

EIM Stakeholder Meeting

April 10, 2019 9am – 1:15pm Rates Hearing Room



For our WebEx and phone participants:

- We have muted all calls on entry, if you have a question, you will need to unmute by using *6. Then please identify yourself by name and let us know who you represent.
- Please do not put this call on hold OR take other calls while you are dialed into this one.
- If we identify a noisy line, you may be disconnected from the meeting.

Agenda

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• Welcome, Safety Moment, Introductions

$$9:05 - 9:10$$

Topics for Today's Meeting

• Review of BPAs EIM Principles and Timeline

$$9:10 - 10:00$$

EIM Process and Venues

10:00- 11:00

Carbon in the EIM

11:00 - 11:15

• Cost Benefit Analysis: Status Update

11:15 - 11:30

• Break

11:30-1:00

• Structured Scenario

1:00 - 1:15

Next Steps, Q&A

Topics For Today's Meeting

- Timeline Review
- All the issues that BPA identified at the initial July 24th EIM Stakeholder meeting have been discussed and evaluated:
 - 1. Relationship of EIM to Other Emerging Markets
 - 2.BA Resource Sufficiency
 - 3.EIM Settlements
 - 4.Market Power
 - 5. Treatment of Transmission
 - 6.Generation Participation Model (FCRPS)
 - 7.Governance
 - 8. Carbon Obligation in EIM
- Structured Scenario
- Question and Answer Session

Statement of BPA's Principles:

- 1. Participation is consistent with statutory, regulatory, and contractual obligations.
- 2. Maintain reliable delivery of power and transmission to our customers.
- 3. Resource participation in the EIM is and always will be voluntary.
- 4.BPA's decision to participate in the EIM will be based on a sound business rationale.

If BPA signs the EIM Implementation Agreement it would authorize BPA to begin spending on EIM implementation projects with the CAISO and signals BPA's intent to join the EIM as long as BPA's EIM principles continue to be met. However, it does not bind BPA to join the EIM.

Timeline Leading up to the ROD

Agendas for previous and future monthly EIM Stakeholder meetings:

July 24	 Grid Modernization Overview, Strategic Plan Connection, Intro to 8 Issues BPA is Reviewing, Initial Cost Benefit Analysis 				
September 13	◆EIM 101				
October 11	Process Plan, Transmission, Generation, Governance				
November 14	Process Plan, Market Power				
December 18	Settlements, Non-Federal Generation Participation				
January 16	Resource Sufficiency, Emerging Markets				
February 20	Base Case Structured Scenario, Market Mitigation				
March 13	•EIM Issues and Venues, Oversupply Management Protocol, Settlements, Structured Scenario				
April 10	Carbon in the EIM, Cost Benefit Analysis Status Update, Structured Scenario				
May 15	Cost Benefit Analysis				
June 12	Cost Benefit Analysis Update				
July	•Letter to the Region with a 30 day public comment				
August	•BPA drafts Record of Decision (ROD)				
September	•Final ROD for signing the EIM Implementation Agreement				

EIM Decision Process

1. Letter to Region and Record of Decision

July 2019 – September 2019

- Solicit stakeholder feedback on: Draft Implementation Agreement, Cost Benefit Analysis, Legal considerations, Roadmap of process/issues, Proposed Decisions on Certain Policy Issues, Principles for Joining
- 30-day comment period
- Final decision to sign Implementation Agreement, and on other items covered in Letter to Region

2. Policy Implementation Decisions

October 2019 – August 2020

- Discuss all remaining policy issues with stakeholders.
- Provide written proposal, solicit written stakeholder comment, and make final written decision(s) on policy issues
- Final decisions on these policy issues

3. BP-22 and TC-22 Cases

October 2020 - July 2021

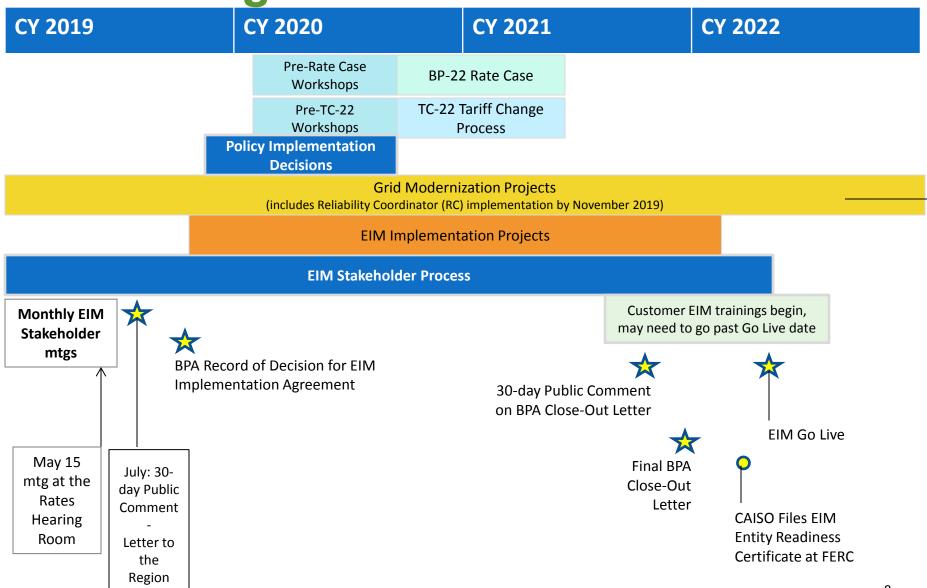
- Settlement discussions August October 2020
- Follow 7(i) process and conclude with ROD / final decision

Draft and Final Close-Out Letters

October 2021 – December 2021

- Draft Close-Out Letter addressing: principles for joining the EIM, any additional policy issues that have arisen, propose final decision whether to join the EIM, and incorporate final decisions made in steps 1 and 2 above.
- 30-day comment period
- Final Close-Out Letter: Address comments raised, Final Decision whether to join EIM, if decision is to join move forward to sign relevant EIM Agreements

BPA's High Level EIM Timeline



EIM Issues and Venues

Legend:

F = Final Decision

I = Implementation

This shows BPA's current thinking but the matrix will evolve over time

Issue	Letter to Region / ROD (July 2019 – September 2019)	Policy Implementation Decisions (October 2019 – August 2020)	TC-22 Tariff Terms & Conditions Case (October 2020 – July 2021)	BP-22 Rate Case (October 2020 – July 2021)	Close-Out Letter (October 2021 – December 2021)
BPA's EIM Principles Development / Evaluation	F – Development	I	1	_	F – Evaluation of the issues against the principles
Statutory Authority for Joining the EIM	F				
EIM Impacts on BPA Contractual Commitments	F				
NEPA and Environmental Obligations	F				
EIM Governance	F				Confirm
Cost Benefit Analysis	F				consistency with
Carbon Obligations	F				the principles.
Market Power (LMPM, DEB)	F				
Oversupply Management Protocol	F				
OCBR and other Reliability Tools	F				
Federal Generation Participation Plan	F				
Load Zone (LAP)	F		I	I	
Resource Sufficiency — BAA Level	F				Final action
Transmission — Interchange	F		I	I	regarding
Transmission — Network		F	I	I	decision to join.
Allocation of EIM Charge Codes		F			
Resource Sufficiency — Sub-BAA Level		F	l		
Transmission Losses		F	I		
Nonfederal Resource Participation Requirements		F	l	I	
Settlements/Billing (Mechanics)		F	I		
Data Submission Requirements		F	I		
Metering Requirements		F	I		

Carbon in the EIM

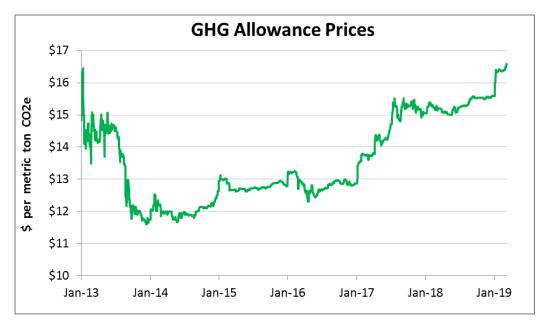


Background: California Cap-and-Trade

- The California cap-and-trade program for greenhouse gas (GHG) emissions was implemented in 2013
 - A market-based program covering multiple sectors, including electricity generated in or imported into California
 - Sets a cap on GHG emissions, which decreases annually to achieve the states target reduction in GHG emissions (40% below 1990 levels by 2030)
 - Covered entities must obtain "allowances" to cover their reported GHG emissions
- Entities also report GHG emissions annually to California under the California Air Resource Board's (CARB) Mandatory Reporting Requirements (MRR) regulation
 - BPA voluntarily reports its GHG emissions to CARB

Background: California Cap-and-Trade

- An allowance can be thought of as a permit authorizing an entity to emit one metric ton of carbon dioxide equivalent (CO2e)
- CARB distributes allowances in accordance with the cap through direct distribution to certain covered entities and sales at quarterly auctions
 - The auction has a price floor that escalates each year, and starting in 2020 there will also be an escalating price ceiling
- Entities can also buy and sell allowances in secondary markets
- Allowance prices at the auctions currently are ~\$16 per metric ton CO2e
 - Fluctuates due to the supply demand balance of allowances

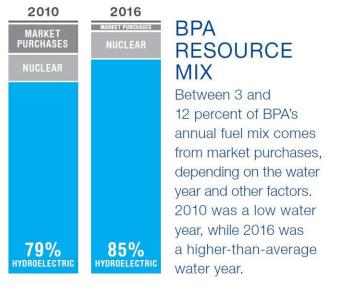


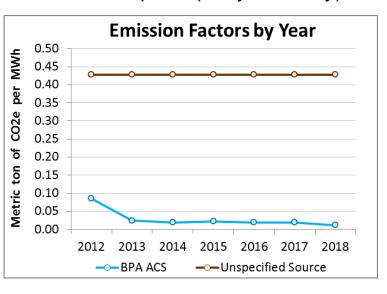
Background: California Cap-and-Trade

- Electricity generated in or imported into California is subject to the California cap-and-trade program
- The source of electricity is either specified (known) or unspecified (unknown)
- An emission factor is assigned to a generation source based on its fuel source
 - In units: metric ton of CO2e emitted per MWh
- The emissions factor for an unspecified source is 0.428 metric ton CO2e per MWh
 - Roughly equivalent to natural gas thermal generation

BPA Power System Fuel Mix

- BPA sells power from the Federal system
 - The dams (hydro) and CGS (nuclear) produce carbon-free power
 - Emissions are attributed to BPA's market purchases
- BPA reports to California annually and is recognized as an Asset Controlling Supplier (ACS)
 - An ACS owns or operates interconnected electricity generating facilities or serves as an exclusive marketer for these facilities even though it does not own them
 - ACS emission factors are based on the resource mix reports (a 2 year delay)





GHG Cost

Comparison between BPA ACS and Unspecified Source power

Units:	Metric ton CO2e per MWh	MWh	\$ per metric ton CO2e	\$ per MWh
Source	Emission Factor	Imported Power	GHG Allowance Price	GHG Cost
Unspecified Source	0.43	1	\$16	\$6.8
BPA ACS	0.02	1	\$16	\$0.3
Difference	0.41			\$6.5

Carbon in the EIM

- Energy generated in or imported into California is subject to California's greenhouse gas (GHG) regulations.
- For imports into California through the EIM, the Participating Resource Scheduling Coordinator is considered the first deliverer into California, and is responsible for purchasing allowances.
- Resources outside California have the option to sell directly into California.
 - California bids would include a GHG compliance cost adder separate from the energy bids.
 - If BPA were to participate in the EIM, any carbon attributed to imports into CA would incur a compliance obligation with California's cap-andtrade program

Carbon in the EIM

- BPA currently cannot purchase carbon allowances under CARB's cap and trade program.
 - Carbon allowances are considered a state tax by the U.S. DOE, BPA, and other federal agencies.
 - Federal agencies have sovereign immunity from state taxes and cannot pay them unless Congress specifically authorizes it.
- Currently, BPA sales into California use third-party arrangements.
 These third-parties are responsible for the carbon compliance obligation.
 - These arrangements are inefficient and have an incremental cost

BPA's Approach for Carbon in the EIM

- Congressional authorization to purchase allowances
 - BPA would need statutory expenditure authorization to directly purchase carbon allowances under California and potentially other state carbon programs, to avoid additional costs when selling into those power markets.
- Opt to not have EIM deliveries directly sent to California
 - Potential impact to the value obtained by EIM participation, especially if carbon pricing expands to other states in the EIM footprint
- <u>Conclusion</u>: California's carbon policy is not a barrier to participation in the EIM. However, until BPA obtains Congressional Authorization BPA intends to opt out of directly delivering EIM energy into California.

Cost Benefit Analysis



Cost Benefit Analysis

- In 2017, BPA performed an initial Cost/Benefit Analysis for joining the EIM that indicated the following:
 - ~\$10M in annual dispatch benefits, net of ongoing costs and opportunity cost
 - A variety of qualitative Transmission benefits
 - ~\$35M in startup costs
- We're updating the business case to achieve multiple objectives
 - Utilize an approach consistent with almost all potential and current EIM participants
 - Evaluate benefits in multiple scenarios
 - Refresh market assumptions and cost estimates
 - Flesh out Transmission benefits, potentially quantifying some of them
 - Provide more comprehensive support for an EIM-related ROD
- Steps taken to date
 - Contracted with E3 to perform an "industry standard" Benefits Analysis
 - Reviewing and updating cost estimates provided by Utilicast in 2017
- Expected timeline at upcoming EIM stakeholder meetings:
 - May 2019: Share draft results and request feedback
 - June 2019: Discuss customer comments

Break



Structured Scenario



Structured Scenarios: Overview

- A Load Serving Entity (LSE) is using three resources to serve their load
 - BPA Slice delivery
 - Wind resource located inside the BPA EIM BAA
 - Tagged purchase from a resource inside the BPA EIM BAA

 They are managing uncertainty regarding the Slice amount, wind output, and market conditions

VERS in EIM

- Like all resources, Variable Energy Resources ("VERS") - like wind - will need an hourly base schedule
- However, unlike dispatchable resources, VERS have their 5-minute schedules/dispatches updated to reflect their expected output within the hour
- Those adjustments are a combination of a shortterm persistence value adjusted by forecast data

VERS in EIM Continued

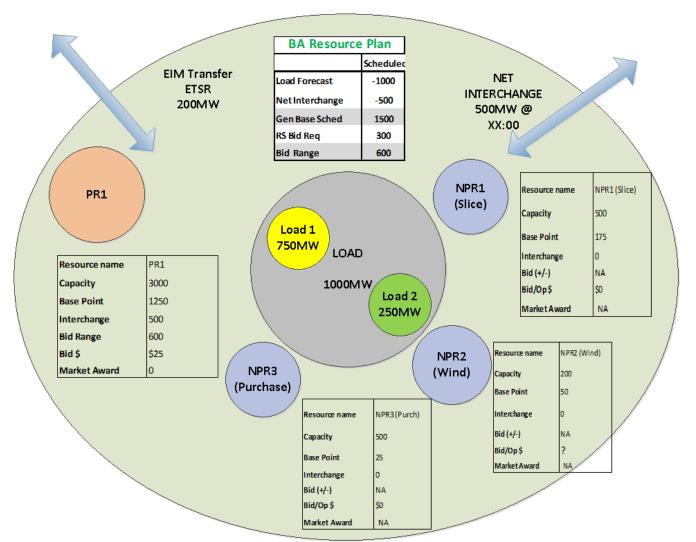
- For simplicity, today's scenario BPA is using an 10/5 persistence value to adjust 5-minute schedules/dispatches
 - I.E., the actual output of a resource 10-minutes prior to the start of a RTD interval sets the schedule/dispatch for that 5-minute period
- Note this is true irrespective of the energy values submitted via an eTag for either inter or intrachange
 - Differences between wind output and a load or eTag for export are treated as imbalance that will either be served by the market or a manual dispatch

Structured Scenarios: 3.A

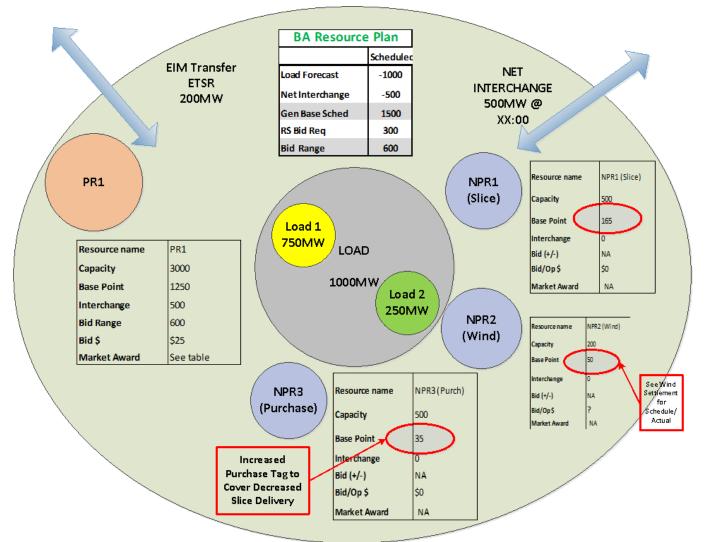
- All LSE resources are non-participating
- Wind base schedule is set at T-55*
- Slice is expected to be 175MW but is reduced to 165MW at T-35
- A purchase was increased 10MW at T-30 to account for the Slice reduction
- Wind actual generation drops throughout the hour

^{*} BPA has not determined the cutoff time for Base Schedule submission

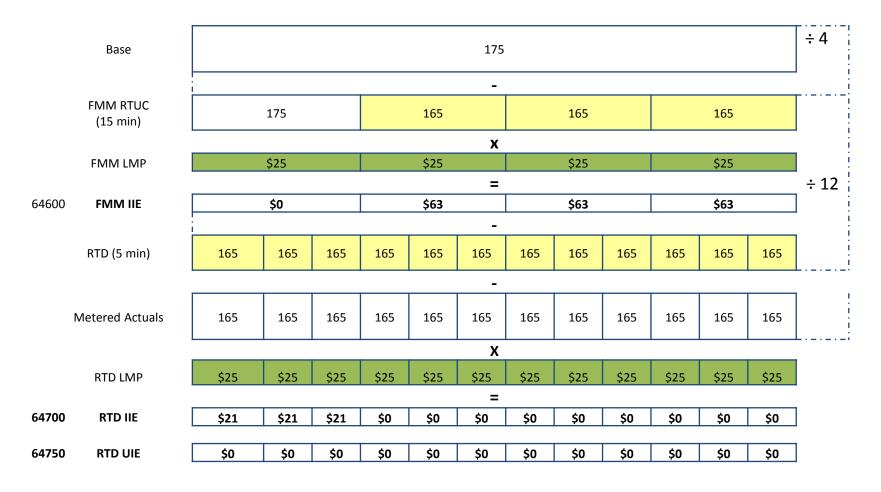
3.A – Wind to Load with Slice/Purchase



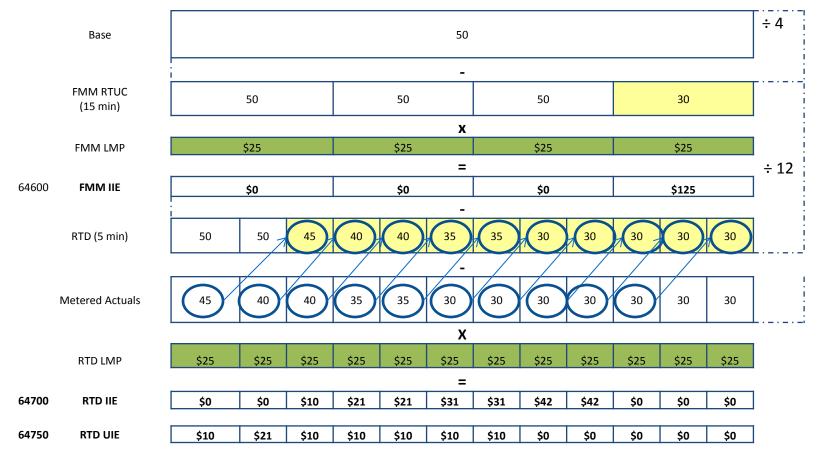
3.A – Wind to Load with Slice/Purchase



3.A Settlements – NPR1 (Slice)

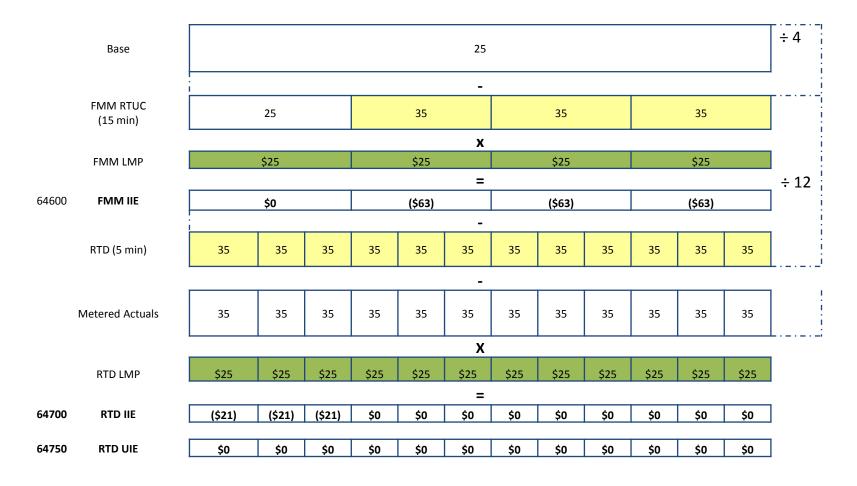


3.A Settlements – NPR2 (Wind)

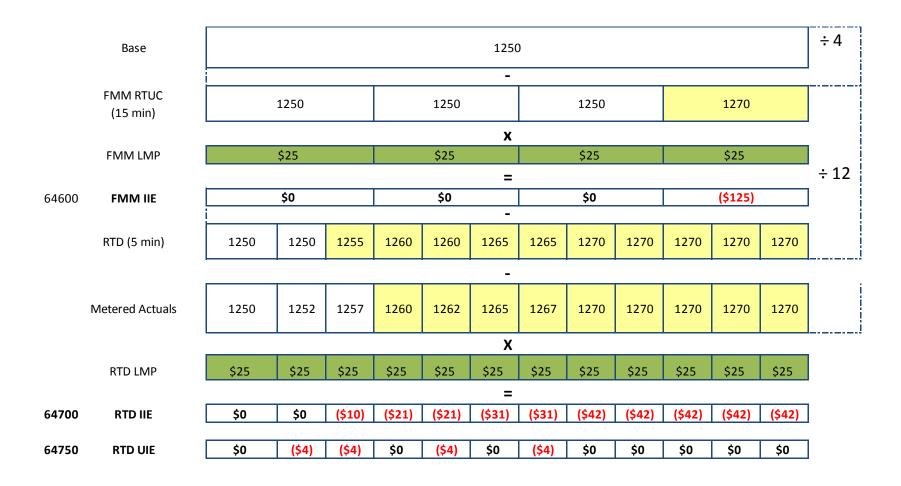


Note: Actual persistence and forecast values based on telemetered State Estimator Data, which may differ from "Metered Actuals" for settlements

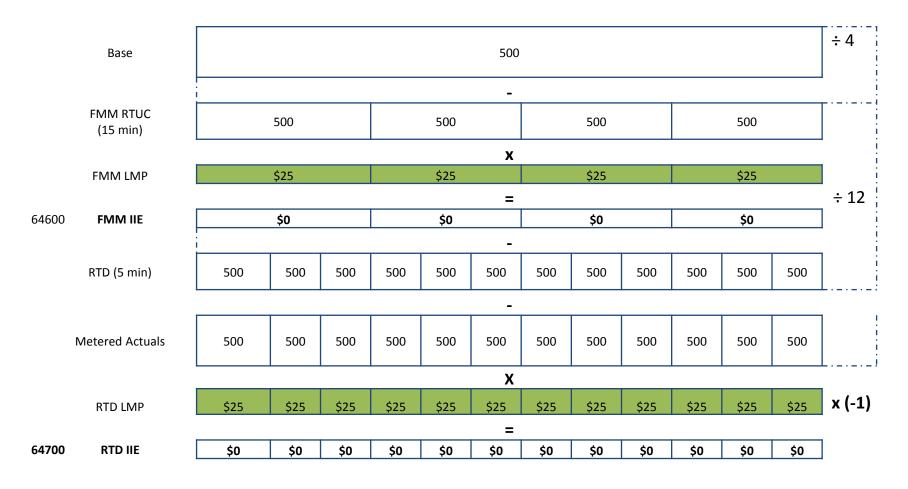
3.A Settlements - NPR3 (Purchase)



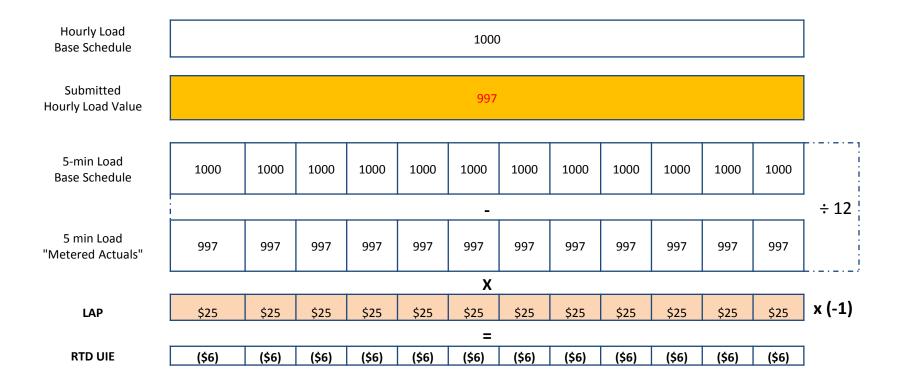
3.A Settlements – PR1



3.A Settlements - Interchange



3.A Settlements - Load



Summary

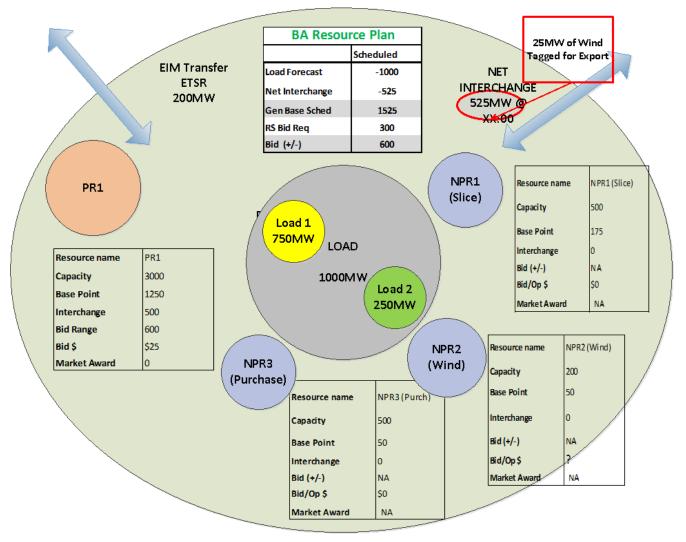
LSE		PR		Load	
NPR 1 IIE	\$250	IIE	(\$323)	UIE	(\$67)
NPR 1 UIE	\$0	UIE	(\$17)		
NPR 2 IIE	\$323				
NPR 2 UIE	\$83				
NPR 3 IIE	(\$250)				
NPR 3 UIE	\$0				
Total	\$406	Total	(\$340)	Total	(\$67)

- The Slice and Purchase transactions offset (NPR 1/3 IIE)
- The NPR 2 and PR IIE offset and require transactions among the BAA/MO/PR
- Load UIE is equal to the UIE of resources in the BAA and require transactions among customer/BAA/MO/PR

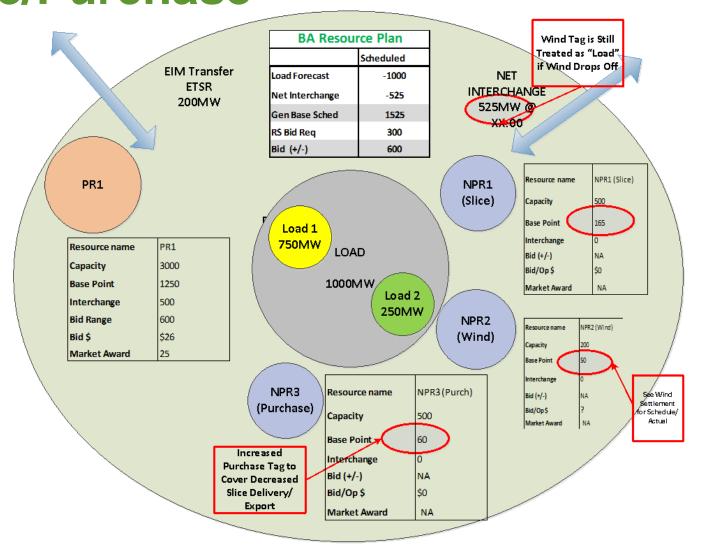
Structured Scenarios: 3.B

- All resources are non-participating
- Wind base schedule is set at T-55
- 25MW of wind is tagged at T-55 as an export for a sale
- Slice is expected to be 175MW but is reduced to 165MW at T-35
- A purchase was increased 10MW at T-30 to account for the Slice reduction
- Wind actual generation drops throughout the hour

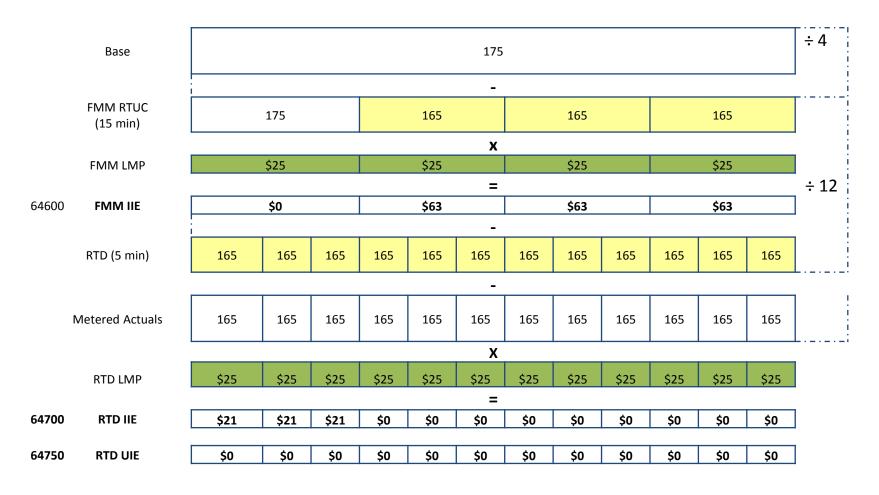
3.B – Wind to Load and Export with Slice/Purchase



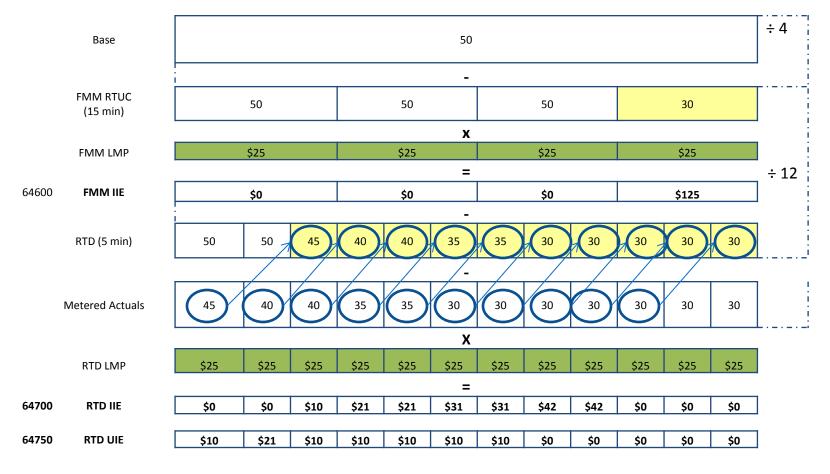
3.B – Wind to Load and Export with Slice/Purchase



3.B Settlements – NPR1 (Slice)

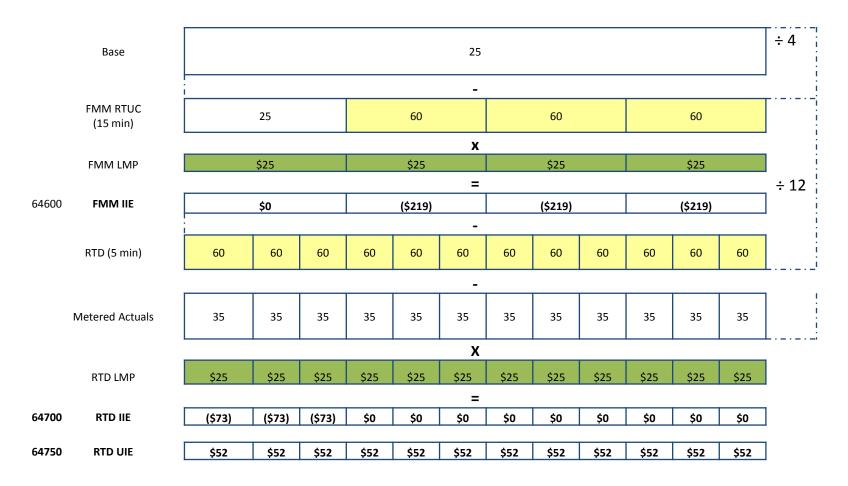


3.B Settlements – NPR2 (Wind)

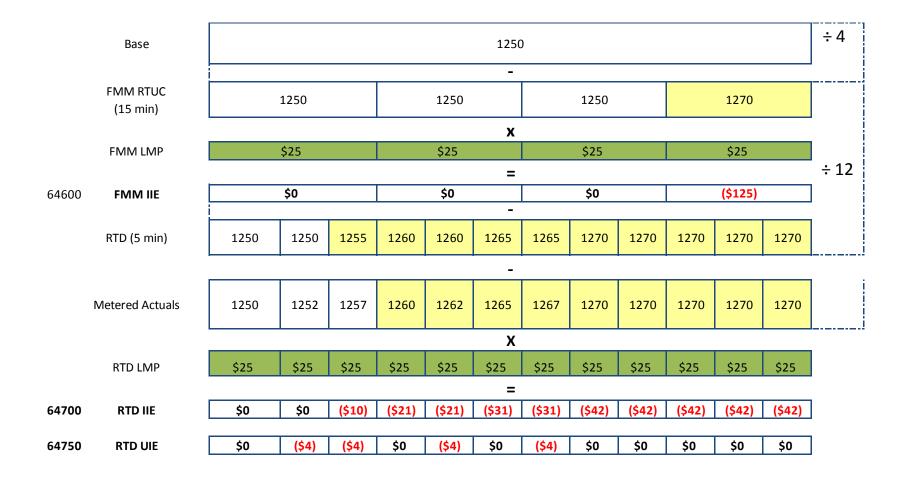


Note: Actual persistence and forecast values based on telemetered State Estimator Data, which may differ from "Metered Actuals" for settlements

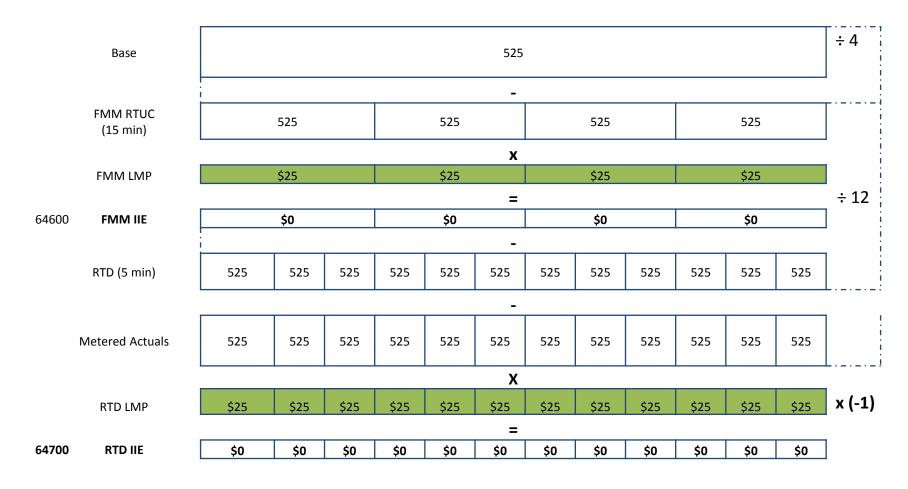
3.B Settlements - NPR3 (Purchase)



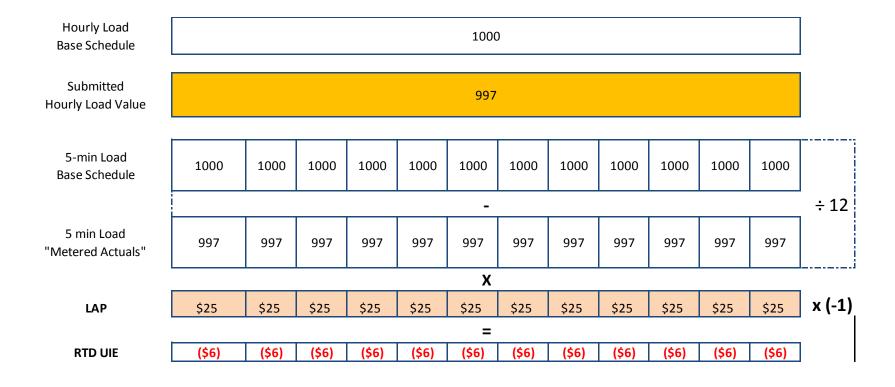
3.B Settlements – PR1



3.B Settlements - Interchange



3.B Settlements - Load



Net Conclusions

LSE		PR		Load	
NPR 1 IIE	\$250	IIE	(\$323)	UIE	(\$67)
NPR 1 UIE	\$0	UIE	(\$17)		
NPR 2 IIE	\$323				
NPR 2 UIE	\$83				
NPR 3 IIE	(\$250)				
NPR 3 UIE	\$0				
Total	\$406	Total	(\$340)	Total	(\$67)

- Net Imbalance is the same
- In this example the PR is essentially backfilling the export instead of the load

Future Structured Scenarios

 BPA proposes to not do anymore Structured Scenarios in this stage of the stakeholder process

 If BPA executes the IA it expects to continue this work in the "Post-Rod" policy process

 BPA is happy to work with individual stakeholders to support their own evaluation of scenarios

Next Steps



Next Steps

- Next meeting scheduled for <u>Wednesday May 15th</u> at the Rates Hearing Room.
 This will be an all-day meeting to discuss our next structured scenario.
 - WebEx and Phone participation will be available
 - Agenda and materials will be distributed in advance via Tech Forum
- We welcome feedback on this meeting. Your comments will help shape future EIM Stakeholder Meetings, please email us at techforum@bpa.gov and reference "EIM Stakeholder Meeting" in the subject. Comments are due by April 24th Wednesday.
- For more information on BPA's EIM Stakeholder process and meetings please visit:

https://www.bpa.gov/Projects/Initiatives/EIM/Pages/Energy-Imbalance-Market.aspx

 For more information on BPA's Grid Modernization Initiative please visit: https://www.bpa.gov/goto/GridModernization

Question and Answer Session

