<td>13%</td>
</tr>
<tr>
<td>SRP</td>
<td>13%</td>
</tr>
<tr>
<td>Tacoma</td>
<td>49%</td>
</tr>
</tbody>
</table>
MARKETS+ RATE EXAMPLE

Assumes recovery of all current affiliate and third party short-term firm and non-firm revenue ($148.5M)

<table>
<thead>
<tr>
<th>Rate based on load</th>
<th>Total</th>
<th>Total less BPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW/yr</td>
<td>$4,502</td>
<td>$4,637</td>
</tr>
<tr>
<td>MW/mo</td>
<td>$375</td>
<td>$386</td>
</tr>
<tr>
<td>MW/hr</td>
<td>$0.51</td>
<td>$0.53</td>
</tr>
</tbody>
</table>
QUESTIONS/DISCUSSION
NEXT STEPS

STEVE JOHNSON, SPP
LUNCH BREAK

GDT BREAKOUT SESSION – NEED BADGES

LUNCH – DIETARY RESTRICTIONS
BREAKOUT SESSIONS
GOVERNANCE DESIGN TEAM
BREAKOUT SESSION
### AGENDA – GOVERNANCE BREAKOUT SESSION

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30-2:15</td>
<td>Panel – Initial Reactions</td>
</tr>
<tr>
<td>2:15-3:00</td>
<td>Workshop Issues</td>
</tr>
<tr>
<td></td>
<td>Straw Proposal Questions/Discussion</td>
</tr>
</tbody>
</table>
GOVERNANCE PANEL
STRAW PROPOSAL REACTIONS

MODERATOR: MARY ANN ZEHR, TRI-STATE

PANELISTS: ALY KOSLOW, APS
           MAURY GALBRAITH, WIEB
           LEA FISHER, PGP
           SCOTT MILLER, WPTF
           ALAIN GINOCCHIO, WRA
GOVERNANCE WORKSHOP ISSUES
JOINT TRANSMISSION AND MARKET DESIGN TEAMS

BREAKOUT SESSION
# AGENDA – JOINT TRANSMISSION AVAILABILITY AND MARKET DESIGN TEAMS BREAKOUT SESSION

<table>
<thead>
<tr>
<th>Agenda Item</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion Management</td>
<td>SPP Staff</td>
</tr>
<tr>
<td>Operational Congestion Management – An Overview</td>
<td></td>
</tr>
<tr>
<td>Congestion &amp; Seams Coordination</td>
<td></td>
</tr>
<tr>
<td>Congestion &amp; Price Formation</td>
<td></td>
</tr>
<tr>
<td>Transmission Congestion Cost Example</td>
<td></td>
</tr>
<tr>
<td>Non-Binding and Binding</td>
<td></td>
</tr>
<tr>
<td>Questions/Discussion</td>
<td></td>
</tr>
<tr>
<td>Next Steps</td>
<td></td>
</tr>
</tbody>
</table>
WHAT IS CONGESTION?

- Generation -> Transmission -> Load
- “Bottleneck” when energy cannot get to a customer on a particular transmission element due to:
  - Desired electricity flows exceed physical capability
    - System Operating Limits - Thermal, Voltage/Stability
  - Contractual Limitations
    - defined transfer Transmission Paths
**FLOWGATE CONSTRAINT**

- A mathematical construct for identified transmission constraints, comprised of one or more monitored transmission facilities and optionally one or more contingency Facilities.

- PTDF is a Power Transfer Distribution Flowgate that is typically controlling a group monitored transmission elements to a total real-time flow based on thermal or stability transfer limitation - *typically identified thru power flow transfer studies*

- OTDF is an Outage Transfer Distribution Flowgate that is controlling transmission elements in a ‘what-if’ n-1 condition. The Reliability Coordinator controls the flowgate of a monitored element such that if a contingent element trips, the element monitored does not exceed its limit - *typically represents RTCA identified transmission constraints*
• **WECC Path**: TSP/WECC defined transmission paths designed to limit intertie transfers. The characteristics of a path relate to the lines it is composed of, though paths are not always a simple aggregation of the individual transmission equipment characteristics.

• **Zonal Constraints**: Defining zones within the market to limit energy transfer to respect transmission service limitations.
### TRANSMISSION CONSTRAINT TYPES

<table>
<thead>
<tr>
<th>Constraint Type</th>
<th>SOLs / IROLs (Reliability Based Constraints)</th>
<th>WECC Paths / Qualified Paths</th>
<th>Zonal Transfer Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>RTCA or Power Flow Studies Coordinated with RC</td>
<td>Transmission Service Providers</td>
<td>Third Party Reliability based Limitation (e.g. Reserve Sharing Group)</td>
</tr>
<tr>
<td>Modeled as</td>
<td>Flowgates (OTDF or PTDF)</td>
<td>SPP Service Flow Constraint (SFC)</td>
<td>Zonal Constraints between Zones</td>
</tr>
</tbody>
</table>

- **SOLs / IROLs** (Reliability Based Constraints)
- **WECC Paths / Qualified Paths**
- **Zonal Transfer Constraints**
- **RTCA or Power Flow Studies Coordinated with RC**
- **Transmission Service Providers**
- **Third Party Reliability based Limitation (e.g. Reserve Sharing Group)**
- **Flowgates (OTDF or PTDF)**
- **SPP Service Flow Constraint (SFC)**
- **Zonal Constraints between Zones**
CONGESTION & SEAMS COORDINATION
MARKET-TO-MARKET (M2M)

- Transmission constraint specific coordination agreement with a neighboring market
- Defined transmission rights allocated to each Market entity (e.g., Markets+ with CAISO DA/EIM Coordination)
- Each Market is assigned a relief request by the “monitoring entity”
  - Native Gen -> Load re-dispatch. Not a transfer of Energy
- Least cost solution between the markets to achieve relief
WHY M2M?

- Lower congestion cost: expanding the pool of resources to solve congestion effectively and economically.
- Price convergence on the seams reflecting congestion in the area.
- More Reliable operation: allowing the RC and market to resolve congestion utilizing a bigger selection of resources.

M2M Objectives

- Greater Re-dispatch Efficiency: Allows a more efficient re-dispatch solution for coordinated constraints across multiple systems.
- Consistent Pricing: Provides more consistent and effective pricing profile across the two (2) Markets.
- Enhanced System Reliability: Pools Resources from both RTOs to jointly control transmission constraints near the RTO borders.
- Compensation: Provides a payment mechanism for two-market congestion management.
**UN SCHEDULED FLOW MITIGATION PROCESS (WIUFMP)**

- Western Interconnection coordinated on **4** Qualified Paths.
- WIUFMP event initiated by Path Operators:
  - Phase Shifter adjustment and
  - Tagged energy transaction schedules are subject to curtailment.

---

**Diagram:**
- Tagged Interchange Impact
- Generation Dispatch to serve native Load Impact
- Qualified WECC Path
- 7-F On-Path
- 7-F Off-Path
- 0-NX On-Path
- 0-NX Off-Path

- >= 10% Impact
• Expand transmission relief allocation to tagged transaction schedules and BA non-tagged impact equitably and effectively utilizing transmission priorities and a threshold impact.

• Ability to capture the impact breakdown of every transmission constraint created by a TOP, BA, or RC utilizing an existing application.

• Expand coordinated western interconnection congestion to all SOLs/IROLs and WECC Paths
EXPANDED WI CONG. MANAGEMENT

Tagged Interchange Impact

Generation Dispatch to serve native Load Impact (Markets Impacts + BA Impacts)

SOLs/IROL/WECC Paths

Activation by markets and Target Flow as Binding Limit

M2M on markets assigned relief is acceptable
SEAMS COORDINATION OVERVIEW

Western Interconnection Cong. Mgmt Coordination + Market-to-Market

WIUFMP

Expanded WI Coordination

Joint Operating Agreement

Qualified Paths

Any Transmission Element (SOL/IROL and Paths)

Coordinated Transmission Constraints (Flowgates or Service Flow Constraints)

Tagged Transaction Scheduled Curtailment

Tagged Transaction + “Markets” Impacts Re-dispatch + Balancing Authority Generation to Load Impacts Re-dispatch

“Market” Impacts Re-dispatch

Least Cost Solution between two Markets
CONGESTION & PRICE FORMATION
SCED follows unit commitment and determines the level at which each resource should be operated.

For DA: Establish dispatch levels for generation to meet bid-in load and operating reserves.
For RT: Establish dispatch instructions for generators to meet load forecast and Markets Obligation for next five (5)-minute period.

SCED

Supply Offer Clearing (DA) Generator Dispatches (RT)

Balances the Market

Maintains Operating Reserve and Security Constraints

Produces LMPs and MCPs

Produces final dispatch and LMPs for a given unit commitment.

Consider resource constraints and congestion management.
SYSTEM CONGESTION: IMPACT ON LMP/MCP

• LMPs are computed to reflect the cost to supply the next incremental MW of Energy at each location, including the economic impact of congestion when it exists:

  • LMPs in a lossless congested system will have the following components:

    • **Energy Component**: the price of energy at reference bus, energy component same for all pricing locations
      
      • SPP and other markets use load-weighted reference bus

    • **Congestion Component**: value determined based on the congestion economic impact of a net injection at the pricing location

    \[
    \text{LMP at Pricing Location} = \text{Energy Component} + \text{Congestion Component at that Pricing Location}
    \]

  • Because of co-optimization, the Market Clearing Price (MCP) of any other market product may also be impacted by the economic impact of congestion, when it exists
SCED FUNCTION: CONSTRAINT SHADOW PRICE

• A problem constraint can be associated with an economic impact value

• A potential change value of system production cost with respect to an incremental increase in limit on that constraint is known as the constraint shadow price

• For a given set of system solution variables, the following is true for any of the problem constraints:
  • When the constraint is not binding, its shadow price is zero
  • When the constraint is binding or breached, its shadow price is typically non-zero
SCED FUNCTION: SYSTEM CONGESTION

• When one or more transmission constraints are binding, the system is said to be congested

• System congestion results from the fact that the energy flow on one or more transmission constraints has reached the defined line maximum MW capability
TRANSMISSION CONGESTION COST EXAMPLE
NON BINDING CONSTRAINT
System Congestion: No congestion

<table>
<thead>
<tr>
<th>Bus 1</th>
<th>Bus 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load 1</td>
<td>Gen 1</td>
</tr>
<tr>
<td>Energy Award (MW): 100</td>
<td>Energy Offer Cost ($/MWH): 20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gen 1</th>
<th>Gen 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Award (MW): 120</td>
<td>Energy Award (MW): 80</td>
</tr>
</tbody>
</table>

Energy Award MW = 120MW

Line Rating = 25MW

LMP1 = 50 $/MWh
LMP2 = 50 $/MWh

Flowgate Shadow Price = 0 $/MWh

20 MW

123
System Congestion: Transmission Element at Limit - No congestion cost

**Total Production Cost = $ 6,400**

- **Energy Award MW = 120MW**
- **Energy Award MW = 80MW**

**Line Rating = 20MW**

- **Gen 1**
  - Econ. Cap. Min (MW): 50
  - Econ. Cap. Max (MW): 120
  - Energy Offer Cost ($/MWH): 20

- **Gen 2**
  - Econ. Cap. Min (MW): 50
  - Econ. Cap. Max (MW): 120
  - Energy Offer Cost ($/MWH): 50

- **Load 1**
  - Energy Award (MW): 100

- **Load 2**
  - Energy Award (MW): 100

- **Flowgate Shadow Price = 0 $/MWh**

- **LMP1 = 50 $/MWh**
- **LMP2 = 50 $/MWh**

- **MEC = Load weighted LMP = $50**
- **MCC at Bus 1 = $0**
- **MCC at Bus 2 = $0**

- **System Congestion:** Transmission Element at Limit

- **Transmission Element at Limit**
  - No congestion cost

- **When there is no congestion and no losses:**
  - LMPs are uniform throughout the Market footprint,
  - An incremental change on the flowgate limit will not impact the market results
  - The shadow price of the flowgate constraint is zero
  - The system is dispatched in the most economic way possible and is not limited by transmission
TRANSMISSION CONGESTION COST EXAMPLE

BINDING CONSTRAINT
System Congestion: Energy Only – Binding Flowgate

- Let's determine for a 1-hour Market:
  - Each Market Participant Resource award (Energy)
  - Each Bus LMP
  - The market's total production cost
  - The flowgate shadow price
  - The congestion impact for each bus LMP based on the physical flow
System Congestion: Energy Only – Binding Flowgate

**Total Production Cost = $ 6,550**

**Line Rating = 15 MW**

**Energy Award MW = 115 MW**

**Energy Award MW = 85 MW**

- **LMP1 = 20 $/MWh**
- **LMP2 = 50 $/MWh**

**Flowgate Shadow Price = -30 $/MW**

- When there is congestion:
  - LMPs are reflective of the transmission limits
  - The shadow price of the flowgate constraint is **-30 $/MW**.
  - What does that mean? Remember shadow price is **change in system production cost with respect to an incremental increase in limit on that constraint**

**MEC = Load weighted LMP = $35**

**MCC at Bus 1 = ($-15)**

**MCC at Bus 2 = ($15)**
QUESTIONS/DISCUSSION
MARKETS +
Afternoon Break
3:00 – 3:30
GENERAL SESSION IV
CONGESTION RENT
ALLOCATION
## AGENDA – GENERAL SESSION IV
### CONGESTION RENT ALLOCATION

<table>
<thead>
<tr>
<th>Agenda Item</th>
<th>Description</th>
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<tbody>
<tr>
<td>Transmission Service Reservations – An Overview</td>
<td></td>
</tr>
<tr>
<td>Congestion Hedging Principles</td>
<td></td>
</tr>
<tr>
<td>Allocation of Congestions Rents – An Overview</td>
<td></td>
</tr>
<tr>
<td>Allocation Methodology Examples</td>
<td></td>
</tr>
<tr>
<td>Uplift</td>
<td></td>
</tr>
<tr>
<td>Option vs. Obligation</td>
<td></td>
</tr>
<tr>
<td>Timelines</td>
<td></td>
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<tr>
<td>Questions/Discussion</td>
<td></td>
</tr>
<tr>
<td>Next Steps</td>
<td></td>
</tr>
</tbody>
</table>
CONGESTION RENT ALLOCATION OVERVIEW

MICHA BAILEY
TRANSMISSION SERVICE RESERVATIONS
AN OVERVIEW
TRANSMISSION SERVICE RESERVATIONS

• Transmission Service Reservations (TSR)s are Physical Transmission Rights

• The objective of TSRs is to ensure the reliable delivery of Energy (from specific generators to loads) and Capacity, and.....
  • Mechanism to ensure that Load Serving Entities have Capacity Requirements met for Resource Adequacy
  • Provides compensation to Transmission Owners for the use of the transmission system

• TSR reserves a specific amount of
  • capacity in megawatts (MW)
  • across a specific transmission system path (i.e. from A to B)
  • for a given timeframe
TYPES OF FIRM TSRs

• **Network Integrated Transmission Service (NITS)**
  Delivery from a generation station (or stations) to a load settlement location

• **Firm Point-to-Point (FPTP)**
  Delivery from a one location on the grid to another location on the grid. Today, used primarily for exports/imports into SPP

• **Grandfathered Agreements (GFAs)**
  A pre-existing contractual agreement prior to SPP Tariff that is the network equivalent to NITS

• **Conditional Firm Service**
  Treated as firm when specific conditions are met
## Transmission Service Reservation Priorities

<table>
<thead>
<tr>
<th>Priority</th>
<th>Acronym</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>NX</td>
<td>Next-hour Market Service</td>
</tr>
<tr>
<td>1</td>
<td>NS</td>
<td>Service over secondary receipt and delivery points</td>
</tr>
<tr>
<td>2</td>
<td>NH</td>
<td>Hourly Service</td>
</tr>
<tr>
<td>3</td>
<td>ND</td>
<td>Daily Service</td>
</tr>
<tr>
<td>4</td>
<td>NW</td>
<td>Weekly Service</td>
</tr>
<tr>
<td>5</td>
<td>NM</td>
<td>Monthly Service</td>
</tr>
<tr>
<td>6</td>
<td>NN</td>
<td>Network Integration Transmission Service from sources not designated as network resources</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>Firm Point-to-Point Transmission</td>
</tr>
<tr>
<td></td>
<td>FN</td>
<td>Network Integration Transmission Service from Designated Resources</td>
</tr>
</tbody>
</table>
CONGESTION HEDGING PRINCIPLES

THE BASICS
WHY DO WE HAVE CONGESTION REVENUE?

• When elements on the transmission grid are at their limit, they can no longer support additional flow in power.

• When this happens in an Energy Market, more expensive generation must be dispatched to provide displacement power to relieve this physical constraint and serve load.

• As such, price separation occurs between total generation payments and total load charges. This separation occurs on either side of a congestion path (see example).
CONGESTION AND PRICING

No Congestion:

- Money In = Money Out
- Net revenue = $0

Example:

<table>
<thead>
<tr>
<th>MP</th>
<th>Settled</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN_1</td>
<td>$20 x 99 MW</td>
<td>$-1,980</td>
</tr>
<tr>
<td>GEN_2</td>
<td>$50 x 0 MW</td>
<td>$-</td>
</tr>
<tr>
<td>LOAD</td>
<td>$20 x 99 MW</td>
<td>$1,980</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>$0</td>
</tr>
</tbody>
</table>
Congestion:

- Money In ≠ Money Out
- $3,000 Over-Collection

Example:

<table>
<thead>
<tr>
<th>MP</th>
<th>Settled</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN₁</td>
<td>$20 x -100 MW</td>
<td>-$2,000</td>
</tr>
<tr>
<td>GEN₂</td>
<td>$50 x -1 MW</td>
<td>-$50</td>
</tr>
<tr>
<td>LOAD</td>
<td>$50 x 101 MW</td>
<td>$5,050</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>$3,000</td>
</tr>
</tbody>
</table>
Congestion in electricity can expose market participants to high energy costs.

Owners of transmissions rights need to be protected from high energy costs.
BENEFITS OF CONGESTION RENT ALLOCATION

- Puts a value on firm Transmission Service Reservations (TSRs)
  - Provides compensation of Day-Ahead congestion rents based upon difference in Marginal Congestion Component (MCC)s at the Source and Sink locations
- Makes load indifferent from which generators are committed in the Day Ahead Market
- Hedges against volatility of the MCC of the Local Marginal Price (LMP)
  - Congestion can swing hour by hour
ALLOCATION OF CONGESTION RENTS
OVERVIEW

MARKETS+
CONGESTION RENTS

DA Congestion Rents
- Sum up all Generators
- Sum up all Loads
- Net out losses

Allocation of DA Congestion Rents
Allocation of Congestion Rent Collected

- Allocation, no market functions
  - No Simultaneous Feasibility Testing
- TSR Path based
  - Source, Sink, and MWs
- Allocation cap
  - Network = 103% * (Average last three years of peak load)
  - PTP = MWs on PTP reservation
ALLOCATION OF CONGESTION RENT COLLECTED

• No uplift calculations
  • What is collected, allocate back

• All positions will be options not obligations
  • Counter flow positions will have a value of $0

• Allocation value determined as:
  • \[
  \frac{\text{TSR MWs} \times (\text{Source MCC} - \text{Sink MCC})}{\text{Sum of Markets} + \text{TSR MWs} \times (\text{Source MCC} - \text{Sink MCC})}
  \]
ALLOCATION METHODOLOGY EXAMPLES
ALLOCATION METHODOLOGY

• Allocation based all of MP’s TSRs vs MP submitted TSRs
  • All of MP’s TSRs
    • Congestion rent allocation based on prorate of all TSR paths up to allocation capacity
  • MP submitted TSRs
    • Outaged resources not eligible
    • Baseload schedules could be included
    • Allocate based on the full value of the path or prorate based on congestion rent collected? (Uplift discussion)
ALLOCATION METHODOLOGY

• Example

• 4 MPs
• In this internal the market collected $1,000
• How will this be allocated?
  • \[
  \frac{\text{TSR MWs} \times (\text{Source MCC} - \text{Sink MCC})}{\text{Sum of Markets}} + \frac{\text{TSR MWs} \times (\text{Source MCC} - \text{Sink MCC})}{\text{Sum of Markets}}
  \]
**Allocation Method Example:**
*MP Submitted TSR V. All TSRS*

<table>
<thead>
<tr>
<th>Source MCC Value</th>
<th>Sink MCC Value</th>
<th>MP Submitted TSR</th>
<th>All TSRS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MWs Chosen</td>
<td>Value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MP1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSR 1</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSR 2</td>
<td>50</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td><strong>MP 2</strong></td>
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</tr>
<tr>
<td>TSR 1</td>
<td>100</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>TSR 2</td>
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<td>5</td>
<td>20</td>
</tr>
<tr>
<td><strong>MP 3</strong></td>
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</tr>
<tr>
<td>TSR 1</td>
<td>100</td>
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<td>10</td>
</tr>
<tr>
<td><strong>MP 4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTP TSR 1</td>
<td>50</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>SPP Total</td>
<td></td>
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</tr>
</tbody>
</table>

Congestion Rent Collected = $1,000
ALLOCATION METHODOLOGY

• [TSR MWs * (Source MCC minus Sink MCC)]/ Sum of Markets + [TSR MWs * (Source MCC minus Sink MCC)]

• MP 1 – Pick the Path
  • 50 * (1 – 10) = $450 / $1600 = 0.28125
  • 0.28125 * $1000 = $281.25

• MP 1 – All TSRs
  • [25 * (5 - 10)] + [25 * (1 - 10)]
  • ($125 + $225) / $1166.67 = 0.3
  • 0.3 * $1000 = $300
Allocation Method Example

Congestion Rent Collected = $1,000

<table>
<thead>
<tr>
<th></th>
<th>MP 1</th>
<th>MP 2</th>
<th>MP 3</th>
<th>MP 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP Submitted Path</td>
<td>$281.25</td>
<td>$468.75</td>
<td>$156.25</td>
<td>$93.75</td>
</tr>
<tr>
<td>Full Set of TSRs</td>
<td>$300.00</td>
<td>$357.14</td>
<td>$214.29</td>
<td>$128.57</td>
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Congestion Rent Collected = $1,000
ALLOCATION METHOD EXAMPLE:
MP SUBMITTED TSR V. ALL OF MP’S TSRS

**MP Submitted TSRs**

- **Pros:**
  - MPs are able to select which TSRs they deem valuable

- **Cons:**
  - Potentially less equitable in the long-term since allocation of congestion could favor MPs with higher valued TSRs
  - Implementation price goes up

**All of MP’s TSRs**

- **Pros:**
  - All TSRs are valued
  - Allocation essentially becomes a function of settlements
  - Cost to implement is less

- **Cons:**
  - MPs are unable to select which TSRs they deem valuable
UPLIFT
## Allocation of Congestion Rent Collected with and Without Uplift

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>With Uplift</th>
<th></th>
<th>Without Uplift</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Ratio</td>
<td>Money Paid to AO</td>
<td>Money Paid Back by AO</td>
<td>Ratio</td>
</tr>
<tr>
<td>MP 1</td>
<td>-$350</td>
<td>30%</td>
<td>$350</td>
<td>$50</td>
<td>30%</td>
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<tr>
<td>MP 2</td>
<td>-$416.67</td>
<td>35.7%</td>
<td>$416.67</td>
<td>$59.67</td>
<td>35.7%</td>
</tr>
<tr>
<td>MP 3</td>
<td>-$250</td>
<td>21.4%</td>
<td>$250</td>
<td>$36</td>
<td>21.4%</td>
</tr>
<tr>
<td>MP 4</td>
<td>-$150</td>
<td>12.9%</td>
<td>$150</td>
<td>$21</td>
<td>12.9%</td>
</tr>
<tr>
<td>Total</td>
<td>-$1,166.67</td>
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<td>$1,166.7</td>
<td>$166.67</td>
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</tbody>
</table>

Congestion Rent: $1,000
# Uplift Calculation MWS vs Value

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<thead>
<tr>
<th>MP</th>
<th>MWs</th>
<th>Source MCC</th>
<th>Sink MCC</th>
<th>Value</th>
<th>Based on MWs</th>
<th>Based on Value</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ratio</td>
<td>Money Paid</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Back by AO</td>
<td>by AO</td>
</tr>
<tr>
<td>MP 1</td>
<td>25</td>
<td>5</td>
<td>10</td>
<td>-$125</td>
<td>25%</td>
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<tr>
<td></td>
<td>25</td>
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<td>10</td>
<td>-$225</td>
<td>25%</td>
<td>$41.67</td>
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<tr>
<td>MP 2</td>
<td>33.33</td>
<td>5</td>
<td>10</td>
<td>-$166.67</td>
<td>25%</td>
<td>$41.67</td>
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<tr>
<td></td>
<td>16.67</td>
<td>5</td>
<td>20</td>
<td>-$250</td>
<td>25%</td>
<td>$41.67</td>
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<tr>
<td>MP 3</td>
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<td>-$250</td>
<td>25%</td>
<td>$41.67</td>
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<tr>
<td>MP 4</td>
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<td>Total</td>
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<td></td>
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<td>-$1,166.67</td>
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<td>$166.67</td>
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<tr>
<td>Congestion Rent</td>
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<td></td>
<td></td>
<td>$1,000</td>
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</table>
OPTION VS OBLIGATION
OPTION VS OBLIGATION

- **Option**
  - Counterflow positions will be set to $0 in the valuation of the allocation of congestion rents

- **Obligation**
  - Counterflow positions would pay in to bucket of congestion rents

Since the Markets+ construct is an Allocation of congestion rent and there are no market functions, obligations are unnecessary, therefore Markets+ will utilize options.
• Congestion Rent Allocation - Daily

• TSR submissions – Any increment from one year to daily
  • Benefits of doing daily is that firm service sold for that day could receive a portion of the congestion rents
  • Daily submissions would need to be coordinated with close of DAMKT
  • Benefits of doing seasonally or monthly is that the MP will only have to submit TSRs 4-12 times a year

• HPL submissions – Monthly
**TIME LINES**

TSR Submissions & HPL Submissions at the start of every month
12 times a year


TSR Submissions everyday
365 times a year
QUESTIONS/DISCUSSION
NEXT STEPS
RECEPTION
5:30 – 6:30

DOUBLETREE HOTEL
83 E. 120TH AVE., THORNTON
MARKETS