

Provider of Choice: HWM & Tier 1 System Discussion

PPC Rates and Contracts

July 13, 2021

PROVIDER OF CHOICE

— POST-2028 —



Agenda

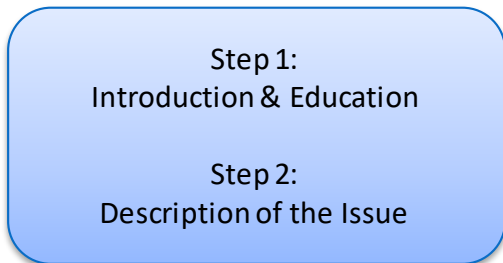
- Introduction and Expectations
- CHWM Options and Considerations
- Tier 1 System Options and Considerations
- Unused CHWM/RHWM and Augmentation
- Other Thoughts?
- Next steps

High Water Mark and Tier 1 System

Today’s discussion session addresses a variety of options for continuing firm power sales and allocating the cost of the Tier 1 System for the post-2028 period. BPA wants to gauge customer interest in these options and seeks input into whether BPA should develop the options further in the BPA Concept Paper, scheduled to be released by the end of 2021. The options reflect customer input received during the post-2028 customer engagement.

Background sessions

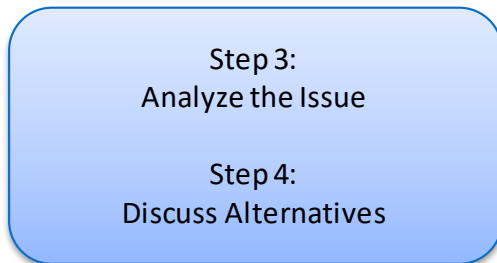
- Steps 1 and 2



May 27
session

Discussion sessions

- Steps 3 and 4



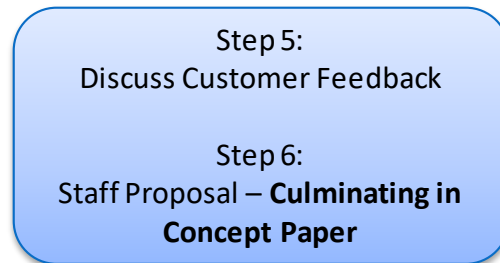
Today's
Session

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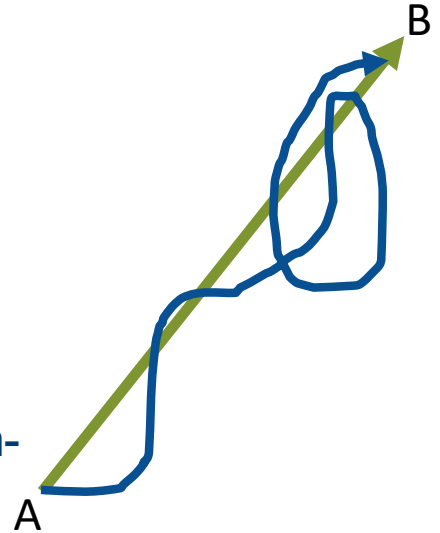
Feedback

- Will carve out time each session to address feedback (Step 5) from prior session.



Expectations and commitments

- Schedule established for planning purposes, but maintains some flexibility and fluidity.
- BPA commitment to:
 - Be prepared.
 - Provide materials with as much advance notice as possible.
 - Have subject matter experts present and in attendance.
- BPA heard calls for customers to establish comparable engagement principles or commitments.
- For both BPA and customers, discussions in 2021 are non-committal, scoping, information gathering.



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Options for CHWMs

Should existing RD CHWMs be reset
for the Post -2028 Contract?

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Context: 2029 Projected Customer Load Data (aMWs)

By Product	TRL	Net Requirement	NLSL	Specified Non-Federal Resources
Load Following	5,459.595	3,710.241	1,698.104	67.824
Slice/Block	3,485.851	2,902.858	65.467	521.422
Block	1,143.678	442.354	0.000	699.407
By State	TRL	Net Requirement	NLSL	Specified Non-Federal Resources
WA	5,486.651	4,290.444	26.000	1,179.568
OR	3,554.402	1,755.135	1,737.571	64.322
ID	436.599	413.499	0.000	23.555
MT	368.979	355.663	0.000	16.855
NV	115.927	115.927	0.00	0.000
WY	109.255	107.474	0.000	4.353
CA	17.311	17.311	0.000	0.000
Total	10,089.124	7,055.453	1,763.571	1,288.653

Customer Load Growth During RD (2012-2028) (aMWs)

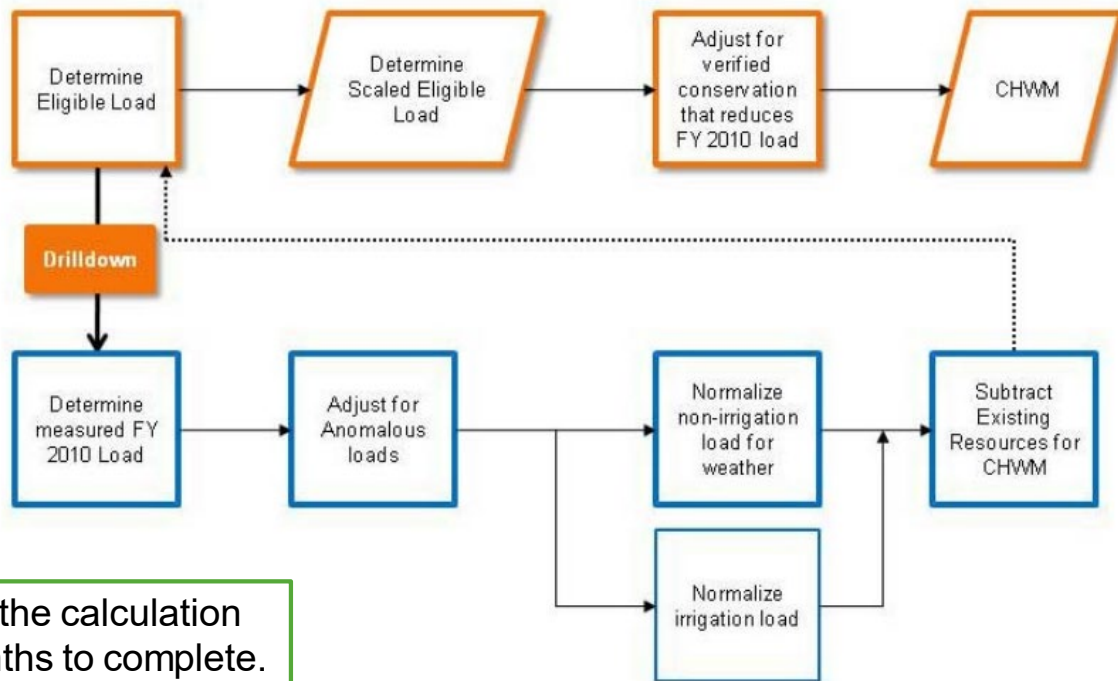
By Product	TRL Load Growth	NLSL Load Growth	Change in Specified Non-Federal Resources
Load Following	2,204.090	1,698.104	25.696
Slice/Block	-129.245	0.237	32.025
Block	-188.124	-60.790	34.018
By State	TRL Load Growth	NLSL Load Growth	Change in Specified Non-Federal Resources
WA	-122.667	-59.790	59.849
OR	1,879.251	1,697.341	6.671
ID	28.183	0.000	15.758
MT	59.274	0.000	16.136
NV	18.474	0.000	0.000
WY	24.714	0.000	3.324
CA	-0.508	0.000	0.000

CHWMs

Keep CHWM or set new CHWMs?

- To continue with a tiered rate structure, Tier One System costs would need to be allocated in a matter similar to the current CHWMs/TRM.
- If current CHWMs are used, customers would know their Above CHWM positions sooner, but current CHWMs are based on 2010 load data and that may be out of date.
- Calculating new CHWMS would require additional processes for both BPA and customers.

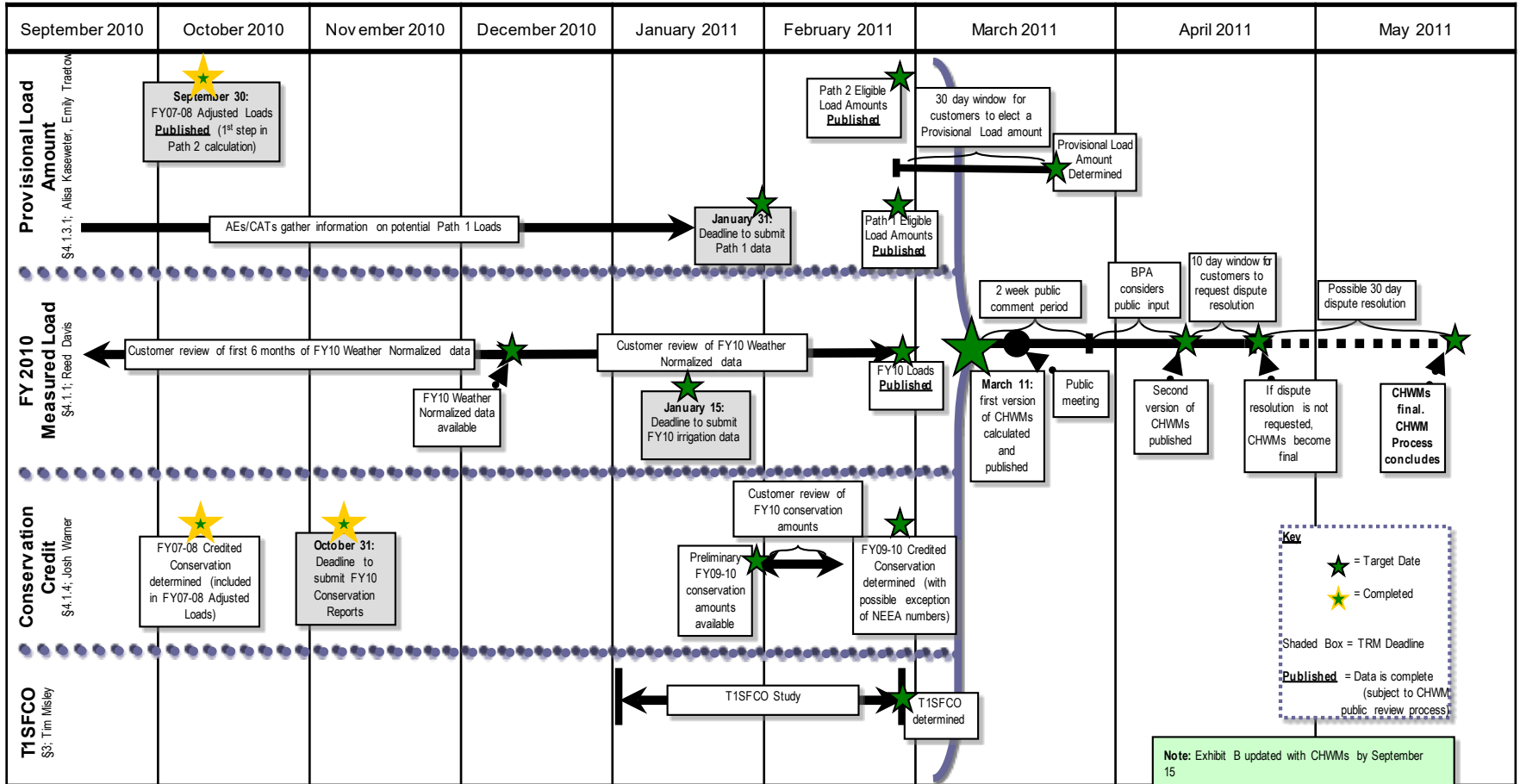
How CHWMs were calculated for RD



Each element of the calculation took several months to complete.

CHWM Process

Revised 12/07/10



CHWM Calculation

§4.1; Alisa Kaseweter

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CHWM Review Process

§4.1.5.1, §13.10; Alisa Kaseweter, Scott Wilson

Calculating new CHWMs

Base Load Year(s) for CHWMs calculations

If BPA calculates new CHWMs, a base year or years will need to be established for the calculation. Basing the calculations on a single load year (as done for the RD contract) means less workload but the selected year might not be a good representation of load for all customers. Using an average of multiple years could account for variability between years. Either way additional processes would be needed to establish the base year and collect and verify the load data.

Calculating new CHWMs

Adjustments to Base Load Year(s)

For the RD CHWMs, the base year load data was adjusted for several factors, including weather normalization, EE achievement, and irrigation load. While these adjustments account for variations in the base year load, it took considerable time to calculate and incorporate into the CWHM calculations. If BPA includes similar adjustments for a new CWHM calculation for the post 2028 power sales contract, both BPA and customers must be prepared additional processes and workload.

Calculating new CHWMs

Existing Non-Federal Resources

If BPA calculates new CHWMs, BPA and customers will need to determine and verify existing resource amounts for the calculation. The resources identified in Attachment C to TRM could be used, or the resource list could be updated. BPA and customers may also want to discuss changing the definition of “existing” resources for the post-2028 power sales contract.

Calculating new CHWMs

Updates to CHWMs after they are set

- For the RD contract, there was one adjustment to the CHWMs to account for an unexpected event: the 2008 Great Recession. BPA and customers agreed to calculate Provisional CHWMs to account for lower loads in 2010. In 2014, loads were reassessed to see if customers with Provisional CHWMs had grown back into them. Some did, but many did not.
- For the post 2028 contract, if a significant event such as a recession occurred, parties may need to consider how to adjust the CHWMs to account for load changes.

CHWM considerations

Issues		Timing Risk	Certainty	Accounts for Variability	Additional Discussion Needed
CHWMS	Keep Current CHWMS	Minimal	Above CHWM position known now.	Limited to what was accounted for already.	No
	Calculate New CHWMS	High	Position only known after calculation.	Could account for load changes since 2010.	See below rows
If New CHWMS	Single Base Year	Low	Position only known after calculation.	No	Which year
	Multiple Base Years	High	Position only known after calculation.	Yes	Which years
	Weather Normalization	Medium	Position only known after calculation.	Yes	No
	Credit for EE Achievements	Depends on how included	Position only known after calculation.	Yes	Need to determine how EE would be included.
	Irrigations Adjustments	High	Position only known after calculation.	Yes	No
	Existing Resources	Depends if updated	Position only known after calculation.	Maybe	Discussion in Non-Federal Resource forum.



Tier 1 System: Options and Considerations

What is included in physical Tier 1 Critical System? Options for establishing the Tier 1 System and considerations that need to be made!



Tier 1 System under RD

The **Tier 1 System** is the collection of resources and contract purchases that comprise the **Tier 1 System Resources**, minus the collection of contract loads and obligation that comprise the **Designated BPA System Obligations**

- **Tier 1 System Resources** are the Federal System Hydro Generation Resources listed in TRM Table 3.1; the Designated Non-Federally Owned Resources listed in TRM Table 3.2; and the Designated BPA Contract Purchases listed in TRM Table 3.3
- **Designated BPA System Obligations** are the set of obligations specified in TRM Table 3.4, or imposed on BPA by statutes, regulations, court order, treaties, executive orders, memoranda of agreement, or contracts, that require the generation or delivery of power, forbearance from generating power, or receipt of power, in order to support the operation of the FCRPS, including any obligations to the BPA Balancing Authority (Transmission Services), and that are not intended for commercial purposes.

Tier 1 System Firm Critical Output is the Firm Critical Output of Tier 1 System Resources less the Designated BPA System Obligations.

Regular changes to the Tier 1 System

Federal System Hydro Generation (TRM Table 3.1)

- Resources listed in this table are primarily Federally owned
- Past expiration of Idaho Fall project, and future expiration of Cowlitz Falls (2032)

Designated Non-Federally Owned Resources (TRM Table 3.2)

- Resource contracts expire based on expiration date
- More than half already expired, all but 3 will expire prior to end of current contracts
 - CGS, Dworshak/Clearwater Small Hydro, Fourmile Hill Geothermal will remain

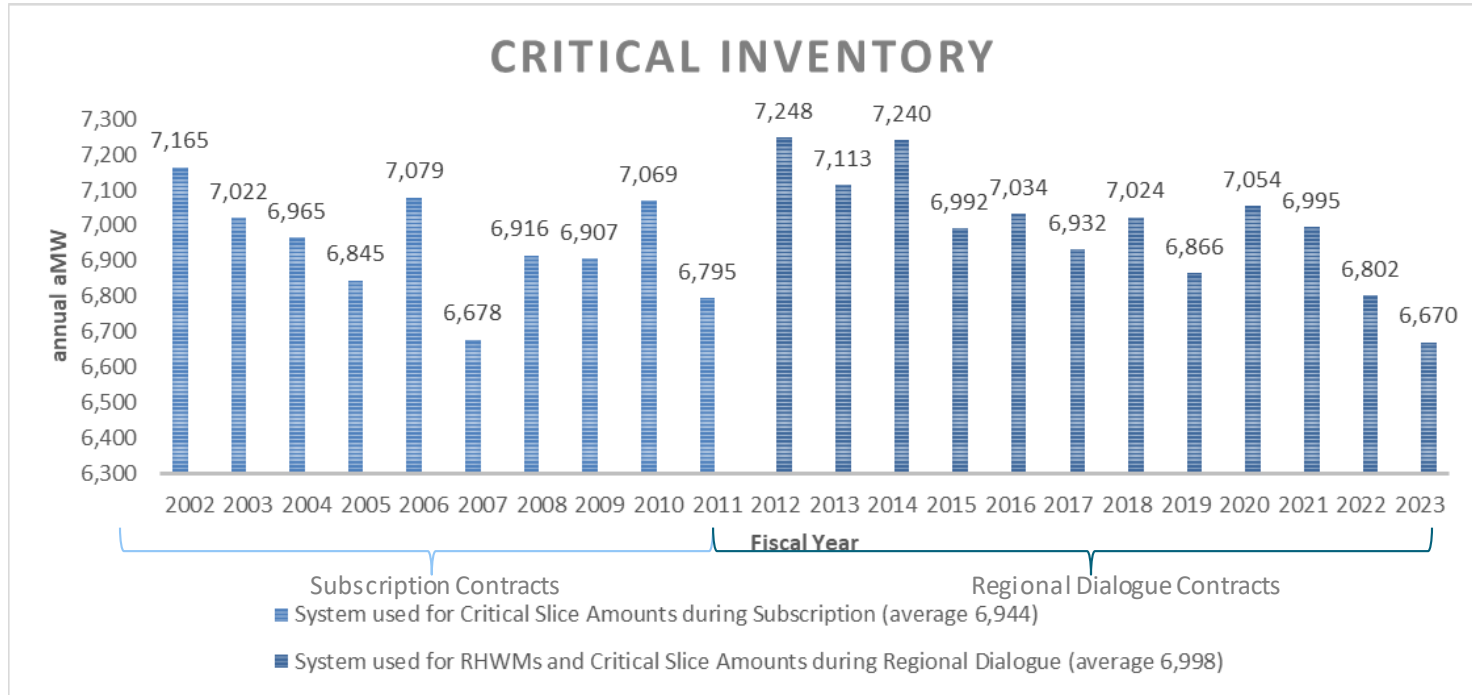
Designated BPA Contract Purchases (TRM Table 3.3)

- Only Columbia River Treaty related contracts still exist
- All others have expired

Designated BPA System Obligations (TRM Table 3.4)

- Remaining obligations do not have expirations, they are imposed obligations that will continue

Historical Critical Inventory



Water Year modeling evaluations

- **Historical Streamflow Record**
 - Updated periodically – in conjunction with Modified Stream Flow record updates
 - 2014 Rate Process included update from 70 Water Year Record to 80 Water Year Record
 - Expect another update in spring of 2022, analysis is underway
- **Climate Change Analysis**
 - BPA is still evaluating how to view climate change information in the context of Stream Flow and Hydro Generation output
 - Expect to include thoughts in spring 2022
- **Critical Period Analysis**
 - Defined as - the period when the expected regulated and independent hydroelectric power generation from water available from reservoir releases plus historical natural stream flows produces the least amount of firm power to meet system load requirements while taking into account the historical streamflow record, power and non-power operating constraints, the planned operation of non-hydro resources, and expected net contract obligations
 - Analysis will be conducted in relationship to Historical Streamflow Record updates

Rates based on Critical Water vs not

- Critical Water Planning = Firm Planning
- Anything else = Non-Firm Planning

- Whatever the incurred costs to “firming up” the system are, they must be recovered in rate setting.
 - Augmentation
 - Buy and meld
 - Etc.

- Setting rates with anything other than Firm Planning amounts creates questions in:
 - Slice, System Shaping, Net Secondary, Tier2 loads
 - No decision is binary to the specific area of conversation, decisions have impacts in other areas of rates structure

Options Beyond Critical Water Planning

Using BP-22 RHWM Tier 1 System Studies (annual aMW)	Critical Water Firm Power	P10 Monthly	Set at 7,000	P20 Monthly	Average Water - by Month (P50)	Average Water - Annual Basis	Set at 9,000	Average of Critical and Average Annual
Federal System Hydro (Regulated and Independent)	6,294	6,359		6,812	8,441	8,598		7,446
Non-Federal Resources (CGS and Dworshak/Clearwater Small Hydropower)	1,086	1,086		1,086	1,086	1,086		1,086
Contract Purchases (Mainly Mid-C Hydro Returns for Canada)	136	136		136	136	136		136
Designated Obligations (except fed power losses)	(624)	(624)		(624)	(624)	(624)		(624)
Federal Transmission Losses (Estimated 3%)	(225)	(227)		(241)	(290)	(295)		(260)
Total Tier 1 System Output	6,667	6,730	7,000	7,169	8,749	8,901	9,000	7,784
RHWM Augmentation (from BP-22 RHWM Process)	69	69	69	69	69	69	69	69
Total RHWM Tier 1 System Capability (RT1SC)	6,736	6,799	7,069	7,238	8,818	8,970	9,069	7,853



Tier 1 System options compared to loads

using BP-22 RHWM Tier 1 System Studies (annual aMW)	Critical Water Firm Power	P10 Monthly	Set at 7,000	P20 Monthly	Average Water - by Month (P50)	Average Water - Annual Basis	Set at 9,000	Average of Critical and Average Annual
Total RHWM Tier 1 System Capability (RT1SC)	6,736	6,799	7,069	7,238	8,818	8,970	9,069	7,853
FY 2029 Tier 1 Load Forecast (Using existing CHWMs and FY2028 Existing Resources)	6,414	6,446	6,572	6,642	6,965	6,975	6,981	6,815
Energy Needed to Firm the System Max of (FY2029 Tier 1 Load less Critical RT1SC, 0)	0	0	0	0	229	239	245	79

Headroom and Above-RHWM Load amounts, using existing CHWMs and FY2028 Existing Resources	Critical Water Firm Power	P10 Monthly	Set at 7,000	P20 Monthly	Average Water - by Month (P50)	Average Water - Annual Basis	Set at 9,000	Average of Critical and Average Annual
Headroom annual aMW	322	353	497	596	1,853	1,995	2,088	1,038
<i>Headroom customer count</i>	27	31	49	62	116	120	121	92
Above-RHWM Load aMW	696	664	538	468	145	135	129	295
<i>Above-RHWM Load customer count</i>	107	103	85	72	18	14	13	42



Tier 1 System considerations

Issues		Timing Risk	Certainty	Accounts for Variability	Additional Discussion Needed
Firm Planning (Critical - Status Quo)	System Size set by Critical Water	Currently Understood	T1 Rate Set based on FIRM capability	<ul style="list-style-type: none"> RHWM process accounts for system variability during contract. Augmentation/Firm Surplus sales adjust system to balance. 	No. Current Structure.
Non Firm Planning (based on something other than Critical)	System Size set by something other than Critical Water	When would BPA account for shortages? Preset in rate case (augmentation), real time with a cost adder later, other?	Delta to Firm Power has to be accounted for.	<ul style="list-style-type: none"> RHWM process would account for system variability Augmentation or other determined methodology to account for delta to Firm Power would still account for system variability during contract. Secondary sales would be impacted. 	<ul style="list-style-type: none"> BPA determine new system size Determine methodology to handle delta How are System Shapes handled Impacts to Net Secondary
	Fix Tier 1 System		<ul style="list-style-type: none"> Known size of T1 System = known RHWM amount over duration of contract Delta to Firm Power has to be accounted for 	<ul style="list-style-type: none"> No accounting for system variability – Potentially no RHWM Process Augmentation or other determined methodology to account for delta to Firm Power 	<ul style="list-style-type: none"> BPA determine new system size Determine methodology to handle delta How are System Shapes handled Impacts to Net Secondary





Unused CHWM/RHWM and Augmentation

How should we treat unused CWHM, and should we allow for CHWM augmentation for new publics/tribal load growth?



Treatment of unused CHWM/RHWM

- Several customers have lost load since CHWMs were initially established and have significant amounts of headroom. Under the TRM, the value of this unused RHWM is credited back to all customers purchasing power at Tier 1 rates.
- If we set new CHWMs on a future load year, then customers will no longer have headroom due to load loss that has occurred since 2010. Although unused RHWM could still exist in the future due to system size assumptions or as loads change over time.
- One possibility to reduce headroom amounts partially (rather than a complete reset) would be to establish new CHWMs by leveraging existing CHWMs, essentially reallocating existing CHWM amounts from customers with headroom to customers without headroom.

A hybrid CHWM recalculation example

- Use data from a RHWM process to determine those customers with headroom. Determine the CHWM amounts those customers could free up that would result in their headroom being reduced by 50%. Re-allocate the freed up CHWM to all other customers based on Above-RHWM Load (Above RHWML) size.
- Using BP22 RHWM Process data this could look like:
 - $\text{CHWM}^{\text{RevisedHeadroom}} = \text{CHWM}^{2022} - ((0.5 * \text{Headroom}) / (\text{RT1SC} / \text{Sum of CHWM}^{2022}))$
 - $\text{CHWM}^{\text{RevisedAboveRHWML}} = \text{CHWM}^{2022} + ((\text{AboveRHWML}^{2022} / \text{Sum of AboveRHWML}^{2022}) * (\text{Sum of CHWM}^{2022} - \text{Sum of CHWM}^{\text{RevisedHeadroom}}))$

	CHWM 2022	count
Headroom 2022	280 aMW	34
AboveRHWML 2022	444 aMW	100
	CHWM Revised	count
Headroom Revised	140 aMW	34
AboveRHWML Revised	304 aMW	100

- A benefit of this method is that CHWMs could be locked down rather quickly.
- A drawback of this method is that there would still be customers experiencing headroom or Above-RHWM Load based on load changes that have occurred since 2010.



RHWM augmentation

RHWM augmentation

- Under RD, the Tier 1 System could be augmented to provide Tier 1 PF rates for Firm Requirements Power for new publics, tribal utilities for limited load growth and DOE-Richland to support the proposed vitrification plant. BPA could also plan for RHWM augmentation in the Post 2028 Power Sales Policy and contract for certain load growth.
- BPA and customers would have to determine whether and how to set limits for augmentation, but BPA may have to account for broader public policy issues.



Other Thoughts on CHWM/RHWM Process?

Are there other modifications or concepts to explore regarding the CHWM/RHWM process?



CHWM/RHWM Process

- While BPA has tried to capture comments and suggestions on the CHWM/RHWM concept and process received during the RD contract and post-2028 discussions, we recognize that there might be other thoughts or changes customers would like to have considered.

Feedback Questions:

- If BPA pursues similar tiered rates construct, do you think the High Water Marks should be reset for the post-2028 contract?
- Do you think Bonneville should consider basing the Tier 1 System on a broader metric than critical firm planning?
- When considering Tier 1 service, what type of certainty is most important to you, resource cost certainty or resource amount certainty?



Next Steps

- BPA is seeking feedback on today's session by July 27. Please provide feedback to post2028@bpa.gov (copy your Power AE), via discussions with your Power AE, or through your trade organizations as applicable.
- BPA will plan to reflect back on feedback at August 10 meeting (“what BPA heard”)
- The next PPC-hosted meeting will be July 27 featuring discussion on non-federal resources (full schedule on following slide)

Thank you for your time today and your ongoing engagement in post-2028 conversations.

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Pre-decisional. For Discussion Purposes Only.



Upcoming schedule

	4-6 Weeks Between Background and Discussion (schedule subject to adjustment)
May 27, 10am-noon	HWM & Tier 1 System Background
June 8, 1-3pm	Non-Federal Resources Background
June 22, 1-3	BPA's Statutes, Capacity & Resource Adequacy Background
July 13, 1-3	HWM & Tier 1 System Discussion
July 27, 1-3	Non-Federal Resource Discussion
August 10, 1-3	Carbon Background, Term/Cost Control Background
August 24, 1-3	Capacity & Resource Adequacy Discussion
September 14, 1-3	Transfer & Transmission Background, EE Background
September 28, 1-3	Carbon Discussion
October 12, 1-3	Transfer & Transmission Discussion
October 26, 1-3	Term/Cost Control Discussion and revisit Interests
November 9, 1-3	EE Discussion
Mid-November	REP Background
December 14	
Mid-December	

