



MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

Rely on us.

TO: Commissioners McRae, Barofsky, Schlossberg, Brown, and Carlson

FROM: Brian Booth, Chief Energy Resources Officer; Megan Capper, Energy Resources Manager; Jonathan Hart, Power Planning Supervisor; Emily Tozier, Senior Energy Resource Analyst

DATE: March 29, 2024

SUBJECT: 2024 Power Market, Budget Hedging and Generation Update

OBJECTIVE: Information Only

Issue

The purpose of this backgrounder is to provide an annual update of wholesale power markets and a generation resource outlook.

Background

The Energy Division, which is comprised of the Power Planning and Trading Operations Departments, manages EWEB's power supply and wholesale market activities consistent with utility financial objectives in accordance with Board Strategic Direction Policy SD8, and as further described in the Power Risk Management Procedures (Procedures) maintained by the Power Risk Management Committee (RMC). The Generation Department manages EWEB's owned generation assets.

Summary

Wholesale power market prices have declined from their highs in 2022/2023. This change is primarily driven by decreasing natural gas prices in the west. Natural gas generators have historically determined the price at which electricity markets settle, but new resource development in the region is coming from non-dispatchable resources like solar and wind. This transition in the balance of dispatchable vs as-run resources in the west is changing market dynamics. So, while EWEB expects lower electric prices in 2024, staff anticipate continued periods of price volatility during periods of high load or constrained resource operations, the recent and local January ice storm as an example. EWEB continues to participate in, and implement, the non-binding phase of the Western Power Pool's (WPP) Western Resource Adequacy Program (WRAP), which aims to address forecasted capacity scarcity by creating a set of shared standards and practices to ensure regional reliability and market liquidity. Staff are working to modernize EWEB's 5-year hedging program to better align with, and incorporate, these new Resource Adequacy standards into EWEB's overall portfolio hedging strategy.

Generation continues efforts at various EWEB owned projects related to implementation of the Carmen Smith license, developing a decommissioning plan for Leaburg and strategic evaluation of Walterville, and investigating/monitoring for existing or emergent dam safety issues, and adjusting operational plans to align with hydrologic conditions in the Northwest. The Stone Creek Hydroelectric, International Paper TGU#4, and Harvest Wind Projects continue to operate normally and are expected to do so throughout 2024. This update for markets and generation is reflected in our current financial projections.

Discussion

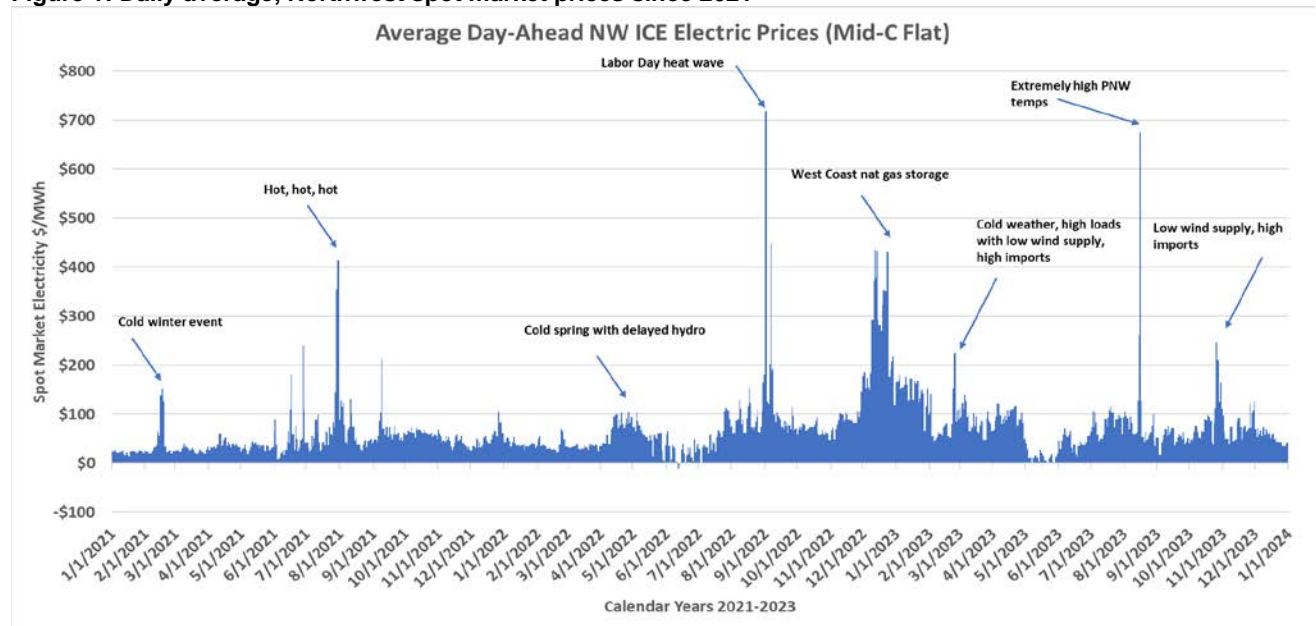
Market Price Update

Wholesale energy markets can generally be described as either near-term “spot markets” or longer term “forward markets”¹. Spot market prices are impacted by weather (e.g., temperature and precipitation), fuel costs, and operational phenomena (e.g., generation and transmission availability), while forward markets tend to reflect longer term market expectations of energy supply and consumer demand. Both forward and spot markets can influence the cost of balancing EWEB’s energy portfolio in annual, monthly, daily, and hourly time frames.

Spot Markets

In recent years, the WECC² region, including the Pacific Northwest (Northwest), have seen continued generation additions from renewable resources like wind and solar, and incremental retirements of conventional, thermal resources like coal and nuclear. This shift in the composition of regional generation has increased the abundance of low and zero cost marginal energy while, at the same time reducing the amount of controllable capacity resources available to meet demand during high load periods³. This has resulted in recent spot markets that can be characterized as periods of generally low/stable prices, interspersed with short, intense periods of extremely high and volatile pricing. Because the Northwest is interconnected with other parts of the WECC Region (e.g., with and through California) and experiencing similar changes in regional supply mix⁴, it is exhibiting similar trends in local spot market and forward market pricing.

Figure 1: Daily average, Northwest spot market prices since 2021



3 Spot markets typically refer to markets where commodities are traded for immediate (next day, next hour) delivery, whereas forward markets imply markets where the traded commodity is delivered in a future period.

4 Western Electricity Coordinating Council.

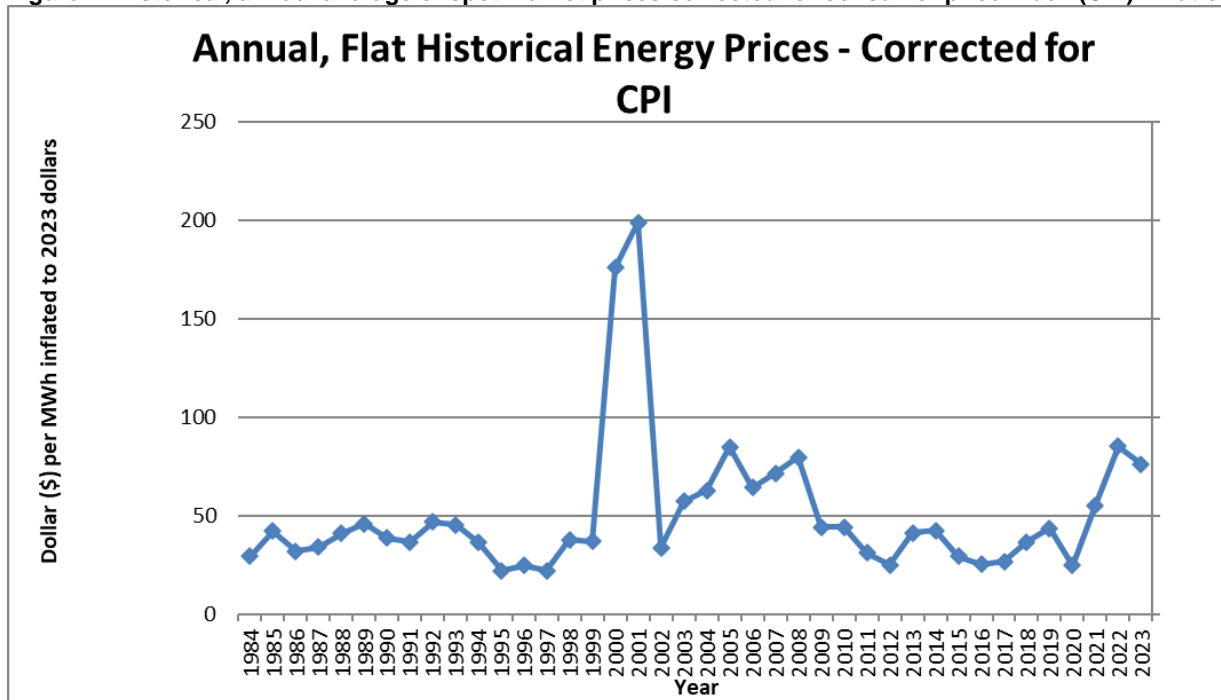
5 Market penetration of capacity only resources (i.e. batteries) is growing, but still limited. As such, the current fleet of renewable resources can only replace a portion of the effective capacity of now retired thermal resources.

6 <https://www.nwccouncil.org/energy/energy-topics/power-supply>

Spot Market Drivers: 2021 and 2022 experienced a variety of load and resource changes, which resulted in general increases in both average price and price volatility. In February 2021, prices surged during a nationwide cold weather event, which drove up demand for energy while limiting the supply of natural gas. During spring and summer months the west experienced high prices and volatile markets, driven by low water supply conditions and limited hydroelectric generation (hydro), high natural gas prices, and high loads from an unprecedented heat dome event. High natural gas prices continued to prop up electricity prices on the West Coast for the remainder of the year, despite a return to mild weather. 2022 included longer duration price events that cycled over weeks instead of days. The 2022 Northwest trading hub was trading over California hubs due to both hydro and natural gas systems' inability to keep up with the unusual demand at that time of year. This was partially related to multiple gas generators in the Northwest going offline, and a chillier region. In late summer, the Northwest experienced heat spikes, increased load, and dwindling hydro. The 2022 average settled price was \$82, which was the highest average price since 2004.

2023 prices started high, relative to 10-year historical norms, driven primarily by scarce natural gas storage in the Western region. Though January Henry Hub (national gas) prices averaged \$3.27, the northwest local gas prices surpassed \$48 per MMBtu, which had a large impact on Northwest electric energy prices. Pricing remained strong during the spring, but began to soften, and appeared less volatile when compared to the prior year. Despite a general return to more familiar price levels, there were still periods of short-term price volatility. The highest hourly peak prices of 2023 were over \$1000 per MWh on August 16, as the entire Pacific Northwest experienced an extremely warm weather event. During this time, observed temperatures at Portland International Airport reached 108 degrees Fahrenheit. In late October, prices surged again due to a combination of colder temperatures, reduced generation capacity at the Columbia Generating Station, low regional wind output, and constrained hydro operations. After the event, prices were relatively stable until the start of the new year.

Figure 2: Historical, annual average of spot market prices corrected for consumer price index (CPI) inflation



Forward Markets

Forward market prices for 2024 are currently trading above 2023 spot market prices, at close to \$84/MWh for the year, but at lower levels than were anticipated (for 2024) this time last year. The reduction appears to be coincident with the lower cost of natural gas fuel supplies for generators. Though natural gas prices have moderated, natural gas prices are still generally higher than periods before 2022, as there are still continued effects from increased US LNG exports to Europe and other regions impacted by the Ukraine war and reductions in Russian natural gas exports⁵. Elevated natural gas prices, changing regulatory policy, the shift in regional load resource balance, and general uncertainty surrounding physical resource adequacy create upward pressure on forward prices which is why they continue to exhibit price levels that are higher than periods before 2022.

Natural gas: January 2023 saw historic highs in natural gas prices due to increasing global exports, lagging production, and low levels of gas storage in the west. Natural gas prices moderated as west coast storage recovered during a period of strong production⁶, increased storage capacity, and mild weather. The U.S. Energy Information Administration (EIA) forecasts that natural gas commodity prices should hold at the current, relatively stable, level through the end of 2025⁷.

Carbon Policy: Emergent Carbon policy, including the Washington Climate Commitment Act (CCA), continues to have a direct impact on Northwest energy markets. The most recent carbon allowance auction (March 2024) included 7.4 million allowances sold at a settlement price of \$25.76. This price is nearly half of settled auction prices seen in 2023, likely due to an initiative to link the WA carbon market to lower priced markets in California and Quebec. Since Northwest power trading can carry carbon liability, it is assumed that the cost of compliance is embedded in power market prices, though the total dollar impact has yet to be determined.

Regional Resource Mix and Resource Adequacy: In 2020, renewable resources became the second most abundant source of electric generation in the United States⁸, surpassing sources of controllable thermal energy like coal and nuclear. Further for 2024 and 2025, the largest forecasted increase in resource capacity is expected to come from renewable resources⁹ and batteries¹⁰. In regions with high levels of renewable penetration, market prices can experience drastic swings with changes in the level of renewable energy production. Batteries can help with short-term, in-day volatility, but the technology has not progressed to the point of addressing multi-day load and resource balance concerns. When combined with load variability and hydro uncertainty, these factors prompt concerns about general market scarcity, leading market participants to consider adding risk premiums in their bilateral pricing to address increasing levels of potential physical scarcity risk.

5 [Russia's natural gas pipeline exports to Europe decline to almost 40-year lows - U.S. Energy Information Administration \(EIA\)](#)

6 [Natural gas prices fall in first half of 2023 amid record production and mild temperatures - U.S. Energy Information Administration \(EIA\)](#)

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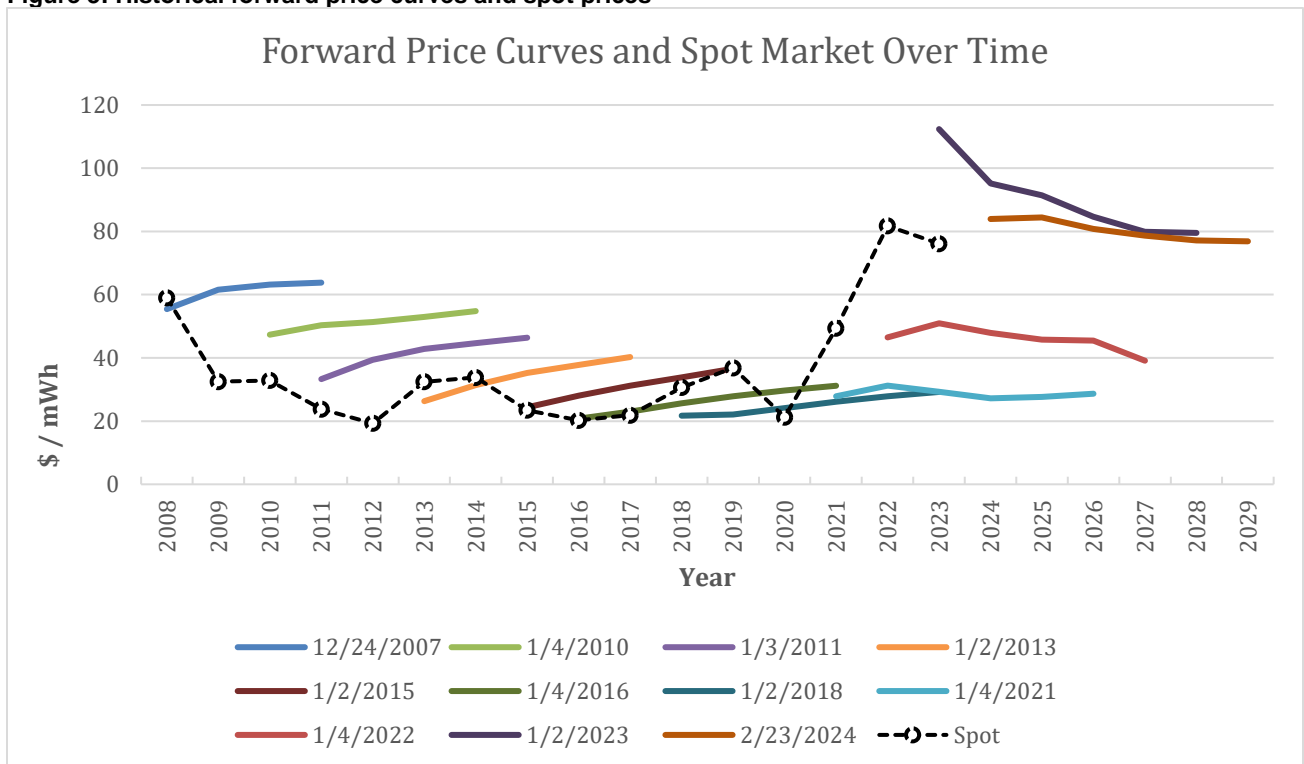
8 [U.S. electric capacity mix shifts from fossil fuels to renewables in AEO2023 - U.S. Energy Information Administration \(EIA\)](#)

9 <https://www.eia.gov/todayinenergy/detail.php?id=55239>

10 <https://www.eia.gov/todayinenergy/detail.php?id=54939>

Figure 3 below shows both forward market price curves and spot market prices over time. A forward curve reflects prices for future periods of delivery, which can be traded today. The first blue line on the left reflects a forward curve taken at the end of 2007 and subsequent lines reflect changing forward price curves for the years that followed. For the period of 2008 - 2020, forward market price curves experienced a period of consistent declining value. However, since 2021, changes in natural gas price forwards as well as changes in regional policy have caused electric market price curves to jump drastically, and now reflect some of the highest pricing seen since the 2001 West Coast energy crisis. The February 23, 2024, curve reflects moderation from the previous year, with prices from 2024 through 2029 currently projected to be flat to moderately declining.

Figure 3: Historical forward price curves and spot prices



Resource Adequacy

EWEB continues to actively participate in the Western Power Pool's (WPP) RA effort. Last year, the Federal Energy Regulatory Commission (FERC) approved the tariff for the Western Resource Adequacy Program (WRAP), which means that the WPP can complete the implementation of the program. As such, the program has begun the transition from a "non-binding" implementation to a "binding" paradigm where the tariff dictates how the program operates.

To date, 23 entities including EWEB have signed on to participate in the next phase of the WRAP program. EWEB sees several benefits to program participation. Externally, we want to provide continued support for the development of new resource adequacy standards and want to be able to advocate for business practices that reflect the capabilities of EWEB's resources and transmission rights. Internally, we want to gain insights for how well EWEB's portfolio aligns with these new standards. Those learnings will inform operational changes as well as assumptions included in our IRP modeling.

Much of the work in the next year will be to provide testing to the various data communications that will make the program work. This includes gathering and transferring of actual EWEB data to the program operator, submitting forecasts of generator outages and loads to the program operator, the transfer of analysis results from the program operator to EWEB planning, and operational transfer of data between EWEB and the system operator as the program moves into the operational timeframe.

As a participant, EWEB has elected to not be "bound by the tariff"¹¹ until Summer of 2028, near the start of the next BPA contract in October of 2028. Since the majority of EWEB's resources come from BPA, it is integral that future BPA products align with WRAP, or its successor, before EWEB fully commits to the program. Should EWEB determine that the WRAP program is not a good fit, or it is misaligned with our BPA product decision, withdrawal is allowed with two years notice. Until such time, EWEB is still committed to fully participating in the planning and operational communications efforts of the program.

Surplus Position Hedging Update

In accordance with EWEB's Risk Management Procedures, Staff hedges¹² a portion of its surplus position¹³ up to five years in advance. In years past, this has provided two benefits: 1) it has reduced financial exposure related to market prices; and 2) it has resulted in sales executed at various times which diversify the sales price by "dollar cost averaging" through time. This strategy resulted in near-term years being fully hedged while year five is the least hedged, with interim years somewhere in between. EWEB does not hedge any surplus energy beyond five years.

An effort is underway to modernize EWEB's approach to budget hedging and portfolio balancing activities. This effort recognizes that EWEB's portfolio needs are changing and that current market dynamics may require adjustment to existing hedging goals, requirements, strategies and metrics. Until this effort has completed, budget hedging activities will primarily be focused on nearer years, though RMC will continue to monitor for emergent needs in all five years. Staff expect most of the length of 2025 to be hedged in the next couple months. After that, the focus will shift to 2026.

11 Subject to the full requirements of the tariff including operational requirement and penalty structures for non-performance.

12 A hedge is a trade, or set of trades, that reduces the market price exposure risk inherent in EWEB's portfolio length. EWEB hedges to provide greater wholesale revenue certainty.

13 Surplus position is an amount of energy that staff forecasts will not be needed to serve EWEB's customers and is therefore exposed to changes in market price. For 2025-2026 there is about 47 aMWs of surplus compared to EWEB's load of about 276 aMWs

Figures 4 and 5 below show EWEB's surplus market peak and off-peak positions for 2025 and 2026 based on a budget hydro assumption of 90% of expected hydro generation. For each chart, the top of each stacked column indicates EWEB's original surplus market position (i.e., the amount of forecasted generation EWEB expects to realize in excess of that which is forecasted as being necessary for reliable load service). The white and red/blue column segments represent the volume of energy risk already hedged by Staff. The solid red/blue column segments represent the remaining unhedged surplus. The black and red/blue column segments reflect energy that is reserved by the RMC for strategic management of seasonal risk. The gray area behind the stacked columns reflects EWEB's expected surplus, without the conservative hydro assumption.

Figure 4: Peak Budget Hedging Progress

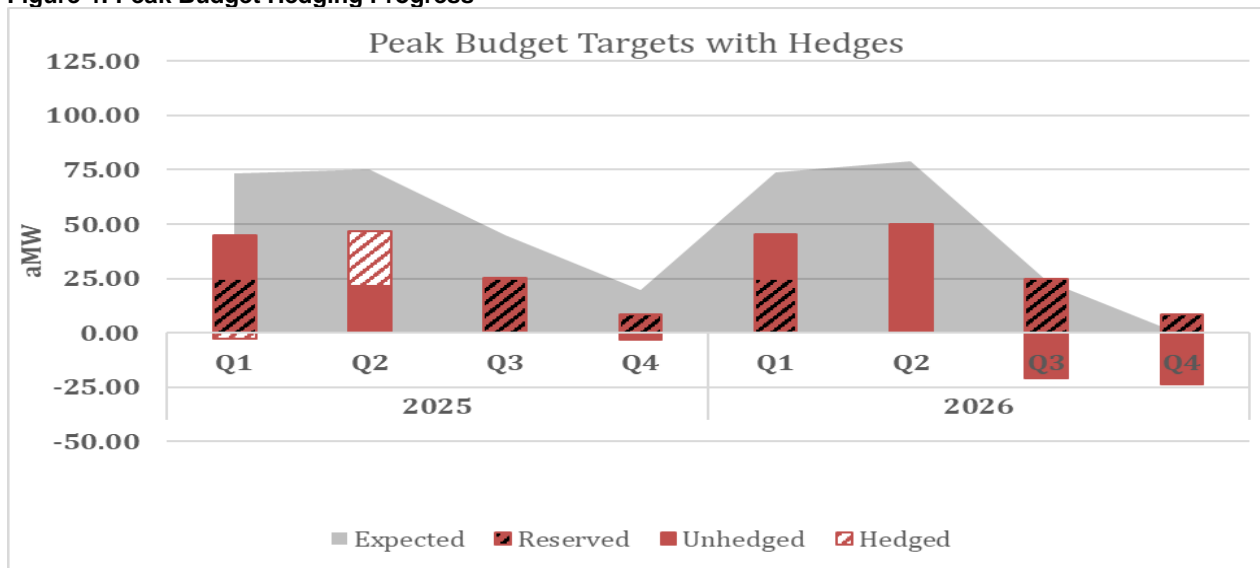
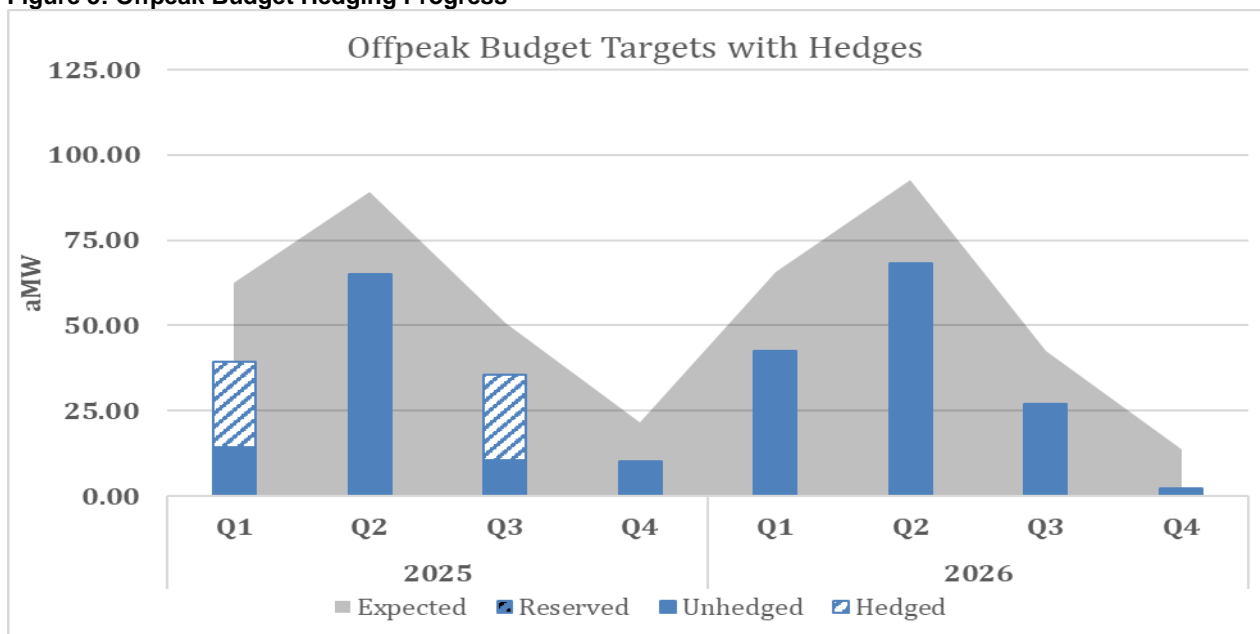


Figure 5: Offpeak Budget Hedging Progress



EWEB-Owned Generation Update

EWEB McKenzie Hydro Projects:

Refurbishment of the first turbine-generator unit at the Carmen Power Plant continued in 2023, though contractor delays pushed back the projected return-to-service date to early 2024. The second Carmen unit will continue to operate until the first unit comes back online. The second Carmen unit overhaul is now expected to start in summer 2024 and be completed by early 2026.

Also, at the Carmen-Smith Project, there was progress on environmental and recreational improvements in 2023. EWEB coordinated with State and Federal fish agencies to complete the temporary trap and haul facility to move Chinook salmon from the recently improved spawning channel below Trail Bridge Dam up into Trail Bridge Reservoir. This interim effort creates an opportunity for spawning above the dam prior to construction of the permanent trap and haul facility. These types of interim efforts became increasingly important as the overall fish passage work plan experienced further schedule delays related to the May 2021 discovery of sinkholes in Trail Bridge Reservoir. The investigation to determine root causes and critical details on the sinkhole formation mechanisms is ongoing. The geotechnical field report was completed in the Fall of 2023 and reviewed by the Board of Consultants (BOC) at meeting No. 04. The BOC recommended an additional potential failure mode (PFM) be evaluated, which will be included in the Sinkhole Evaluation Report that will be completed in April of 2024. Additionally pursuant to BOC & FERC recommendation/requirements EWEB is planning to hold a Semi-Quantitative Risk Assessment (SQRA) workshop for the Trail Bridge sinkholes and trap & haul construction PFMs in July 2024, review the SQRA report in an October 2024 BOC meeting, update the report as per BOC recommendations, and submit the final report to FERC by December 31, 2024. Findings from these investigations will determine if the planned fish passage improvements can safely proceed or if they will need to wait until sinkhole remediation work is complete.

The Leaburg power canal and power plant had been offline since October 2018 due to dam safety concerns. Based on the Board's decision, Staff developed a decommissioning action plan in 2023 while also pursuing near-term risk reduction measures to mitigate dam safety concerns that remain even with the power generation facilities offline. Staff presented the Leaburg Decommissioning Action Plan (LDAP) at the January 2024 Board meeting and received approval to begin implementation of the same. The geotechnical drilling program plan (DPP) that will support near-term risk reduction and initial decommissioning planning was submitted to FERC in March 2023 and their review is expected to be completed in 2024.

The Walterville Hydroelectric Project continued to operate reliably throughout most of 2023, managing to continue operation through the late summer and early fall despite relatively low river flow conditions, however, power generation was impacted by high river flows in late fall and was taken offline for approximately two weeks. Walterville generation disruptions associated with the ice storm and subsequent high river flow conditions in early 2024 were followed by an excessive seepage dam safety event at the power plant's forebay in late February. Current understandings are that forebay repairs will take many months for design, regulatory approvals, and construction. Additional Walterville investigations to support updated dam safety analyses continued and an independent consultant completed the 5-year dam safety inspection report for their inspection work that took place in 2022. The final inspection report was submitted to FERC on May 1, 2023. Geotechnical drilling occurred at Walterville in 2023 to investigate seepage concerns at the forebay and evaluate seismic stability of the canal at high hazard locations. The subsurface data that was collected is being used for various analysis tasks that are currently in progress. An element of the Board's resolution to decommission the Leaburg Project was a directive to complete a strategic evaluation of the Walterville Project by 2030 that will help inform a Board decision on whether to relicense or decommission. The Walterville Strategic Evaluation timeline was incorporated into the LDAP and is expected to begin in late 2024.

Following a relatively wet and cold start of the year, current 2024 river flow forecasts are trending around average for this spring/summer on the McKenzie below Trail Bridge and at Vida. Recent changes to the Army Corps' reservoir operations will continue and are anticipated to result in slightly lower-than-normal summertime flows in the lower McKenzie, affecting expected generation at the Walterville Project. The Corps' operation changes would affect expected generation at the Walterville Project, but the Project will most likely need to remain out of service through the summer regardless due to a dam safety concern that arose at the power plant's forebay in late February. Staff will monitor flow forecasts through mid-April to determine whether low flow mode operations will be required if the unit is not out of service. An update to the Board will be included in the May Board meeting materials.

Other EWEB Owned Projects:

During 2023 operations a Minor Turbine Overhaul was performed at the IP TG4 in April-May, the Newell Road Wildfire prompted the proactive shutdown of the Harvest Wind Site in July until the fire and smoke dissipated, and the Harvest Wind site was shut down in May for the rebuild of the Rock Island Substation by the Klickitat Public Utility District (KPUD).

Both Stone Creek and Harvest Wind are scheduled to have typical maintenance outages this year. A planned switchgear replacement for the International Paper TG4 is scheduled for May of 2024 concurrently with the mills Total Mill Outage. The Harvest Wind project may be impacted by a potential KPUD substation outage in 2024 however, the scope/duration is not yet defined. No other significant capital improvements are currently planned to take place in 2024.

Stone Creek Hydroelectric, International Paper Turbine Generator, and Harvest Wind continue to operate normally and are expected to do so throughout 2024.

Recommendation and Requested Board Action

This item is information only and no Board action is requested.