



BP-24 Settlement Balancing Reserves, OCBR, and OMP Customer Workshop

February 22, 2024



BP 24 Official Settlement Language

- By March 1, 2024, Bonneville will hold at least one BP-26 workshop to discuss the balancing service rate methodology and a summary of the FY 2023 historical use of Operational Controls for Balancing Reserves (OCBR) and Oversupply Management Protocol (OMP). Bonneville will discuss the effects seen on balancing reserves deployment from the Energy Imbalance Market (EIM). Bonneville will make reasonable efforts to respond to customer requests for data related to Bonneville's balancing service rate methodology, OCBR, and OMP, provided that the request seeks data that is in Bonneville's possession, not unduly burdensome to gather and provide, and can be made publicly available. Bonneville will have no obligation to conduct analysis of any data.

Issues to cover

- Balancing Reserve Methodology
- Summary of the FY 2023 historical use of Operational Controls for Balancing Reserves (OCBR) and Oversupply Management Protocol (OMP)
- Effects seen on balancing reserves deployment from the Energy Imbalance Market (EIM)
- What changes has BPA made while in the EIM?



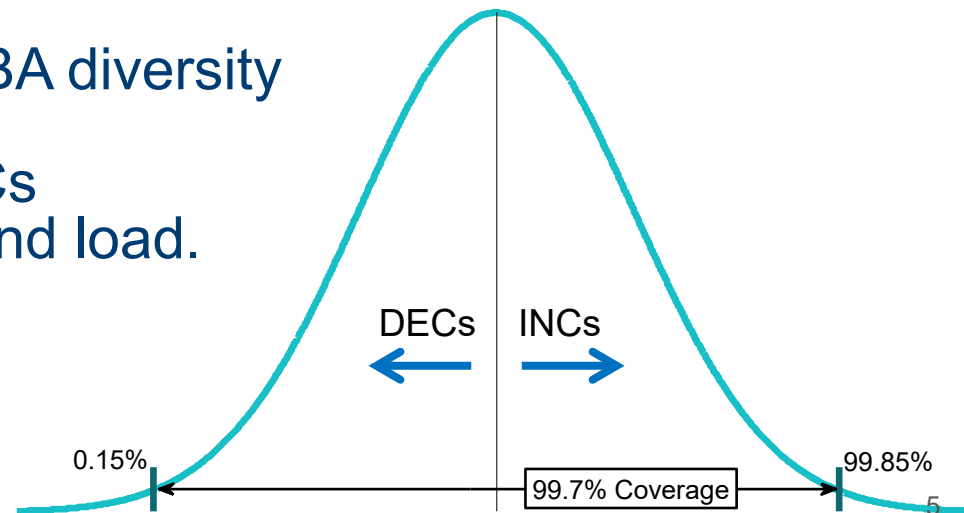
Issue 1: Balancing Reserve Methodology

Step 2 and 3



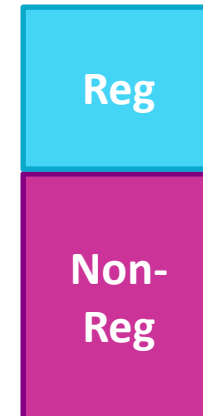
Balancing Reserve Methodology

- BPA holds capacity for balancing reserves to meet the NERC standards and OATT requirements to maintain load-resource balance within its BAA.
- Balancing reserves needed for the BPA BAA are set in advance of the start of each rate period.
- BPA performs statistical evaluations of combined load and generation fleet error to yield a final amount of balancing reserve capacity needed to meet BPA's 99.7% planning standard.
- This evaluation captures BA diversity benefits, the difference in timing of INCs and DEC's deployed for generators and load.

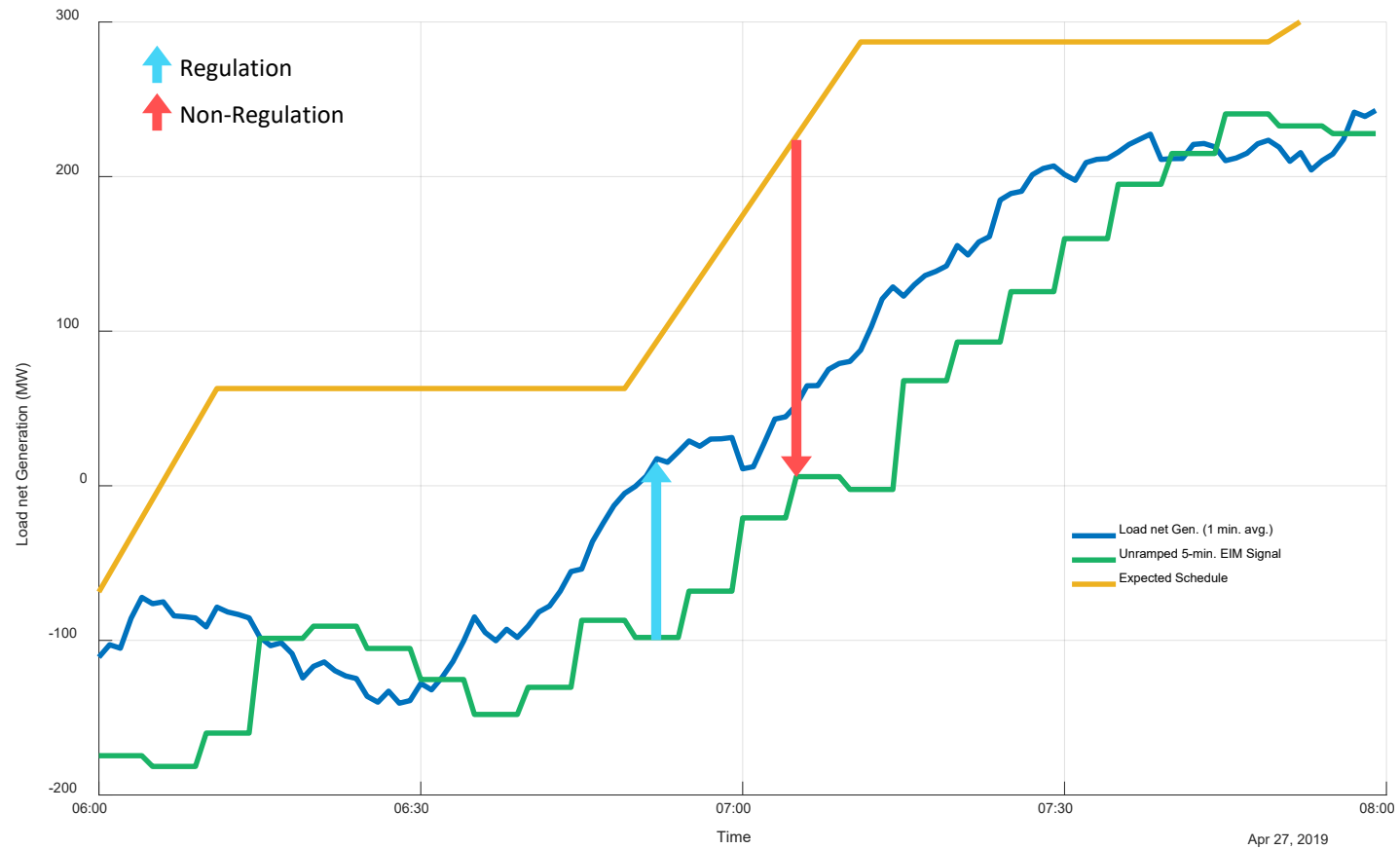


Balancing Reserve Components in the EIM

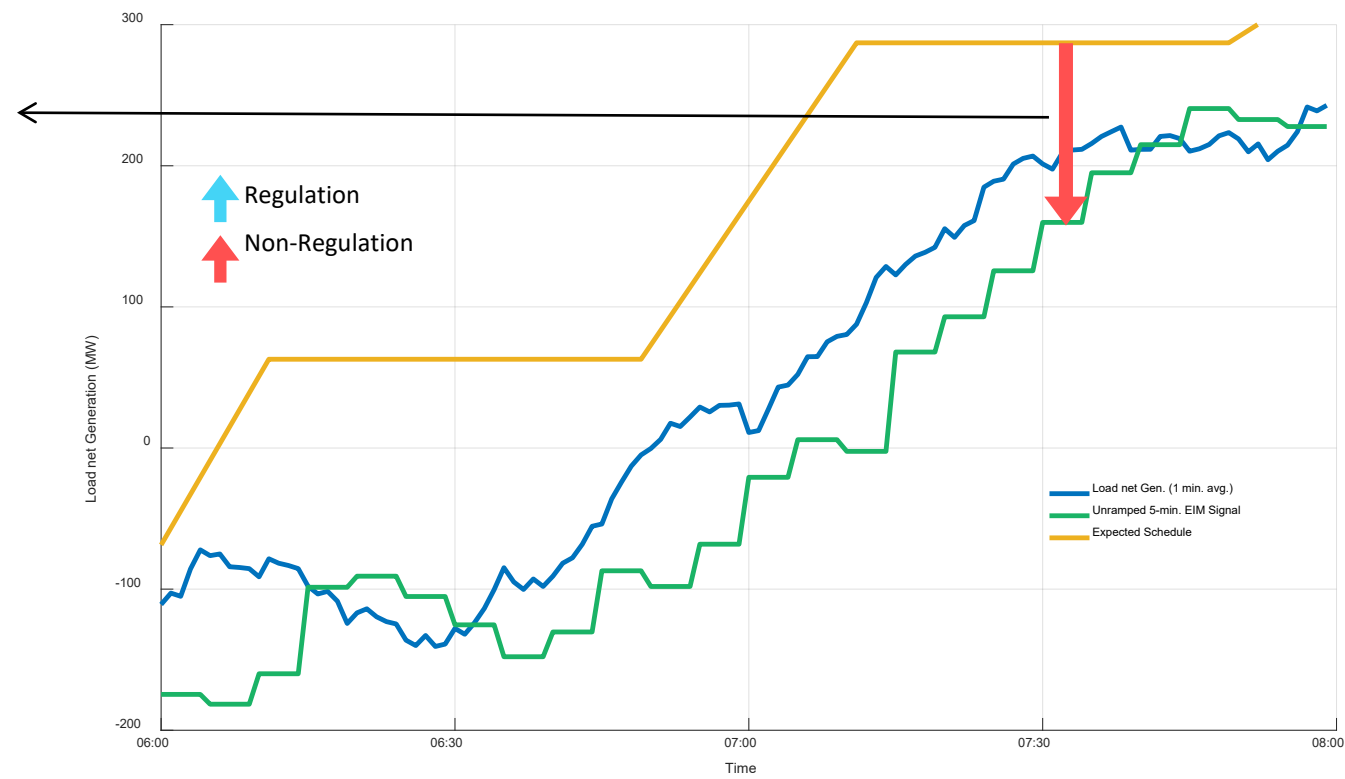
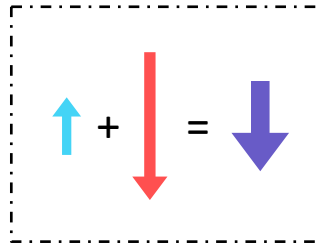
- BPA defines balancing reserve capacity as a combination of “regulation” and “non-regulation” capacity to promote consistency with definitions in the EIM.
 - Regulation Capacity (Reg)
 - The difference between actual Load net Generation and the net EIM dispatch operating target (DOT) of Load net Generation
 - Non-Regulation Capacity (Non-Reg)
 - The difference between the net EIM dispatch operating target (DOT) of Load net Generation and expected hourly schedule of Load net Generation
 - BPA makes its Non-Reg portion of its balancing reserve available to the EIM by bidding or designating as Available Balancing Capacity (ABC)



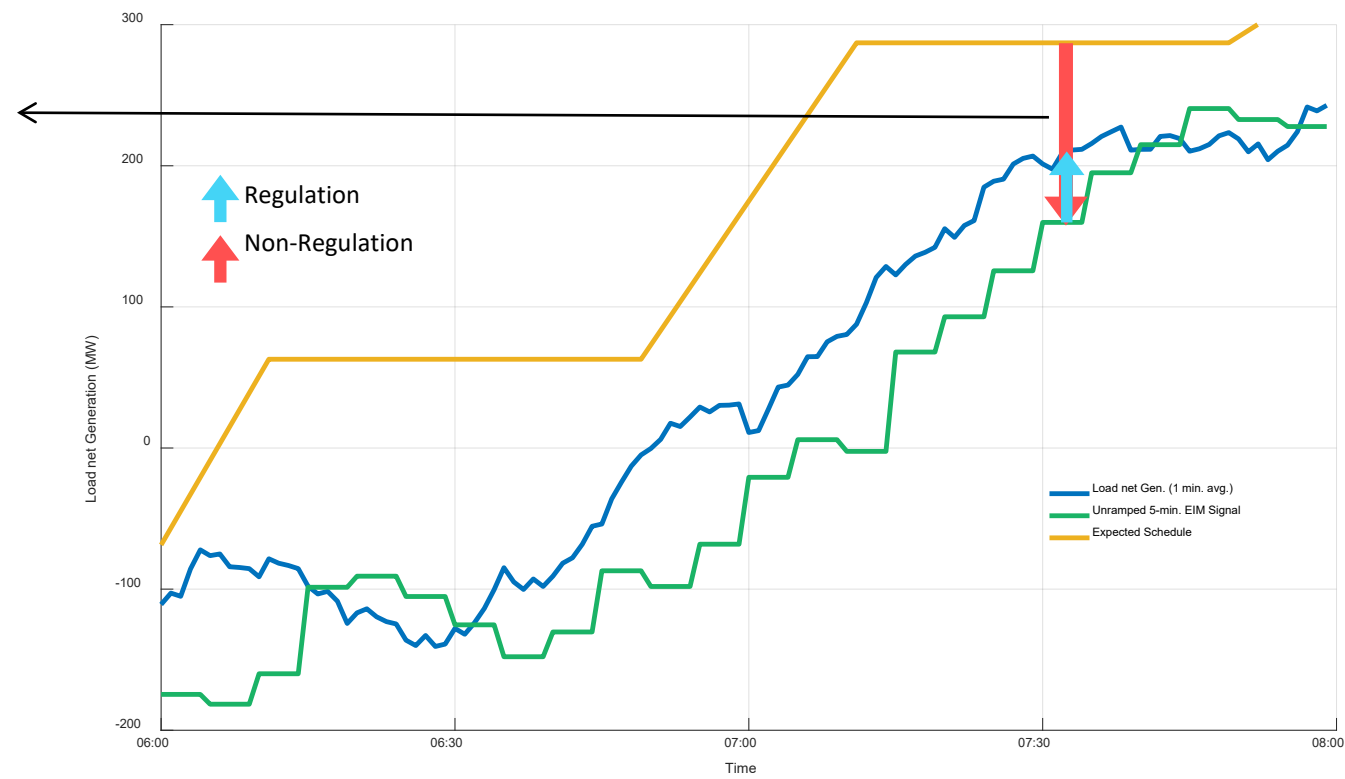
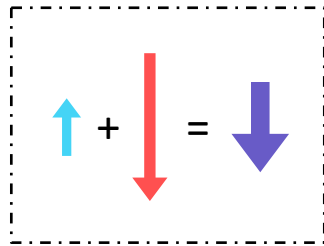
Balancing Reserve Components in the EIM



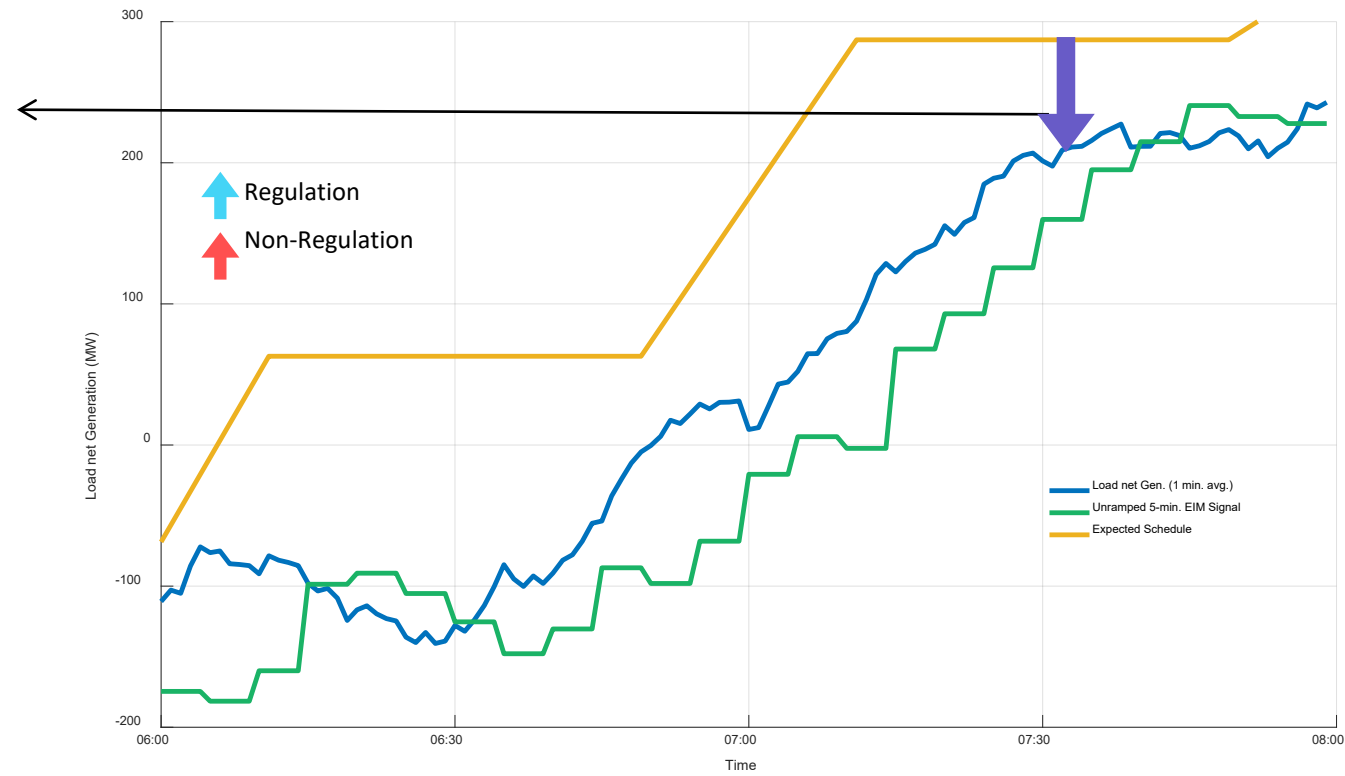
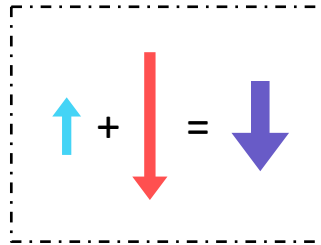
Balancing Reserve Components in the EIM



Balancing Reserve Components in the EIM



Balancing Reserve Components in the EIM





Issue 2A: Historical OCBR Events for FY 2023

Step 2 and 3



OCBR Actions in the EIM

REVIEW

- **OCBR INC Events = OCBR Under-Gen**
 - AGC pauses deployment of Regulation at the onset of OCBR trigger
 - Allows for the DOT from the market to catch up to VER generation, relieving the event.
 - OCBR outside of the EIM still results in Curtailments
- **OCBR DEC Events = OCBR Limitation**
 - Level 1: Limits generation to output at the time of OCBR trigger.
 - Limitation holds for approximately 35 minutes or less
 - Limitations inside or outside of the EIM are identical

OCBR Events before and after EIM (Fiscal year)

Fiscal Year	INC	DEC	Grand Total
2019	52	84	136
2020	25	42	67
2021	30	26	56
2022*	65	66	131
2023	61	50	111
Grand Total	233	268	501

*May 2, 2022 BPA entered the EIM

OCBR Events before and after EIM by month (FY19 to 2023)

Fiscal Year	INC													INC Total
	01 Oct	02 Nov	03 Dec	04 Jan	05 Feb	06 Mar	07 Apr	08 May	09 Jun	10 Jul	11 Aug	12 Sep		
2019	3	3	6	5	4	3	7	2	3	1	9	6	52	
2020	2		2	8	1	2	4	6					25	
2021	2	3		7	5	4	1		2	1	2	3	30	
2022	2	1	3		2	2	15	9	13	6	7	5	65	
2023	1	5	13	9		3	11	11	6		2		61	
Grand Total	10	12	24	29	12	14	38	28	24	8	20	14	233	

Fiscal Year	DEC													DEC Total
	01 Oct	02 Nov	03 Dec	04 Jan	05 Feb	06 Mar	07 Apr	08 May	09 Jun	10 Jul	11 Aug	12 Sep		
2019	3	6	8	7	1	10	10	7	9	11	6	6	84	
2020	14		4	6	1	1	4	6	6				42	
2021	1	5	1	2		4	5		3	1	4		26	
2022	5	2	4	3	10		15	10	11	2	4		66	
2023	3	5	2	2		7	4	15	5	1	4	2	50	
Grand Total	26	18	19	20	12	22	38	38	34	15	18	8	268	

OCBR Events before and after EIM by month (FY19 to 2023)

INC														INC Total
Fiscal Year	01 Oct	02 Nov	03 Dec	04 Jan	05 Feb	06 Mar	07 Apr	08 May	09 Jun	10 Jul	11 Aug	12 Sep		
2019		3	3	6	5	4	3	7	2	3	1	9	6	52
2020		2		2	8	1	2	4	6					25
2021		2	3		7	5	4	1		2	1	2	3	30
2022		2	1	3		2	2	15	9	13	6	7	5	65
2023		1	5	13	9		3	11	11	6		2		61
Grand Total		10	12	24	29	12	14	38	28	24	8	20	14	233

DEC														DEC Total
Fiscal Year	01 Oct	02 Nov	03 Dec	04 Jan	05 Feb	06 Mar	07 Apr	08 May	09 Jun	10 Jul	11 Aug	12 Sep		
2019		3	6	8	7	1	10	10	7	9	11	6	6	84
2020		14		4	6	1	1	4	6	6				42
2021		1	5	1	2		4	5		3	1	4		26
2022		5	2	4	3	10	15	10	11	2	4			66
2023		3	5	2	2		7	4	15	5	1	4	2	50
Grand Total		26	18	19	20	12	22	38	38	34	15	18	8	268

During April to June 2022, BPA was either in parallel ops or entering the EIM and dealing with system issues as we entered the market

OCBR impacts of EIM Transitions

- BPA has had to temporarily suspend EIM participation more often than anticipated
 - When these occur, transitions for regulation deployment do not generally go smooth and more OCBR events have resulted
- These temporary suspensions are driven by:
 - EIM Systems Upgrades
 - Systems Issues at CAISO, at BPA or on the communication links between the two



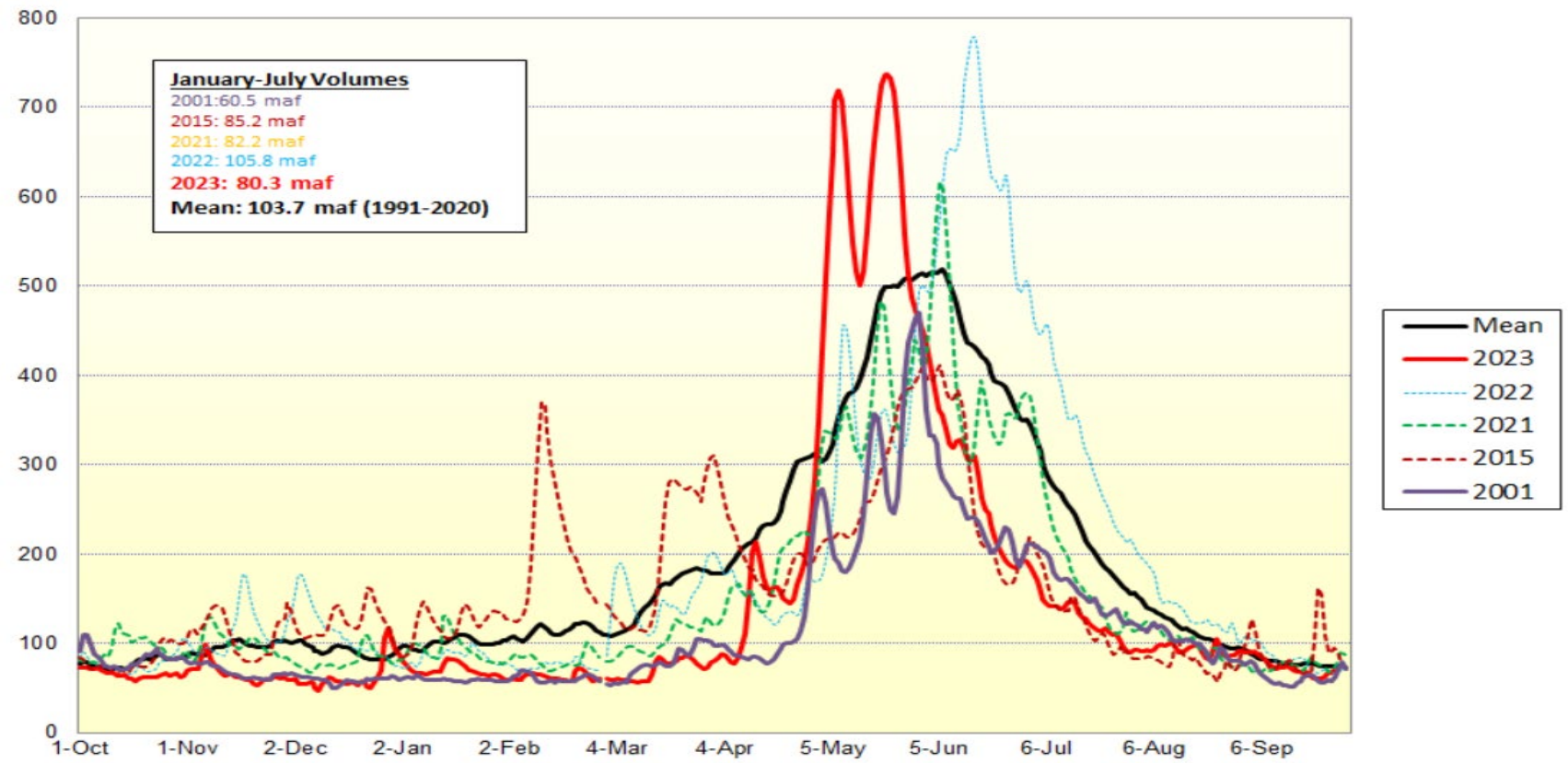
Issue 2B: Historical Oversupply Events for FY 2023

Step 2 and 3



Comparison of Water Years

Natural Flows Comparison at The Dalles



- 2023 was characterized by below average snowpack across the basin, coupled with a very cool spring, resulting in well below average natural flows in early spring. May ended up generally warm and wet, pulling off the bulk of the snow pack in May throughout the basin, as shown by the red line on the graph above.

2023 Summary of Oversupply Management Protocol

- The Jan-Jul water volume for 2023 was 80.3 MAF. The NWRFC 30 year Jan-Jul water volume average (1991-2020) is 103.7 MAF.
- In 2023, there were 7 OMP event days in May:
 - For a total of 64 hours
 - For a total displacement of 46,184 MW
 - There were 31 affected generators
 - BPA paid 26 generators (that submitted cost curves) a total of \$2,964,984 in displacement costs for the season.
 - 2023 was a refueling year for CGS so it was not available to be displaced during the events
- Losses waived totaled 9,768 MW.
- More event information can be found at:
<https://www.bpa.gov/energy-and-services/transmission/oversupply/annual-oversupply-review>

Where to Find More Information

- For BPA's 2023 presentation at the Joint Operating Committee, go to <https://www.bpa.gov/energy-and-services/transmission/interconnection/joint-operating-committee>
- For most current BPA's OMP Business Practice, go to: <https://www.bpa.gov/energy-and-services/transmission/business-practices>
- For Interconnection related Business Practices, go to: <https://www.bpa.gov/energy-and-services/transmission/interconnection/business-practices-related-to-interconnections>
- For BPA's OATT Attachment P, go to: <https://www.bpa.gov/-/media/Aep/transmission/open-access-transmission-tariff/bpa-open-access-transmission-tariff-20211001.pdf>
- For historical information regarding BP-24 and/or TC-24, go to: <https://www.bpa.gov/energy-and-services/rate-and-tariff-proceedings/bp-24-rate-case>

OMP Annual System Test

- OMP Annual System Test to be conducted the week of March 11th.
- OMP will be tested for one hour, likely less.
- No displacement of generation below schedules is expected.
 - All Generators should limit to Schedule (or Generation Estimate for behind-the-meter).
 - No Cost Generators are not required to reduce to Minimum Generation
- No OMP credits or FTC for OMP will apply
 - Generation Imbalance billing still applies.
 - Failure to respond will likely get a phone call after the fact from BPAT Operations or your Transmission AE.
 - Compliance with other Dispatcher directives will apply as always.



Issue 3: Effects on Balancing Reserve Deployment from the EIM

Step 2 and 3



Background

- BPA has been in the EIM since May 2nd 2022
- BPA has seen a reduced deployment of Balancing Reserves since the EIM is deploying bids to fill the Non-Reg from other sources
 - BPAP sees less energy deployments for EI/GI service in these instances
 - While Reserves Planning Margin (99.7%) for *capacity* is the same, the market is helping us to serve the imbalance *energy*.

Big 10 Contributions to EIM

- There is a significant amount of time (~ 43%) when the BPA net APR Dispatch Operating Target (DOT) is zero and the EIM is largely balancing the BPA BAA.
 - There is an additional 12% of the time where the EIM is assisting with balancing the BAA.

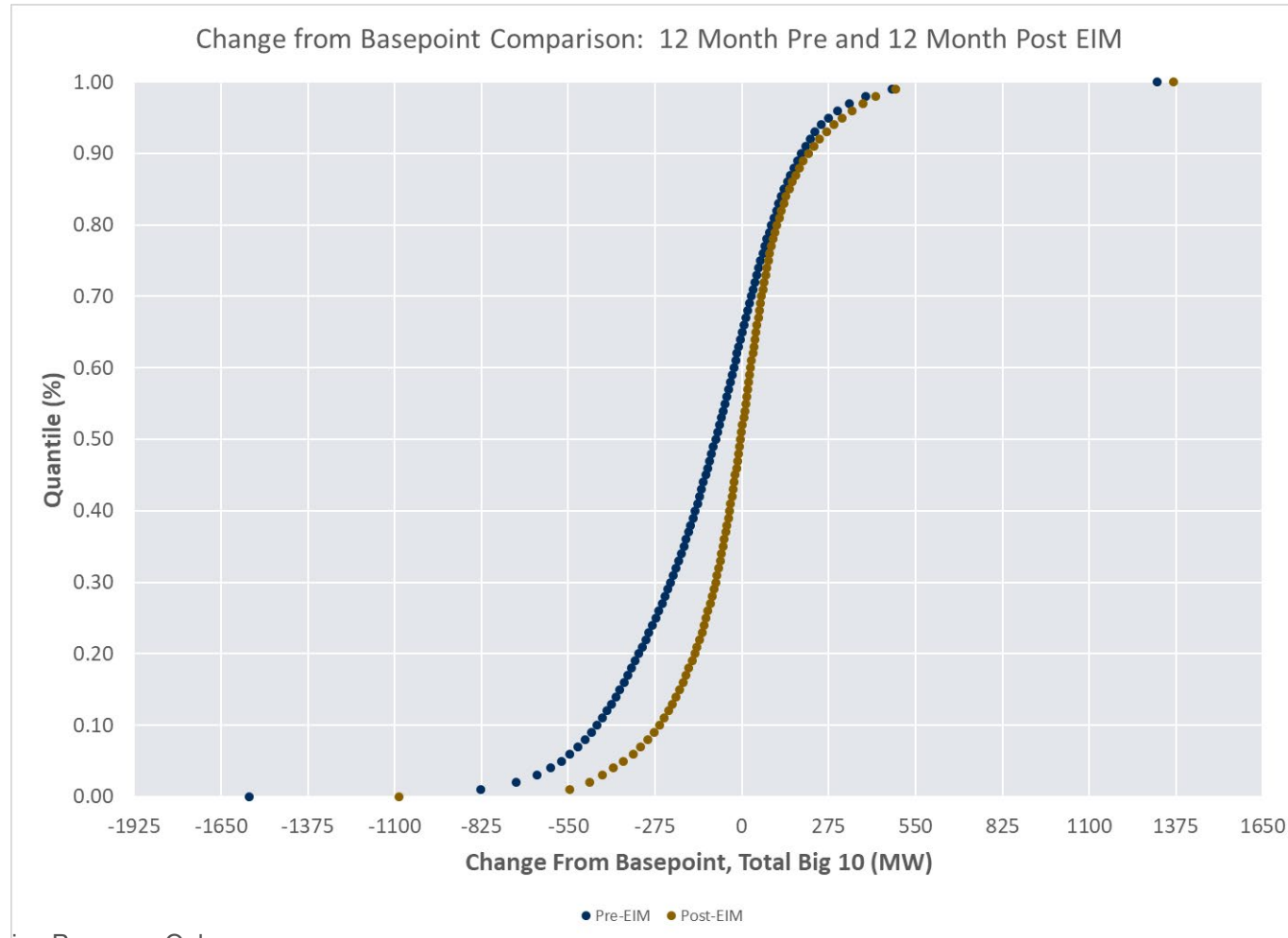
Big 10 Contributions to EIM

- The likelihood of the BPA APR providing balancing solely to the EIM is low (6.63%).
 - These events tend to be short in duration at the 99.7th percentile.
- While these events can have a significant magnitude, their likelihood and duration both are relatively low.

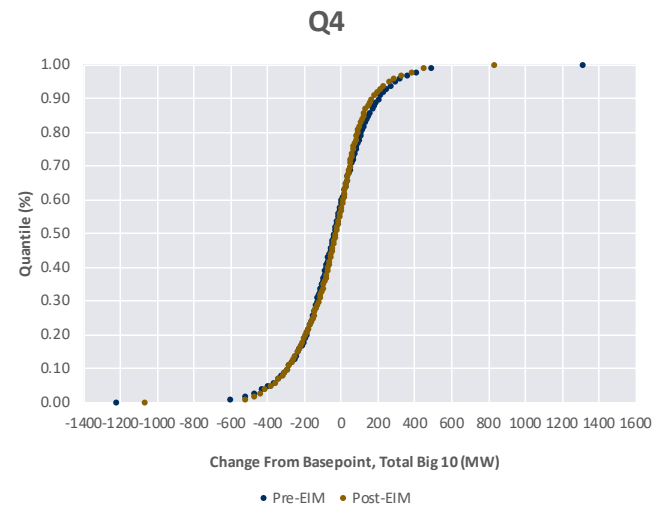
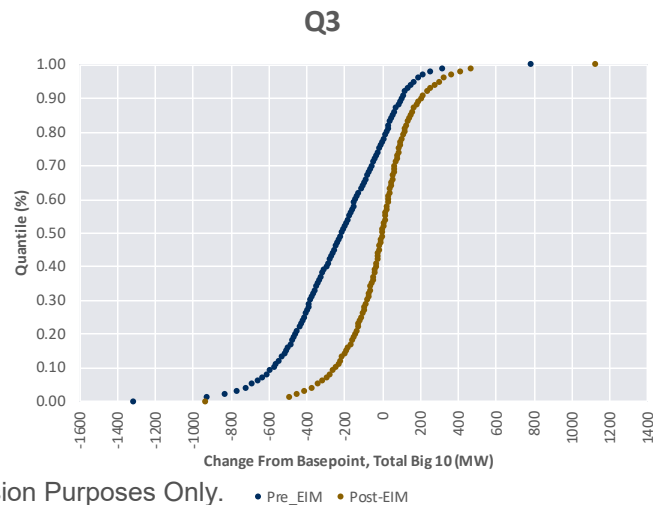
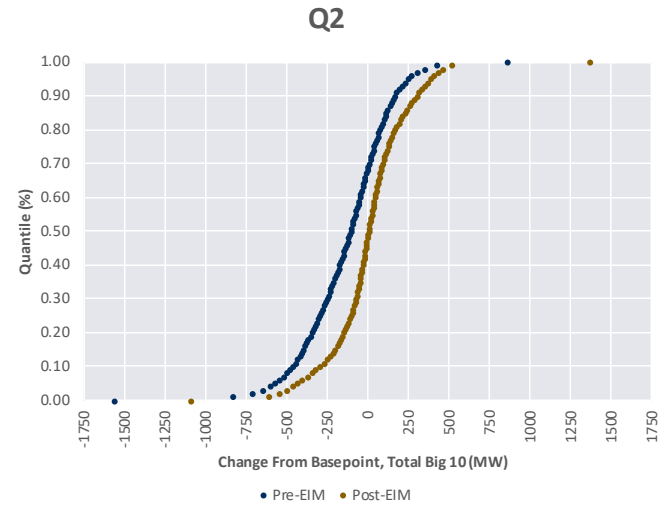
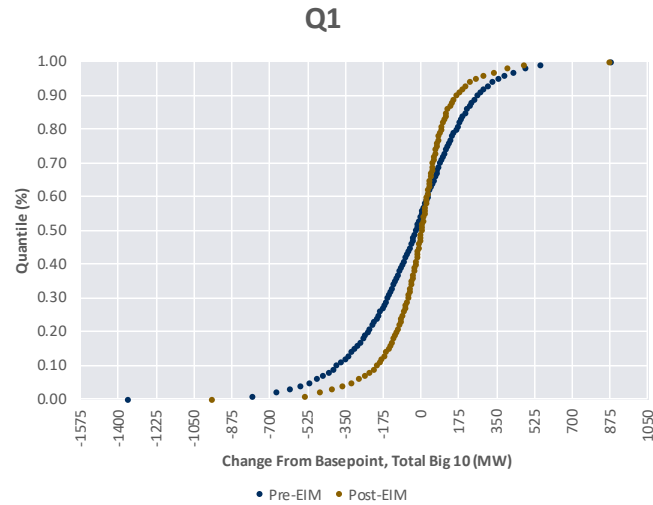
Pre and Post Generation for Big 10

- There appears to be fewer generation changes post-EIM as compared to pre-EIM.
 - Observing the Big 10 generation changes from the planned basepoint for the 12 months prior to EIM and the 12 months after joining EIM shows a narrower range of generation changes.
- At this juncture, the analysis is more indicative as the operating conditions are not identical. However, the differences are significant enough to warrant consideration.

Pre and Post Generation for Big 10



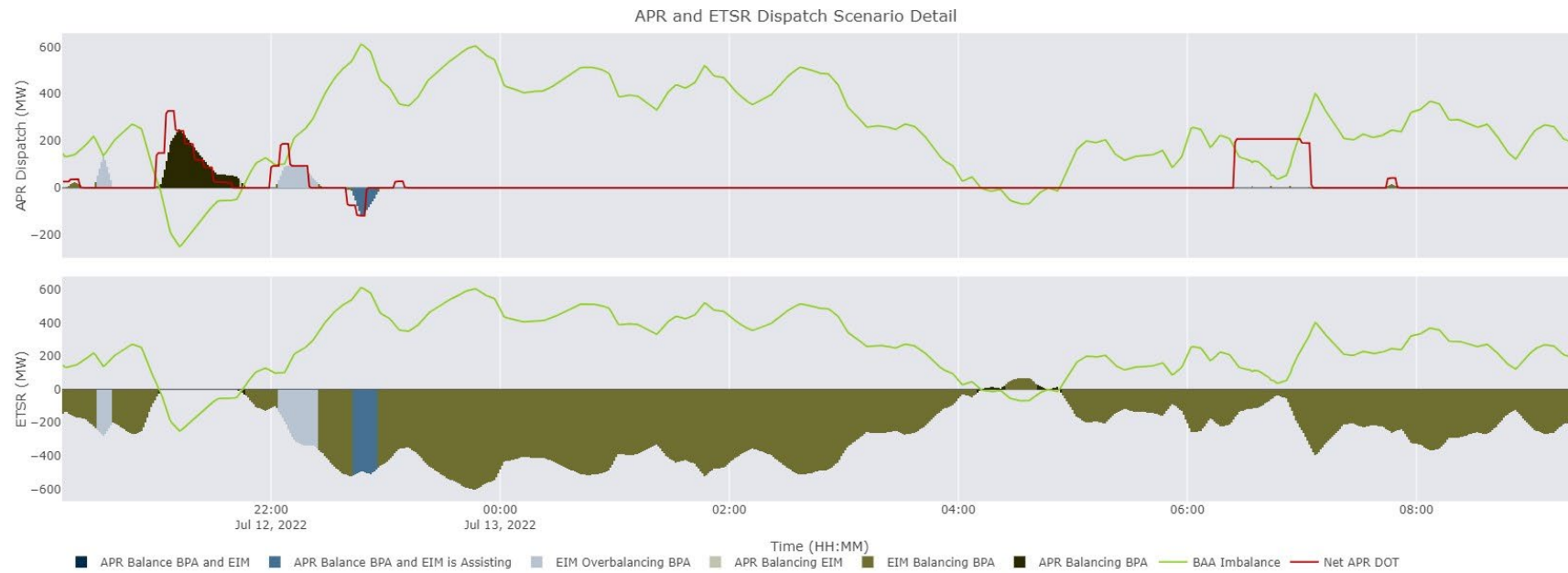
Pre and Post Generation for Big 10



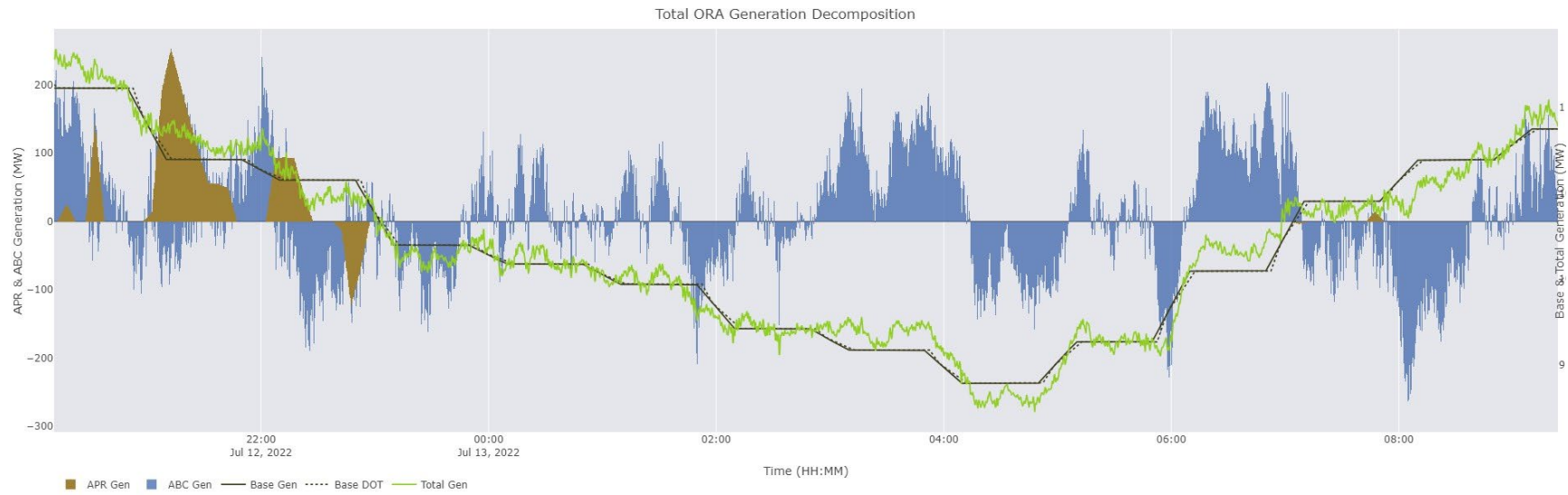
Balancing Reserves Deployed in the EIM

- The following two charts are example of an instance where EIM has provided for all of the BPA BAA imbalance and the Big 10 hydro projects operation is tracking very close to plan.
- The first chart shows the APR dispatch, the ETSR dispatch and the BAA imbalance.
- The second chart show the aggregate Big 10 basepoint, actual generation, APR generation and ABC regulation for the same time period.

BRD in the EIM



BRD in the EIM



Resolutions of BRD in the EIM

- If BPA holds less Non-Reg Capacity, BPA will be limited in participation in the EIM and OCBR frequency will increase.
 - Non-Reg is bid into the EIM to facilitate passing RS tests and, therefore, less Non-Reg will reduce participation in the EIM.
 - When limited participation in the EIM, the BPA BA must cover a majority of the error itself using Balancing Reserves, both Non-Reg and Reg.
 - Summary: Less Non-Reg = Less EIM Participation = More OCBR Events
- More frequent OCBR events has the potential to force BPA to redesign for OCBR Curtailments in the EIM and more impactful OCBR Limitations.



What changes has BPA made while in the EIM?

Step 4



Balancing Reserve Methodology

- Balancing Reserve methodology remains unchanged from the BP-22 changes with no changes made for BP-24.
- BP-22 Changes:
 - Reg/Load Following/Generation Imbalance changed to Reg/Non-Reg
 - VER Scheduling Elections removed, only Hourly Forecast is valid in the EIM

Balancing Reserve Methodology

- BPA is working toward a day-ahead market (EDAM or M+) – BPA has not currently decided on which DA market
- BPA does not have enough information on either DA market to determine what/if any impacts would occur to the Balancing Reserve Methodology
- BPA's current Balancing Reserve Methodology will provide the Planning Reserve Margin of Balancing Reserves for the BPA BA in either market, but design of either DA market may impact the required amount of Balancing Reserves

Oversupply Management Protocol & OCBR

- **Oversupply Management Protocol**
 - No fundamental changes before or after BPA entered the EIM
 - Some data submittal timeframes changed with the T-57 tag deadline for Base Schedules
 - EIM experience with Oversupply shows the same benefits as outside of the EIM
- **OCBR**
 - No changes after BPA entered the EIM



Questions?

Step 5 and 6

