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November 10, 2026

MEMORANDUM

TO: **Council Members**

FROM: **Jennifer Light, Director of Power Planning**

SUBJECT: **Ninth Power Plan Development and Comment Review**

BACKGROUND:

Presenter: Council staff

Summary: The Council will have roughly five hours together over November 17 and 18 to discuss the Ninth Power Plan development. The purpose of this time is to discuss:

(1) Follow up conversation of the updates to the GENESYS model set-up, including ongoing discussions with Bonneville and the region and the status of readiness for Ninth Plan adequacy modeling.
(2) Presentation of new modeling results based on new needs assessments conducted since identifying and updating the GENESYS model set-up issue. At this time, staff will also share comments received during the public comment period regarding the regional resource strategy (RES-1).
(3) Discussion of the broader set of public comments received and proposed changes to the draft Ninth Plan.

This will be an opportunity for the Council to take stock of all the comments received on the draft Plan, discuss necessary updates based on modeling changes, and chart a path forward in the development of the Plan.

Relevance: Under the Northwest Power Act, the Council is required to review its power plan no less frequently than once every five years. The Council initiated its review of the power plan in February 2025, with a goal of developing and releasing a draft power plan in July of 2026 and final power plan by November 2026.

Workplan: B. Development of the Ninth Power Plan



Ninth Power Plan Development and Comment Review

November 17-18, 2026

Northwest **Power** and **Conservation** Council

Agenda:

1. Overview of Public Comment

2. Deep dive into the modeling since close of public comment:
   - GENESYS model setup issue and resolution
   - Staff recommendation for next steps with GENESYS
   - New OptGen results and discussion of public comment on resource strategy

3. Discussion of broader set of public comment on the draft Ninth Plan



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Public Comment Period

- 8 public hearings, with around 250 individuals in attendance and 85 providing comment
- Received 1,225 comments representing
  - 2 federal agencies
  - 4 state agencies
  - 5 tribals or tribal organizations
  - 5 local government agencies
  - 24 public utilities
  - 9 public utility and other utility organizations
  - 39 environmental or efficiency NGOs
  - 11 companies or industry groups
  - 1,098 individuals





Comments Cover a Range of Topics

Regional resource strategy

Recommendations to Bonneville

Data Centers

Transmission

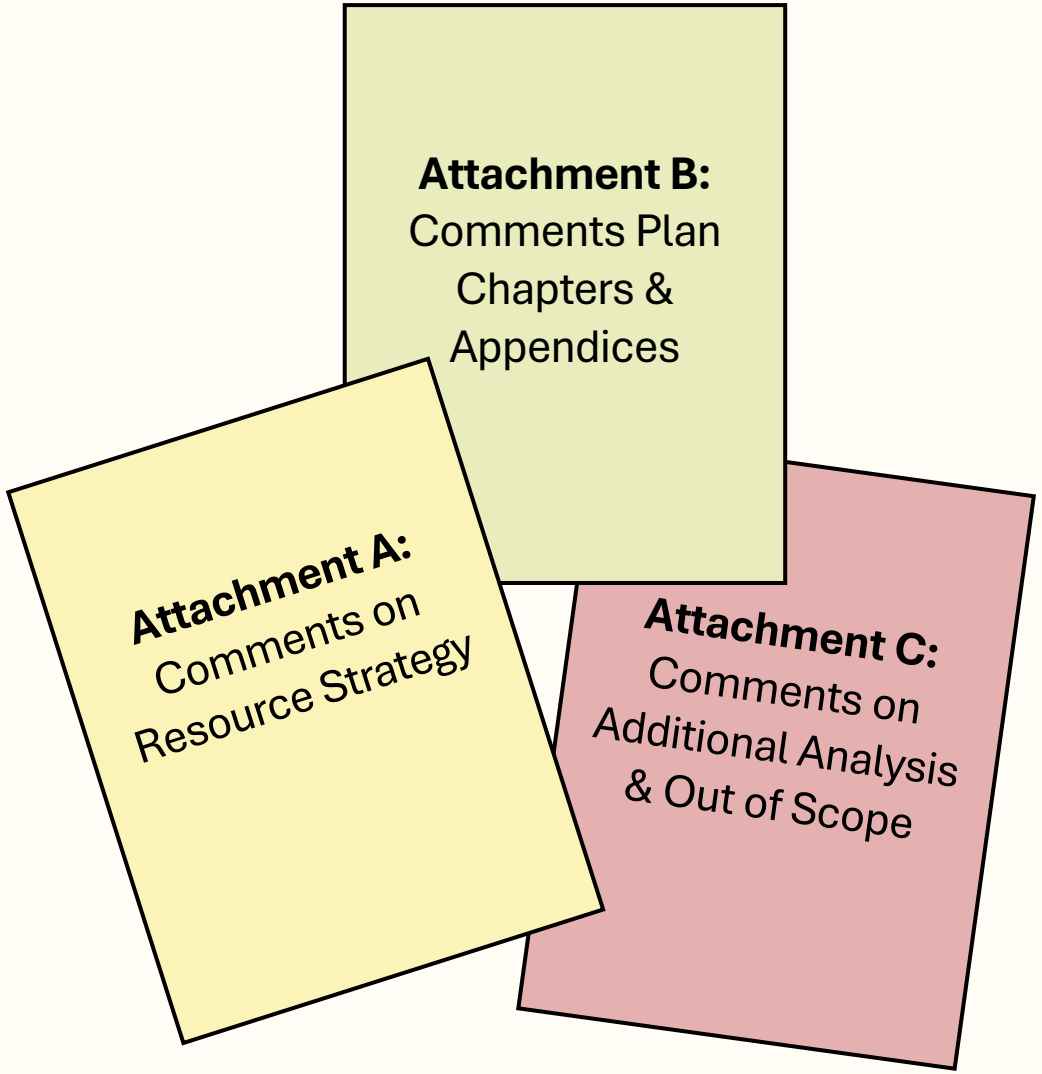
Action Items

Proposed additional analysis

And more…

Comment Summaries

- Staff have summarized the comments and staff recommendations for Council consideration
- Goal for this meeting will be to walk through these three documents in some form or another
- These are also meant to provide reference for after the meeting as we work towards finalizing a plan



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Overview

- As presented at the October 23 Power Committee, through discussions with Bonneville, staff identified an error in the GENESYS setup that needed to be addressed
- Impact on the strategy is significant, and the Council will need to revise its resource strategy accordingly
- Today, we want to spend more time on:
  - What was the issue in the model setup and how have staff addressed it?
  - Where the model stands now and the staff recommendation for next steps?
  - What are the potential implications for the regional resource strategy?

A Super Short History Lesson

- GENESYS is the Council's **adequacy model** which also provides information on hydro operations
  - It's important to keep this in mind… it is first and foremost an adequacy model
- Council redeveloped GENESYS prior to the 2021 Power Plan to improve the modeling of adequacy
  - One major enhancement was the incorporation of market dynamics, a critical piece of data for adequacy
- Redevelopment also included capturing more projects with more detail at each project, allowing the Council to improve its modeling of hydro operations
- Working with the region, the Council made significant strides in modeling of hydro operations, but the recent "future value of hydro" enhancement introduced some new challenges in this area
- Important note, this is fundamentally an issue with the model setup, not the model itself
- We now need to determine how best to proceed as we continue development of the Ninth Plan

Cutting to the Chase

1: Staff feel confident that the model provides solid information to guide regional resource solutions that are adequate

#2: At the same time, staff have concerns about the limitations in representing hydro operations with the current model setup

Given #1, and the time it would take to appropriately resolve #2, staff recommend that we proceed with development of the Ninth Plan under the current (and updated) model setup, while also recognizing the limitations of the model

Using the Modeling to Move Forward with the Ninth Plan

- Staff have completed new needs assessments and OptGen runs for a handful of sensitivities to provide updated information for the strategy
  - These supplemental model runs build on the existing information, which continue to provide useful information around resource tradeoffs to manage uncertainty
- Council should consider the modeling limitations when developing a resource strategy
  - For example, one concern is the representation of hydro flexibility, and the Council has information about effective ways to hedge against this specific risk
- Considering the status of the modeling, as well as the information provided during public comment, staff think the updated strategy will need to be written in a way that provides more useful guidance for modifying the strategy as the Council and region learn more on all the areas of uncertainty between plans

Acknowledge the Limitations of the Hydro Operations Modeling in the Plan

- In addition to considering these limitations when developing the resource strategy, staff also recommend adding/modifying language elsewhere in the plan
- This includes:
  - Reframing (or removing) the hydro flexibility action item (RES-4), as the draft Plan language cannot be supported under these current modeling limitations
  - Include a new action item that calls on the Council to work with the region (after the plan) on improving the modeling of hydro operations
- Staff also recommend the Plan include a clear statement cautioning others against using the Council's GENESYS modeling results to make near-term decisions on the hydro operations
  - The modeling is good to inform out year (5-6 year) needs and adequacy
  - It should not be used to make statements about today's hydro operations

Understanding the Modeling Issue and Proposed Path Forward

Quick Review of Hydro Modeling Updates

- Through discussions with Bonneville regarding the Council's hydro system modeling, Bonneville raised a flag regarding some data from GENESYS
  - Modeling data shared with Bonneville showed an additional ~40 MAF of water coming through the system

- Staff reviewed the data and confirmed that there was an error in the GENESYS setup that needed to be addressed
  - Note that this setup issue does not affect OptGen hydro modeling

Staff Made the Following Changes to Improve the Flows

Tighter control of target storage between the weekly and hourly stage

This significantly improves the alignment of the weekly and hourly storage levels, and therefore the outflows and generation in the model

Two Options Explored

1. **Increased the slack variable penalty associated with making the weekly inventory match between weekly and hourly stages to 110% of the cost of a taking shortfall**
   - The model should prioritize more accurate river operations over adequacy
2. Tested making constraint hard
   - With current setup, enough infeasibilities occurred to make output data less useful

New initial storage alignment in Mica and Arrow in the weekly stage

While the previous assumption was not an error, this improvement provides more nuanced information for the future value of hydro

- **Modification to initial storage alignment in Mica and Arrow in the weekly model improved Mica representation and more conservative future value of hydro outcome (that isn't based on starting high Mica in all years)**

Comparing Simulation Data Before and After Changes

Inflows, outflows, storage and generation

Before and After Change: Coulee Inflow & Outflow Difference

The model update greatly reduced the regulated inflow coming into Coulee, from average of ~166 to ~122 kcfs, and therefore the difference from natural inflow to ~6.5 MAF, a result that is much tighter and comfortable moving forward as will be discussed in later slides

- The issue raised was the discrepancy between natural inflow (unregulated streamflow) and simulated outflow
  - Suggesting substantially more water was coming out of Coulee than was coming into it

- However, it is important to consider the concept of regulated inflows to understand model operations:
  - Natural inflows are an **input** and represent forecasted water availability
  - Regulated inflows are **simulated** and account for operations of upstream project outflows and irrigation
  - Ideally, natural inflows and regulated inflows are similar

- Understanding what led to ~40 extra MAF:
  - GENESYS was using more water that it should have from each project, with the **"extra" water cascading down the system, increasing the regulated inflow**

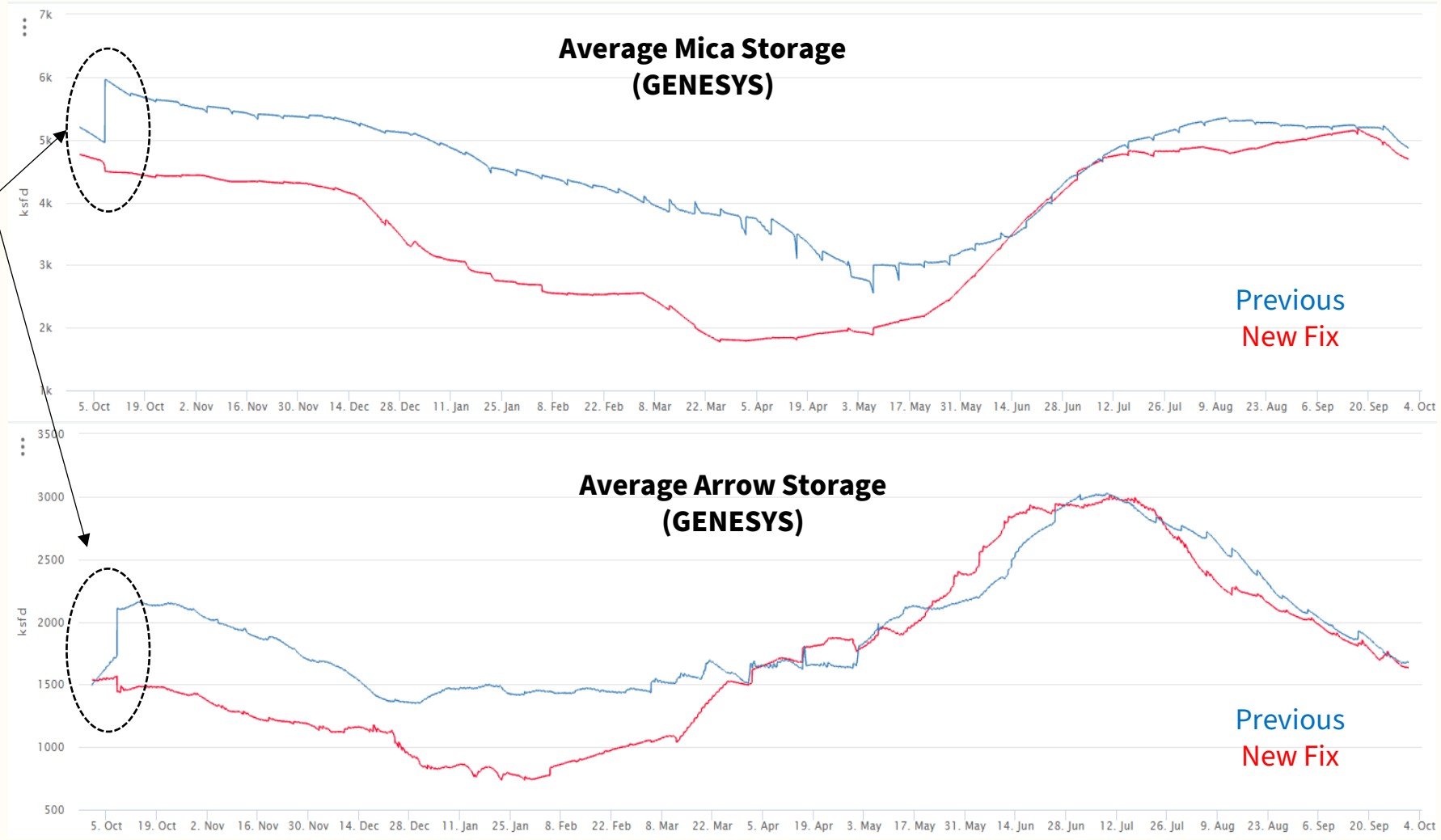
Variable	Before Fix	After Fix
Average natural inflow	113.8 kcfs	113.8 kcfs
Average Outflow	~167 kcfs	~123 kcfs
MAF difference between natural inflow and outflow	~40 MAF	~6.5 MAF

- While Coulee's average **natural inflow** is 113.8 kcfs, the average **regulated inflow** into Coulee was ~166 kcfs
  - The difference between the natural and regulated inflow is the driver for the ~40 MAF difference
  - The difference between regulated inflow and outflow is significantly lower, on average around ~1 kcfs and ~1-1.6 MAF

Fix #1: Updated Initial Storage Assumption at Mica and Arrow

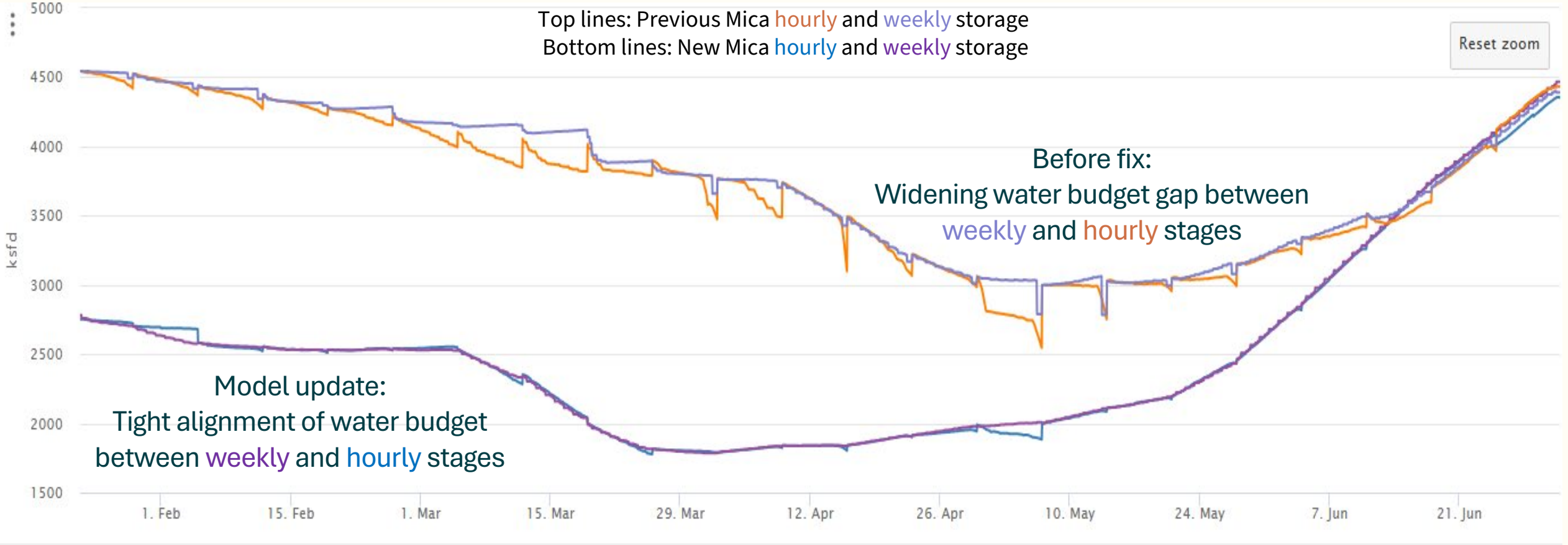
- Utilizing a lower, more conservative assumption on the starting storage conditions at Mica and Arrow given historic observations
  - Lower starting position but still achieving refill by end of year

- New values are important in reducing the water coming down from main Canadian projects in the first part of year and therefore more representative hydro regime for the region



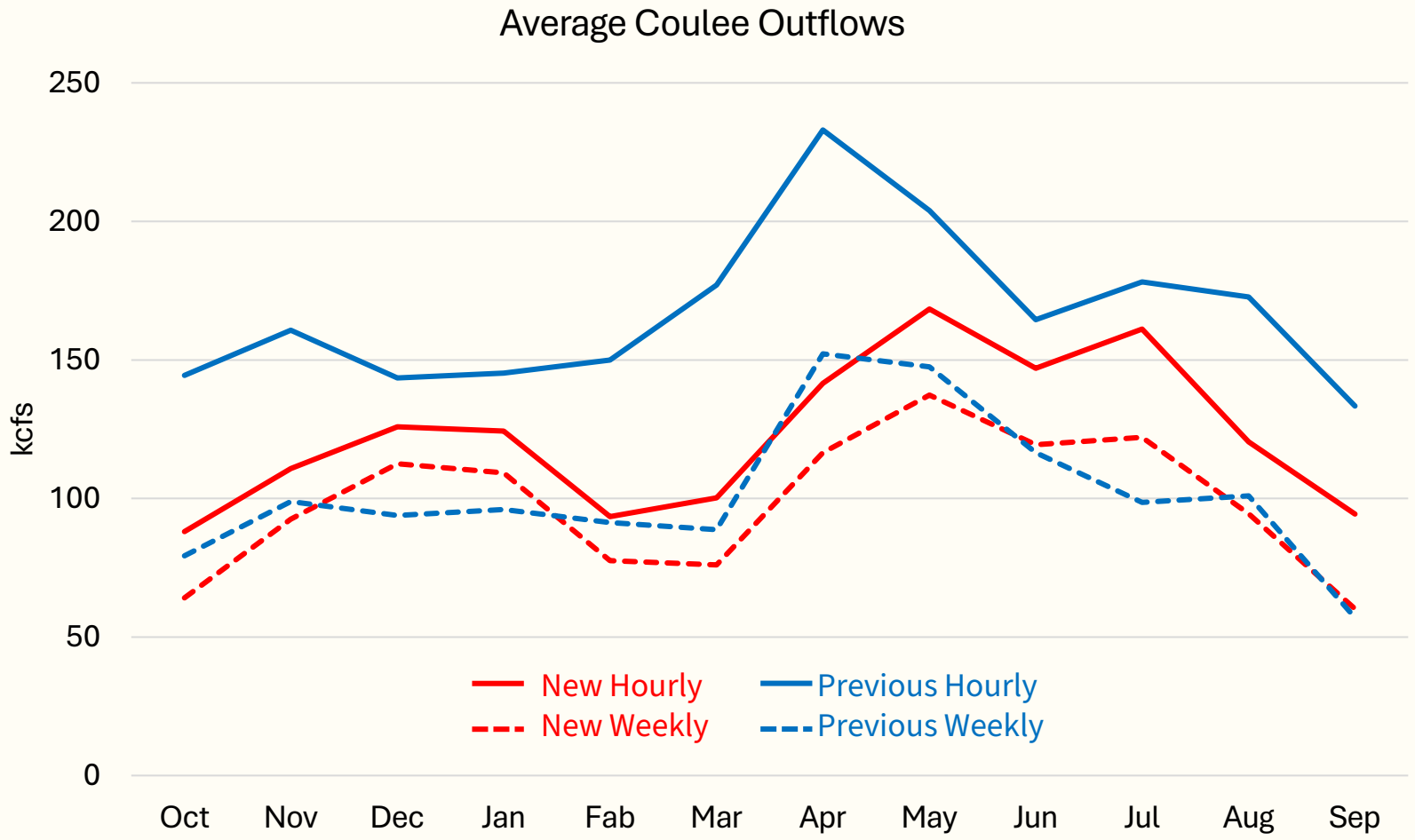
Fix #2: Tighter Target Storage Constraint between weekly and hourly phases (all projects)

Mica Example
(showing impact of both lower starting storage condition and tighter target storage)



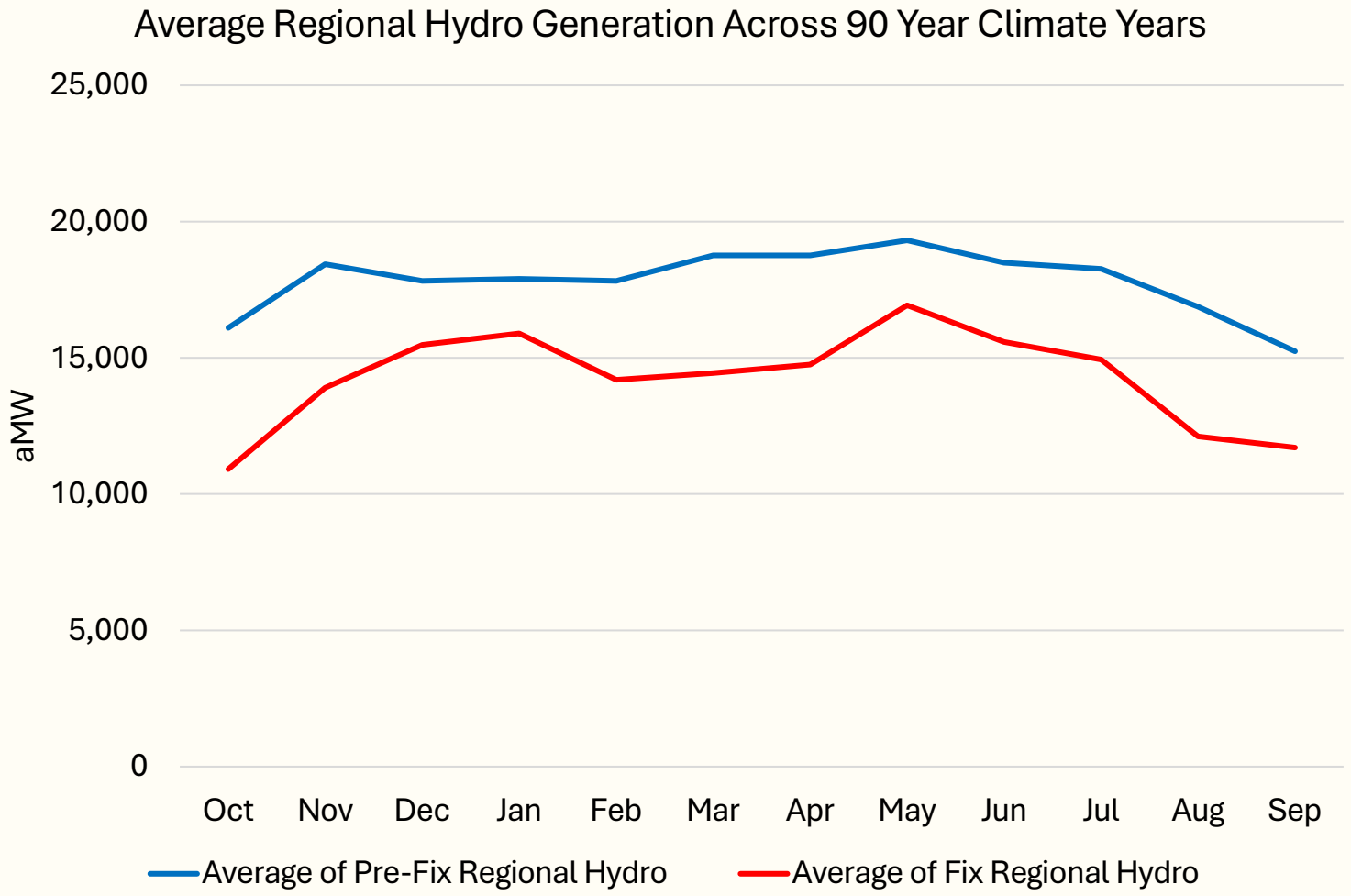
Weekly & Hourly Outflow Fix from Target Storage

- The tighter relationship of water budget between the weekly and hourly storage (previous slide) leads to a tighter relationship between the outflows as well
    - Specifically, the hourly model is now showing much lower outflows
- The fix is imperfect, and a narrow gap between the weekly and hourly remains, but the impact on adequacy can be quantified and will be discussed in following slides



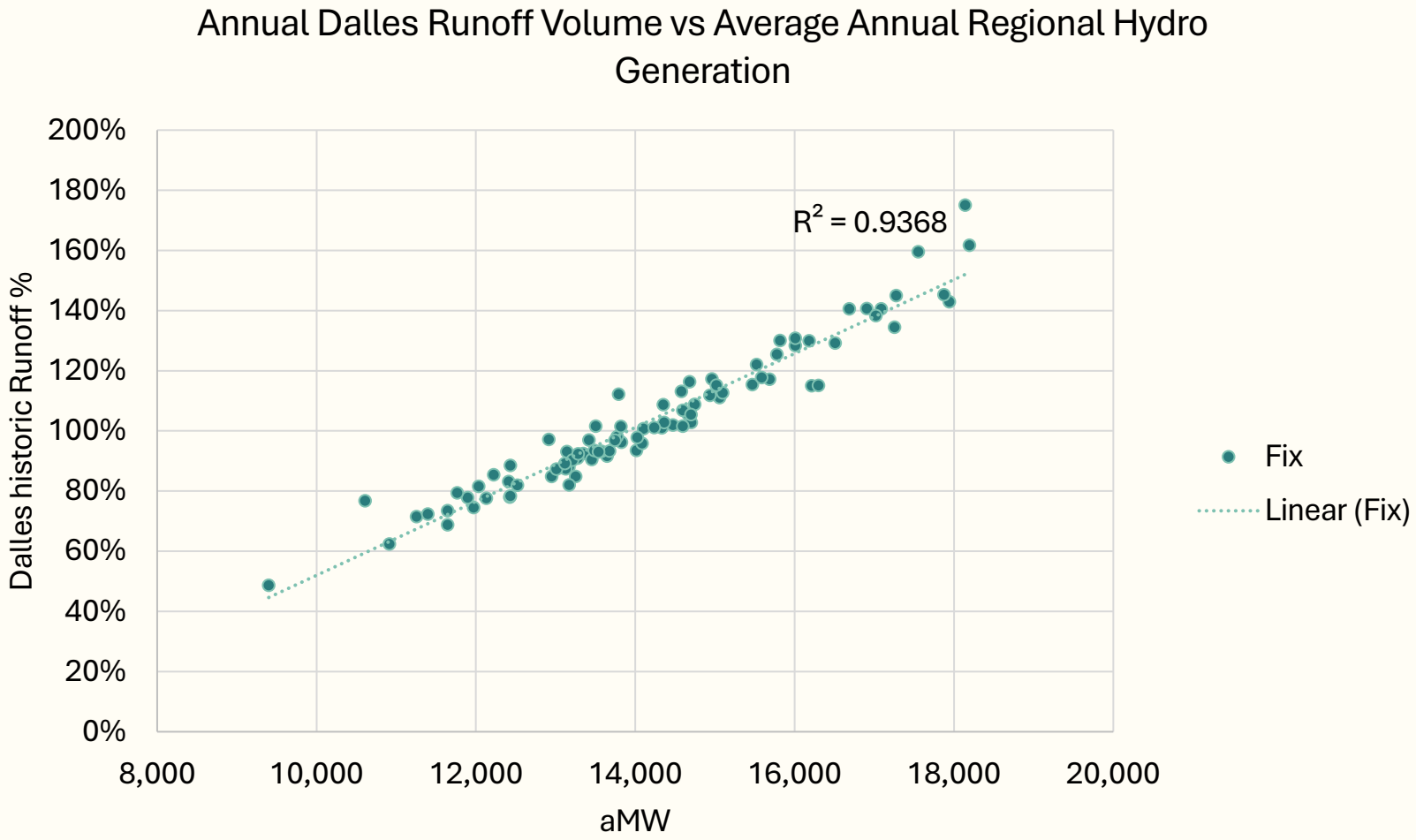
Regional Hydro Generation Impact

- The reduced outflow directly leads to reduced turbined outflow: the model fix reduced average annual hydro generation by ~3,600 aMW
    - This directly translates to additional needs, and why a new Needs Assessment was completed
- Current (after fix) average annual hydro across 90 water years is ~15,500 aMW, which is comparable to average historic water year (~16,000 aMW)



GENESYS Hydro Representation Maintains Strong Relationship to Water Availability

- The 90 climate informed flows represent a wide range of water availability forecasts
  - from ~50% to ~175% of historical Dalles runoff
- Hydro generation in GENESYS shows a strong relationship to water year
- A strong relationship is maintained on a wide range of hourly generation percentiles



Discussion of Initial Impact Estimates of Updates on Resource Needs

Initial estimates on impact, methodology of how we assess impact and updated needs

Impact on Needs and Adequacy

- As stated earlier, the draft Plan assumed more water on average in the hourly stage of GENESYS, and therefore more generation in the existing system, than is appropriate
- More generation translates to less need for new resources to meet future load growth
- After updating GENESYS, the generation from the existing system is reduced and the resultant need for new resources increases
- As discussed, the Council will need to add additional resource (1,000s of MW) to the proposed strategy to make up for this difference in needs

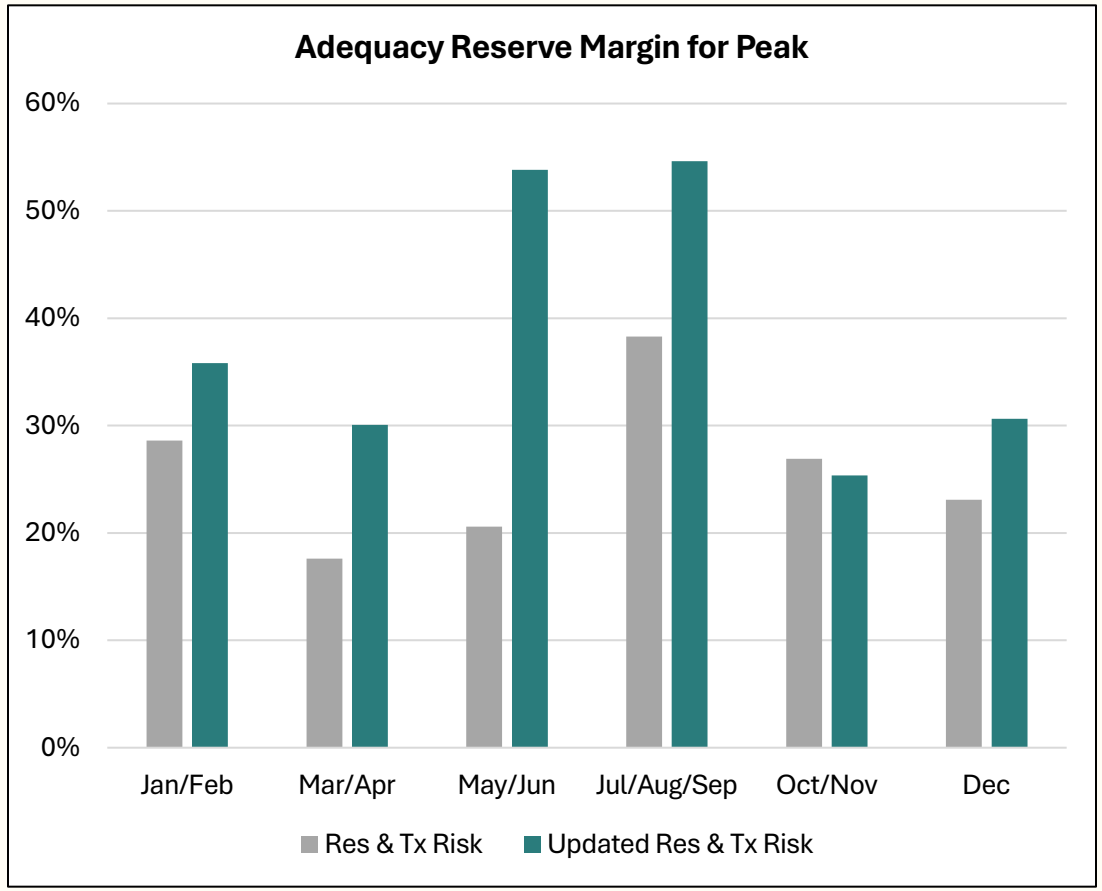
How Are Needs Calculated?

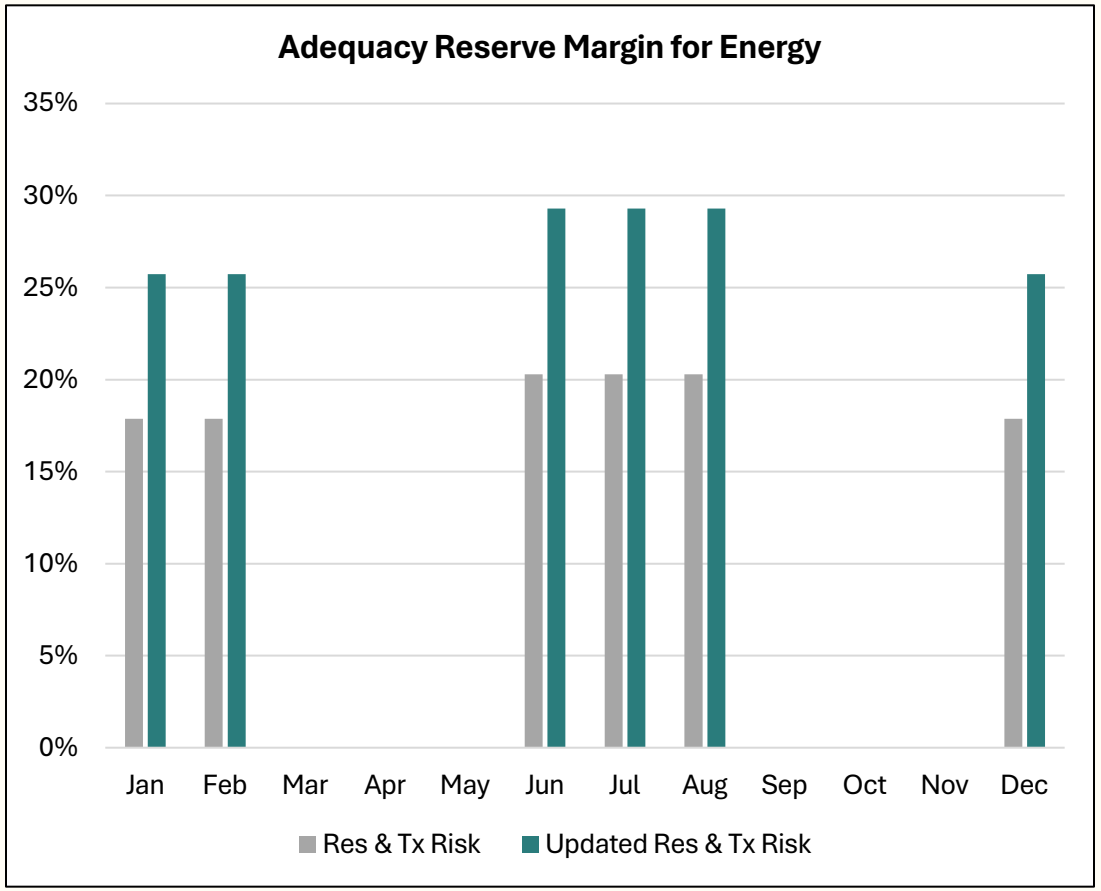
- Adequacy metrics are calculated from the shortfall record
- Each metric has an implied need that, should enough resources be added to the system, the metric would be satisfied
  - Satisfying the frequency and Peak VaR metrics develops the Planning Reserve Margin (PRM)
  - Satisfying the Duration VaR metric develops the Firm Energy requirement
- This methodology is described in Technical Appendix M and Ninth Plan Needs Assessment Workbook (review for process)

Adequacy Metrics

	Frequency			Extreme Deficits		
	Annual LOLEV (events)	Winter LOLEV (events)	Summer LOLEV (events)	VaR 97.5 Duration (hr)	VaR 97.5 Peak (MW)	VaR 97.5 Energy (MWh)
Study/Criteria	0.2	0.1	0.1	8	1,200	9,600
Previous Res & Tx Need	10.5	6.96	2.32	24	11,045	880,638
New Res & Tx Need	42.9	16.2	18.0	67.5	14,471	3,285,231

Updated Needs





Discussion of Current GENESYS Setup Fix and Whether it is Sufficient for Now

The Hydro Fix is Not Perfect, But is It Good Enough?

- Recall that staff configured the model to prioritize more accurate river operations over adequacy in the fix
- While it is not sufficient for the long-term, staff believe it is good enough for now
- Followed up with Bonneville on whether the fix addressed all their concerns
  - BPA staff acknowledged the annual flows looked better on average
  - They still had some concerns about seasonal inflow differences and whether there was unintended hydro generation in some hours that could change an adequacy signal
- Staff agreed with those concerns and since that conversation has estimated additional regional hydro generation due to the imperfect fix
- Is this additional generation material for understanding adequacy?



Do Those Instances of Additional Hydro Generation Change the Resource Strategy?

- Recall this issue is limited to GENESYS and is currently limited to needs assessment results
- With the implemented fix, the potential additional needs from the updated needs assessment are non-zero
- At the same time, the methodology converting adequacy metrics into reserve margins is conservative and overestimates requirements during many times of the year
- And, any additional needs from GENESYS may not yield significantly more useful information from OptGen since OptGen is currently close or is limited by the supply-side resource ramp limitations



Description of Overestimation of Hydro Using Current Approach

What matters for adequacy?

- Times when there is more flow than should be available in the hourly simulation that turns into hydro generation that would alleviate or prevent a load shortfall
- This means more hydro generation during a time when the additional capability of the existing thermal generation or market would not address potential system stress

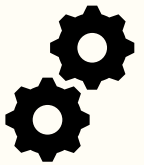
Can we estimate how often and to what magnitude there is additional hydro generation that may matter for adequacy consideration?

- Additional hydro generation that would potentially affect needs occurred in under 9% of all the hours sampled
- On average, during those stressful times when there is more flow, there is actually 15 aMW less hydro generation. However, adequacy is judged not by the average…



- If all of this "additional" hydro is added to the shortfall record in the high needs assessment, the **seasonal energy need could be as much as 500 aMW more** and the **peak need could be higher by just under 1,000 MW in the winter and just over 1,600 MW in the summer**
- In isolation, this sounds like a substantial additional need, but more context will be given in following slides

Description of the Conservative Assumptions Within the Model



These can cause operations in reality to be smoother than in the model

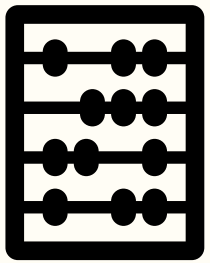
- The adaptive mid-year hydro inventory management of non-power operations that happens in reality within the water year is not currently modeled as a choice but rather the model tries to force the non-power operations to happen regardless of water condition until the hourly model.
- System maintenance (hydro and thermal) cannot be delayed or deferred in the model based on adequacy needs.
- Transmission capability is statically derated annually to allow for reserve provision

OptGen Reserve Requirements (Planning and Operating)

Firm Energy Constraints	• Calculated based on minimum energy necessary to ensure an adequate system • Fidelity: Defined seasonally and can change annually • Qualifying Resources: New thermal, VERs, EE, and DVR
Planning Reserve/Contingency Reserve	• Calculated based on minimum 2 hour sustained peaking capacity necessary to ensure an adequate system plus 3% Generation, 3% Demand • Fidelity: Defined seasonally as a percentage of load (maximum hourly percentage per month) • Qualifying Resources: Existing and new dispatchable thermal, hydro, storage, and DVR
Dynamic Probabilistic Reserve Requirement	• Calculated based on reserve necessary to mitigate forecast error associated with variable energy resources • Fidelity: Calculated dynamically by season-hour per amount of variable energy resources and implied uncertainty associated. • Qualifying Resources: Existing and new dispatchable thermal, hydro, storage, and DVR

Description of the Methodology of Converting Adequacy Metrics to Reserves

- The **planning reserve margin and energy reserve margin calculations are conservative** in interpreting the needs defined by the adequacy metrics from GENESYS and how that translates into needs in OptGen
- This overestimates the reserves required in many hours but was meant to account for imperfect translation of multiple adequacy metrics into reserve margins
  - Reserve margins by definition cause a system to have more resources than needed during many times of the year
  - The uncertainty about when the additional capability might be needed is better captured by seasonal margins but there still are many hours of additional length
  - These overestimates are larger than the differences of the additional hydro generation on a seasonal basis.



An example of when the overestimates are larger than the additional hydro generation is in May/June. The hydro generation overestimate is 1,600 MW The most conservative peak reserve margin is 5,600 MW.

Season	Energy	Peak
Winter	500 aMW	3,800 MW – 4,000 MW
Summer	400 aMW	3,000 MW – 5,600 MW

Season	Energy	Peak
Winter	500 aMW	1,000 MW
Summer		1,600 MW

Is The Implemented Fix Enough for Now?



- Staff acknowledges that the current fix is not guaranteed to eliminate the original issue
- Staff acknowledges that a better long-term solution is to ensure mass balance within a tighter tolerance
- Analysis shows that there are still instances where extra flow and subsequent overrepresentation of possible hydro generation occurs in the model during times of system stress
- There are number of conservative assumptions in the current configuration of the model
- The methodology for using adequacy metrics to create a signal to OptGen to build an adequate system creates more reserve in most hours than would be necessary to maintain adequacy

AND, as will be addressed in upcoming slides…

- **Any additional needs from GENESYS may not yield significantly more useful information from OptGen**



Updating a Regional Resource Strategy

Organizing this Discussion

- As we transition to thinking through updates to the strategy, we want to weave together some different pieces of information
  - Initial modeling results and connecting those to the updated modeling
  - Public comments on the strategy or considerations that might impact the strategy (Attachment A to the rescue!)
- Today's not the only time to go through this, so we can sit with it and revisit/go deeper in any area at a future Council meeting



Reminder on the Resource Strategy

- Conservation and demand response are recommended at higher levels than seen in the bulk of the modeling as they provide a hedge against supply side constraints
- Strategy leans more into renewables and storage to meet additional needs, mindful of the priorities outlined in the Power Act
- Natural gas, primarily peakers, play an important role to hedge against risk of low hydro generation

Resource	Amount
Conservation	1,060 aMW 860 aMW OR/WA (up to $150/MWh) 200 aMW ID/MT (up to $70/MWh)
Demand Response	590 MW
Voltage Regulation	220 MW
Renewables	9,000 MW
Storage	5,200 MW
Natural Gas	2,100 MW

Staff expects this will change, just putting it here as a reminder

Public Comment on Resource Amounts

Differing perspectives on the how to balance clean resources (primarily renewables) with natural gas in the strategy

Differing perspectives on the conservation target, with some wanting a higher target, others wanting a lower one, and recommending the current amount

Strong support across commenters for moving to a single target approach for conservation, with one commenter preferring the dual target approach

Support for increasing the recommendation for demand response, with no dissenting opinion on this one

Some support for increasing the recommendation for batteries, others recommending less, and some support for including long-duration energy storage

Comments cautioning against overbuilding of resources, with some of this focused on natural gas, while others cautioned against underbuilding

Public Comments on Assumptions that Impact Resources and Amounts in Strategy

Recommendations to revisit the environmental methodology or approach to environmental quality to include more assumptions

Recommendations to revisit resources costs for one or more resources (gas, gas prices, rooftop solar, renewable cost curves, etc.)

Recommendations to revisit the market reliance limit, with some wanting it to be higher, others lower, and another recognizing the risk in both directions

Recommendations to revisit the transmission and distribution deferral value used in the conservation analysis

Recommendations around how to think about transmission development and its connection to the strategy

Public Comments on Other Considerations

Commenters spoke to siting considerations, with specific focus on the impact of renewable builds

Commenters focused on concerns around the modeling of hydro flexibility recommending the Council assume less, but for differing reasons (note: this connects to modeling topic)

Commenters spoke to the size of the overall resource builds, with one commenter providing suggested near-term actions to hedge against the risk of being able to build at pace.

Commenters provided recommendations around the role of data centers in the development of resources, with one wanting a requirement of renewables for data centers

Pg. x

As we go through, I'll weave in comments. These comment bubbles point to the page in Attachment A where discussion starts.

Key Takeaways from Updated Runs

- Demand side resources continue to support system needs when there are supply side resources limitations
- Natural gas continues to be selected up to the physical limits assumed in the modeling, with a continued focus on peaking plants
- Wind and hybrid solar + storage make up the bulk of the added resources to meet needs across sensitivities
  - There are some differences in the renewable builds from before, which we will talk about
- The modeling is hitting the assumed build limits in many cases, and the Plan's resource strategy will need to consider hedging risks and supporting flexibility to adapt between plans as we learn more with our annual studies

Supplemental Sensitivities

Transmission Plus	Assumes the build assumptions for all resources as agreed to by the Council and informed by the advisory committee process, as well as added transmission that aligns with the WestTEC 10-year study. During analysis, staff ultimately created two versions of this study starting in 2030 to address resource constraints (more later).
Constrained World	Consistent with the previous Constrained World sensitivity. This was included in the update to provide a bookend for conditions where both supply side resources and transmission are constrained, relative to the assumptions in the Transmission Plus sensitivity.
Changing Federal Policy	Consistent with initial version, but with the higher build limit in 2030 used for the second Tx Plus. This was selected because (1) it showed a lower end gas build in the initial round and (2) it provides insight on how a greater price differential between natural gas and renewables impacts the strategy.
Lower Data Center Loads	Excludes the two load trajectories with the high data center forecast. This was selected in response to public comments to provide insight on how regional resource buildouts would change if data center loads either did not materialize on the high end or some portion were fully responsible for serving their needs.

Note About Supply Side Build Limits

- For these updated runs, staff started with the total supply side resource build limits consistent with those developed for the initial studies
  - These were developed through conversations with advisory committees
- As modeling progressed, staff were seeing constraints in 2030 and decided to create some updated ramps to relax that constraint for two sensitivities:
  (1) Second version of Tx Plus but with a 2030 ramp update and (2) the Fed Policy sensitivity

	2028	2030	2032
Constrained World	2,600	6,900	12,100
Transmission Plus	6,900	13,800	23,000
Tx Plus with Updated 2030 Ramp	6,900	19,320	23,000

Recent Regional Builds

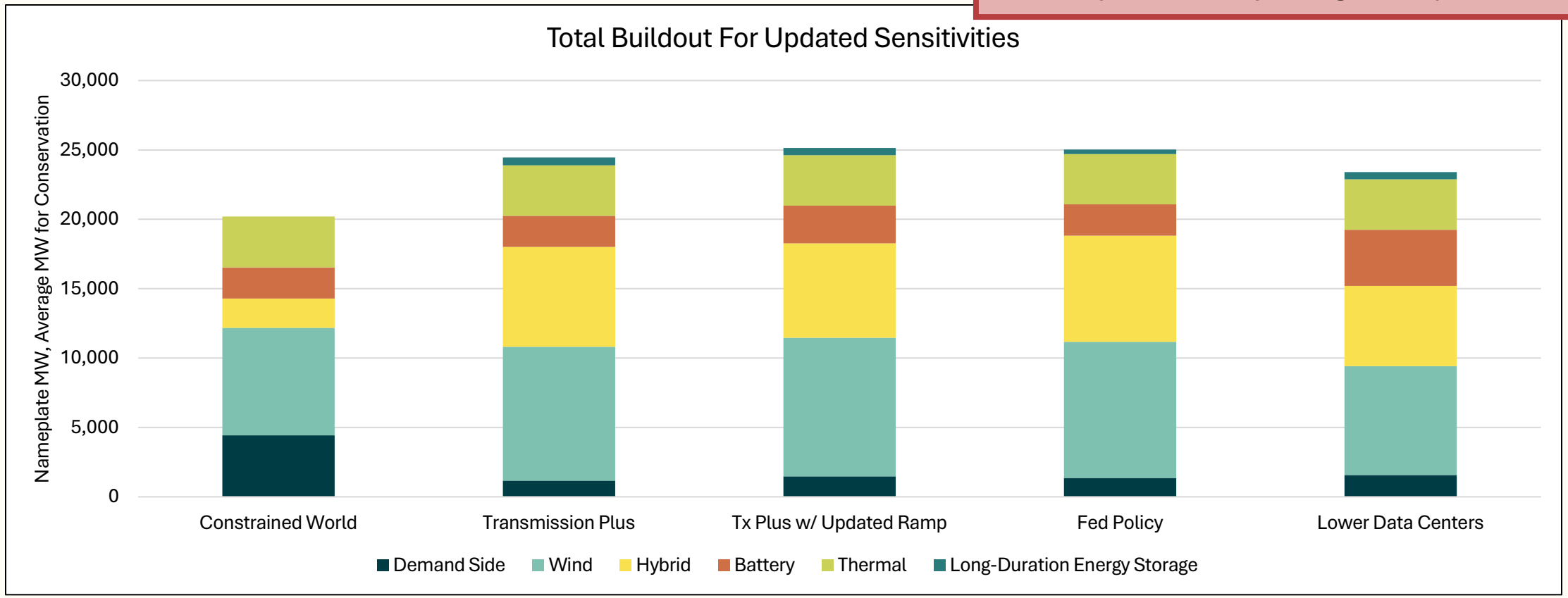
- Assumed build limits in the modeling are higher than what has been developed in recent years
  - These were used to help inform the Constrained World build limits
- This is to provide context, not to say that the region cannot build at a faster pace to meet needs
- But the question around the pace of building is a key area to be discussed as we work on the updated strategy

Resource	6 Year Build (MW) 2020-2026
Wind	2,533
Solar	2,141
Batteries	1,184
Natural Gas	233
Hydro Upgrades	172
Other	25
Total	**6,289***

*This is higher due to rounding.

2032 Resource Builds for Updated Sensitivities

The results are generally hitting the assumed resource build limits. Connecting back to the earlier discussion of needs, further refinements to the needs assessment that increase needs slightly are not likely to materially change the OptGen results.



Note: Constrained World build is not likely adequate.

Conservation Acquired by 2032

- Model continues to go all the way up the supply curve when the supply side is constrained
- Model selecting a little more conservation, but is limited by economics when there are no constraints on the supply side
- This additional conservation comes from the modeling selecting a higher cost bin for some of the zones in the region

Sensitivity	Buildout by 2032 (aMW)	
	Initial Runs	New Runs
Constrained World	1,482	1,487
Transmission Plus	678	705*
Tx Plus w/ Updated Ramp	n/a	699
Changing Fed Policy	589	634
Lower Data Center Loads	626	682

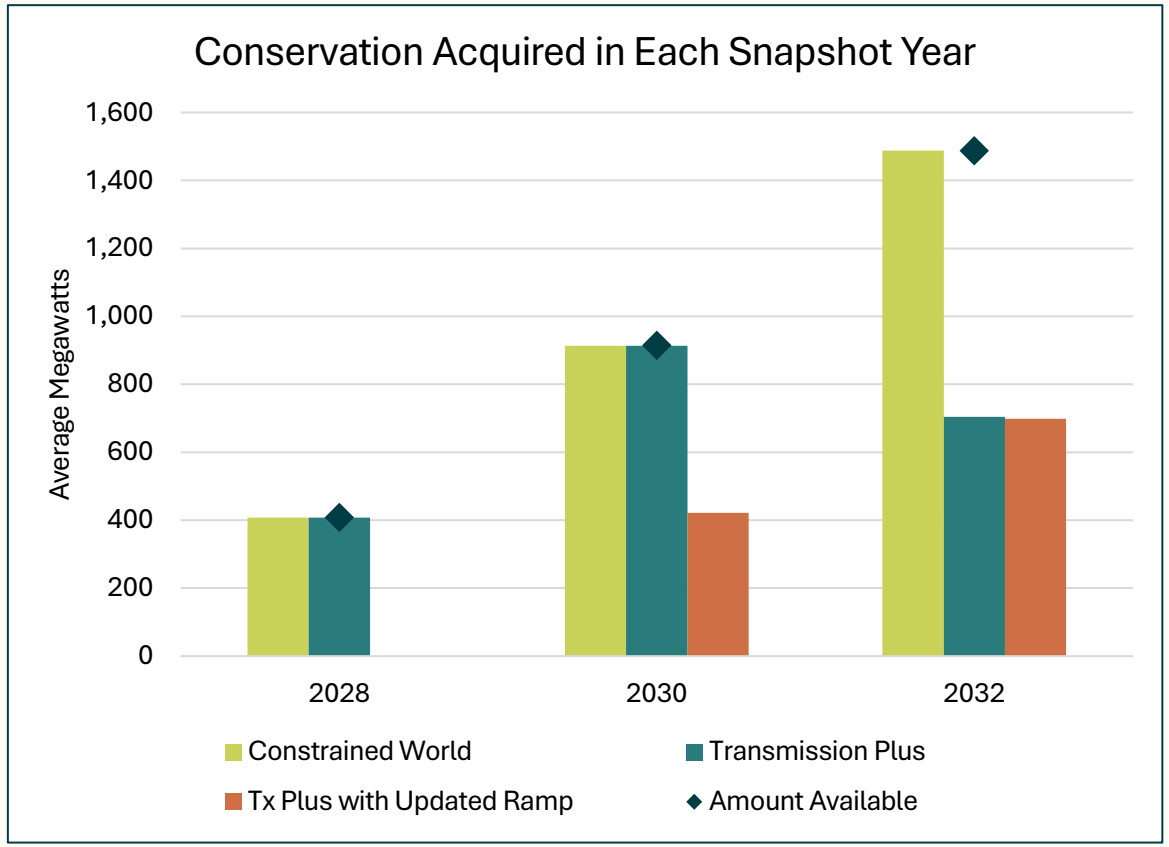
*Technically, this one acquired more in 2028 and 2030, but staff chose to not lock in 2030 resources to let the model optimize in 2032.

Conservation + Supply Side Constraints

Pg. 4

Comments with differing perspectives on the target size: Some recommend higher to manage for constraints; others recommend lower, with one recommending deemphasizing the constrained world sensitivity.

- More conservation is acquired when there are supply side build constraints:
  - In 2028 only planned resources are available, which constraints the options
  - Tx Plus with the initial ramps and Constrained World are also constrained in 2030
- In those specific years, the model selects significantly more conservation than in years when it is not constrained



Note: Tx plus with updated ramp was not modeled for 2028

Conservation Amount By Zone

Pg. 5

Commenters supported moving to a single target. A couple commenters suggested more discussion and analysis around how to use the locational value data.

- These are the max cost bins acquired in each zone by 2032 comparing the initial and the update
- Some key takeaways
  - The higher amounts of conservation are coming from buying a bit more in some of the zones, but not a lot
  - There is still some locational signal for us to keep thinking about in the long-term
  - As renewables are cheaper, less conservation is cost-effective

Transmission Plus Max Cost Bins in 2032

	Initial	Update
NWMT	40	40
BPAIDMT	50	60
IPCO	50	60
PACE	50	60
AVA	60	70
BPAOR	60	60
BPAWA	60	60
CCPUD	60	70
DCPUD	60	70
GCPUD	60	60
PACW	60	60
PGE	60	60
PSEC	60	60
PSEN	60	60
PSEO	60	60
SCL	60	60
TPWR	70	80

Fed Policy Max Cost Bins in 2032

	Initial	Update
NWMT	20	40
BPAIDMT	40	40
IPCO	50	50
PACE	40	50
AVA	50	50
BPAOR	50	50
BPAWA	50	50
CCPUD	50	60
DCPUD	50	60
GCPUD	50	60
PACW	50	60
PGE	50	60
PSEC	50	60
PSEN	50	60
PSEO	50	60
SCL	50	60
TPWR	50	60

Demand Response Acquired by 2032

- Demand response continues to provide a hedge when supply side resources are constrained
- Updated modeling generally selects higher amounts of demand response
- Model prefers the frequently deployable demand response, only buying limited frequency demand response in the Constrained World sensitivity

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Constrained World	1,483	1,944
Transmission Plus	228	234*
Tx Plus w/ Updated Ramp	n/a	551
Changing Fed Policy	228	505
Lower Data Center Loads	224	660

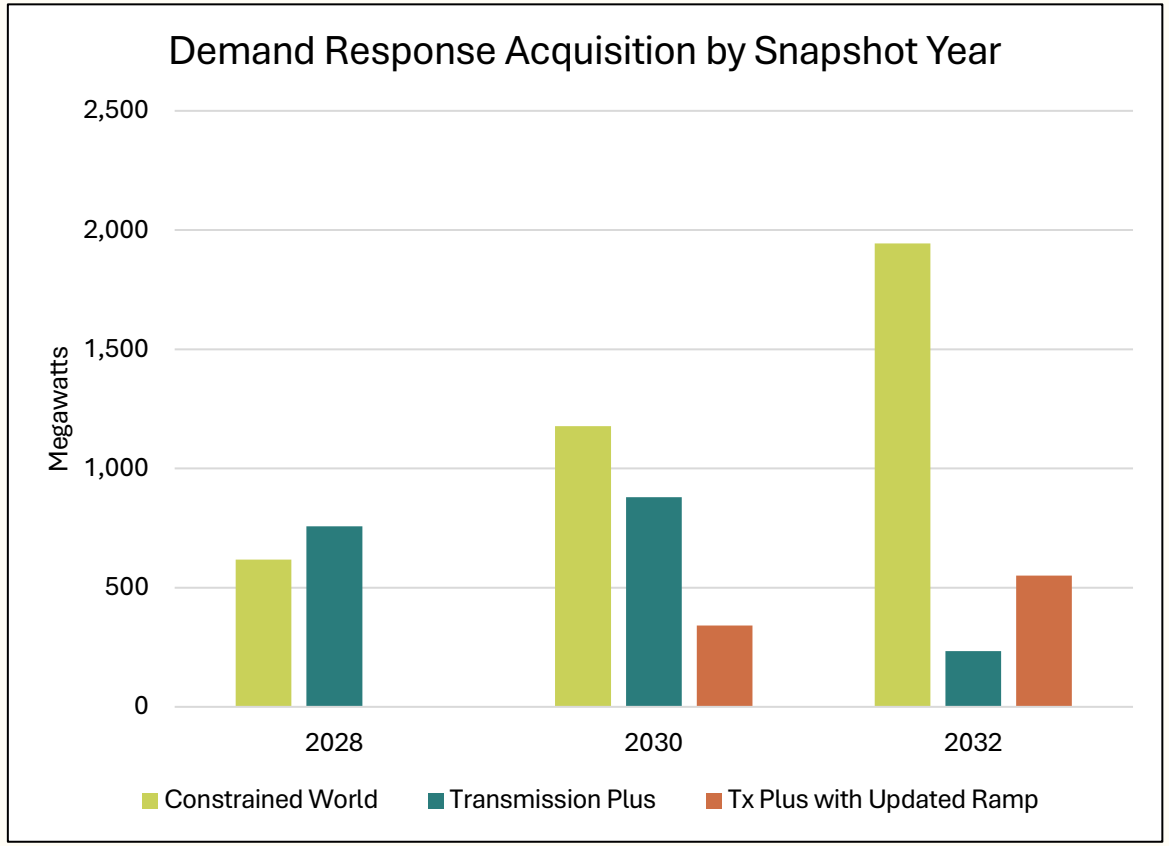
*This is lower in 2032 because we did not lock in any resources in the 2030 snapshot year for this specific sensitivity. It buys more, when just looking at 2030 (see next slide)

DR + Supply Side Constraints

- Similar to conservation, more demand response was acquired when the supply side was constrained
  - All sensitivities are constrained in 2028 to planned resources only
  - Tx Plus and constrained world are constrained in 2030 as well
- Even under constraints, the model is not acquiring *all* demand response but prioritizing the frequently deployable

Pg. 6

Comments recommended the Council pursue higher DR targets to hedge risk of supply side challenges, extreme weather and price volatility. Some comments on specific approaches to the DR target



Note: Tx plus with updated ramp was not modeled for 2028.

Behind the Meter Solar + Public Comment

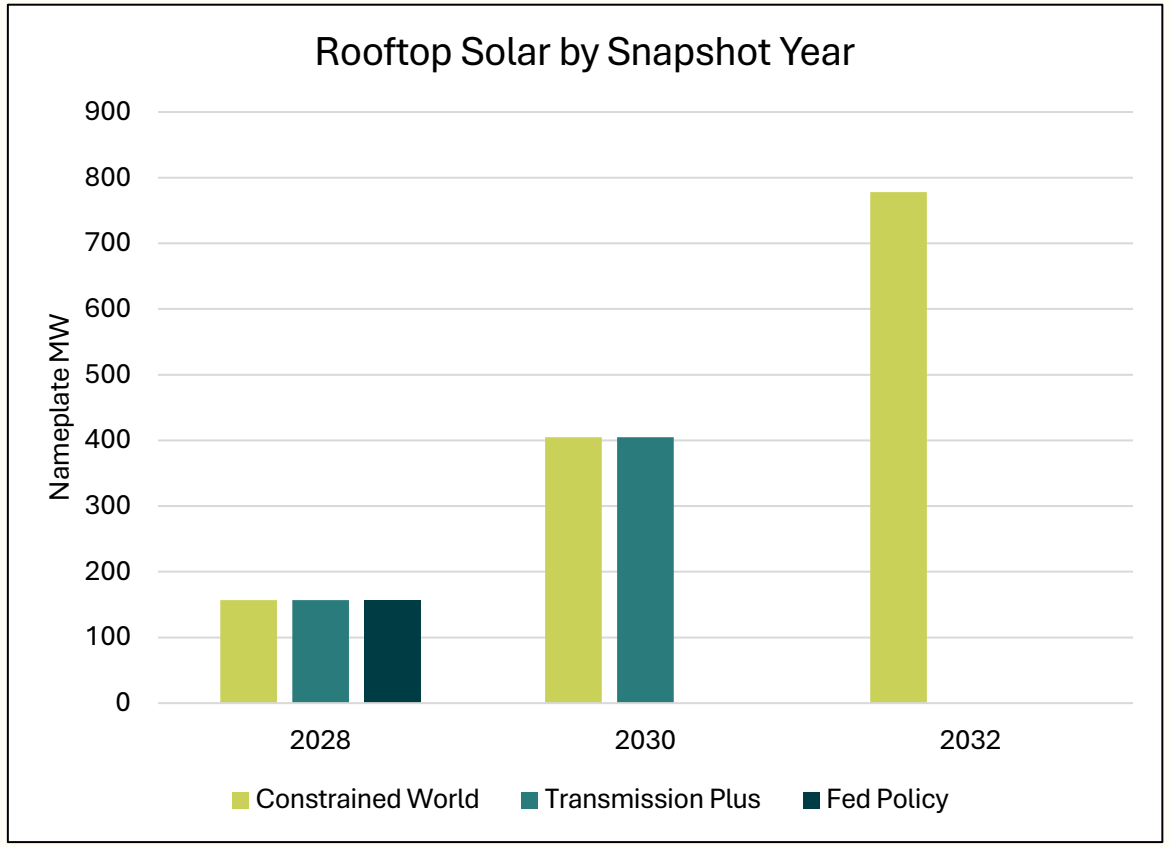
- Consistent with the initial results, behind the meter solar is acquired only when supply side resources are constrained

Pg. 7

Comments recommended the Council include behind the meter solar and other distributed resources in the strategy.

7, 12

Comments raised concerns about siting of renewables and some comments point to distributed energy resources as being a potential tool to address.



Voltage Regulation

- Updated modeling continues to show the same signal for voltage regulation, which is to acquire all of this resource in every single sensitivity
- No comments were submitted with respect to the recommendation for this resource in the regional strategy
  - Some entities submitted comments regarding the Bonneville recommendations for this resource, which we will discuss later
- This is the one “easy” piece of the strategy for which staff can recommend today to keep the same in the final strategy



Natural Gas

- Model is consistently maxing out the natural gas allowed
  - Reminder: the modeling assumes a 3,000 MW limit in the near-term due to physical constraints in the gas system
- Aside from one combined cycle, the bulk of the natural gas selected is peaking plants in most sensitivities
  - The Constrained World looks different with mostly combined cycles

Pg. 3

Comments differ on the role of natural gas, with some wanting less (and more clean resources), and others recommending more.

Pg. 3

Comments differ on how to recognize system constraints, with some recommending a lower amount of gas and others recommending expanding the gas system.

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Constrained World	2,500	3,000
Transmission Plus	2,917	2,967
Tx Plus w/ Updated Ramp	n/a	2,967
Changing Fed Policy	2,167	2,967
Lower Data Center Loads	2,850	2,967

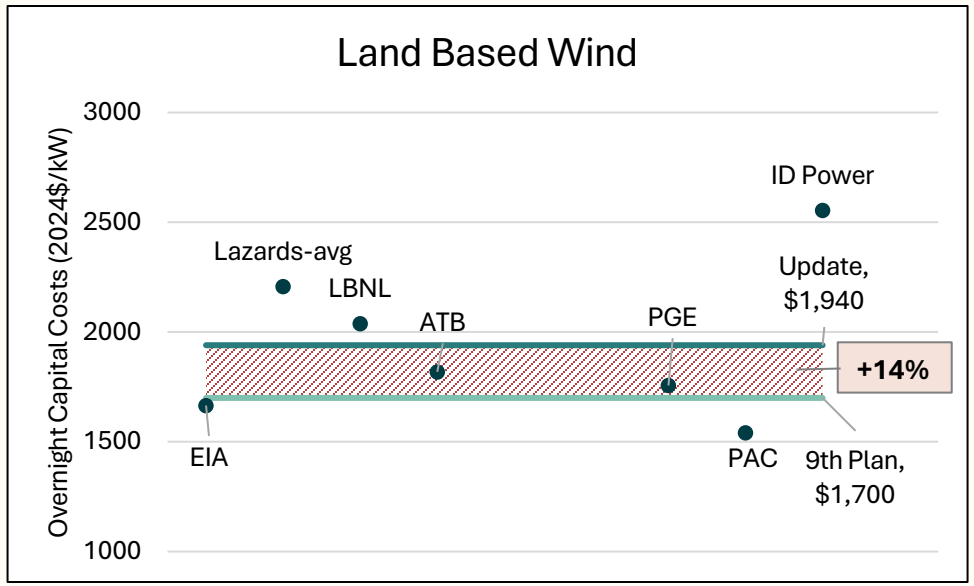
Note: 2,967 is basically 3,000 because we have 1 plant in the model that is 167 MW, and the model then can't go above 3,000.

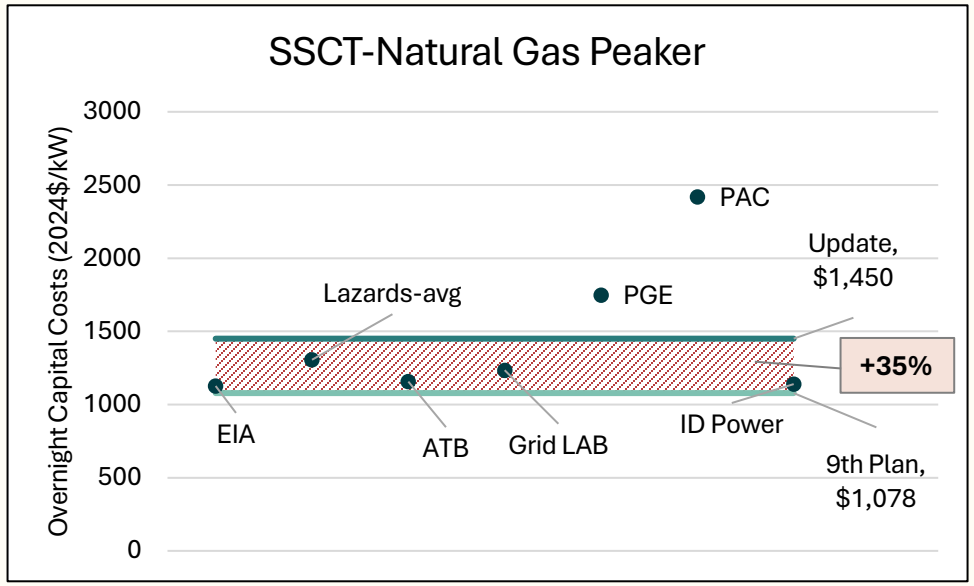
Some Quick Updates on Wind and Gas Prices

3, 10

Comments recommended the Council consider or update the assumed resource costs for natural gas.

- Staff did a quick review of costs
  - These have not gone through the advisory committee process, so please keep that in mind!
- Fed Policy sensitivity provides some insight into how builds change with a greater price differential between these resources
- Staff believe sufficient data exists to help the Council make an informed decision without updated modeling





Renewables and Storage

3, 7

Commenters go in both directions on both renewables and storage, with some wanting more of one or both resources, and others wanting less.

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Constrained World	**6,309**	**12,100**
Wind	*2,541*	*7,749*
Solar	*601*	*0*
Hybrid	*922*	*2,106*
Battery	*2,245*	*2,245*
Lower Data Center Loads	**6,797**	**17,675**
Wind	*1,880*	*7,853*
Solar	*4,900*	*0*
Hybrid	*17*	*5,738*
Battery	*0*	*4,039*

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Transmission Plus	**9,717**	**19,093**
Wind	*3,640*	*9,651*
Solar	*1,673*	*0*
Hybrid	*2,158*	*7,197*
Battery	*2,245*	*2,245*
Changing Fed Policy	**12,728**	**19,711**
Wind	*4,651*	*9,811*
Solar	*3,782*	*0*
Hybrid	*2,050*	*7,656*
Battery	*2,245*	*2,245*

Wind

Wind shows the largest increases in builds between the initial and the new runs. The model is also deploying this resource differently than in the initial runs by concentrating more of it in locations with better capacity factors and sufficient transmission capacity.

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Constrained World	**6,309**	**12,100**
Wind	*2,541*	*7,749*
Solar	*601*	*0*
Hybrid	*922*	*2,106*
Battery	*2,245*	*2,245*
Lower Data Center Loads	**6,797**	**17,675**
Wind	*1,880*	*7,853*
Solar	*4,900*	*0*
Hybrid	*17*	*5,738*
Battery	*0*	*4,039*

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Transmission Plus	**9,717**	**19,093**
Wind	*3,640*	*9,651*
Solar	*1,673*	*0*
Hybrid	*2,158*	*7,197*
Battery	*2,245*	*2,245*
Changing Fed Policy	**12,728**	**19,711**
Wind	*4,651*	*9,811*
Solar	*3,782*	*0*
Hybrid	*2,050*	*7,656*
Battery	*2,245*	*2,245*

Solar

Strategy for solar resources shifts from building a mix of standalone solar to focusing on hybrid resources that bring along batteries. Solar hybrid projects represent consistently around 40% of the renewable builds (with the exception being the Constrained World sensitivity)

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Constrained World	**6,309**	**12,100**
Wind	*2,541*	*7,749*
Solar	*601*	*0*
Hybrid	*922*	*2,106*
Battery	*2,245*	*2,245*
Lower Data Center Loads	**6,797**	**17,675**
Wind	*1,880*	*7,853*
Solar	*4,900*	*0*
Hybrid	*17*	*5,738*
Battery	*0*	*4,039*

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Transmission Plus	**9,717**	**19,093**
Wind	*3,640*	*9,651*
Solar	*1,673*	*0*
Hybrid	*2,158*	*7,197*
Battery	*2,245*	*2,245*
Changing Fed Policy	**12,728**	**19,711**
Wind	*4,651*	*9,811*
Solar	*3,782*	*0*
Hybrid	*2,050*	*7,656*
Battery	*2,245*	*2,245*

Batteries

Modeling is selecting more batteries, but in the form of hybrids. Standalone batteries stay consistent with the model selecting only 2,245 MW by 2032. These are the planned batteries already in the pipeline.

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Constrained World	**6,309**	**12,100**
Wind	*2,541*	*7,749*
Solar	*601*	*0*
Hybrid	*922*	*2,106*
Battery	*2,245*	*2,245*
Lower Data Center Loads	**6,797**	**17,675**
Wind	*1,880*	*7,853*
Solar	*4,900*	*0*
Hybrid	*17*	*5,738*
Battery	*0*	*4,039*

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Transmission Plus	**9,717**	**19,093**
Wind	*3,640*	*9,651*
Solar	*1,673*	*0*
Hybrid	*2,158*	*7,197*
Battery	*2,245*	*2,245*
Changing Fed Policy	**12,728**	**19,711**
Wind	*4,651*	*9,811*
Solar	*3,782*	*0*
Hybrid	*2,050*	*7,656*
Battery	*2,245*	*2,245*

DC Load

The Lower Data Center Loads looks the most different from the initial runs. Initially it was backing off on batteries. This time around, **less renewables** are selected when there are lower loads, and **more batteries** are added. (Note: conservation, DR, and natural gas were the same)

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Constrained World	**6,309**	**12,100**
Wind	*2,541*	*7,749*
Solar	*601*	*0*
Hybrid	*922*	*2,106*
Battery	*2,245*	*2,245*
Lower Data Center Loads	**6,797**	**17,675**
Wind	*1,880*	*7,853*
Solar	*4,900*	*0*
Hybrid	*17*	*5,738*
Battery	*0*	*4,039*

There was a slight difference in methodology between these two

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Transmission Plus	**9,717**	**19,093**
Wind	*3,640*	*9,651*
Solar	*1,673*	*0*
Hybrid	*2,158*	*7,197*
Battery	*2,245*	*2,245*
Changing Fed Policy	**12,728**	**19,711**
Wind	*4,651*	*9,811*
Solar	*3,782*	*0*
Hybrid	*2,050*	*7,656*
Battery	*2,245*	*2,245*

Long-Duration Energy Storage

- More long-duration energy storage was selected in the modeling
- Reminder, this is one of the emerging tech proxy plants, which was not initially included in the strategy because it is still considered an emerging technology

Sensitivity	Buildout by 2032 (MW)	
	Initial Runs	New Runs
Transmission Plus	20	570
Tx Plus w/ Updated Ramp	n/a	530
Changing Fed Policy	260	322
Lower Data Center Loads	0	531

Pg. 7

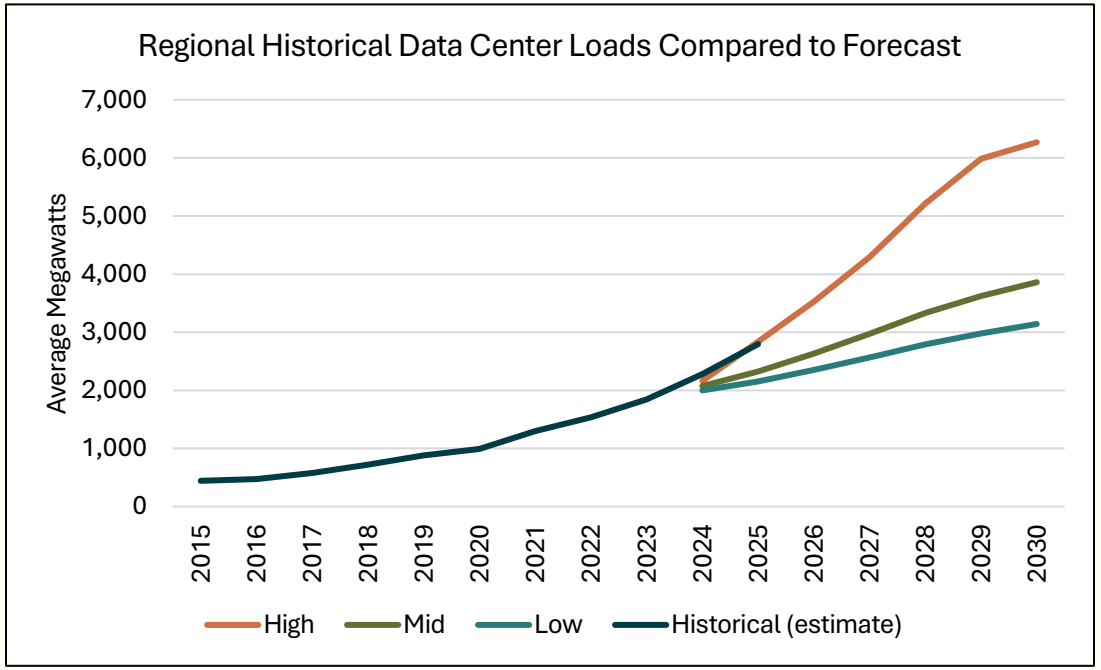
Commenters recommend the Plan encourage long-duration energy storage, with one commenter recommending it be located near assets that experience renewable droughts.

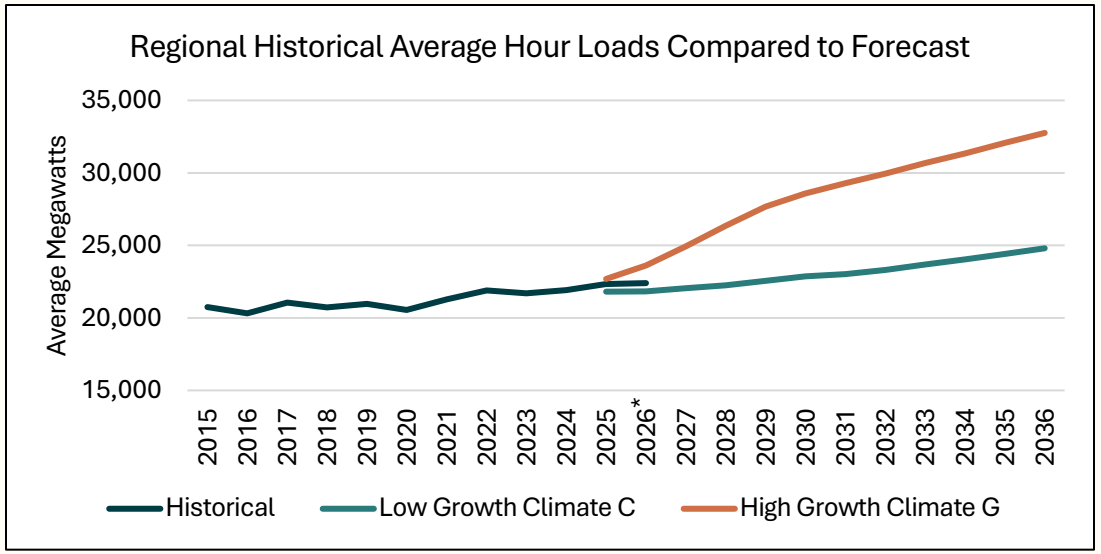
Avoid Over and Under Building

Pg. 8

Comments cautioning against overbuilding of resources, with some of this focused on natural gas, while others cautioned against underbuilding.

- Some analysis shows recent loads are tracking within the Council forecast
  - Data centers track towards the high forecast
  - Regional average hourly loads are within the range, tracking towards the lower portion
- Staff cautions over-reading this with only a couple years of data





*2026 data are through October 31st

More Comments Connected to Strategy

Pg. 9

Recommendations to revisit the environmental methodology or approach to environmental quality to include more assumptions

Pg. 10

Recommendations to revisit resources costs for one or more resources (gas, gas prices, rooftop solar, renewable cost curves, etc.)

Pg. 10

Recommendations to revisit the market reliance limit, with some wanting it to be higher, others lower, and another recognizing the risk in both directions

Pg. 11

Recommendations to revisit the transmission and distribution deferral value used in the conservation analysis

Pg. 12

Recommendations around how to think about transmission development and its connection to the strategy

More Comments Connected to Strategy

Pg. 12

Commenters spoke to the environmental impacts of the proposed renewable builds, and considerations around that for the strategy.

Pg. 13

Commenters asked the Council to highlight the importance of early consultation with states, tribes, and others in siting new resources and transmission.

Pg. 13

Commenters focused on concerns around the modeling of hydro flexibility recommending the Council assume less, but for differing reasons (note: this connects to modeling topic)

Pg. 14

Commenters spoke to the size of the overall resource builds, with one commenter providing suggested near-term actions to hedge against the risk of being able to build at pace.

Pg. 14

Commenters provided recommendations around the role of data centers in the development of resources, with one wanting a requirement of renewables for data centers

Pg. 15

Several other comments were submitted that touch on aspects of the narrative that could support the strategy.

Next Steps in Working Towards an Updated Resource Strategy

- Staff have scheduled some additional meetings to walk through staff's model updates and new analysis
  - **November 20, 10-3 Pacific:** RAAC/SAAC meeting to provide time for follow-up question on hydro updates and share out updated modeling results
  - **November 20, 3-4 Pacific:** Open webinar to provide space for broader community to ask questions regarding these new updates
- Council has time at its December meeting in Portland to go deeper in any area of the results and proposed strategy
  - This might include some options for how the strategy could be updated in light of the updated modeling and considerations raised in public comment

Agenda:

1. Overview of Public Comment

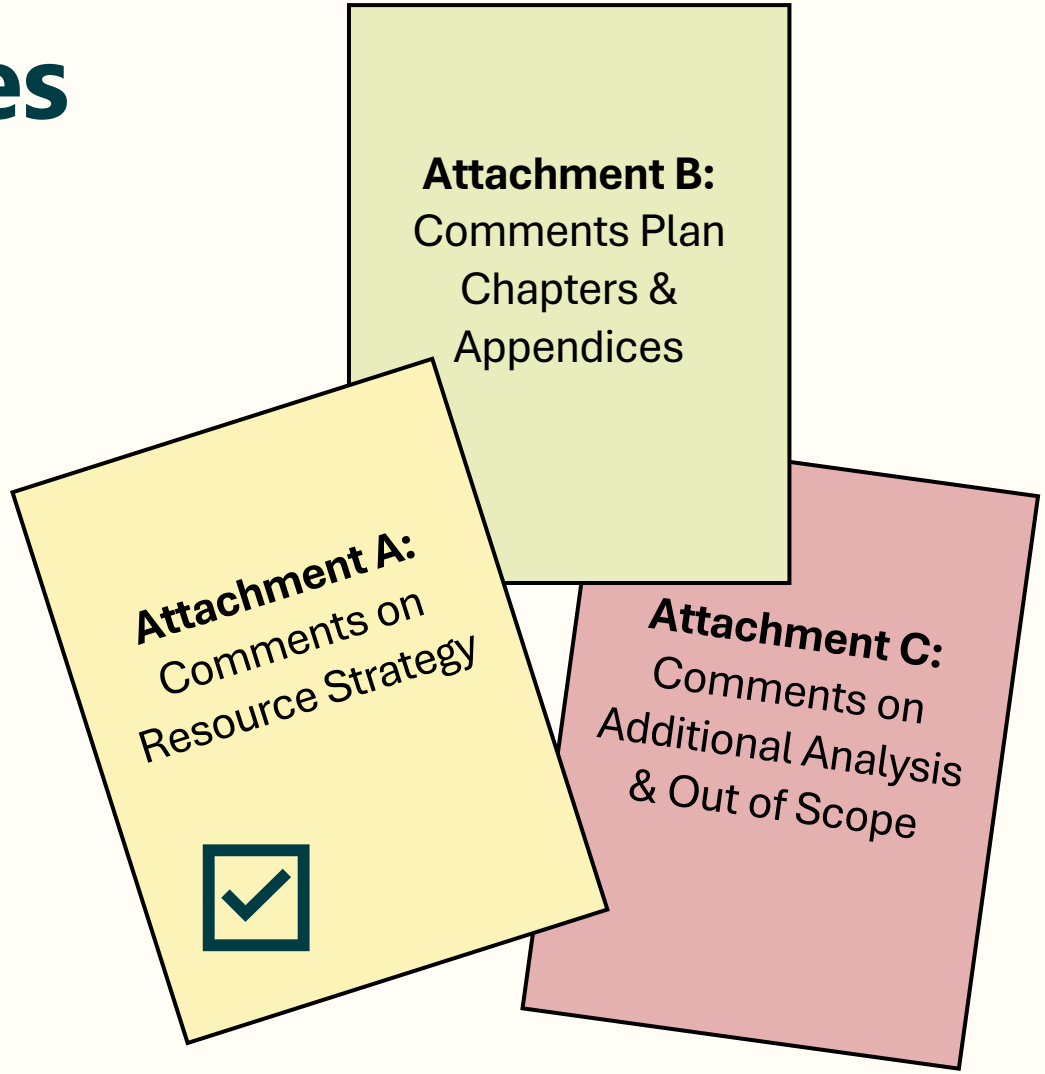
2. Deep dive into the modeling since close of public comment:
   - GENESYS model setup issue and resolution
   - Staff recommendation for next steps with GENESYS
   - New OptGen results and discussion of public comment on resource strategy

3. Discussion of broader set of public comment on the draft Ninth Plan



More Comment Summaries

- We worked through the comments around the strategy, as captured in Attachment A
- Now we will step through the next two attachments, getting as far as we can with the remaining time that we have at this meeting



Upcoming Council Meetings

Month	Council Agenda Item	Time Est.
December 2 (Webinar)	If needed to continue reviewing public comment	TBD
December 15-16 (Portland)	Continued discussion around updated results and next steps in developing another draft of the Ninth Plan: • Deeper discussion on results (as needed) • Staff proposal for potential revision to strategy (if ready) • Staff recommendations for changes to document in response to comments	6 hr min.
January 12-13 (Portland)	Continued discussion around development of the resource strategy and plan language *(Note: there are only 3 weeks between the December and January meeting. Between that and the holidays, staff do not anticipate the discussion will be on new information as much as continuing to build on the December discussion.)*	1-4 hrs?
February 9-10 (Portland)	Potential release of second draft of Ninth Plan	1-2 hrs

Public Comment and Finalizing a Plan

Month	February Draft 2 Release (45 day)	February Draft 2 Release (60 day)
Release Draft 2	February 9-10 Meeting	February 9-10 Meeting
Public Comment Period	45-day	60-day
End of Public Comment	End of March	Mid April
Review Comments (initial)	April (maybe added meeting)	May 11-12 Meeting
Review Comments + Discuss Changes	May 11-12 Meeting	Late May (added meeting) or June
Potential Adoption of Final	May or June	June or July