

# MARKETS



Portland, OR Meeting  
August 10, 2022



*Working together to responsibly and economically  
keep the lights on today and in the future.*



SouthwestPowerPool



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**WESTERN  
ENERGY  
SERVICES**

# WELCOME BACK

BRUCE REW

SPP SR. VP, OPERATIONS

# AGENDA – AUGUST 10

<b>8:30-10:00</b>	<b>Workshop Session III – General Session: Settlements</b>
<b>10:00-10:30</b>	<b>Morning Break</b>
<b>10:30-12:00</b>	<b>Workshop Session IV – Breakout Sessions</b>
	Governance: MPEC Voting Structure (Firs)
	Joint Transmission/Market Design: Functional Roles and Responsibilities (Main)
<b>12:00-1:00</b>	<b>Lunch</b>
<b>1:00-2:30</b>	<b>Workshop Session V – Breakout Sessions</b>
	Governance: Types of Sector Voting (MIP NC, WGs) (Firs)
	Transmission: Mkt Transmission Service Rev Recovery (Cedars)
	Market Design: Unit Commitment/Resource Sufficiency (Main)

# AGENDA – AUGUST 10

<b>2:30-3:00</b>	<b>Afternoon Break</b>
<b>3:00-4:30</b>	<b>Workshop Session VI – General Session: GHG Tracking and Accounting</b>
<b>4:30-5:00</b>	<b>Closing Session</b>
	Service Offering
	Next Steps/Schedule

# WORKSHOP SESSION III

## GENERAL SESSION: SETTLEMENTS

# AGENDA – WORKSHOP SESSION III

## SETTLEMENTS

<b>General Overview</b>	Timelines
	Meter Data Submission
	Reporting
	SPP Settlement Management System
<b>Settlement Design</b>	Day Ahead vs. Real Time
	Determinants/Charge Types
	Distribution Methods
	Revenue Neutrality Uplift (RNU)
	Make Whole Payment/Out of Merit
	Recovery of Market Transmission Service Use Costs

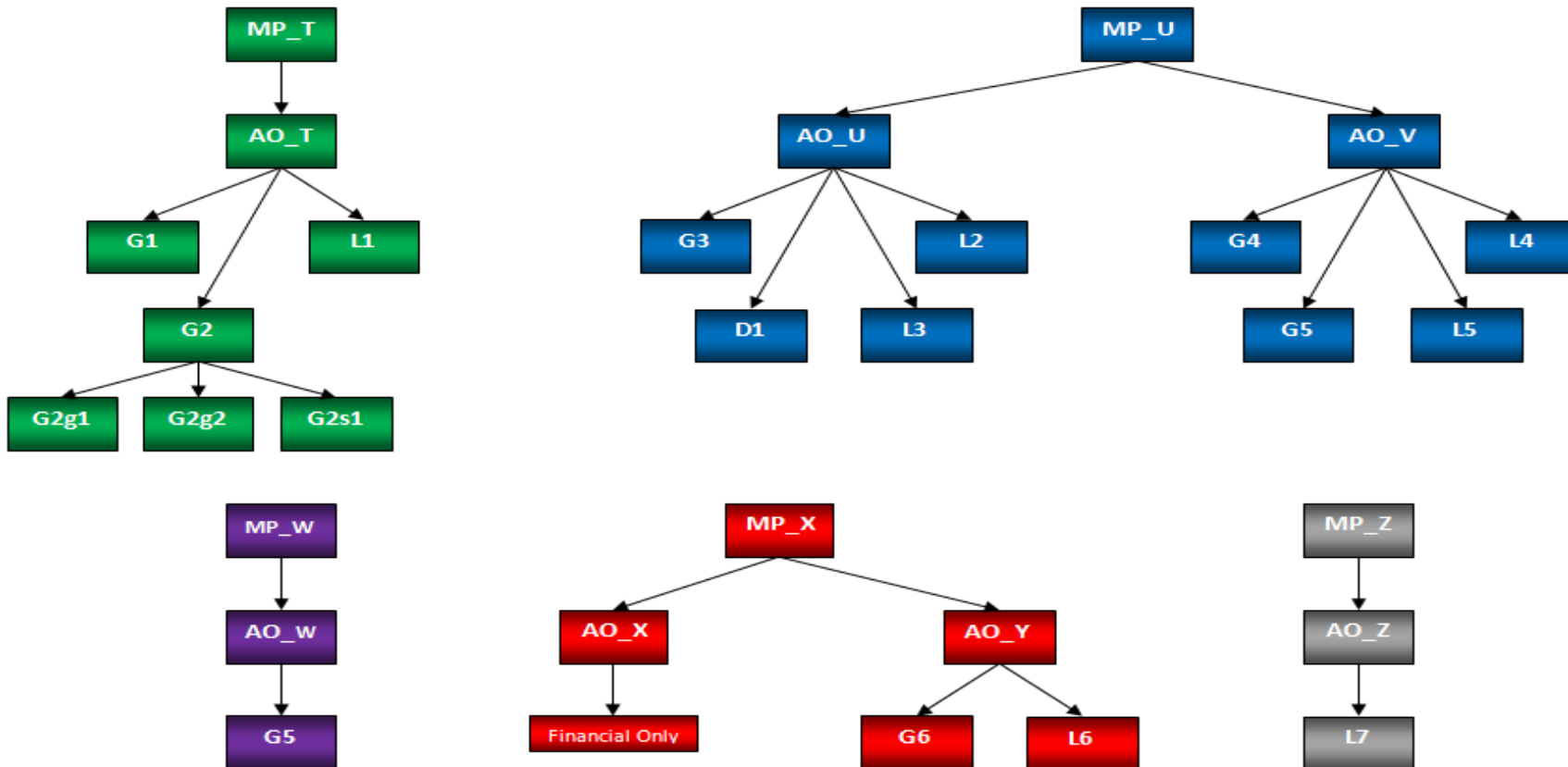
# GENERAL OVERVIEW

TIMELINES

# MODELING

Commercial Model:

Financial Entities & Relationships

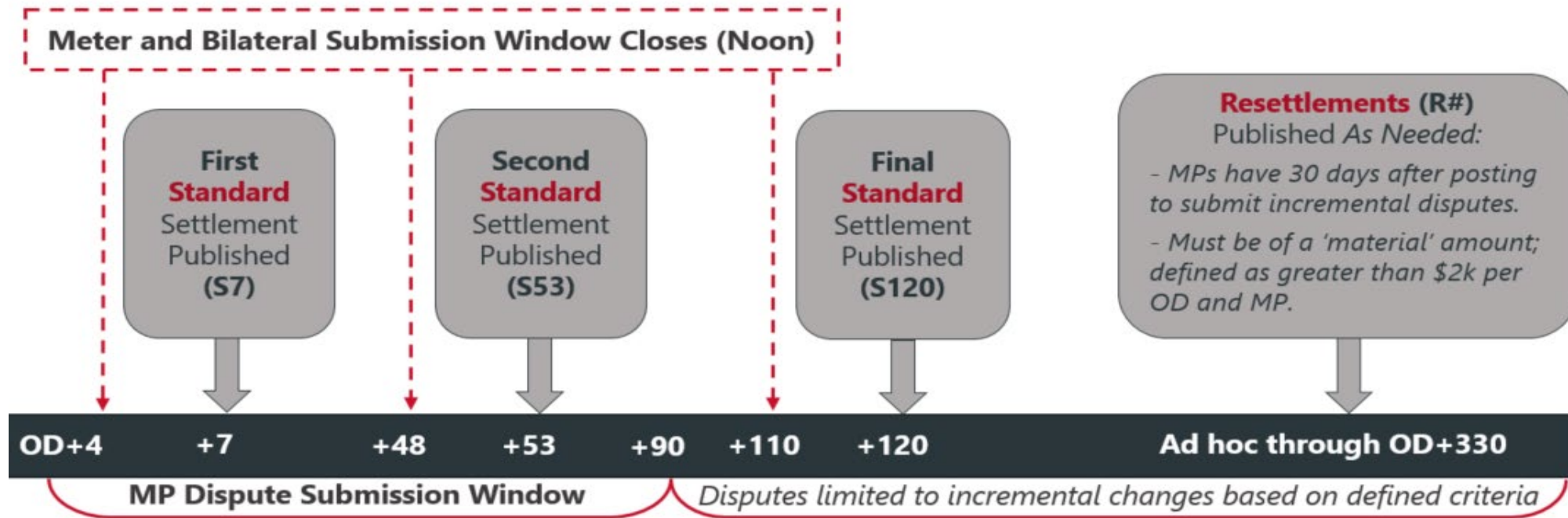


Legend:

- AO = Asset Owner
- MP = Market Participant
- G = Generator
- L = Load
- D = Demand Response



# TIMELINES



- Three standard daily postings: S7, S53, S120
  - Number indicates calendar days after the operating day; S7 posts 7 days after the operating day.
  - No postings on weekends or holidays; move to the next business day
- Meter data due OD+4 (S7), OD+48 (S53), OD+110 (S120)

# TIMELINES

- Resettlements are scheduled as needed (R#) in order to correct issues that are not resolved by the S120
  - Caused by granting a dispute, data or software error, court order or FERC order
  - Must be of a 'material' amount; defined as \$2k per MP per day
  - Limited to 330 days after the OD allowing for a dispute period
  - Can not exceed 365 days (1 year limit) without FERC order
- Invoices
  - Post weekly on Thursdays and include all settlement postings for the prior Wednesday through current Tuesday.

# CALENDAR EXAMPLE

February 2022						
Sun	Mon	Tues	Wed	Thu	Fri	Sat
		1	2	3	4	5
		S7 Data Due 28-Jan-22 S53 Data Due 15-Dec-21 S120 Data Due 14-Oct-21	S7 Data Due 29-Jan-22 S53 Data Due 16-Dec-21 S120 Data Due 15-Oct-21	S7 Data Due 30-Jan-22 S53 Data Due 17-Dec-21 S120 Data Due 16-Oct-21	S7 Data Due 31-Jan to 2-Feb-22 S53 Data Due 18-Dec to 20-Dec-21 S120 Data Due 17-Oct to 19-Oct-21	
		S7 Posting 25-Jan-22 S53 Posting 10-Dec-21 S120 Posting 4-Oct-21	S7 Posting 26-Jan-22 S53 Posting 11-Dec-21 S120 Posting 5-Oct-21	S7 Posting 27-Jan-22 S53 Posting 12-Dec-21 S120 Posting 6-Oct-21	S7 Posting 28-Jan-22 S53 Posting 13-Dec-21 S120 Posting 7-Oct-21 R352 17-Feb-21	
			Invoice Due Date 27-Jan-22	Invoice Posting 3-Feb-22	Invoice Pay Date 27-Jan-22	
6	7	8	9	10	11	12
S7 Data Due 3-Feb-22 S53 Data Due 21-Dec-21 S120 Data Due 20-Oct-21	S7 Data Due 4-Feb-22 S53 Data Due 22-Dec-21 S120 Data Due 21-Oct-21	S7 Data Due 5-Feb-22 S53 Data Due 23-Dec-21 S120 Data Due 22-Oct-21	S7 Data Due 6-Feb-22 S53 Data Due 24-Dec-21 S120 Data Due 23-Oct-21	S7 Data Due 7-Feb to 9-Feb-22 S53 Data Due 25-Dec to 27-Dec-21 S120 Data Due 24-Oct to 26-Oct-21		
SD 2/5 2/6 2/7 S7 Posting 29-Jan-22 30-Jan-22 31-Jan-22 S53 Posting 14-Dec-21 15-Dec-21 16-Dec-21 S120 Posting 8-Oct-21 9-Oct-21 10-Oct-21	S7 Posting 1-Feb-22 S53 Posting 17-Dec-21 S120 Posting 11-Oct-21	S7 Posting 2-Feb-22 S53 Posting 18-Dec-21 S120 Posting 12-Oct-21 R359 15-Feb-21	S7 Posting 3-Feb-22 S53 Posting 19-Dec-21 S120 Posting 13-Oct-21	S7 Posting 4-Feb-22 S53 Posting 20-Dec-21 S120 Posting 14-Oct-21		
			Invoice Due Date 3-Feb-22	Invoice Posting 10-Feb-22	Invoice Pay Date 3-Feb-22	
13	14	15	16	17	18	19
S7 Data Due 10-Feb-22 S53 Data Due 28-Dec-21 S120 Data Due 27-Oct-21	S7 Data Due 11-Feb-22 S53 Data Due 29-Dec-21 S120 Data Due 28-Oct-21	S7 Data Due 12-Feb-22 S53 Data Due 30-Dec-21 S120 Data Due 29-Oct-21	S7 Data Due 13-Feb-22 S53 Data Due 31-Dec-21 S120 Data Due 30-Oct-21	S7 Data Due 14-Feb to 16-Feb-22 S53 Data Due 1-Jan to 3-Jan-22 S120 Data Due 31-Oct to 2-Nov-21		
SD 2/12 2/13 2/14 S7 Posting 5-Feb-22 6-Feb-22 7-Feb-22 S53 Posting 21-Dec-21 22-Dec-21 23-Dec-21 S120 Posting 15-Oct-21 16-Oct-21 17-Oct-21	S7 Posting 8-Feb-22 S53 Posting 24-Dec-21 S120 Posting 18-Oct-21	S7 Posting 9-Feb-22 S53 Posting 25-Dec-21 S120 Posting 19-Oct-21	S7 Posting 10-Feb-22 S53 Posting 26-Dec-21 S120 Posting 20-Oct-21	S7 Posting 11-Feb-22 S53 Posting 27-Dec-21 S120 Posting 21-Oct-21		
			Invoice Due Date 10-Feb-22	Invoice Posting 17-Feb-22	Invoice Pay Date 10-Feb-22	
20	21	22	23	24	25	26
S7 Data Due 17-Feb-22 S53 Data Due 4-Jan-22 S120 Data Due 3-Nov-21	S7 Data Due 18-Feb-22 S53 Data Due 5-Jan-22 S120 Data Due 4-Nov-21	S7 Data Due 19-Feb-22 S53 Data Due 6-Jan-22 S120 Data Due 5-Nov-21	S7 Data Due 20-Feb-22 S53 Data Due 7-Jan-22 S120 Data Due 6-Nov-21	S7 Data Due 21-Feb to 23-Feb-22 S53 Data Due 8-Jan to 10-Jan-22 S120 Data Due 7-Nov to 9-Nov-21		
SD 2/19 2/20 2/21						

# GENERAL OVERVIEW

METER DATA

# METER DATA

- Can be submitted at a granularity of 5-minute or hourly
  - API or XML Upload
- State Estimator data is used if meter data is not submitted

# METER REPORTS

- Meter Reports available near real-time or as of posting
  - Report Card
    - Missing Meter
    - Calibration (unaccounted energy)
    - State Estimator
    - Billable
  - Calibration
    - By Settlement Area
  - Interchange
    - For Reciprocal Tie Locations in the Settlement Area

# METER REPORTS

- Meter Agent – Access to all locations assigned to the MA
  - Calibration
  - Report Card
  - Interchange
- Market Participant – Access to all locations assigned to the MP
  - Calibration
  - Report Card
- Asset Owner – Access to all locations assigned to the AO
  - Calibration

# METER REPORTS

MA Reports

Report Type \*

Report Card

Report Card

Interchange

Calibration

Settlement Type \*

S7

Choose Report



MA Reports

Report Type \*

Report Card

Operating Date \*

2021-08-25

Settlement Type \*

S7

Live

S7

Choose Settlement Type





# METER REPORTS – REPORT CARD

## Report Card

Market Participant: MP\_T  
Settlement Type: S7  
MLs Not Submitted: 0

Operating Date: 2021-08-31  
Calculated Date: 2021-09-20T16:14:54  
Latest Data Submit Date: 2021-07-28T08:39:38

 XML

 CSV

Filter by Meter Location

SUBMITTED:

YES

NO

SA: SA\_A

MLs Not Submitted: 0

ML: L1 MA: MA_A	LOAD	Submitted: Yes	Submission Type: Five Minute
ML: G1 MA: AECC	GEN	Submitted: Yes	Submission Type: Hourly
ML: G2 MA: MA_A	GEN	Submitted: Yes	Submission Type: Five Minute

# METER REPORTS – REPORT CARD

## Report Card

Market Participant: MP\_T  
 Settlement Type: S7  
 MLs Not Submitted: 0

Operating Date: 2021-08-31  
 Calculated Date: 2021-09-20T16:14:54  
 Latest Data Submit Date: 2021-07-28T08:39:38

 XML

 CSV

Filter by Meter Location ▼

SUBMITTED:

YES

NO

SA: SA\_A

MLs Not Submitted: 0

ML: L1

LOAD

Submitted: Yes

Submission Type: Five Minute

MA: MA\_A

Hour Ending:	Submitted	SE	Loss	Calibration	Billable
2021-08-31T 01:00:00	82.500	82.250	8.250	3.276	77.526
2021-08-31T 02:00:00	82.500	82.250	8.250	3.276	77.526
2021-08-31T 03:00:00	82.500	82.250	8.250	3.276	77.526
2021-08-31T 04:00:00	82.500	82.250	8.250	3.276	77.526
2021-08-31T 05:00:00	82.500	82.250	8.250	3.276	77.526

# METER REPORTS – REPORT CARD

SA: SA\_A

MLs Not Submitted: 0

ML: L1

LOAD

Submitted: Yes Submission Type: Five Minute

MA: MA\_A

Hour Ending: 2021-08-31T01:00:00

Submitted	SE	Loss	Calibration	Billable
82.500	82.250	8.250	3.276	77.526

Five Minute Ending	Submitted	SE	Adjusted	Load Gross Up	Loss	Calibration	Billable
2021-08-31T00:05:00	6.500	78.000	70.000		8.000	3.107	73.107
2021-08-31T00:10:00	6.583	79.000	70.996		8.000	3.147	74.143
2021-08-31T00:15:00	6.667	79.000	72.004		8.000	3.147	75.151
2021-08-31T00:20:00	6.667	80.000	72.004		8.000	3.186	75.190
2021-08-31T00:25:00	6.750	81.000	73.000		8.000	3.226	76.226
2021-08-31T00:30:00	6.833	82.000	73.996		8.000	3.266	77.262
2021-08-31T00:35:00	6.917	83.000	75.004		8.000	3.306	78.310
2021-08-31T00:40:00	7.000	83.000	76.000		8.000	3.306	79.306
2021-08-31T00:45:00	7.083	84.000	76.996		8.000	3.346	80.342
2021-08-31T00:50:00	7.083	85.000	75.996		9.000	3.386	79.382
2021-08-31T00:55:00	7.167	86.000	77.004		9.000	3.425	80.429
2021-08-31T01:00:00	7.250	87.000	78.000		9.000	3.465	81.465

# METER REPORTS – CALIBRATION

## Calibration Report

Market Participant: MP\_T  
Settlement Type: S7

Operating Date: 2021-08-31  
Calculated Date: 2021-09-20T16:14:54  
Latest Data Submit Date: 2021-07-28T08:39:38

 XML

 CSV

Filter by Meter Location

SA: SA\_A

Generation	Interchange	Load	Loss	Calibration
-12993.992	-5440.000	12712.659	523.333	5198.008

# METER REPORTS – CALIBRATION

## Calibration Report

Market Participant: MP\_T  
Settlement Type: S7

Operating Date: 2021-08-31  
Calculated Date: 2021-09-20T16:14:54  
Latest Data Submit Date: 2021-07-28T08:39:38

 XML

 CSV

Filter by Meter Location ▼

SA: SA_A	Generation	Interchange	Load	Loss	Calibration	
	-12993.992	-5440.000	12712.659	523.333	5198.008	^
Hour Ending: 2021-08-31T 01:00:00	Generation	Interchange	Load	Loss	Calibration	▼
	-203.334	-85.000	268.250	8.250	11.835	
Hour Ending: 2021-08-31T 02:00:00	Generation	Interchange	Load	Loss	Calibration	▼
	-203.334	-85.000	268.250	8.250	11.835	
Hour Ending: 2021-08-31T 03:00:00	Generation	Interchange	Load	Loss	Calibration	▼
	-203.334	-85.000	268.250	8.250	11.835	
Hour Ending: 2021-08-31T 04:00:00	Generation	Interchange	Load	Loss	Calibration	▼
	-203.334	-85.000	268.250	8.250	11.835	
Hour Ending: 2021-08-31T 05:00:00	Generation	Interchange	Load	Loss	Calibration	▼
	-203.334	-85.000	268.250	8.250	11.835	
Hour Ending: 2021-08-31T 06:00:00	Generation	Interchange	Load	Loss	Calibration	▼
	-203.334	-85.000	268.250	8.250	11.835	
Hour Ending: 2021-08-31T 07:00:00	Generation	Interchange	Load	Loss	Calibration	▼
	-608.834	-255.000	582.000	24.583	257.251	

# METER REPORTS – INTERCHANGE REPORT

## Interchange Report

 XML

 CSV

Meter Agent: MA\_C  
Settlement Type: S7  
MLs Not Submitted: 0  
Recip MLs Not Submitted: 0  
Total  $\Delta$ : 8.000

Operating Date: 2021-08-31T00:00:00  
Calculated Date: 2021-09-20T16:14:54  
Latest Data Submit Date: 2021-07-28T08:39:38  
Max Hourly  $\Delta$ : 1.000

Filter by Meter Location

ML SUBMITTED:

YES

NO

Daily  $\Delta$  Threshold: \_\_\_\_\_

Hourly  $\Delta$  Threshold: \_\_\_\_\_

SA: SA\_C

Missing MLs	Missing Recip MLs	Max Hourly $\Delta$	Total $\Delta$
0	0	1.000	8.000

# METER REPORTS – INTERCHANGE REPORT

SA: SA_C	Missing MLs	Missing Recip MLs	Max Hourly Δ		Total Δ	
	0	0	1.000		8.000	^
<b>Hour Ending:</b> 2021-08-31T 01:00:00	<b>Agent</b>	<b>Recip Agent</b>	<b>SE</b>	<b>Recip SE</b>	<b>Total Δ</b>	∨
	48.000	-48.000	48.000	-48.000	0.000	
<b>Hour Ending:</b> 2021-08-31T 02:00:00	<b>Agent</b>	<b>Recip Agent</b>	<b>SE</b>	<b>Recip SE</b>	<b>Total Δ</b>	∨
	48.000	-48.000	48.000	-48.000	0.000	
<b>Hour Ending:</b> 2021-08-31T 03:00:00	<b>Agent</b>	<b>Recip Agent</b>	<b>SE</b>	<b>Recip SE</b>	<b>Total Δ</b>	∨
	48.000	-48.000	48.000	-48.000	0.000	
<b>Hour Ending:</b> 2021-08-31T 04:00:00	<b>Agent</b>	<b>Recip Agent</b>	<b>SE</b>	<b>Recip SE</b>	<b>Total Δ</b>	∨
	48.000	-48.000	48.000	-48.000	0.000	
<b>Hour Ending:</b> 2021-08-31T 05:00:00	<b>Agent</b>	<b>Recip Agent</b>	<b>SE</b>	<b>Recip SE</b>	<b>Total Δ</b>	∨
	48.000	-48.000	48.000	-48.000	0.000	
<b>Hour Ending:</b> 2021-08-31T 06:00:00	<b>Agent</b>	<b>Recip Agent</b>	<b>SE</b>	<b>Recip SE</b>	<b>Total Δ</b>	∨
	48.000	-48.000	48.000	-48.000	0.000	
<b>Hour Ending:</b> 2021-08-31T 07:00:00	<b>Agent</b>	<b>Recip Agent</b>	<b>SE</b>	<b>Recip SE</b>	<b>Total Δ</b>	∨
	143.000	-143.000	143.000	-143.000	0.000	
<b>Hour Ending:</b> 2021-08-31T 08:00:00	<b>Agent</b>	<b>Recip Agent</b>	<b>SE</b>	<b>Recip SE</b>	<b>Total Δ</b>	∨
	143.000	-143.000	143.000	-143.000	0.000	
<b>Hour Ending:</b> 2021-08-31T 09:00:00	<b>Agent</b>	<b>Recip Agent</b>	<b>SE</b>	<b>Recip SE</b>	<b>Total Δ</b>	∨
	143.000	-143.000	143.000	-143.000	0.000	

# GENERAL OVERVIEW

REPORTING



# REPORTING

## PRIVATE

Determinant

Statement

Invoice

FERC

## PUBLIC

Historical

Calendar

# REPORTING - PRIVATE

- **Determinant Report (Daily)**
  - Most granular, includes all determinants and charge types
- **Statement (Daily)**
  - Roll-up at the Asset Owner and Market Participant Level
- **Invoice (Weekly)**
  - Only for Market Participants since they are financially responsible
- **FERC Reports**
  - In our current market, SPP creates these reports in the format FERC has requested as a convenience for the Members. They can download these reports and submit them to FERC.

# REPORTING - ACCESSIBILITY

## API\*

- Calendar\*\*
- Determinant
- Statement
- Invoice

## XML (Download)

- Determinant
- Statement
- Invoice

## CSV (Download)

- Determinant
- Statement
- Invoice

## PDF (Download)

- Calendar
- Invoice

\*API – Application Programmable Interface

\*\* Calendar is also available as an Excel file in the public reports

## REPORTING - PUBLIC

Historical

- SPP Market-wide rates
- Uplift (MWP, OOME, Products)

Calendar

- Excel File Download

# GENERAL OVERVIEW

SETTLEMENT MANAGEMENT SYSTEM (SMS)

# SETTLEMENT MANAGEMENT SYSTEM

- Maintained in-house, no vendors
  - Minimizes implementation time, provides flexibility, and cuts costs
- Adaptable and scalable
  - One system for different Settlement types (market, transmission)
- Shadow Calculation
  - Use a separate in-house program
  - Runs for all postings
  - Shadows 100% of the calculations for all entities

# SETTLEMENT DESIGN

DAY-AHEAD VS REAL-TIME

# DAY-AHEAD VS REAL-TIME

- Day-Ahead
  - Financially Binding
  - Hourly Settlements
- Real-Time
  - Difference between Real-Time and Day-Ahead
  - 5-Minute Settlements



# SETTLEMENT DESIGN

DETERMINANTS / CHARGE TYPES

# DETERMINANTS / CHARGE TYPES

- **Determinants**
  - Granular line items that are used as inputs to calculate Charge Types
    - Nodal/specific Settlement Locations
    - SPP or BA rates/ratios (uplift/distribution)
    - Settlement Area (Calibration)
    - Reserve Zones (Products)
- **Charge Types**
  - Represents amount that is charged or credited for certain market activity

# DETERMINANTS / CHARGE TYPES

	INTEGRATED MARKETPLACE	WEIS MARKET	MARKETS+
DETERMINANTS	1000+	93	~500
CHARGE TYPES	85	5	~50-55

# SETTLEMENT DESIGN

DISTRIBUTION METHODS

# DISTRIBUTION METHODS (COST CAUSATION)

Load Ratio Share

Market Activity

Deviation

# DISTRIBUTION METHODS

- Load Ratio Share
  - Load's share (percent) of total Market Load
- Collect monies from Loads to pay Generators for supplying products in RT
- Distribute calibration to Loads within a Settlement Area

# DISTRIBUTION METHODS

- Market Activity
  - DA Make Whole Payment Distribution
    - Withdrawal Only (Loads, Exports, Virtual Bids)
  - Revenue Neutrality Uplift (RNU)
    - Any Market Activity (Gen, Loads, Imports/Exports, Virtual)

# DISTRIBUTION METHODS

- Deviations / Cost Causers
  - RT Make Whole Payment Distribution
    - Deviations between DA and RT (Loads, Imports/Exports)
    - Virtual Offers
    - RT Generator Deviations



# SETTLEMENT DESIGN

REVENUE NEUTRALITY UPLIFT (RNU)

# REVENUE NEUTRALITY UPLIFT

- Mechanism to make SPP revenue neutral
- The amount of money paid out should equal the amount of money collected
- Sum all of the credits and charges across the market
  - Residual amounts (charge or credit) uplifted to Entities that participated in the Market: Gen, Load, Imports/Exports, and Virtuals
  - The more market activity an Entity has, the more the Entity will be charged or credited.

# REVENUE NEUTRALITY UPLIFT

- Causes
  - Rounding (related to the calculation of all Charges/Credits)
  - Joint Operating Agreements (Market to Market)
  - Out Of Merit Energy (OOME)
  - Miscellaneous Charges/Credits
  - Inadvertent Interchange (Difference between Actual vs. Scheduled Interchange transactions)

# SETTLEMENT DESIGN

MAKE WHOLE PAYMENT / OUT-OF-MERIT ENERGY

# MAKE-WHOLE PAYMENT

- Day-Ahead and Real-Time
- Mechanism to ensure Generator's costs are covered when committed by the market.
  - Eligible costs include: Start Up/Transition, No Load, Energy, Products
- Certain eligibility rules must be met
- Accounts for all types of Generators
  - Traditional Generators
  - Battery Storage
  - Combined Cycle that can transition

# OUT-OF-MERIT ENERGY

- Mechanism to financially recover costs/charges from an adverse effect of dispatching a unit non-economically
- Consists of three parts:
  - Incremental – OOME in the UP direction
    - Paid the difference of where you actually were and where you would have been
  - Decremental – OOME in the DOWN direction
    - Reimburses any Energy buy back in respect to the DA position
  - Flex Reserves – Reimburses any buy back since a unit can't clear during a manual dispatch.

# SETTLEMENT DESIGN

RECOVERY OF REGIONAL TRANSMISSION USE COSTS

# RECOVERY OF MARKET TRANSMISSION SERVICE USE COSTS

- Costs for Qualified Recovery (QR) amounts for Transmission use.
- This would remove a need for a separate Transmission Settlement instance, consolidating all settlement into a singular timeline.
- Calculate an hourly recovery (fixed cost) that is used to charge MPs for their share of market activity.
- MW activity – Participation in the market



# RECOVERY OF MARKET TRANSMISSION SERVICE USE COSTS

- Collection

$QR / 8760 = \text{Hourly Recovery Cost}$

$MP \text{ MW} / \text{Total Footprint MW} = MP \text{ MW } \%$

$\text{Recovery Cost} * MP \text{ MW } \% = MP \text{ Charge}$

- Distribution

$\frac{\text{Transmission Provider's QR}}{\text{Total QR Recovered}}$

# QUESTIONS/DISCUSSION

# MARKETS



MORNING BREAK

10:00-10:30



*Working together to responsibly and economically  
keep the lights on today and in the future.*



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**WESTERN  
ENERGY  
SERVICES**

# **WORKSHOP SESSION IV**

## **BREAKOUT SESSIONS**

# GOVERNANCE

FIRS ROOM

# AGENDA – WORKSHOP SESSION IV GOVERNANCE BREAKOUT

## MPEC VOTING STRUCTURE

# MARKETS+ PARTICIPANTS EXECUTIVE COMMITTEE (MPEC)

- Each Markets+ Participant will appoint a representative
- Authority:
  - Make recommendations to the MIP
  - Establish Working Groups and Task Forces

All Stakeholders should be Represented on the MPEC

Concerns about MPEC Chair appointing WG Representatives

Support Participant Only Composition

How will MPEC provide Recommendation to the MIP?  
Advisory?  
Non-binding?

If only Participants on the MPEC, create Advisory Group for Stakeholders?

# MPEC VOTING OPTIONS TO CONSIDER

## NIPPC Proposal: Three equally weighted sectors: (Unicameral)

- *Investor-owned utilities:* All Participants within this sector are “public utilities” under the Federal Power Act, are regulated by a state regulatory commission, and have a fiduciary responsibility to investors to earn a rate of return on ratebased assets.
- *Public power:* Participants in this sector would include publicly-owned utilities, electric cooperatives, power marketing administrations, and perhaps Powerex (as a subsidiary of BC Hydro – a Canadian Crown Corporation).
  - Given the significance of BPA, WAPA, and Powerex as wholesale marketers within the same sector as retail utilities, the sector may want to reserve a portion of the vote (for example, 30-50%) to those three entities or, alternatively, weight votes within the sector by load responsibility.
- *Independent:* Independent power producers, marketers, transmission developers, and end-users. This sector is purposefully a “catch-all” for Participants who aren’t utilities or publicly owned marketers. The presence of end-users within the sectors reflects uncertainty about the extent to which those entities will elect to become Participants while still reserving them a sector for purposes of MPEC voting.

## Other Weighted Voting Option (Unicameral)

Upon execution of a Participants Agreement, a Participant shall be assigned to one of two Membership sectors for the sole purpose of voting on matters before the Markets+ Participants Executive Committee: Balancing Authority Participants (BAP) or Other Participants.

Each sector votes separately with the result for that sector being a percent of approving votes to the total number of Participants voting. The BAP sector represents 50% of the vote and the Other Participants sector represents 50% of the vote.

An action is approved if the average of these two percentages is at least 66%.



# MPEC VOTING STRUCTURE

17 of 21 Commenters  
provided input

Prefers the Three Sector  
option (7)

- Not equally weighted
- Include a re-opener provision to reevaluate market participation

Prefers the BA/Non-BA  
sector voting structure (5)

Should MMS have Voting  
Rights?

# CONSENSUS BUILDING QUESTIONS

Unicameral or House/Senate Approach?

Two Sectors or Three Sectors?

Which Sectors?

Equal or Weighted Voting?

Reopener Clause to Revisit Sectors after Participants are Determined?

# JOINT: TRANSMISSION AND MARKET DESIGN

MAIN CONFERENCE ROOM

# AGENDA – WORKSHOP SESSION IV JOINT TRANSMISSION/MARKET DESIGN BREAKOUT

## FUNCTIONAL ROLES AND RESPONSIBILITIES

Reliability Coordinator
Balancing Authority
Transmission Operator
Transmission Service Provider
Transmission Owner
Generator Owner/Operator
Purchasing-Selling Entity
Load Serving Entity
Market Operator

# RELIABILITY COORDINATOR (RC)

- RC role remains the same as today
- SPP RC service not required for Markets+
- RC may interact with Market Operator (MO) for congestion management function in concert with Balancing Authority

# BALANCING AUTHORITY (BA)

- The MO will interact with the BA while performing the market function, but BA responsibilities will not change
  - Unit commitment/generation dispatch (close coordination with MO will be necessary)
  - BAAL compliance
  - Contingency reserve deployment
  - Regulating reserve deployment
- Data will be shared electronically
- Voice communication between the MO and the BA will take place as necessary to maintain reliability and market operation

# TRANSMISSION OPERATOR (TOP)

- TOP role remains the same as today
- TOP interaction with the BA and RC will remain unchanged
- Congestion management efforts may be coordinated between the TOP, BA and MO

# TRANSMISSION SERVICE PROVIDER (TSP)

- TSP role remains unchanged from today
- Information will need to be exchanged between the MO and TSP to ensure OATT rights and transmission set asides are acknowledged as well as market use of the transmission system
- MO will communicate market use of transmission to TSP in an electronic format
- After blackout period, short-term transmission sales can continue through real-time



# TRANSMISSION OWNER (TO)

- TO role will remain unchanged from today
  - Regional system planning
    - MO will provide data as requested and allowed to aid in planning processes, but will not provide planning services

# GENERATOR OWNER/OPERATOR (GO/GOP)

- GO/GOP function role remains the same as today
- Interaction with MO function for operation may be necessary depending on ownership and associated registration
- GO/GOP relationship with BA and TOP will remain as today

# PURCHASING-SELLING ENTITY (PSE)

- PSE role remains unchanged
- All NERC functions will continue to follow standard operating guidelines per their BA and TSP

# LOAD SERVING ENTITY (LSE)

- The LSE role will remain unchanged from today
- The LSE defined in the NERC Functional Model is not to be confused with, or equated to, the LSE as defined in any tariff

# MARKET OPERATOR (MO)

- Market operations is not a reliability function, all compliance requirements remain with the reliability functions
- The MO is responsible for the centralized commitments and dispatch of resources
- The MO preforms the role of resource integration following specific, agreed upon market and tariff rules recognized by states, federal and provincial regulators
- The MO will coordinate with the RC, BA and TOP as necessary to maintain reliability

# OTHER MARKET ROLES AND RESPONSIBILITIES

- **Market Participant (MP)**
  - An entity that generates, transmits, distributes, purchases, or sells electricity in the Markets+ Market
- **Asset Owner (AO)**
  - An aggregation of assets defined by a Market Participant through SPP's registration process that is eligible to be represented by the Market Participant through any combination of Resource and load.

# QUESTIONS/DISCUSSION

# MARKETS



LUNCH in the ATRIUM

12:00-1:00



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# **WORKSHOP SESSION V**

## **BREAKOUT SESSIONS**

# GOVERNANCE

FIRS ROOM

# AGENDA – WORKSHOP SESSION V GOVERNANCE BREAKOUT

## TYPES OF SECTOR VOTING

MIP Nominating Committee	
Working Groups	
	Types of Sector Voting
	Establish Three Standing Working Groups
	For Each Working Group, what Sectors should be Represented

# MIP NOMINATING COMMITTEE

# Overview of SPP Membership Sectors

Sector	Definition
Alternative Power	Entities that advocate for the development of alternative power resources including wind, solar, and battery.
Cooperatives	Member-owned and operated. Primarily provide electricity to residential customers.
Federal Power Marketing Agency	Any agency or instrumentality of the United States (other than the Tennessee Valley Authority) which sells electric energy.
Independent Power Producer	A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation of electricity for use primarily by the public, and that is not an electric utility.
Independent Transmission Companies	Entities that build, own, and operate transmission facilities, but do not generate electricity.
Investor Owned Utilities	For-profit corporations owned by either public or private shareholders and typically regulated by state commissions.
Large Retail	Non-residential end-use customers with individual or aggregated loads of one MW or more
Marketers	Business entities engaged in buying and selling electricity. Power marketers do not usually own generating or transmission facilities.
Municipals	Owned and operated by the local government or another state body to provide electricity to the public.
Public Interest	Includes consumer advocates, environmental groups, citizen participation, and other entities that are largely representative of end-use customer interests
Small Retail	Residential customers and other customers with individual or aggregated loads of less than one MW
State Agencies	Agencies of a state that provide electricity to municipalities and/or end-use customers.

# MIP Nominating Committee

- Ten sector-based representatives (based on first written comment responses):

- MIP representative, who shall serve as chair
- Independent power producers
- Markets+ State Committee member
- Public interest organizations
- Cooperatives
- Municipal utilities
- Federal agency
- Investor-owned utilities
- Competitive marketers
- Trade groups

Eliminate  
Trade  
Group  
Sector?

Primarily Meet  
Privately?

Add Consumer  
Advocate? Or  
retail/small  
commercial  
customer  
sector?

Add Large  
Customer  
Sector?

How Many  
is Too  
Many?

Add PUDs to  
Municipals?  
Own sector?

- Election process mirrors SPP BOD process
- Approval: Each MMP and MMS votes at MIP Selection Forum

# WORKING GROUPS

# Working Groups – Comment Summary

13 of 21 Commenters  
provided input

Establish certain Standing  
Committees (9):

- Operations and Reliability (BA entities) (6)
- Market Design (5)
- Seams (3)
- Environmental/GHG

Very supporting of the  
working group model (5)

Remove restriction for  
membership on WGs/TFs



# TYPES OF SECTOR VOTING – SPP EXAMPLES

## Members Committee

- 24 Representatives
- 6 IOUS, 5 Coops, 2 Munis, 2 State Power Agencies, 1 FPMA, 2 Alternative Power/Public Interest, 1 Independent Transmission, 1 Large Retail Customer and 1 Small Retail Customer

## Corporate Governance Committee

- 11 Representatives
- SPP President, BOD Chair, 1 IOU, 1 Coop, 1 Muni, 1 IPP/marketer, 1 State Power Agency, 1 Alternative Power/Public Interest, 1 Independent Transmission, 1 Large/small retail Customer and 1 FPMA

## Strategic Planning Committee

- 5 Transmission Owners
- 5 Transmission Users
- 3-4 Directors

## Human Resources and Finance Committees

- 6-9 Members
- Equal Representation
- 2-3 Transmission Owners
- 2-3 Transmission Users
- 2-3 Directors

*SPP Bylaws Section 3.1: "appointments shall be made with due consideration of the various types (sectors) and expertise of Members and their geographic locations."*

# TYPES OF SECTOR VOTING – RTO/ISO COMPARISON

	CAISO	MISO	PJM	SPP
<b>Senior Committee</b>	None	Advisory Committee	Members Committee	MOPC and Members Committee
<b>Voting Stakeholders</b>	None	MISO Members	PJM Members	SPP Members
<b>Non-Voting Stakeholders</b>	Stakeholders	Non-members	Non-members	Non-members
<b>Senior Committee Voting Approach</b>	None	10 Weighted Sectors (66%)	5 Weighted Sectors (66%)	MOPC: Each Rep. Members: 2 Weighted Sectors (66%)

\*Governance Structure and Practices in the FERC Jurisdictional ISOs/RTOs (Feb. 2021) Prepared for NESCOE

# TRANSMISSION AVAILABILITY

CEDARS ROOM

# AGENDA – WORKSHOP SESSION V TRANSMISSION BREAKOUT

## MARKET TRANSMISSION SERVICE REVENUE RECOVERY

Transmission Usage Assumptions

Market Transmission Service

Market Transmission Service Revenue Recovery  
Determination

MTS (Qualified) Revenue Recovery Determination  
Proposal

MTS (Qualified) Revenue Recovery Proposal

Market Transmission Service Revenue Distribution  
Proposal

Questions/Discussion

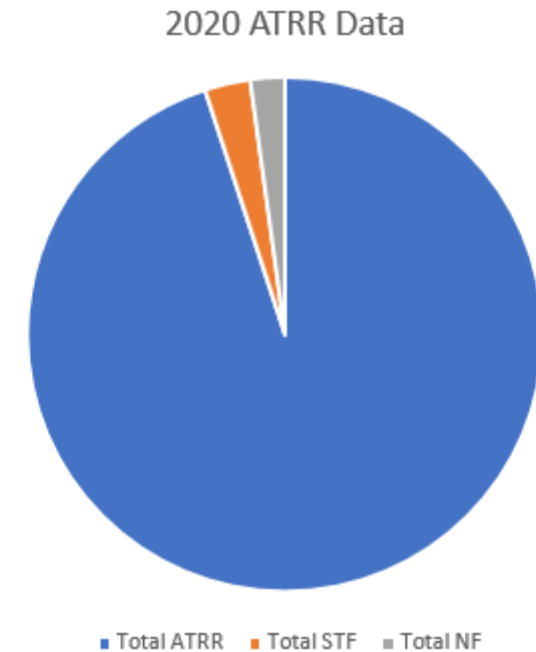
# TRANSMISSION USAGE ASSUMPTIONS

- Transmission systems will continue to be operated by existing TO/TSP as they are today
- Market will leverage transmission in a flow-based manner to maximize use of the system
- Short-term P2P revenue will decrease as entities leverage the market in lieu of real-time bilateral trading
- A transmission use charge needs to be established to allow recovery of revenue lost due to changes in market activity –

## **Market Transmission Service**

# MARKET TRANSMISSION SERVICE

- How much do we recover?
- How do we recover it?
- How do we distribute it?



# MARKET TRANSMISSION SERVICE REVENUE RECOVERY DETERMINATION

- From 8/3 meeting –
  - Concerns about over-collection were raised if 100% of STF and NF revenues are used
    - 50% of STF and NF was proposed:

Transmission Data*	Total	Total less BPA
STF	\$88,091,387	\$59,339,042
NF	\$60,442,798	\$42,742,574
Sum of STF+NF	\$148,534,185	\$102,081,615
50% of STF+NF	\$74,267,092	\$51,040,807
NEL (MWh)	289,022,118	192,853,044
MTS charge @ 50% based on NEL	\$.26	\$.26

\*Transmission data will need to be collected from all M+ participants to determine final rate

# MTS (QUALIFIED) REVENUE RECOVERY DETERMINATION PROPOSAL

- 50% of average of previous three years' STF+NF for first two years of market
- Establish Transmission Working Group to determine method for revenue requirement calculation for year three and beyond
- Market information will be available after first year to use for calculation
- Year two will provide time for working group to consider alternatives with market data for reference



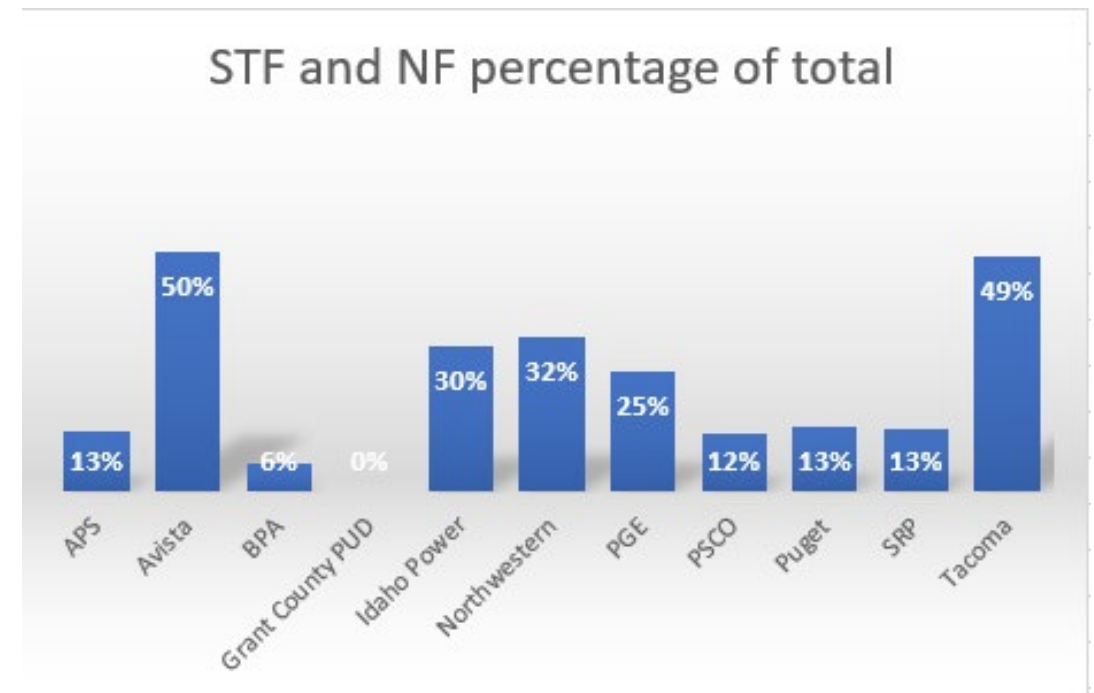
# MTS (QUALIFIED) REVENUE RECOVERY PROPOSAL

- Recovery mechanism
  - Market-based solution
- Apply a charge to the market for the use of the transmission system
- Based on revenue requirement established for MTS and applied to all MW settled by market
- Compensation provided from the market via MTS billing determinant
- Does not affect overall marginal energy costs in the solution

# MARKET TRANSMISSION SERVICE REVENUE DISTRIBUTION PROPOSAL

- Distribution method
  - Based on established Revenue Recovery for MTS

Transmission Provider's RR  
Total Revenue Recovery



# MARKET TRANSMISSION SERVICE REVENUE DISTRIBUTION PROPOSAL

Based on recovery of 50% STF+NF (\$74,267,092)

APS	Avista	BPA	Grant County	Idaho Power
\$3,906,680	\$7,597,842	\$23,226,285	\$0	\$8,104,418

Northwestern	PGE	PSCO	Puget	SRP	Tacoma
\$10,921,546	\$5,928,350	\$3,331,104	\$4,807,324	\$2,548,376	\$3,895,168

# QUESTIONS/DISCUSSION

# MARKET PRODUCTS PRICE FORMATION

MAIN CONFERENCE ROOM



# RESOURCE SUFFICIENCY & UNIT COMMITMENT

JIM GONZALEZ, SPP

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# WORKSHOP SESSION V MARKET DESIGN BREAKOUT UNIT COMMITMENT/RESOURCE SUFFICIENCY

## Topics for Discussion

Resource Sufficiency

WRAP Update: Sarah Edmonds, WPP CEO

Optimal Physical Unit Commitment

Centralized Unit Commitment & Multiple BAs



# **WESTERN RESOURCE ADEQUACY PROGRAM- UPDATE**

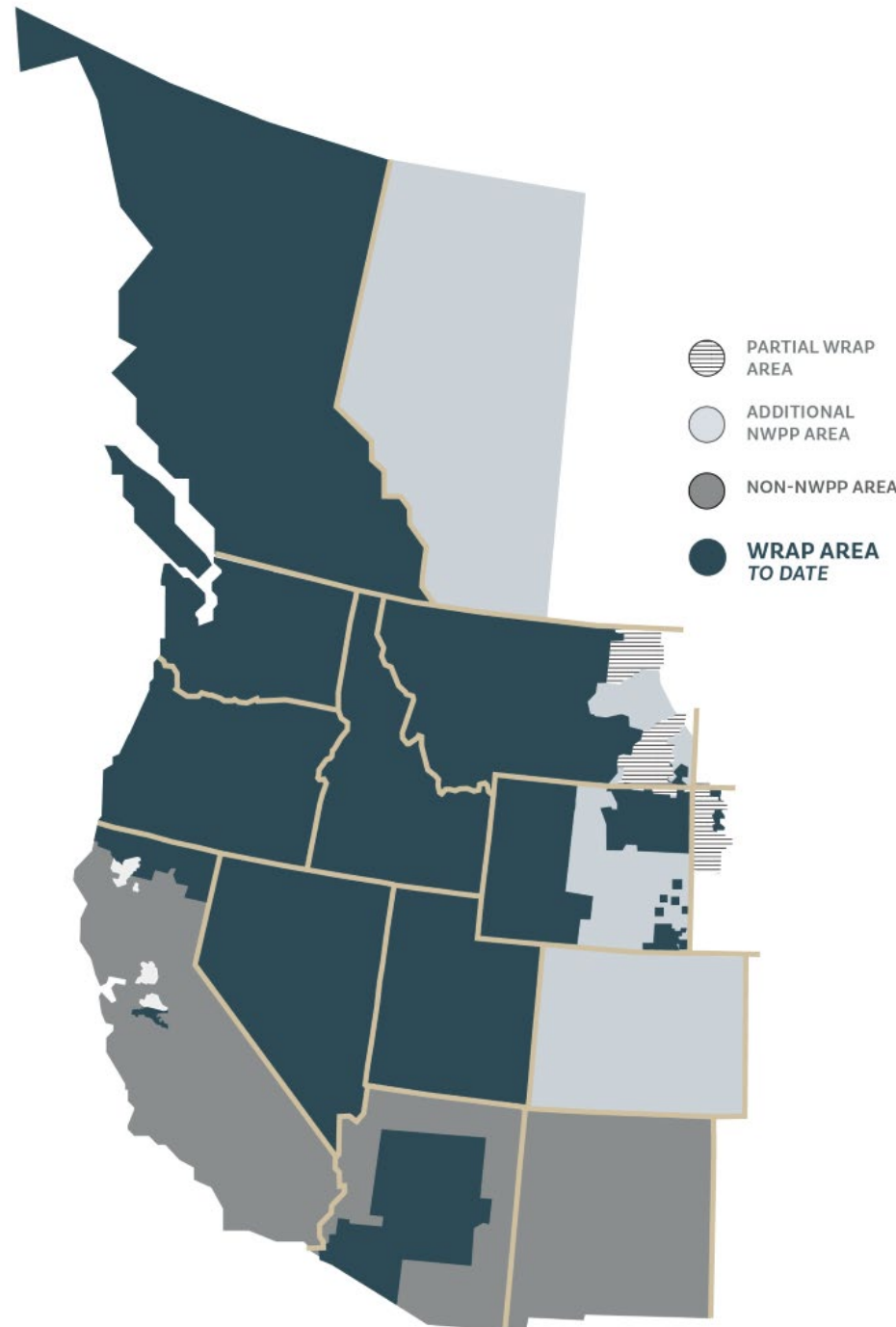
**SPP Markets+ Workshop**

**August 10, 2022**



## PHASE 3A PARTICIPANTS

Arizona Public Service  
Avangrid  
Avista  
Black Hills  
Basin Electric  
Bonneville Power Administration  
Calpine  
Chelan PUD  
Clatskanie PUD  
Douglas PUD  
Eugene Water & Electric Board  
Grant PUD  
Idaho Power  
NorthWestern Energy  
NV Energy  
PacifiCorp  
Portland General Electric  
Powerex  
Puget Sound Energy  
Salt River Project  
Seattle City Light  
Shell  
Snohomish PUD  
Tacoma Power  
The Energy Authority  
Turlock Irrigation District



- > **Industry-driven initiative** for regional approach to help ensure resource adequacy in light of changing resource composition and increased resource uncertainty
  - > Estimated peak winter load of 65,122 MW and summer load of 66,768 MW
- > **Participation is voluntary**, with mandatory requirements once joined
- > Implemented through **bilateral transactions under existing frameworks**

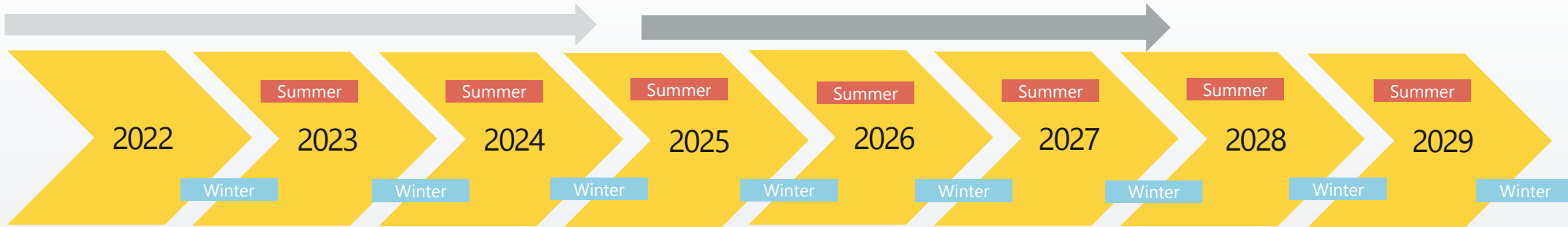
# TRANSITION TO BINDING TIMELINE

## Non-Binding Forward Showing

Winter 22-23, Summer 23, Winter 23-24, Summer 24, Winter 24-25

## Transition Seasons (Ops and FS)

Summer 25, Winter 25-26, Summer 26, Winter 26-27, Summer 27, Winter 27-28



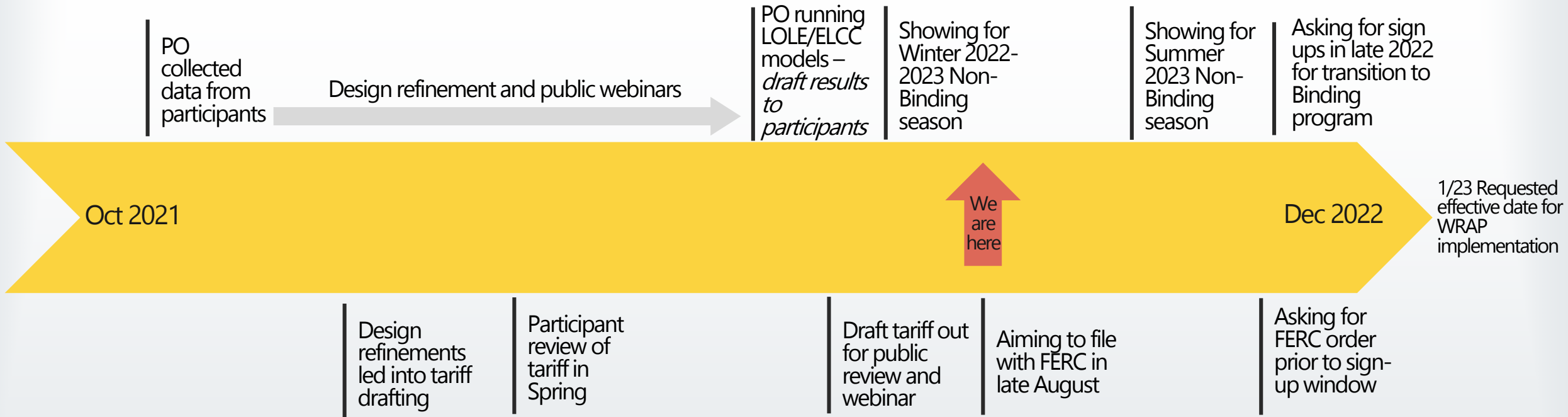
## Non-Binding Operations Program

Summer 23 (trial – will include testing scenarios), Winter 23-24, Summer 24, Winter 24-25

## Binding Program Without Transition Provisions

Summer 28 and all seasons following

# CURRENT PHASE ACTIVITIES



PO = Program Operator  
 LOLE = Loss of Load Expectation  
 ELCC = Expected Load Carrying Capacity



# THANK YOU

*[Sarah.Edmonds@westernpowerpool.org](mailto:Sarah.Edmonds@westernpowerpool.org)*

*For general inquiries or to be added to our mailing list:  
[wrap@westernpowerpool.org](mailto:wrap@westernpowerpool.org)*

# RESOURCE SUFFICIENCY

# BIG PICTURE

## Resource Adequacy

- Planning Horizon
- "One day in ten year" loss of load
- "chunky" assessment (peak hour)

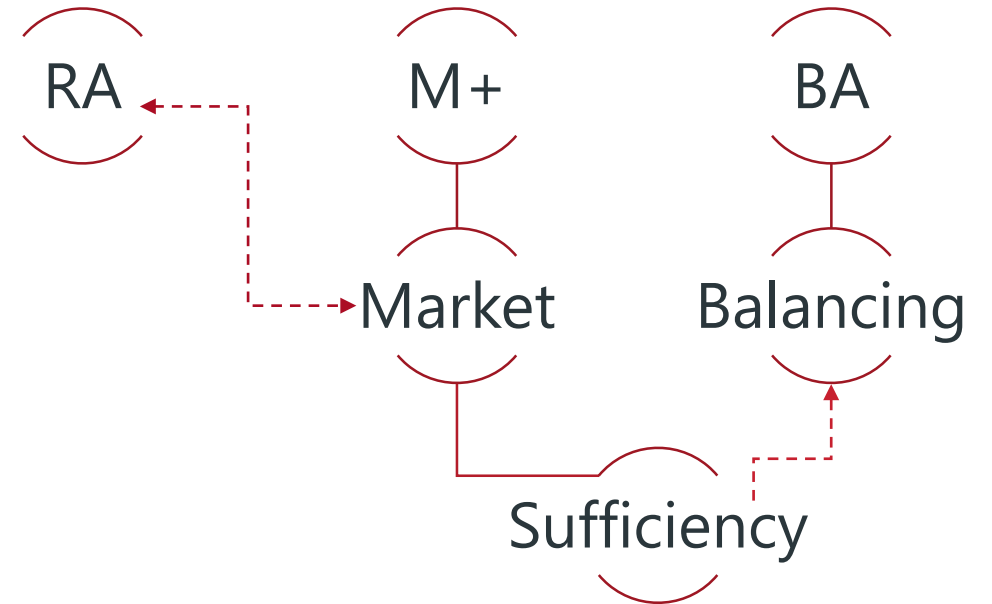
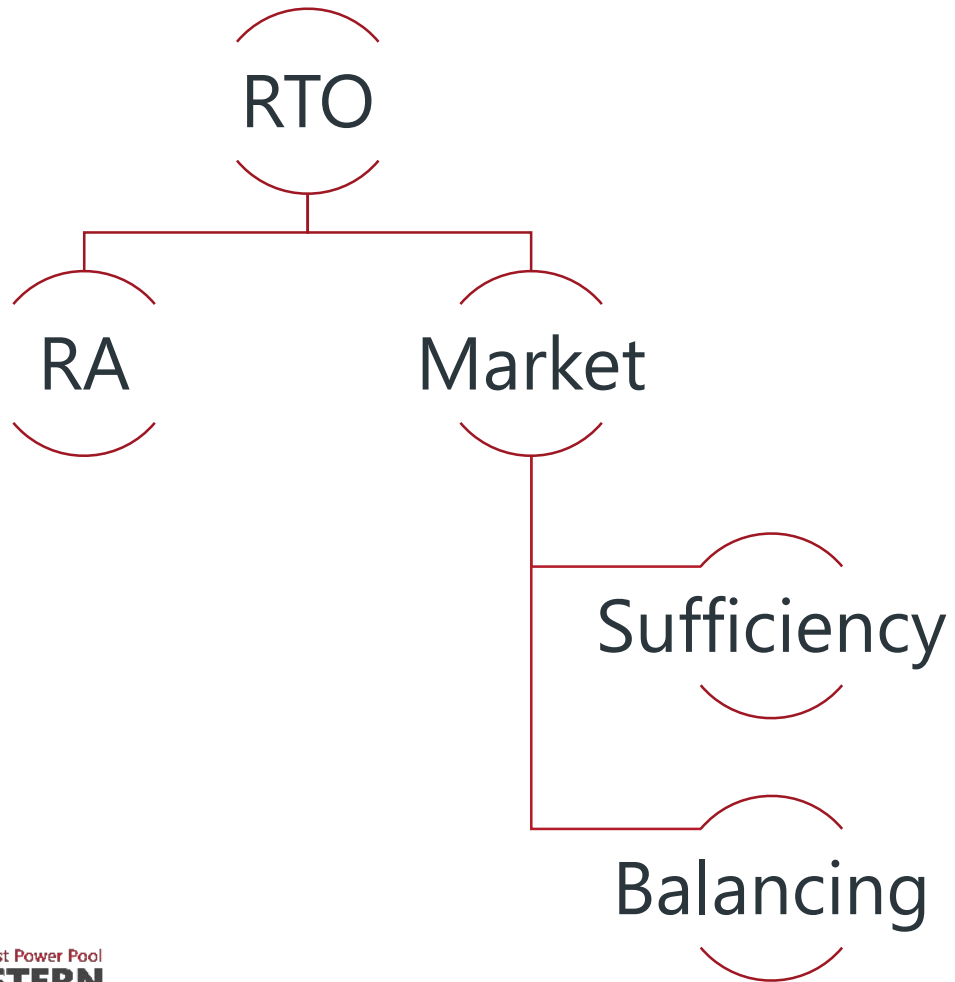
## Resource Sufficiency

- Next Day
- Plan to meet net obligation
- Granular (on peak and off peak, hourly)

## Balancing

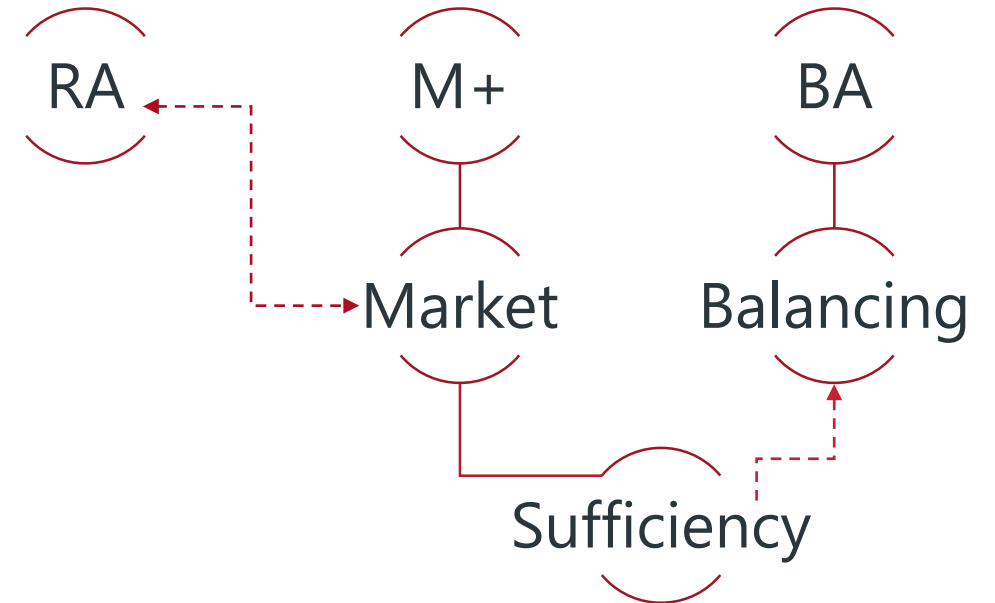
- Right now
- Balance Gen and Obligation
- Maintain Frequency

# RTO VS MARKETS+



# WHY IS SUFFICIENCY IMPORTANT FOR MARKETS+?

- BA separate from Market
- RA separate from Market
- Multiple BAs
- RA may vary in footprint
- Centralized Unit Commitment and Dispatch





# HOW DOES MARKETS+ ENSURE RESOURCE SUFFICIENCY?



- Markets+ is not a Resource Adequacy Program
  - Markets+ participation will require TBD minimum threshold RA standard
- Markets+ will need design features to incent participants to “bring” RA capacity to Day-Ahead Market
  - Must Offer
  - Scarcity Pricing / Pricing when system is “stressed”

\*\*\* Markets+ Sufficiency will only be as good as the RA standard/program \*\*\*

\*\*\* Markets+ is a tool, not the rule \*\*\*

# BACKGROUND

- **Must Offer**
  - A required minimum level of participation
  - Can be for generation or load
  - Ensures that market can meet primary goal of ensuring resource sufficiency for the market footprint
    - BA somewhat dependent on market
- **Scarcity Pricing**
  - Pricing model when market cannot balance supply and demand
    - Market-wide
    - Zonal/locational
  - Administered Price
    - Demand Curve
    - Artificial "Adder"

# SPP PROPOSAL TO ENSURE RESOURCE SUFFICIENCY

- Participants must participate in comprehensive RA program (e.g., WPP's WRAP) or meet equivalent standard
- Participants must make RA capacity available to Markets+
  - Day-Ahead Market and Real-Time Balancing Market
  - Question?: Should requirement be by individual resources or equivalent total capacity
- Scarcity Pricing model should distinguish between insufficient and sufficient BAs
- Markets+ unit commitment processes heavily coordinated with BAs, especially in times of system stress.
  - BAs will have more tools in the toolbox than market operator

# QUESTIONS/DISCUSSION

# UNIT COMMITMENT

PHYSICAL AND OPTIMAL

# MARKETS+ MARKET DESIGN

## Regional Cost Savings

- **Commit Least Cost** Fleet of Resources capable 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

# PRIMARY UNIT COMMITMENT OBJECTIVES

- Maintain Reliable Operations of the Bulk Electric System
  - Participating Balancing Authorities individually sufficient
  - Generation deliverable to load
- Minimize total production cost
  - Maximize participation in the Day-Ahead Market
    - Resources and Load
  - Make decisions early enough to have the largest set of available Resources

PHYSICAL

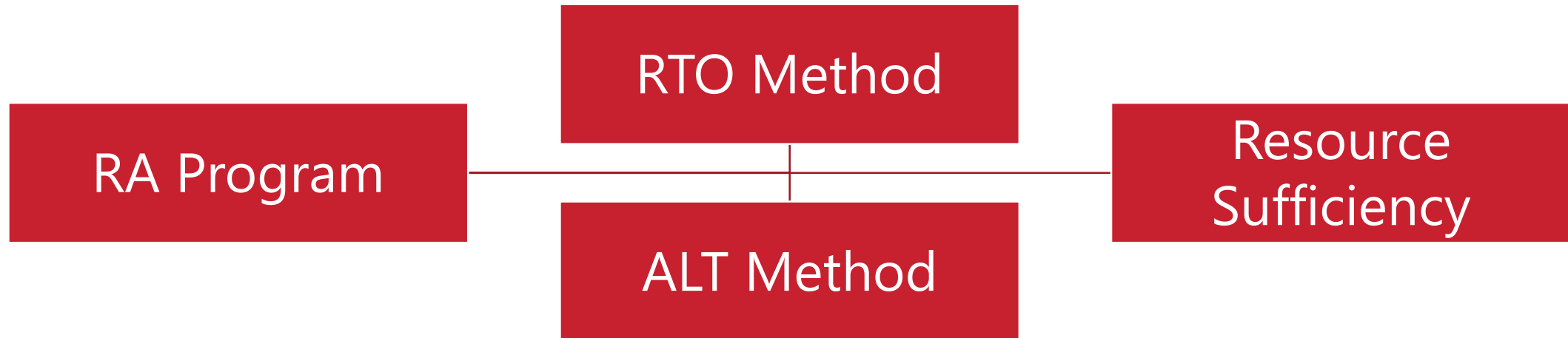
OPTIMAL

# TWO OPTIONS FOR PRIMARY UNIT COMMITMENT

- SPP RTO Method
  - DAMKT
    - Limited must Offer
    - Voluntary Market
    - Behavior-driven
- Alternative Method
  - DAMKT split into parallel paths
    - Physical Commitment
      - Forecast-driven
    - Financial Market
      - Voluntary
      - Purely Financial



# EQUALLY RELIABLE



# SPP RTO METHOD

TCR/Congestion Rent

**RA Program**

- Planning Reserve Margin

No direct tie to Market, but ensures enough capacity planned for

**DAMKT**

- Limited Must Offer
- Behavior-driven
- Voluntary Market

**COST**

Commitment Deviation exits when DAMKT Behavior does not reflect forecast for real-time

**Deviators**

Volume Deviation exits when DAMKT Behavior does not reflect forecast for real-time

**DA RUC**

- Forecast-Driven
- Close Gaps between behavior and reality

**RUC**

- Forecast-Driven
- Close Uncertainty Gap

Sufficient Plan

**RTBM/Balancing**

- Reality-Driven
- BA ensures sufficiency

**COST**

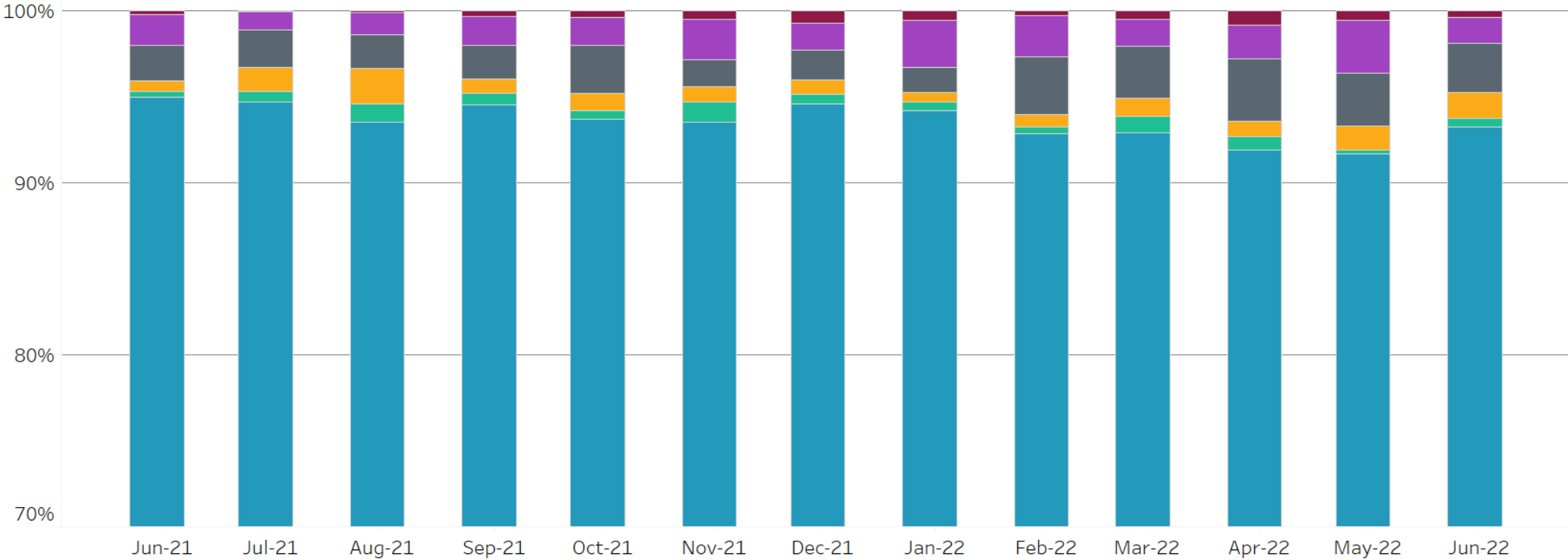
Uncertainty

# THOUGHTS ON RTO METHOD

- RA Program ensures sufficient capacity
- DAMKT Primary Unit Commit Tool
  - Voluntary, financial market with physical output
  - Full set of generation is not offered in DAMKT
- Settlements design incents behavior to reflect RT
  - In theory, little divergence between DA and RT
  - In practice, unit commitment always different
- DA RUC important, first test of DAMKT results
- Incremental RUCs ensure reliability and adjust for changes

# COMMITMENT BREAKDOWN BY MW- June 2022

\*SELF  
commits are  
post DAMKT

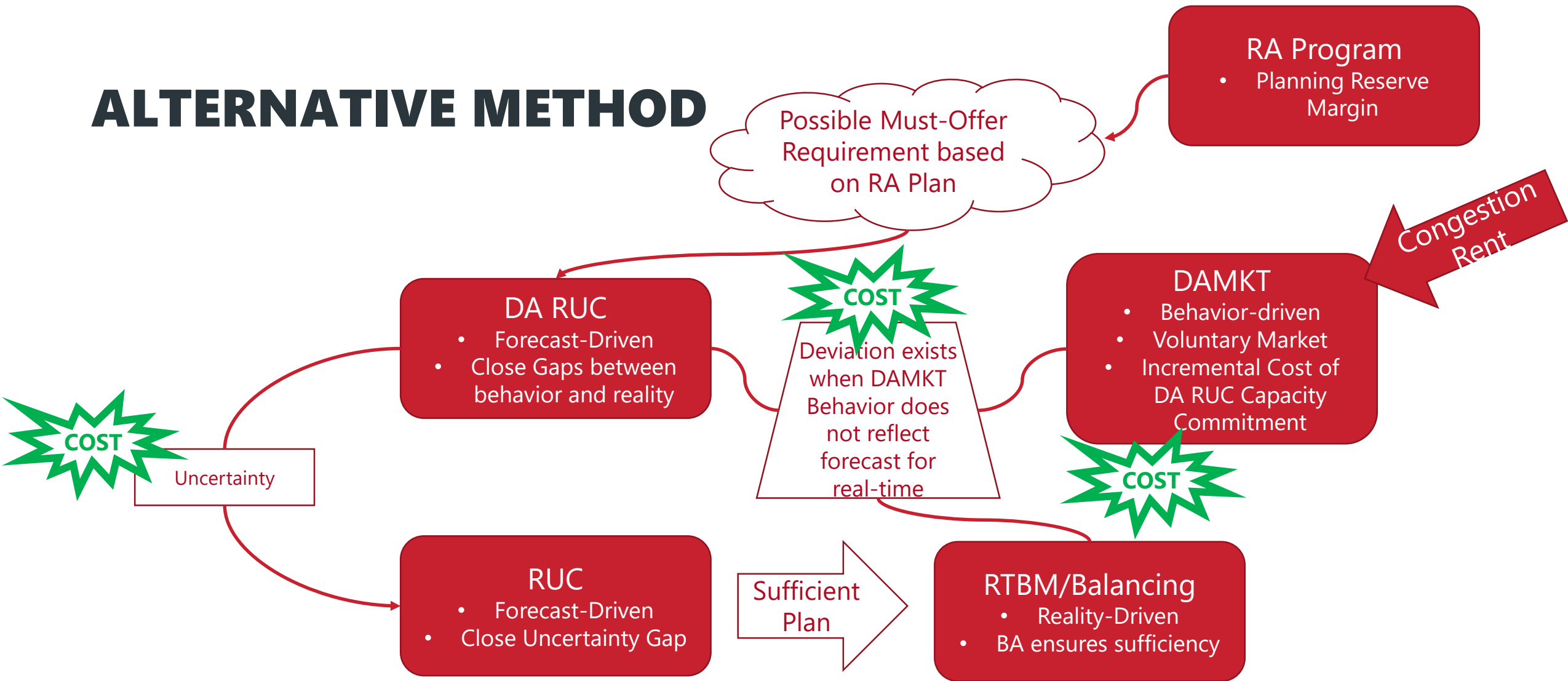


■ ST\_RUC ■ SELF ■ MANUAL ■ ID\_RUC ■ DA\_RUC ■ DAMKT

	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22
DAMKT	21,799,333	24,899,463	24,152,896	19,872,315	15,700,918	14,954,676	15,629,047	19,025,616	16,354,960	14,662,240	12,120,043	16,075,349	21,740,545
DA_RUC	64,448	168,219	276,544	143,203	81,703	181,106	98,976	106,410	71,992	149,764	107,064	44,973	116,375
ID_RUC	145,422	358,571	529,491	179,614	169,203	142,686	133,022	114,181	127,715	168,091	118,126	238,808	350,075
SELF	409,677	278,756	327,198	352,114	263,843	374,030	254,393	554,290	421,793	244,342	254,566	546,316	353,549
MANUAL	479,150	574,755	514,172	406,581	476,170	249,745	287,137	291,320	590,291	482,120	479,404	536,689	670,525
ST_RUC	49,800	16,939	30,873	75,489	69,935	85,162	125,226	110,256	49,910	78,354	113,452	94,885	88,003

\*\*\* From RTO Update – June 2022 \*\*\*

# ALTERNATIVE METHOD



# THOUGHTS ON ALTERNATIVE METHOD

- RA Program ensures sufficient capacity
- DA RUC primary commitment tool
  - More efficient commitment
  - Isolated from voluntary, financial market
- Incremental Cost of Capacity to bridge DAMKT to expected RT conditions is paid by the DAMKT rather than the RTMKT
  - Allocation of cost is more granular between DA RUC and DAMKT
  - RTMKT pays cost of RUC commitments for RT Need (uncertainty)

# METHOD COMPARISON

RTO Method

ALT Method

Resource Adequacy Program Provides Capacity

Participant Behavior Drives Primary Commitment

Forecasted Need Drives Primary Commitment

DAMKT Voluntary Financial Market

Incremental RUCs Commit to Resolve Forecast Uncertainty

# THOUGHTS ON COMPARISON BETWEEN METHODS

- RTO Method

- Established, FERC approved model for a day-2 market
  - In SPP RTO market, vast majority of commitments are made in DAMKT
- Virtual offers can displace physical resources and physical imports
- Virtual offers and bids can create congestion that commits unneeded generation

- The Alternative Method

- New, although other markets are looking at similar designs
- Commitment is more efficient from a full set of generation and no need to offset artificial DAMKT congestion
- Commitment can occur earlier in the day
- DAMKT becomes purely financial
- Opportunities to allocate Cost of Capacity to cost causers in the DAMKT, rather than RTMKT



# SPP PROPOSAL

- Further investigate Alternative Method during Phase I (Commitment to Investigate)
  - Potential benefits of more optimal physical commitment while retaining voluntary, financial market worth additional effort of new market design construct
  - Can quickly transition to RTO Model if additional cost and effort exceed expected benefit.

# QUESTIONS/DISCUSSION

# CENTRALIZED UNIT COMMITMENT

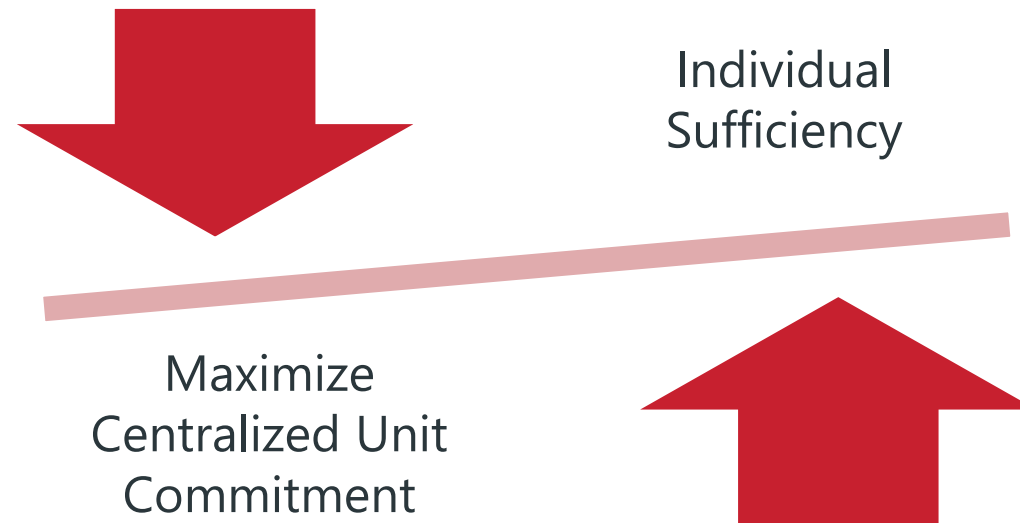
MULTIPLE BALANCING AUTHORITIES

# RTO MARKET

- Consolidated Balancing Authority (CBA) is key component to RTO Markets
  - Maximize value of an Operating Reserve Market
  - Regionalizes NERC balancing requirements
    - Regional diversity
    - Wider pool of resources
- Full benefit of centralized unit commitment

# MARKETS+ MODEL

- Markets+ does not include BA consolidation
  - Existing BAs will continue to exist and maintain NERC requirements
- Markets+ will have centralized unit commitment and dispatch

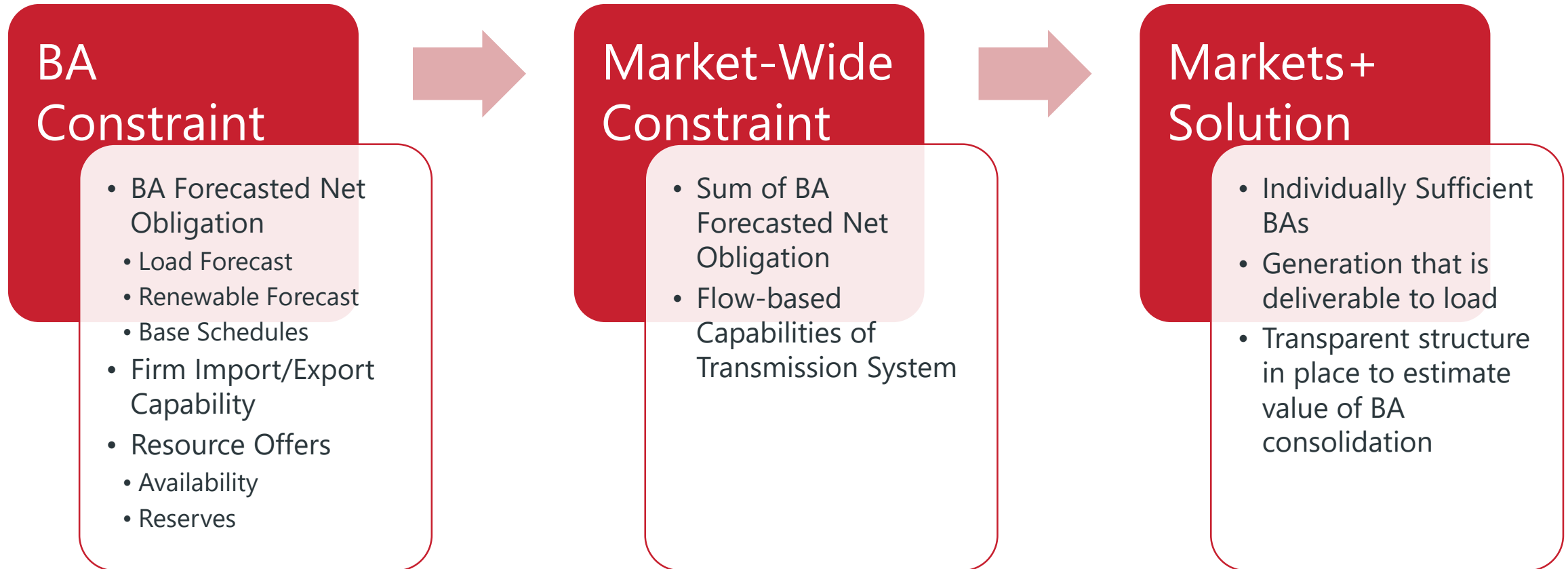


# MARKETS+ UNIT COMMITMENT

- BA minimum capacity
  - Full Optimized unit commitment within BA
  - Ensure minimum amount of generation committed within BA to demonstrate sufficiency
- Flow-based Congestion Management
  - Full flow-based capabilities of participating footprint
    - Energy Dispatch
    - Commitment once individual BAs are minimally sufficient

\*\*\* SPP will work with BAs to determine minimally sufficient requirements \*\*\*

# KEY INPUTS FOR MARKETS+ UNIT COMMITMENT



\*\*\* Assumes all transmission within footprint is "in" \*\*\*

# QUESTIONS/DISCUSSION



# MARKETS



AFTERNOON BREAK

2:30-3:00

Refreshments in the West Foyer



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keep the lights on today and in the future.*



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Southwest Power Pool  
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# **WORKSHOP SESSION VI**

## **GENERAL SESSION: GHG TRACKING AND ACCOUNTING**

# AGENDA – WORKSHOP SESSION VI

## GHG TRACKING AND ACCOUNTING

GHG Proposed Approach Overview

Design Objectives

GHG Zones

GHG Pricing and Settlement

Example System

Addressing MW Shuffling Concerns

GHG Baseline Approach

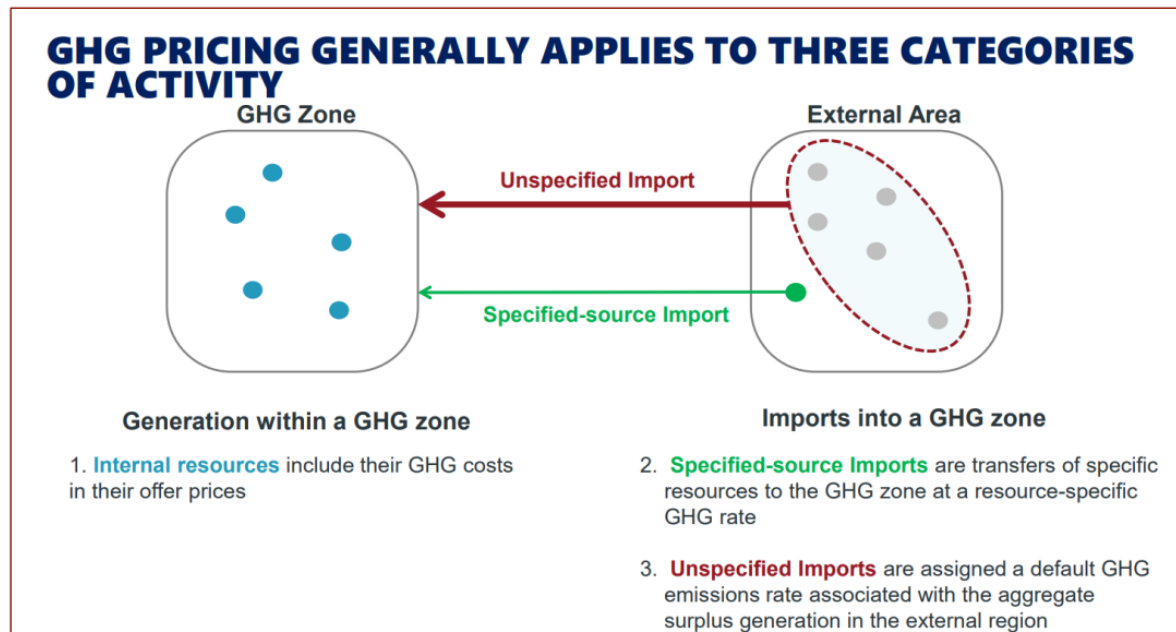
GHG Examples

Questions/Discussion

# GHG PROPOSED APPROACH OVERVIEW

- Consistent with requests summarized in prior workshops and meetings

## ZONAL APPROACH (POWEREX/PGP)



Source: Jeff Spires and Mary Wiencke presentation to SPP, April 2022

# DESIGN OBJECTIVES

- Minimize total production costs with GHG costs considered
- Provide a framework for any capacity to be dispatched to the zone
- Properly account for MWs serving the zone, both from specified and unspecified sources
- Implement a solution that meets the intent of GHG policies
- Ensure that GHG costs associated with imports into the GHG zone only apply to load in that zone.

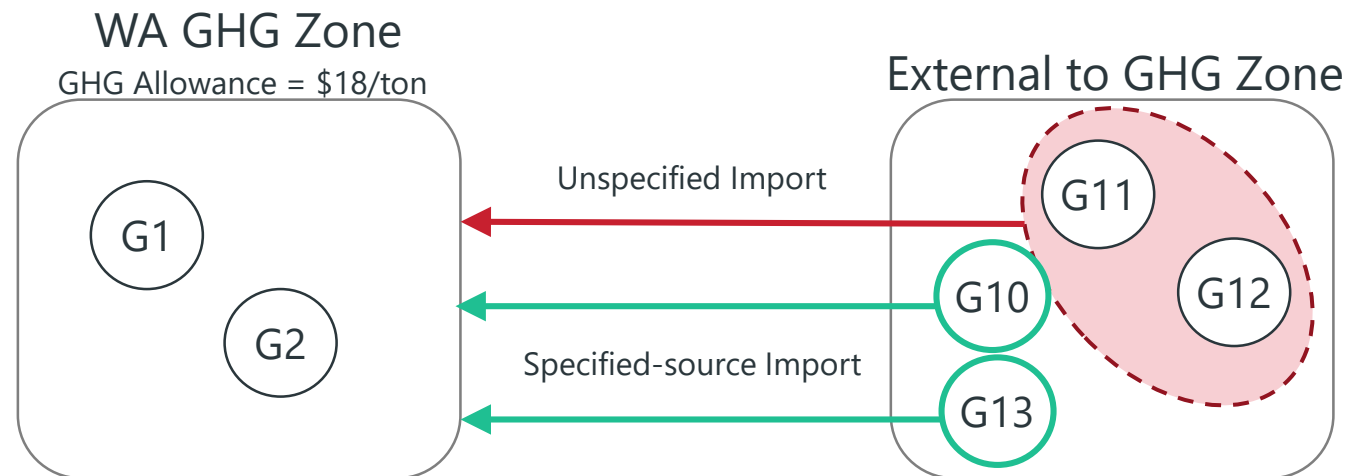
# GHG ZONES

# GHG ZONES

- Flexibility to support multiple GHG zones in Markets+
- Energy dispatched within the GHG zone is designated to load in the zone first.
- Modeled GHG zones are within the Markets+ footprint
  - Addressing overlaps in GHG costs and payments with an External GHG zone should be investigated.

# 3 TYPES OF RESOURCES FOR A GHG ZONE

- The 3 types are defined in the following slide from the GHG May 2022 Workshop
  - ✓ *GHG Internal Resources*
  - ✓ *Specified-source Imports*
  - ✓ *Unspecified Imports*
- GHG zone imports allow resources outside the zone to participate in supplying the GHG zone. These MWs are accounted for and allocated.





# GHG ZONES

- All GHG zone Dispatched MW
  - Is subject to GHG costs
  - Satisfies GHG zone load first.
- GHG rate is specified by
  - resources for GHG zone resources
  - source for Specified-source imports
  - A pre-determined rate for unspecified-source imports
- GHG costs are not included directly in the resource offered \$/MWh
- MWs serving load in the zone from external or internal resource/fleet are accounted for

# **GHG PRICING AND SETTLEMENT**

# GHG PRICE INDEPENDENT OF ENERGY LMP

- GHG cost is the marginal cost of additional load moving to the GHG zone
- GHG costs associated with imports into the zone are not included in the LMPs
- GHG loads and injection MWs assigned to serve the GHG zone are subject to the GHG price
  - GHG zone load pays, and all injections are assigned GHG payments
  - GHG payments are made to Internal Resources and to Resources associated with Specified-source Imports
  - To be determined on who receives GHG payments for Unspecified-source import MWs

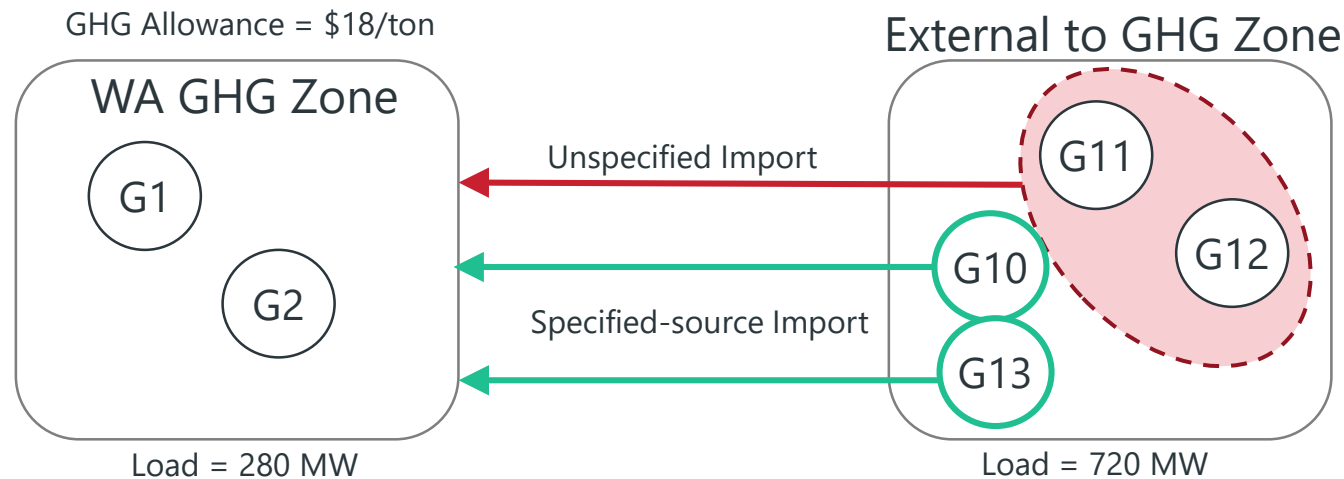
# EXAMPLE SYSTEM

## EXAMPLE SYSTEM USING WASHINGTON GHG ZONE

- 6 generating resources
  - 2 in the GHG zone, one with no carbon emission
  - 2 associated with Specified-source imports
  - 2 resources outside the GHG zone that may participate in Unspecified Imports
- System load is 1000 MW with a portion in the GHG zone
- No interchange
- No transmission congestion or losses

# EXAMPLE SYSTEM

ID	GHG Type	Max MW	\$/MWh	WA GHG ton/MWh
G1	Internal	200	36.8	0.4 (\$7.2/MWh)
G2	Internal	150	2	0
G10	Specified Source	50	37	0.35 (\$6.3/MWh)
G11	Unspecified	600	36	0.5 (\$9/MWh)
G12	Unspecified	200	3	
G13	Specified Source	15	25	0



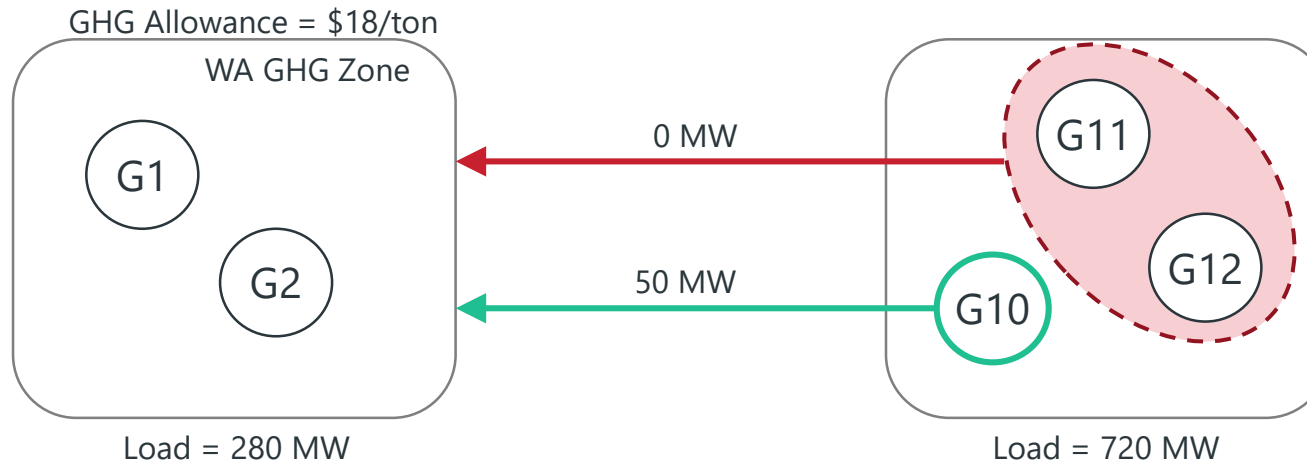
Would these MWs have served load outside the zone if there weren't GHG zone load?

# IMPORTS HELP MEET GHG ZONE LOAD

ID	Max MW	\$/MWh	GHG ton/MWh	Dispatch MW	WA Assign MW
G1	200	36.8	0.4 (= \$7.2/MWh)	80	80
G2	150	2	0	150	150
G10	50	37	0.35(= \$6.3/MWh)	50	50
G11	600	36	0.5 (= \$9/MWh)	520	0
G12	200	3		200	
G13	0	0	0	0	0
				1000	280

WA Load Requirement:  
 G1 80MW + G2 150MW  
 + G10 50MW ≥ 280MW

Shadow price = \$8/MWh  
 incremental WA requirement:  
 G1 increment up  
 - G11 increment down



System Power Balance:  
 Total generation = 1000 MW

Shadow price = \$36/MWh  
 Incremental sys load requirement:  
 G11 increment up

# ADDRESSING MW RE- DESIGNATION CONCERNS



# MW RE-DESIGNATION CONCERNS

- Imagine a zero-carbon resource in M+ (outside the GHG Zone) assigned to serve the GHG Zone (WA) load
- The M+ BA now has to make up for the loss of supply and dispatches a carbon-emitting resource upwards
- Result:
  - Lowering WA GHG “on paper”, but not achieved across the entire market (didn’t get the quantity it thought it would)

# MW RE-DESIGNATION EXAMPLE

External cannot serve WA load

	Dispatch MW	WA Assigned MW	GHG Rate
G1	130	130	0.4
G2	150	150	0
G10	0	0	0.35
G11	505	0	0.5
G12	200	0	0.5
G13	15	0	0

Carbon production  
(tons)

	WA view	Total
G1	52	52
G2	0	0
G10	0	0
G11	0	252.5
G12	0	100
G13	0	0
<b>Total</b>	<b>52</b>	<b>404.5</b>

G10-G13 just serving its own load in this baseline example

Open external to serve WA load:

	Dispatch MW	WA Assigned MW	GHG Rate
G1	65	65	0.4
G2	150	150	0
G10	50	50	0.35
G11	520	0	0.5
G12	200	0	0.5
G13	15	15	0

Carbon production  
(tons)

	WA view	Total
G1	26	26
G2	0	0
G10	17.5	17.5
G11	0	260
G12	0	100
G13	0	0
<b>Total</b>	<b>43.5</b>	<b>403.5</b>

G10-G13 now can serve WA load; G10 & G13 serving WA

WA reduces its Carbon contribution by 8.5 tons, but overall net carbon reduction was 1 ton.

Expected carbon  
reduction

8.5	1
-----	---

# POSSIBLE SOLUTIONS

- To minimize or eliminate the “MW Re-Designation”, also associated with Specified imports, the following approaches should be investigated further
  - *Implement a GHG Baseline approach in the optimization solution*
    - Optimal but must address conditions causing linear programming-based solution limitations
  - *Add transmission deliverability requirements*
  - *Consider resources designation in the resource sufficiency process when determining Specified-source Imports*

# **GHG BASELINE APPROACH**

# POSSIBLE APPROACH TO ADDRESS MW SHUFFLING?

- Add Baseline solution
  1. Assumption is that this is the solution w/ GHG Zonal Imports =0
  2. Exports are still allowed
  3. Internal WA MW + Incremental Increases in all external generation may go to serve load
- What does this do?
  1. Allows us to understand what the dispatch would have been absent Markets+ imports to the GHG zone
  2. This gives us a baseline for external units, so we can see the incremental dispatch of those units to serve the GHG Zone (necessary for modeling item #3 above)

# MW RE-DESIGNATION CONCERNS PREVENTED EXAMPLE

External cannot serve WA load

	Dispatch MW	WA Assigned MW	GHG Rate
G1	130	130	0.4
G2	150	150	0
G10	0	0	0.35
G11	505	0	0.5
G12	200	0	0.5
G13	15	0	0

Carbon production  
(tons)

WA view	Total
52	52
0	0
0	0
0	252.5
0	100
0	0
52	404.5

G10-G13 just serving its own load in this baseline example

Open external to incrementally serve WA load

	Dispatch MW	WA Assigned MW	GHG Rate
G1	80	80	0.4
G2	150	150	0
G10	50	50	0.35
G11	505	0	0.5
G12	200	0	0.5
G13	15	0	0

Carbon production  
(tons)

WA view	Total
32	32
0	0
17.5	17.5
0	252.5
0	100
0	0
49.5	402

G10-G13 now can serve WA load; G10 & G13 serving WA

WA's expected reduction in carbon matches total system reduction of 2.5 tons

Expected carbon reduction

2.5	2.5
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# **GHG EXAMPLES**

WITH BASELINE APPROACH

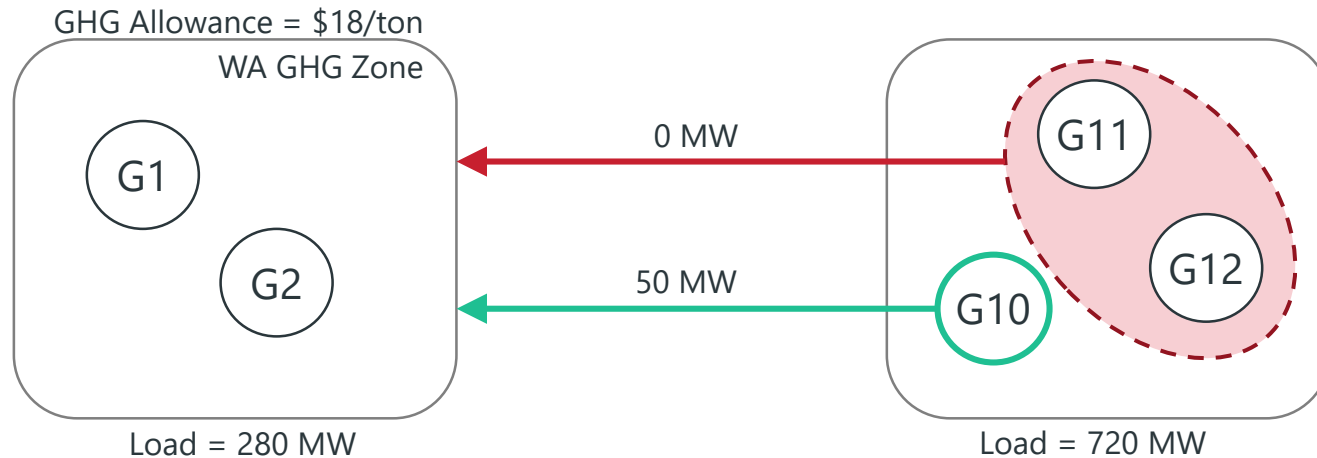
# SCENARIO 1: IMPORTS HELP MEET GHG ZONE LOAD

ID	Max MW	Baseline MW	\$/MWh	GHG ton/MWh	Dispatch MW	WA Assign MW
G1	200	130	36.8	0.4 (\$7.2/MWh)	80	80
G2	150	150	2	0	150	150
G10	50	0	37	0.35(\$6.3/MWh)	50	50
G11	600	520	36	0.5 (\$9/MWh)	520	0
G12	200	200	3	0	200	
					1000	280

\*G13 offline

WA Load Requirement:  
 G1 80MW + G2 150MW  
 + G10 50MW ≥ 280MW

Shadow price = \$8/MWh  
 incremental WA requirement:  
 G1 increment up  
 - G11 increment down



System Power Balance:  
 Total generation = 1000 MW

Shadow price = \$36/MWh  
 Incremental sys load requirement:  
 G11 increment up



# SCENARIO 1: SETTLEMENTS

Equal at all Locations since no congestion or losses  
Dispatch MW \* LMP

WA GHG price applies to any resource which may participate

WA Assign MW \* WA GHG Price

Energy \$ + WA GHG \$

Energy Dispatch Cost + WA Assign MW \* WA GHG Rate \* WA GHG Price per ton

ID	Dispatch MW	LMP \$/MWh	Energy \$	WA Assign MW	WA GHG (\$/MWh)	WA GHG \$	Total Payment (\$)	Total Costs (\$)
G1	80	36	2,880	80	8	640	3,520	3,520
G2	150	36	5,400	150	8	1,200	6,600	300
G10	50	36	1,800	50	8	400	2,200	2,165
G11	520	36	18,720	0	8	0	18,720	18,720
G12	200	36	7,200	0	8	0	7,200	600
WA Ld	-280	36	-10,080	-280	8	-2,240	-12,320	N/A
Rest Ld	-720	36	-25,920	0	N/A	0	-25,920	N/A

Resource Energy + GHG payments  
≥ Energy + GHG costs

# SCENARIO 1: OBSERVATIONS

- System is dispatched to minimize total costs including GHG costs
- Resources not impacted by GHG modeling continue to be normally dispatched according to energy costs
- GHG modeling is tracked granularly enabling detailed accounting and reporting

# SCENARIO 2: UNSPECIFIED IMPORT SUPPORT

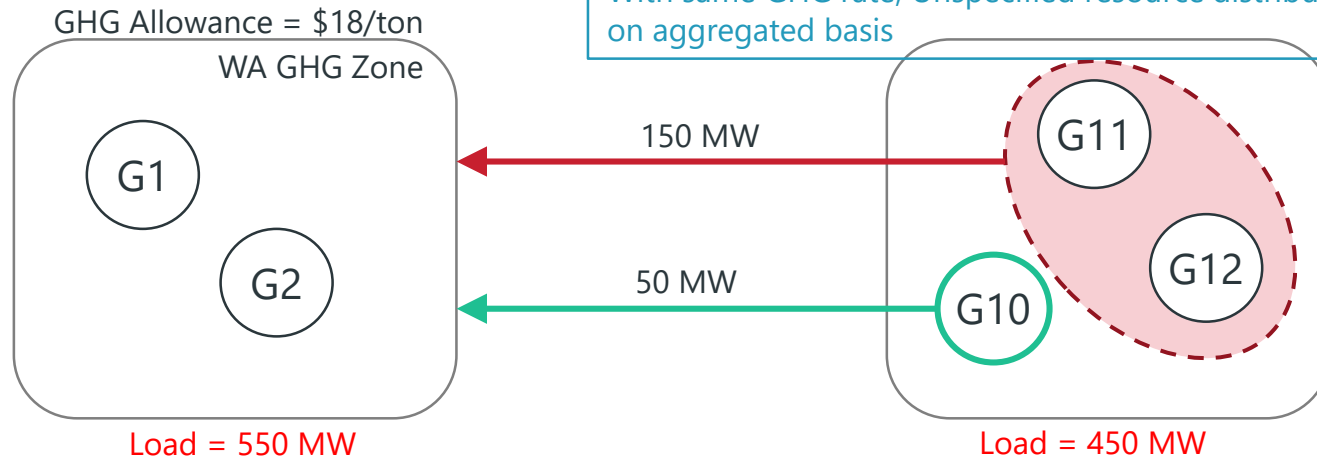
Relative to Scenario 1, G1 Dispatch MW increases to economically serve WA load; G11 reduced

ID	Max MW	Baseline MW	\$/MWh	GHG ton/MWh	Dispatch MW	WA Assign MW
G1	200	200	36.8	0.4 (\$7.2/MWh)	200	200
G2	150	150	2	0	150	150
G10	50	0	37	0.35(\$6.3/MWh)	50	50
G11	600	250	36	0.5 (\$9/MWh)	400	150
G12	200	200	3		200	
					1000	550

\*G13 offline

WA Load Requirement:  
 G1 200MW + G2 150MW  
 + G10 50MW + G11 50MW  
 + G12 100 MW ≥ 550MW

Shadow price = \$9/MWh  
 incremental WA requirement:  
 G11 WA Assign MW ↑  
 → 0.5 ton/MWh \* \$18/ton



With same GHG rate, Unspecified resource distribution is not important. SPP will report on aggregated basis

System Power Balance:  
 Total generation = 1000 MW

Shadow price = \$36/MWh  
 Incremental sys load requirement:  
 G11 increment up

# SCENARIO 2: SETTLEMENTS

Equal at all Locations since no congestion or losses  
Dispatch MW \* LMP

WA GHG price applies to any resource which may participate

WA Assign MW \* WA GHG Price

Energy \$ + WA GHG \$

Energy Dispatch Cost + WA Assign MW \* WA GHG Rate \* WA GHG Price per ton

ID	Dispatch MW	LMP \$/MWh	Energy \$	WA Assign MW	WA GHG (\$/MWh)	WA GHG \$	Total Payment (\$)	Total Costs (\$)
G1	200	36	7,200	200	9	1,800	9,000	8,800
G2	150	36	5,400	150	9	1,350	6,750	300
G10	50	36	1,800	50	9	450	2,250	2,165
G11	400	36	14,400	50	9	450	14,850	14,850
G12	200	36	7,200	100	9	900	8,100	1,500
WA Ld	-550	36	-19,800	-550	9	-4,950	-24,750	N/A
Rest Ld	-450	36	-16,200	0	N/A	0	-16,200	N/A

This payment (\$1350) for the Unspecified Imports MWs would be allocated to an entity with compliance obligation to the GHG zone

Resource Energy + GHG payments  
≥ Energy + GHG costs

## TAKE AWAYS

- Designing and implementing a comprehensive market solution for GHG can be supported by SPP market staff and SPP market and settlements systems
- A proper comprehensive solution should allocate costs associated with GHG zone import to load in the GHG zone
- The stakeholder process will be key to reaching a solution that meets the GHG policies' intent and is supported by the participants

## NEXT STEPS

- Continue to evaluate solutions to address the MW Re-Designation concerns and involve participants in understanding the pros and cons of each approach
- Discuss the proper entity(ies) responsible for collecting the GHG costs allocated to resources

# MORE GHG EXAMPLES

WITH BASELINE APPROACH

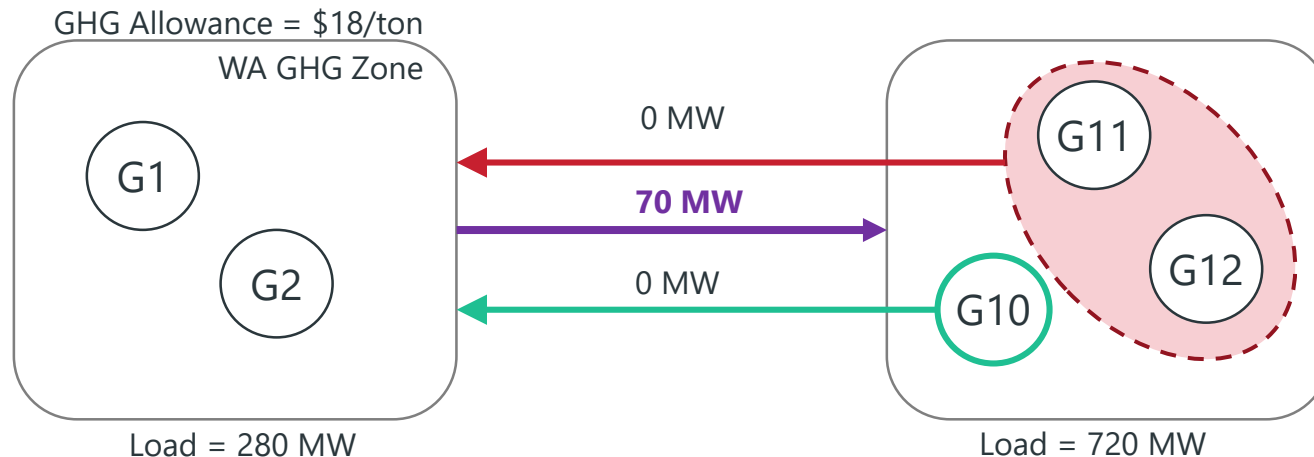
# SCENARIO 3: GHG WHEN GHG ZONE EXPORTING

ID	Max MW	Baseline MW	\$/MWh	GHG ton/MWh	Dispatch MW	WA Assign MW
G1	200	200	27.75	0.4 (\$7.2/MWh)	200	200
G2	150	150	2	0	150	150
G10	50	0	37	0.35(\$6.3/MWh)	0	0
G11	600	450	36	0.5(\$9/MWh)	450	0
G12	200	200	3		200	
					1000	350

\*G13 offline

WA Load Requirement:  
G1 200MW + G2 150MW  
≥ 280MW

Shadow price = \$0/MWh  
incremental WA requirement:  
no change in solution



System Power Balance:  
Total generation = 1000 MW

Shadow price = \$36/MWh  
Incremental sys load requirement:  
G11 increment up



# SCENARIO 3: SETTLEMENTS

Equal at all Locations since no congestion or losses  
Dispatch MW \* LMP

WA GHG price applies to any resource which may participate

WA Assign MW \* WA GHG Price

Energy \$ + WA GHG \$

Energy Dispatch Cost + WA Assign MW \* WA GHG Rate \* WA GHG Price per ton

ID	Dispatch MW	LMP \$/MWh	Energy \$	WA Assign MW	WA GHG (\$/MWh)	WA GHG \$	Total Payment (\$)	Total Costs (\$)
G1	200	36	7,200	200	0	0	7,200	6,990
G2	150	36	5,400	150	0	0	5,400	300
G10	0	36	0	0	0	0	0	0
G11	450	36	16,200	0	0	0	16,200	16,200
G12	200	36	7,200	0	0	0	7,200	600
WA Ld	-280	36	-10,080	-280	0	0	-10,080	N/A
Rest Ld	-720	36	-25,920	0	N/A	0	-25,920	N/A

Resource Energy + GHG payments  
≥ Energy + GHG costs

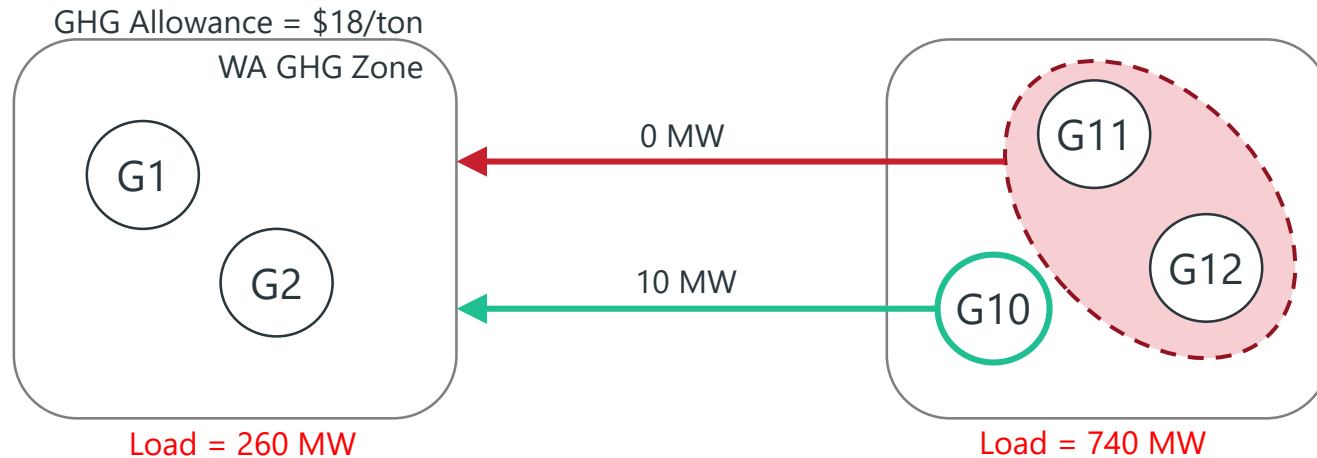
# SCENARIO 4: SPECIFIED UNIT PARTIALLY APPLIED

ID	Max MW	Baseline MW	\$/MWh	GHG ton/MWh	Dispatch MW	WA Assign MW
G1	100	100	27.75	0.4 (\$7.2/MWh)	100	100
G2	150	150	2	0	150	150
G10	50	20	37	0.35(\$6.3/MWh)	30	10
G11	520	520	36	0.5 (\$9/MWh)	520	0
G12	200	200	3		200	
					1000	260

\*G13 offline

WA Load Requirement:  
 G1 100MW + G2 150MW  
 + G10 10MW ≥ 260MW

Shadow price = \$6.3/MWh  
 incremental WA requirement:  
 G10 WA Assign MW ↑  
 → 0.35 ton/MWh \* \$18/ton



System Power Balance:  
 Total generation = 1000 MW

Shadow price = \$37/MWh  
 Incremental sys load requirement:  
 G10 increment up

# SCENARIO 4: SETTLEMENTS

Equal at all Locations since no congestion or losses

Dispatch MW \* LMP

WA GHG price applies to any resource which may participate

WA Assign MW \* WA GHG Price

Energy \$ + WA GHG \$

Energy Dispatch Cost + WA Assign MW \* WA GHG Rate \*

ID	Dispatch MW	LMP \$/MWh	Energy \$	WA Assign MW	WA GHG (\$/MWh)	WA GHG \$	Total Payment (\$)	Total Costs (\$)
G1	100	37	3,700	100	6.3	630	4,330	3,495
G2	150	37	5,550	150	6.3	945	6,495	300
G10	30	37	1,110	10	6.3	63	1,173	1,173
G11	520	37	19,240	0	6.3	0	19,240	18,720
G12	200	37	7,400	0	6.3	0	7,400	600
WA Ld	-260	37	-9,620	-260	6.3	-1,638	-11,258	N/A
Rest Ld	-740	37	-27,380	0	N/A	0	-27,380	N/A

Resource Energy + GHG payments ≥ Energy + GHG costs



# QUESTIONS/DISCUSSION

# CLOSING SESSION

# SERVICE OFFERING

# MARKETS+ DRAFT SERVICE OFFERING

## Governance

- Balanced Approach and Participation
- Organizational Structure: MIP, MPEC, MSC, Working Groups, Task Forces, MIP Nominating Cmte and Forum

## Market Design

- Responsibilities: Participants and Operator
- Key Features: Products; Timeline/Processes; Resource Registration Types; Price Formation; Centralized Unit Commitment; Centralized Unit Dispatch; Robust Physical Sufficiency; Flow-based Market Operations; Virtuals; In-line, Impact-based Mitigation; Marginal Losses; GHG Pricing/Settlement
- Compatability with Existing Constructs: Scheduling Activities; Coordinated Congestion Management; Congestion Hedge; GHG Tracking; Resource Adequacy; RSG; Division of Responsibilities

## Transmission

- ATRR: Eligible for Recovery and Recovery Mechanism
- Transmission Revenue Distribution Methodology
- Base Schedule Methodology
- Flow-Based Operation

# MARKETS+ DRAFT SERVICE OFFERING

## Market Settlements

- Net Settlement
- Uplifts
- Timelines
- Dispute Process

## Market Monitor

- Model
- Market Power Mitigation

## Other Sections

- Resource Adequacy
- Potential Future Market Enhancements
- Stakeholder Relations
- Implementation: Development and Launch Timeline



# QUESTIONS DISCUSSION

# NEXT STEPS SCHEDULE

# 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

# FUTURE DEVELOPMENT UPDATE MEETINGS

- Webinar                      August 17                      10:00 am – Noon Mountain
  - Portland Meeting Summary
- In Person Meeting – Phoenix
  - November 8<sup>th</sup> – 9<sup>th</sup>

# MARKETS



*Working together to responsibly and economically  
keep the lights on today and in the future.*



SouthwestPowerPool



SPPorg



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**WESTERN  
ENERGY  
SERVICES**