

# RHWM Process Workshop

## BP-24 Rate Period – Preliminary Outputs

June 7, 2022

WebEx: [Meeting Link](#)

Meeting Number: 2763 775 3565

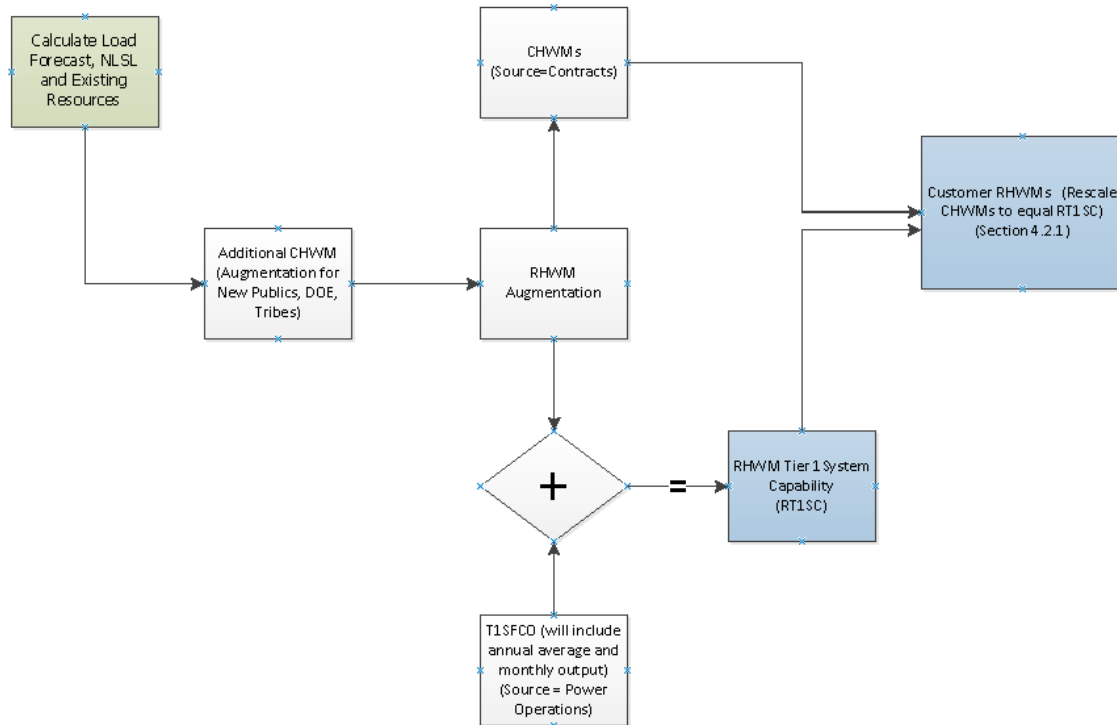
Meeting Password: p8PA39TJ8qg



# RHWM Process Workshop Agenda

<b>Topic</b>	<b>Presenter</b>
Introductions and Purpose of the Workshop	Kathryn Patton
Load Forecast Update	Glen Booth
Tier 1 System Firm Critical Output (T1SFCO):	
• Hydro Study Results	Erin Riley
• T1SFCO Study Results	Steve Bellcoff
RWHM Augmentation	Kathryn Patton
Other Topics	All
Next Steps	Kathryn Patton

# RHWM Process\*



\*For more details about the Rate Period High Water Mark (RHWM) process and calculations, please refer to section 4.2.1 of the Tiered Rate Methodology (TRM)

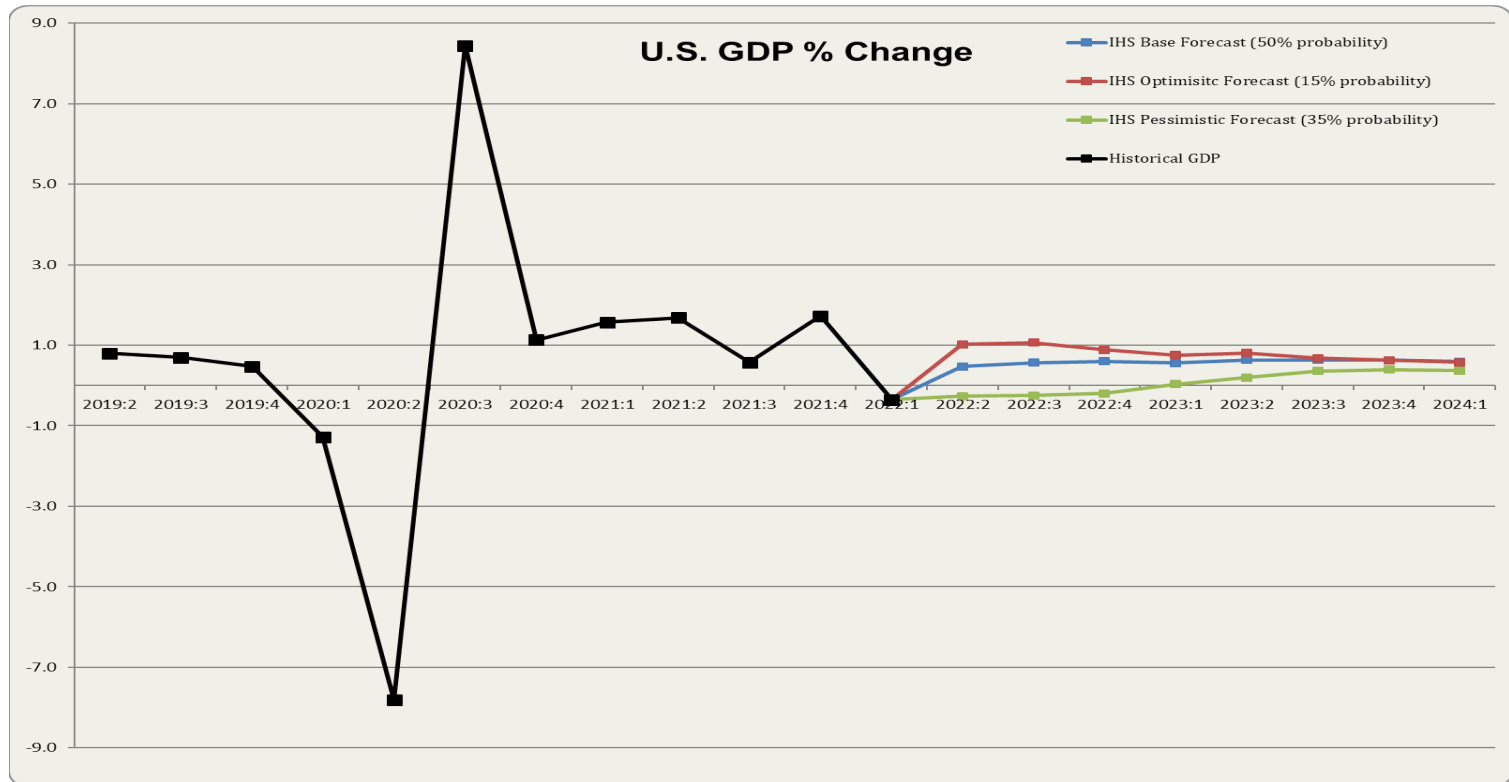
# Load Forecast Update for BP-24 RHWM Process



# Load Forecast Agenda

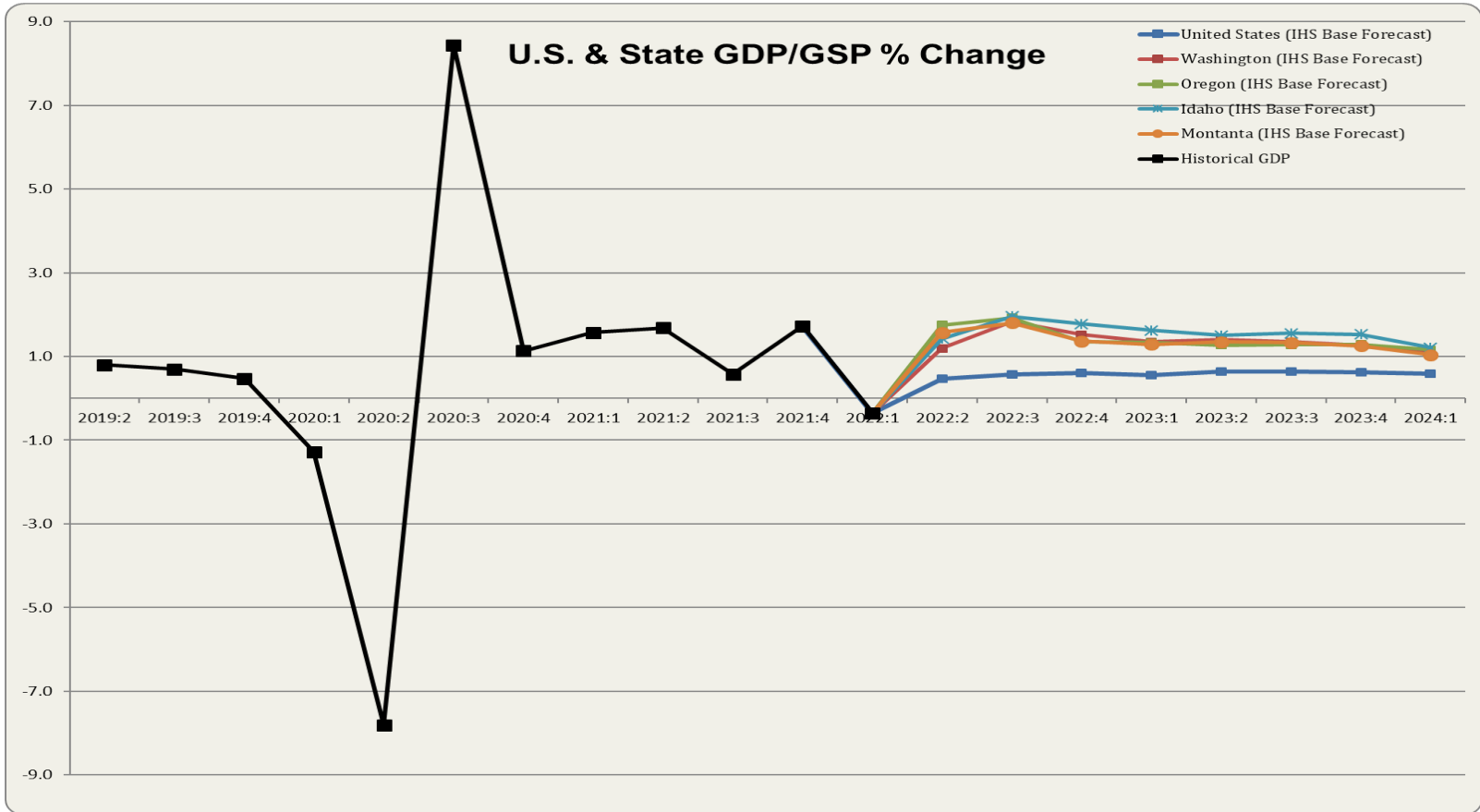
- Review economic conditions
- Review current model performance
- Forecasted Agency Loads (Preference)
- Guidelines for Load Forecast
- Next steps

# Current Economic Forecast - US



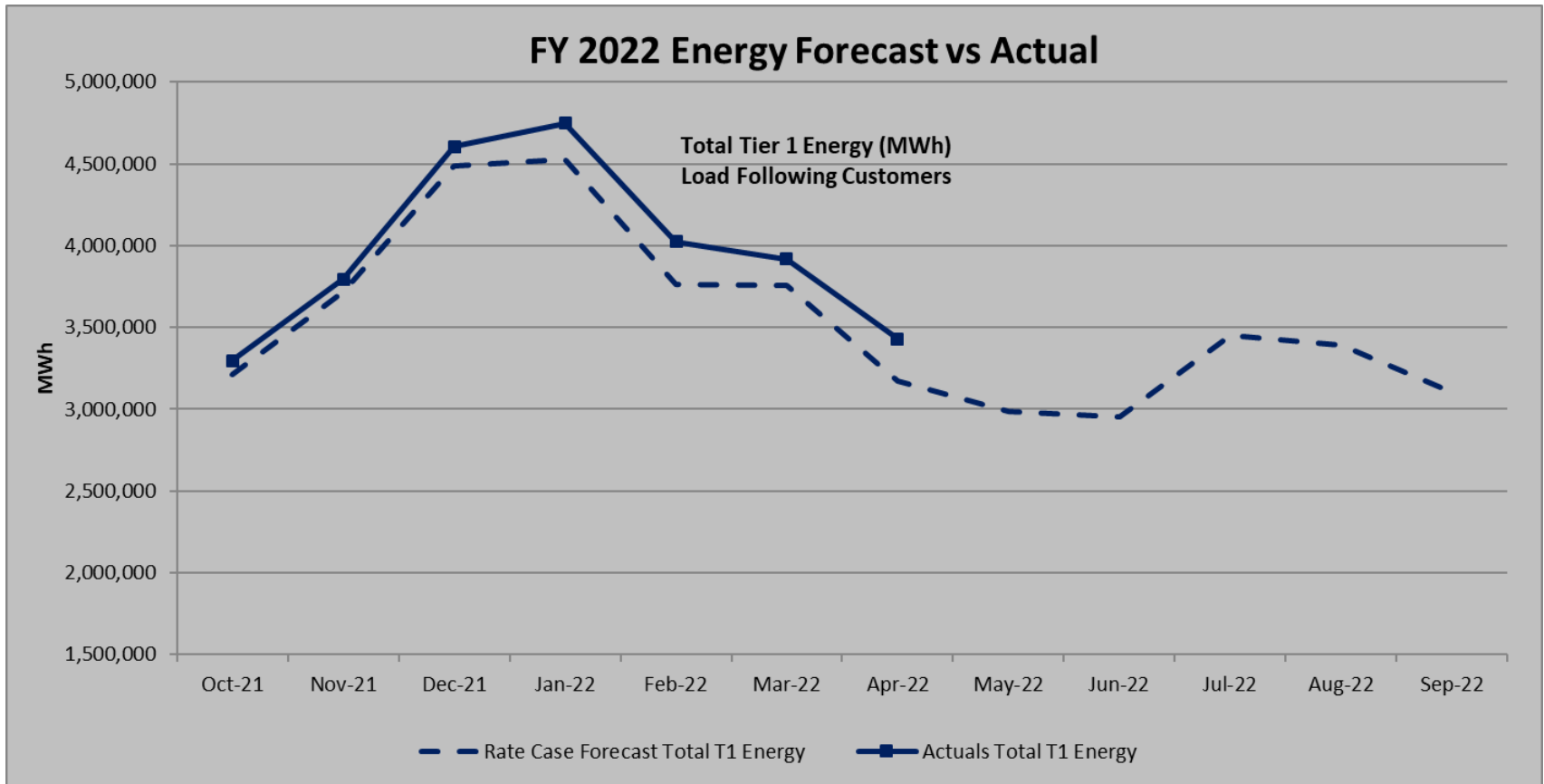
- Positive GDP growth is expected for the nation
- Regional unemployment has decreased significantly
- World economic and geopolitical concerns continue
- BPA Load continues to remain flat

# Current Economic Forecast - PNW



- All Pacific Northwest States are Forecasted to Grow Faster than the U.S.

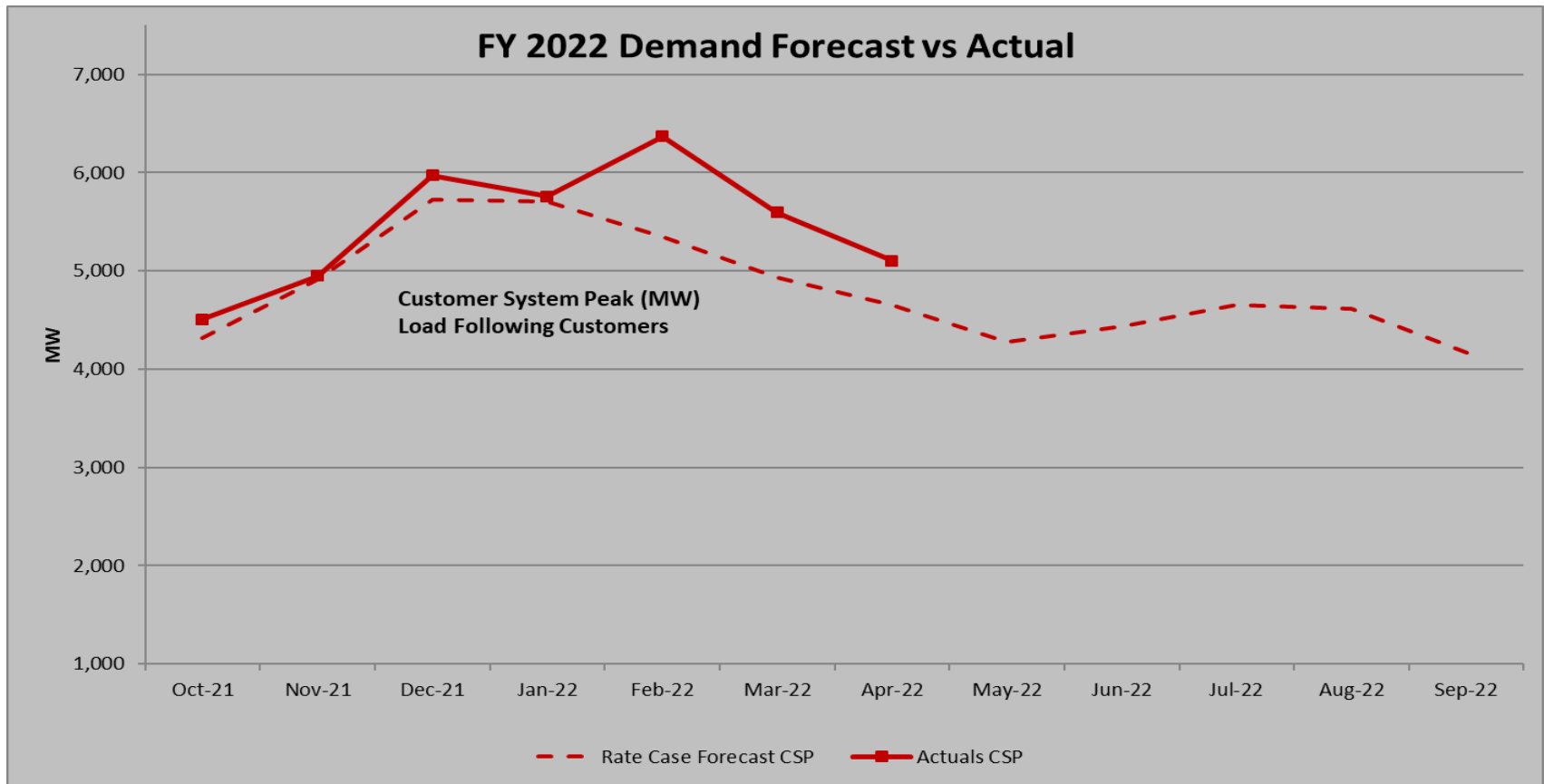
# Current Models – Energy



- **Forecasted energy is performing well after accounting for the colder weather.**
- **Fiscal Year to date Actuals are 4.4% greater than Forecast**



# Current Models – Peaks



- Demand models are performing well after compensating for the weather.

# Forecasted Agency Loads

	<i>BP-22 Final_RAM_July 2020</i>		<i>BP-24 RHWM_LORA_May 2022</i>	
<b>Fiscal Year (aMW)</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
<b>Preference</b>	<b>6,532</b>	<b>6,582</b>	<b>6,856</b>	<b>7,049</b>
Block	474	473	533	531
Slice Block	1,293	1,344	1,332	1,347
Slice (non-block)	1,521	1,491	1,586	1,571
Load Following	3,086	3,100	3,223	3,237
Tier 2 (Block)	157	173	182	363

- Increase in Preference Forecast between FY2023 & FY2024
  - Moderate Increase in Preference Forecast between FY2024 & FY2025
  - Increase between FY2024 & FY2025 is primarily accounted for in Tier 2 Load
- Bulk of changes are the result of anticipated specific large customer adjustments
  - Most of the change coming from a few customers:
    - Data Centers, Mining, Federal and U.S. Navy Projects

# Guidelines for Load Forecast

## Guiding Principles for Revising Load Forecasts

- Avoid subjective bias in results
  - Make changes with a clearly identifiable cause and effect.
  - Avoid making changes within the tolerance of model errors, i.e., changes less than 5%.
  - Rely on models and results put together when consequences are not immediately pending.
- Avoid forcing the models to give specific answers
  - Rely on statistics of models
  - Rely on accuracy of models and improve when results are not within accuracy tolerance levels.
  - Avoid updating without sufficient new data
- Incorporate highly probably information
  - Include new loads/projects that have higher than 70% probability of occurring.

# Load Forecast Next Steps

- Customers provide notice of additional changes - ASAP, please.
- Submit forecast change request (including cause and amount) on BPA.gov comment page.
- Forecaster to review and include necessary changes by July 8, 2022
- Communicate changes to be incorporated by July 18, 2022
- Deliver updated data for continued processing by July 27, 2022

# Hydro and T1SFCO Study Results



# Hydro Study Typical Updates

## Pacific Northwest Coordination Agreement (PNCA) Project Data

- Update based on 2021 PNCA data, with latest Coulee pumping data from upcoming 2022 PNCA submittal

## Canadian Operations

- Based on the 2022 Assured Operating Plan (AOP22) completed under the Columbia River Treaty. AOP22 covers operations from FY20-FY24. We assumed AOP22 for FY25, as post-2024 negotiations are on-going.

## Project Outages

- Update based on the latest long-term maintenance and capital program forecasts. This will use the same methodology as the last rate case.

## Reserves

- FCRPS reserve assumptions consistent with Generation Inputs forecasts.

## Loads

- Latest forecast

# Updates Since BP-22

## Firm Output:

- Monthly tenth percentiles (P10) of recent 30 years (1989-2018).

## Streamflow data

- 2020 Level Modified Flow.

## Water Supply Forecast

- Include the Corps' Water Supply Forecast (1929-2008) from 2010 modified flows, observed WSF from NWRFC (2009-2018) uses consistent forecasting methodology. Will be updated in initial proposal.

## Project Operations assume 2020 EIS Preferred Alternative

- Update URCs based on the new Water Supply Forecast (BPA SMEs) using 2020 CRSO EIS Preferred alternative.
- Minimum irrigation and operating pools on the lower Columbia and lower Snake projects updated in PNCA to target average of range and include John Day avian predator disruption measures.
- Sliding scale summer draft at Libby and Hungry Horse are now in PNCA, included in AER step.
- Trout Spawning operations are modelled in every other year (Operation is not in FY 25)

# Spill: Maintain 2020 CRSO Preferred Alternative 125% Flex Spill

## Spring Spill Season

- Begins - lower Snake Projects: April 3, lower Columbia Projects: April 10
- 125% Flex Spill: LWG, LGS, LMN, IHR, MCN, BON (with 150 kcfs max spill) - applies 125% TDG spill caps (16 hrs), Performance Standard Spill (8 hrs)
- 120% Flex Spill: JDA - applies 120% TDG spill caps (16 hrs), Performance Standard Spill (8 hrs)
- TDA – 40% Performance Standard Spill (24 hrs)

## Summer Spill Season

- Begins – lower Snake Projects: June 21, lower Columbia Projects: June 16
- Performance Standard Spill at all eight projects
- Ends – August 14, and transitions into reduced spill amounts through August 31

## Winter Spill

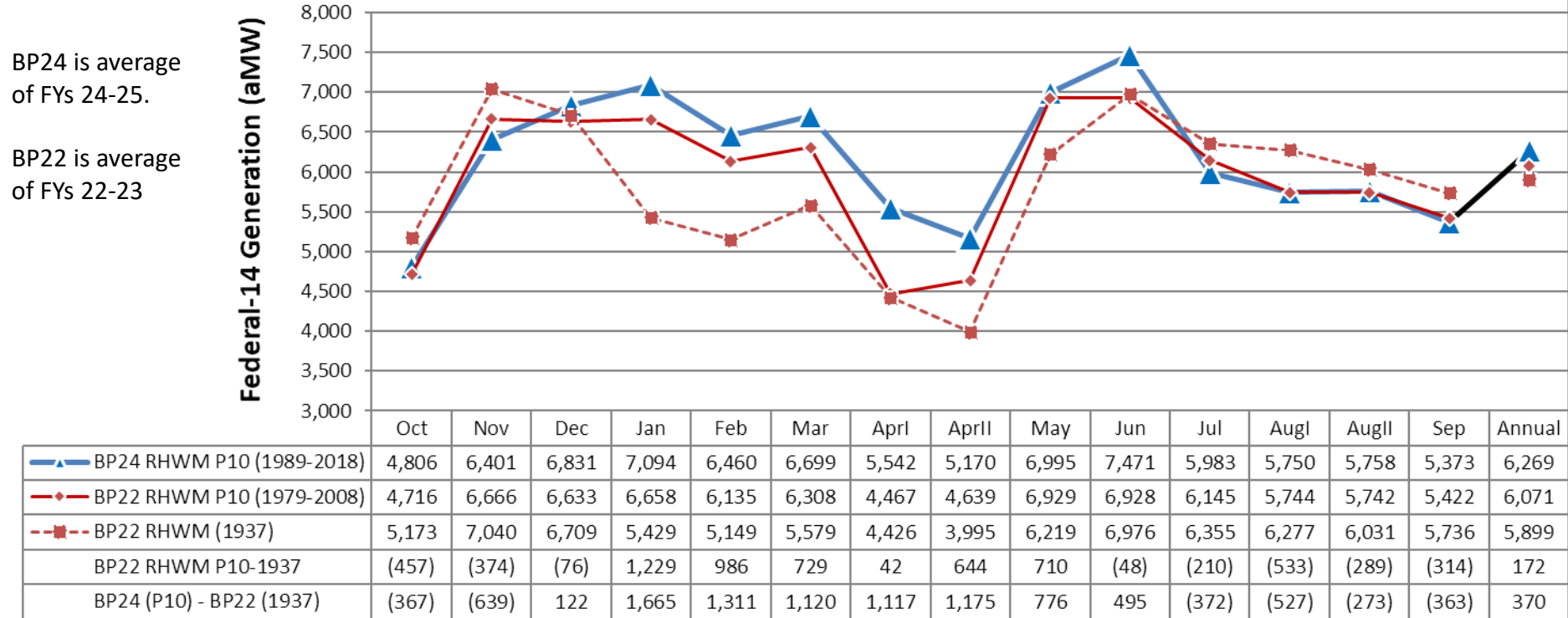
- Periodic Spill at McNary and Lower Snake dams for adult steelhead that overshoot their tributaries
- Ladder attraction spill at Bonneville and John day.

## *SPILL UNCERTAINTY:*

- Spill/deep drawdown operations on the Willamette are still being developed by the Corps. Expecting ~50 aMW loss
- Extending Stay agreement main stem operation also approximately ~50 aMW loss



# Firm Hydro Comparison to BP-22 RHW M



The **370 aMW increase** in annual firm generation compared to BP22 RHW M is *approximately* attributable to:

### Uncertain changes

Expecting additional decrease approx. (-50 aMW) from Willamette injunction measures

Maintaining stay agreement would decrease firm energy approx. (-50 aMW)

Change to 30yr monthly P10 from 1937: 172 aMW

Update to 2020 MF & addl. 10 years: 50 aMW

Update to flexible spill methodology: 85 aMW

Trout Spawning /PNCA updates/Market Limit: 63 aMW

# Federal Tier 1 System Firm Critical Output Summary – 2022 RHWM Process for BP-24 Rate Period (30WY P10)

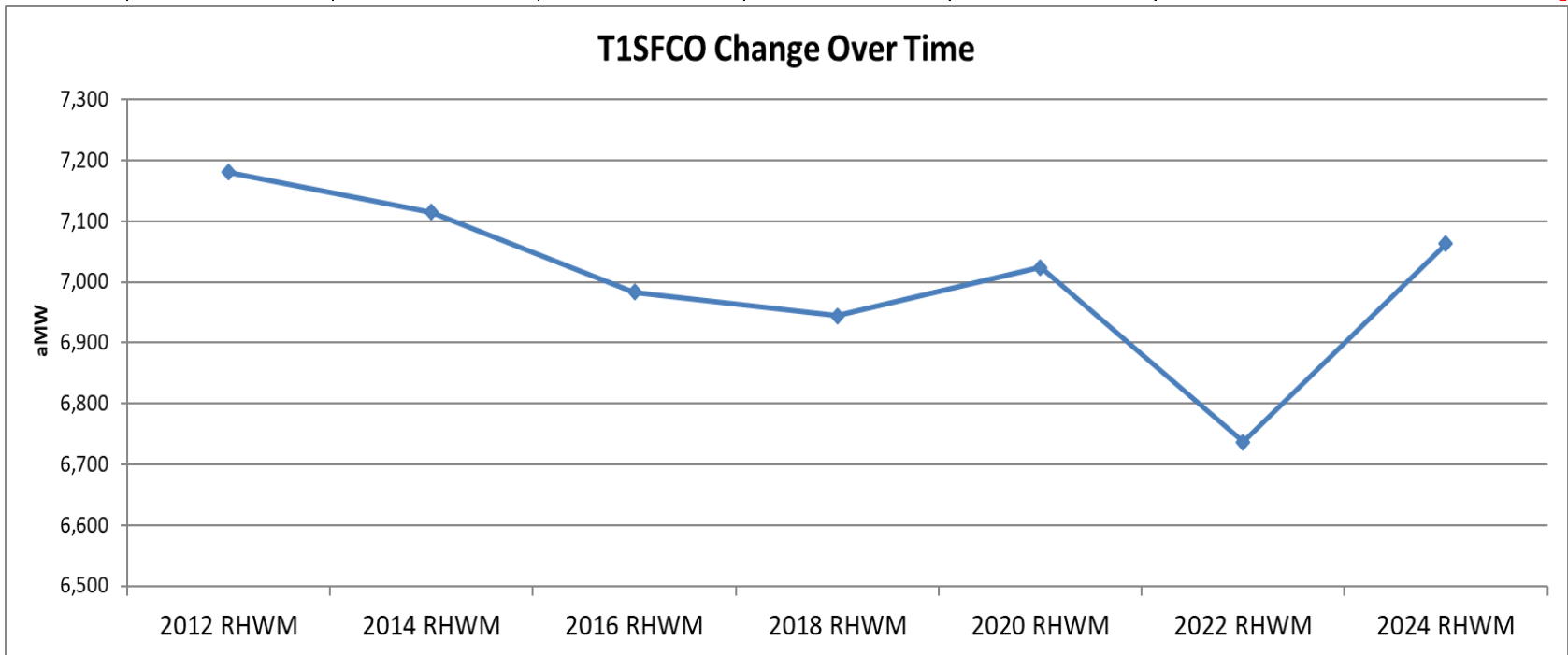
		A	B	C
1.	<b>T1SFCO Projections Energy in aMW</b>	<b>2024</b>	<b>2025</b>	<b>Average</b>
2.	Total Federal System Hydro Generation <i>(TRM Table 3.1)</i>	6,633	6,686	6,660
3.	Total Designated Non-Federally Owned Resources <i>(TRM Table 3.2)</i>	1,140	1,018	1,079
4.	Total Designated BPA Contract Purchases <i>(TRM Table 3.3)</i>	135	135	135
5.	Total Designated System Obligations <i>(TRM Table 3.4)</i>	-881	-880	-881
<b>6.</b>	<b>Federal Tier 1 System Firm Critical Output (sum of Lines 2-5)</b>	<b>7,027</b>	<b>6,958</b>	<b>6,993</b>

# T1SFCO Difference Between BP-24 RHWM Process and BP-22 Final RHWM

T1SFCO 2-Year Average Comparison (Energy in aMW)	RHWM Process for BP-24 Rate Period (FY 2024-25)	RHWM Process for BP-22 Rate Period (FY 2022-23)	Difference 2-Year Average	Component Details
<b>T1SFCO Resource Differences</b>				
1. Total Federal System Hydro Generation (TRM Table 3.1)	6,660	6,294	365	<b>Hydro generation forecasts were increased due to the following:</b> <ul style="list-style-type: none"> <li>- updated with most recent 30WY and P10 as critical water condition (about +170 aMW)</li> <li>- Other modeling updates (about 195 aMW): 2020 Modified Flows, PNCA, spill refinements, etc.</li> </ul>
2. Total Designated Non Federally Owned Resources (TRM Table 3.2)	1,079	1,086	-7	<b>Non Federally owned resource changes:</b> <ul style="list-style-type: none"> <li>- Klondike I contract acquisition expired 4/2022 (-1.4 aMW)</li> <li>- Condon Wind contract acquisition expires 9/30/2022 (-5.9 aMW)</li> </ul>
3. Total Designated BPA Contract Purchases (TRM Table 3.3)	135	136	-1	
<b>T1SFCO Load/Obligation Differences</b>				
4. Total Designated System Obligations (TRM Table 3.4)	-881	-850	-31	<b>Contract purchase changes:</b> <ul style="list-style-type: none"> <li>- BPA/BCHA Canadian Entitlement Return (-12.9 aMW)</li> <li>- Slice Transmission loss Returns (-18.4 aMW)</li> </ul>
5. Federal Tier 1 System Firm Critical Output (2-year average)	6,993	6,667	325	

# T1SFCO Change Over Time

	2012 RHWM	2014 RHWM	2016 RHWM	2018 RHWM	2020 RHWM	2022 RHWM	2024 RHWM
T1SFCO	7,135	7,058	6,924	6,879	6,955	6,667	6,993



# RHWM Augmentation



# RHWM Augmentation

BESID	RHWM Augmentation	Initial CHWM	Additional CHWM through BP-22	TRL 2025	Additional CHWM 2024	Total Additional CHWM	2024 CHWM
10426	U.S. DOE Richland Operations Office	20.288	15.307	37.084	1.489	16.796	37.084
10482	Umpqua Indian Utility Cooperative	2.800	1.375	2.809	-	1.375	4.175
10502	Yakama Power	13.496	5.490	18.718	-	5.490	18.986
13927	Kalispel Tribe Utility	2.894	1.240	4.068	-	1.240	4.134
12026	Jefferson County PUD #1	-	45.847			45.847	45.847
	T1SFCO	6,992.617					
	RHWM Augmentation	70.748					
	RT1SC	7,063.365					

# Next Steps

- Public comment period June 7 – June 21, 2022. Please submit comments (including load forecast change requests) on BPA's public comment page: [Make a Public Comment - Bonneville Power Administration \(bpa.gov\)](#)
- RHWM preliminary outputs are posted on the RHWM website: [Rate Period High Water Mark Process - Bonneville Power Administration \(bpa.gov\)](#)
- August 3, 2022 public workshop to present draft final RHWM outputs.

## Questions?

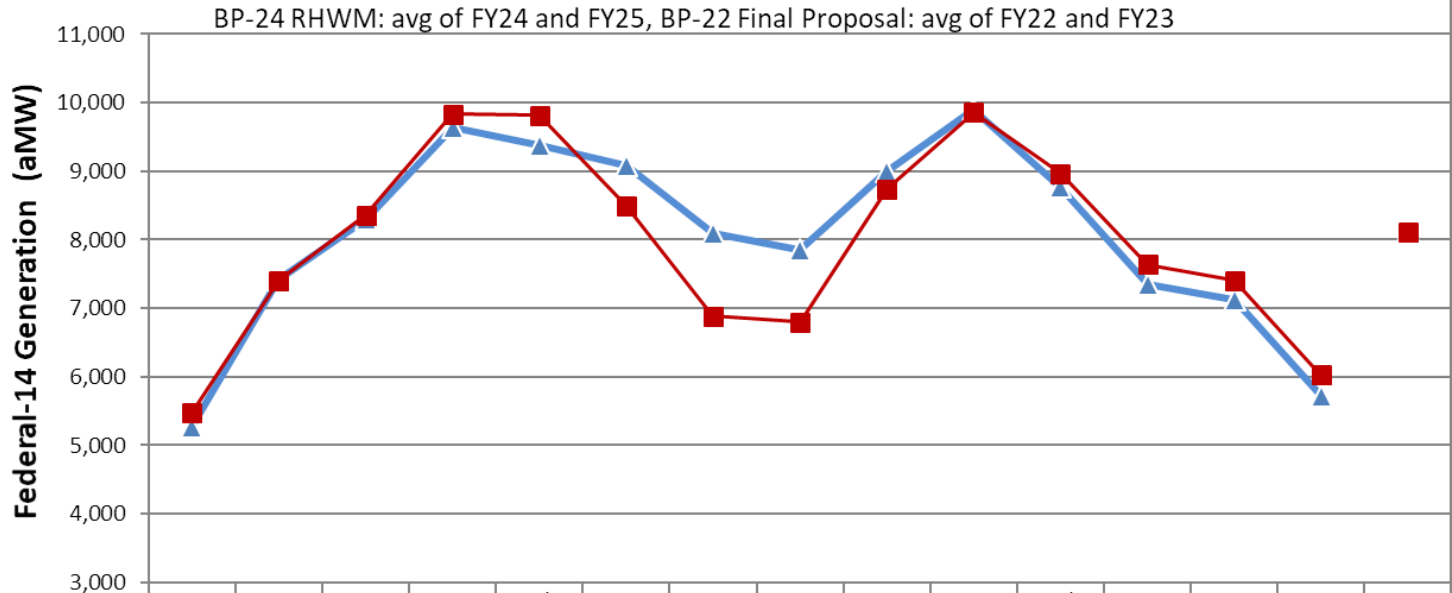


# Appendix

# BP-24 RWHM Timeline

Action	FY 20 Timing
Public Workshop – Present preliminary RWHM process outputs	June 7 (Tuesday)
Public comment period	June 8 (Wednesday) – June 21 (Tuesday)
<b>FORMAL PROCESS BEGINS</b>	
Public Workshop – Present draft final RWHM outputs	August 3 (Wednesday)
Draft final RWHM outputs published	August 3 (Wednesday)
Public comment period	August 4 (Thursday) – August 17 (Wednesday)
Deadline for written preservation of right to dispute	August 8 (Monday)
Republish RWHM Outputs (if changes made due to public comments)	September 2 (Friday)
Deadline for dispute notice	September 12 (Monday)
Publish final RWHM process outputs	September 30 (Friday)

# Average Federal Generation Comparison to Recent Rate Case



	Oct	Nov	Dec	Jan	Feb	Mar	April	April	May	Jun	Jul	AugI	AugII	Sep	Ann.
BP24 RHW 30 yr Avg	5261	7413	8297	9639	9382	9079	8090	7861	8996	9902	8768	7341	7121	5725	8134
BP22 Final Proposal	5,482	7,404	8,363	9,835	9,815	8,497	6,890	6,802	8,741	9,860	8,966	7,636	7,402	6,025	8,106
BP24 RHW (30yr) minus BP22 FP (80yr)	(221)	9	(66)	(195)	(432)	582	1,201	1,059	255	42	(198)	(295)	(281)	(300)	28

The **28 aMW** increase in average annual generation compared to **BP22 Final Proposal** is *approximately* attributable to:

**Uncertain changes**

Expecting additional decrease (-50 aMW) from Willamette injunction measures

Extending stay agreement would decrease generation (-50 aMW)

Update to flexible spill methodology (+64 aMW)  
 Update to 2020 MF(+ 57 aMW)  
 PNCA/ Trout Spawning/ Market limit( -10 aMW)  
 Recent 30 years vs 80yrs (-83 aMW)

# Federal System Hydro Generation Used in T1SFCO Calculation

**Federal System Hydro Generation for use in the T1SFCO Calculation**  
**RHWM Process for BP-24 Rate Period**  
**TRM Table 3.1**  
 S232-RC-20220530-195059

		A	B	C
1.	Regulated Hydro	2024	2025	Average
2.	Albeni Falls	24.7	22.8	23.8
3.	Bonneville	400.7	391.3	396.0
4.	Chief Joseph	1,086.7	1,101.6	1,094.2
5.	Dworshak	169.3	192.8	181.1
6.	Grand Coulee	1,877.6	1,901.0	1,889.3
7.	Hungry Horse	79.1	68.7	73.9
8.	Ice Harbor	164.9	168.6	166.7
9.	John Day	775.1	781.0	778.1
10.	Libby	163.3	149.9	156.6
11.	Little Goose	162.6	160.0	161.3
12.	Lower Granite	148.7	150.1	149.4
13.	Lower Monumental	165.0	159.4	162.2
14.	McNary	461.3	469.5	465.4
15.	The Dalles	646.5	645.0	645.7

# Federal System Hydro Generation Used in T1SFCO Calculation (cont.)

**RHWM Process for BP-24 Rate Period**  
**TRM Table 3.1**  
S232-RC-20220530-195059

		A	B	C
16.	Independent Hydro	2024	2025	Average
17.	Anderson Ranch	10.1	10.1	10.1
18.	Big Cliff	10.5	10.5	10.5
19.	Black Canyon	5.9	5.8	5.8
20.	Boise River Diversion	0.9	1.1	1.0
21.	Chandler	5.2	6.2	5.7
22.	Cougar	14.9	14.8	14.9
23.	Cowlitz Falls	22.4	24.7	23.6
24.	Detroit	31.2	34.2	32.7
25.	Dexter	9.1	9.6	9.4
26.	Foster	9.6	9.4	9.5
27.	Green Peter	22.1	23.7	22.9
28.	Green Springs - USBR	6.7	6.7	6.7
29.	Hills Creek	16.1	14.4	15.3
30.	<i>Idaho Falls - City Plant (expired 9/30/2016)</i>			
31.	<i>Idaho Falls - Lower Plants #1 &amp; #2 (expired 9/30/2016)</i>			
32.	<i>Idaho Falls - Upper Plant (expired 9/30/2016)</i>			
33.	Lookout Point	30.1	31.4	30.7
34.	Lost Creek	27.9	27.0	27.4
35.	Minidoka	10.4	11.2	10.8
36.	Palisades	66.9	74.9	70.9
37.	Roza	7.5	8.3	7.9
<b>38.</b>	<b>Total Tier 1 Federal System Hydro Generation</b>	<b>6,633.4</b>	<b>6,685.6</b>	<b>6,659.5</b>

# Designated Non-Federally Owned Resources Used in T1SFCO Calculation

**Designated Non-Federally Owned Resources for use in the T1SFCO Calculation  
RHWM Process for BP-24 Rate Period  
TRM Table 3.2  
S232-RC-20220530-195059**

		A	B	C
1.	Project	2024	2025	Average
2.	Ashland Solar Project <i>(expired 5/31/2020)</i>	0.0	0.0	0.0
3.	Columbia Generating Station	1,116.0	993.7	1,054.8
4.	Condon Wind Project <i>(expired 9/30/2022)</i>	0.0	0.0	0.0
5.	Dworshak/Clearwater Small Hydropower	2.6	2.6	2.6
6.	Foote Creek 1 <i>(early termination in 2019)</i>	0.0	0.0	0.0
7.	Foote Creek 2 <i>(expired 2014)</i>	0.0	0.0	0.0
8.	Foote Creek 4 <i>(Acquisition Expired 10/1/2020)</i>	0.0	0.0	0.0
9.	<i>Fourmile Hill Geothermal (Not included)</i>	0.0	0.0	0.0
10.	<i>Georgia-Pacific Paper (Wauna) (Acquisition Expired 4/5/2016)</i>	0.0	0.0	0.0
11.	<i>Klondike I (expired 4/2022)</i>	0.0	0.0	0.0
12.	Stateline Wind Project <i>(expires 12/2026)</i>	21.2	21.2	21.2
13.	White Bluffs Solar <i>(expired in 1996)</i>	0.0	0.0	0.0
14.	<b>Total Designated Non-Federally Owned Resources</b>	<b>1,139.8</b>	<b>1,017.5</b>	<b>1,078.7</b>

# Designated BPA Contract Purchases Used in T1SFCO Calculation

**Designated BPA Contract Purchases for use in the T1SFCO Calculation  
RHWM Process for BP-24 Rate Period  
TRM Table 3.3**

S232-RC-20220530-195059

		A	B	C	D
1.	Contract Purchases	Contract #	2024	2025	Average
2.	Priest Rapids CER for Canada	97PB-10099	29.0	29.1	29.1
3.	Rock Island #1 CER for Canada	97PB-10102	17.0	17.1	17.1
4.	Rock Reach CER for Canada	97PB-10103	37.0	37.1	37.1
5.	Wanapum CER for Canada	97PB-10100	27.9	27.9	27.9
6.	Wells CER for Canada	97PB-10101	22.8	23.0	22.9
7.	BCHP to BPA PwrS	99PB-22685	1.0	1.0	1.0
8.	BCHP to BPA LCA <i>(settled financially)</i>	99PB-22685			
9.	PASA to BPA Pk Repl <i>(expired 4/30/2015)</i>	94BP-93658			
10.	PASA to BPA S/N/X <i>(expired 4/30/2015)</i>	94BP-93658			
11.	PASA to BPA Xchg Nrg <i>(expired 4/30/2015)</i>	94BP-93658			
12.	RVSD to BPA Pk Repl <i>(expired 4/30/2016)</i>	94BP-93958			
13.	RVSD to BPA Seas Xchg <i>(expired 4/30/2016)</i>	94BP-93958			
14.	RVSD to BPA Xchg Nrg <i>(expired 4/30/2016)</i>	94BP-93958			
15.	PPL to BPA SNX (Spring Return) <i>(expired 6/1/2014)</i>	94BP-94332			
16.	PPL to BPA SPX (Summer Return) <i>(expired 6/1/2014)</i>	94BP-94332			
17.	<b>Total Designated BPA Contract Purchases</b>		<b>134.7</b>	<b>135.3</b>	<b>135.0</b>

# Designated BPA System Obligations Used in T1SFCO Calculation

## Designated BPA System Obligations for use in the T1SFCO Calculation

### RHWM Process for BP-24 Rate Period

TRM Table 3.4 (Negative numbers indicate obligations)

S232-RC-20220530-195059

		A	B	C	D
1.	System Obligation	Contract #	2024	2025	Average
2.	BPA to BRCJ Chief Joseph	14-03-17506; 14-03-49151	-8.6	-8.6	-8.6
3.	BPA to BRCB Columbia Basin Project	Ibp-4512; 14-03-001-12160	-148.3	-148.7	-148.5
4.	BPA to BRCR Crooked River Project	14-03-73152	-0.7	-0.7	-0.7
5.	BPA to BROP Owyhee Project	EW-78-Y-83-00019	-1.3	-1.3	-1.3
6.	BPA to BRRP Rathdrum Prairie Project	14-03-49151	-0.8	-0.8	-0.8
7.	BPA to BRSID Southern Idaho Projects	EW-78-Y-83-00019	-20.1	-20.2	-20.1
8.	BPA to BRSIN Spokane Indian Develop.	14-03-49151	-0.3	-0.3	-0.3
9.	BPA to BRSV Spokane Valley	14-03-63656	-0.7	-0.7	-0.7
10.	BPA to BRTD The Dallas Reclamation Project	14-03-32210	-1.9	-1.9	-1.9
11.	BPA to BRTV Tualatin Project	14-03-49151	-0.8	-0.8	-0.8
12.	BPA to BRUB Umatilla Basin Project	10GS-75345	-2.5	-2.5	-2.5
13.	BPA to BRYK Yakima Project	DE-MS79-88BP92591	-1.7	-1.7	-1.7
14.	BPA to BCHP LCA (settled financially)	99PB-22685	0.0	0.0	0.0
15.	BPA to BCHA Can Ent	99EO-40003	-454.3	-454.3	-454.3
16.	BPA to BCHA NTSA	12PG-10002	-11.7	-12.3	-12.0



# Designated BPA System Obligations Used in T1SFCO Calculation (cont.)

## Designated BPA System Obligations for use in the T1SFCO Calculation

### RHWM Process for BP-24 Rate Period

TRM Table 3.4 (Negative numbers indicate obligations)

S232-RC-20220530-195059

		A	B	C	D
1.	System Obligation	Contract #	2024	2025	Average
17.	BPA to BHEC 2012PSC (expired 6/30/2017)	97PB-10051			
18.	BPA to PASA C/N/X (expired 4/30/2015)	94BP-93658			
19.	BPA to PASA S/N/X (expired 4/30/2015)	94BP-93658			
20.	BPA to RVSD C/N/X (expired 4/30/2016)	94BP-93958			
21.	BPA to RVSD Seas Xchg (expired 4/30/2016)	94BP-93958			
22.	Federal Intertie Losses (Calculated: 3.0% of Intertie Sales Table 2.12.5 lines 18-21)	n/a	0.0	0.0	0.0
23.	BPA to AVWP WP3 S (expires 6/30/2019)	85BP-92186			
24.	BPA to PPL SNX (Spring Delivery) (expired 6/1/2014)	94BP-94332			
25.	BPA to PPL SPX (Summer Delivery) (expired 6/1/2014)	94BP-94332			
26.	BPA to PSE WP3 S (expired 6/30/2017)	85BP-92185			
27.	BPA to PSE Upper Baker 2	09PB-12126	-1.3	-1.3	-1.3
28.	BPAP to BPAT (Dittmer/Substation Service)	09PB-12128	-9.4	-9.4	-9.4
29.	Federal Power Trans. Losses	n/a	-248.7	-246.7	-247.7
30.	Slice Transmission Loss Returns	n/a	32.2	31.9	32.0
31.	<b>Total Designated System Obligations</b>		<b>-880.9</b>	<b>-880.3</b>	<b>-880.6</b>