MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

Rely on us.

TO:	Commissioners Schlossberg, Brown, Carlson, Barofsky, and McRae
FROM:	Susan Ackerman, Chief Energy Officer
DATE:	April 6, 2021
SUBJECT:	2021 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 Power Planning and Trading Operations sections manage EWEB's power supply and wholesale market activities consistent with utility financial objectives, in accordance with Board Policy contained in SD8, and as further described in the EWEB Energy Risk Management Procedures. Generation manages EWEB's owned generation assets.

Summary

Wholesale markets averaged near historic lows in 2020, with the exception of a short period of volatile pricing during the summer period. For 2021 and beyond, staff expects market prices to remain low, but recognizes there can be regional supply/demand stress events, leading to periods of price volatility, which may impact purchased power costs and wholesale energy sales.

Maintenance and repairs continue at several EWEB generation facilities. Where necessary, repairs are being coordinated with FERC. A wet and cold February improved Oregon hydrologic conditions to near normal levels, but periods of repair and maintenance will likely result in less generation than is historically expected.

This update for markets and generation is reflected in our current financial projections.

Discussion

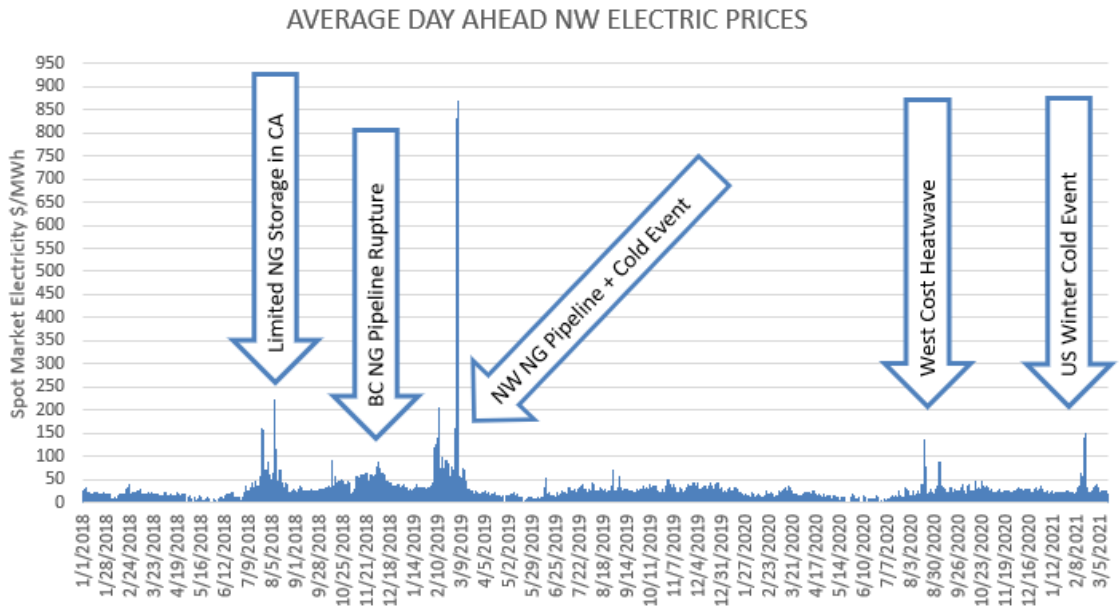
Market Price Update

Wholesale energy markets can generally be described as either near term "spot markets" or longer term "forward markets"[1]. For spot markets, prices are impacted by weather (e.g., temperature and precipitation) 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

Over the last couple years, the WECC[2] Region has seen continued additions of low/zero marginal cost renewable resources like wind and solar, and incremental retirements of conventional, thermal resources like coal and nuclear[3]. As such, during most times of the year there is abundant low/zero marginal cost energy available in the market. However, the region's capability to respond to changes in the region, like a peak load event or unforeseen generator/transmission outage, has diminished. Currently, new renewable resources can only replace a portion of the effective capacity of now retired thermal resources. This has resulted in recent spot markets that can be characterized as long periods of historically low 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., California) and experiencing similar changes in regional supply mix[4], we are seeing similar trends in local spot market and forward market pricing.

Figure 1: Daily average, Northwest spot market prices since 2018



[1] 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.

[2] The Western Electricity Coordinating Council.

[3] https://www.eia.gov/todayinenergy/detail.php?id=46436

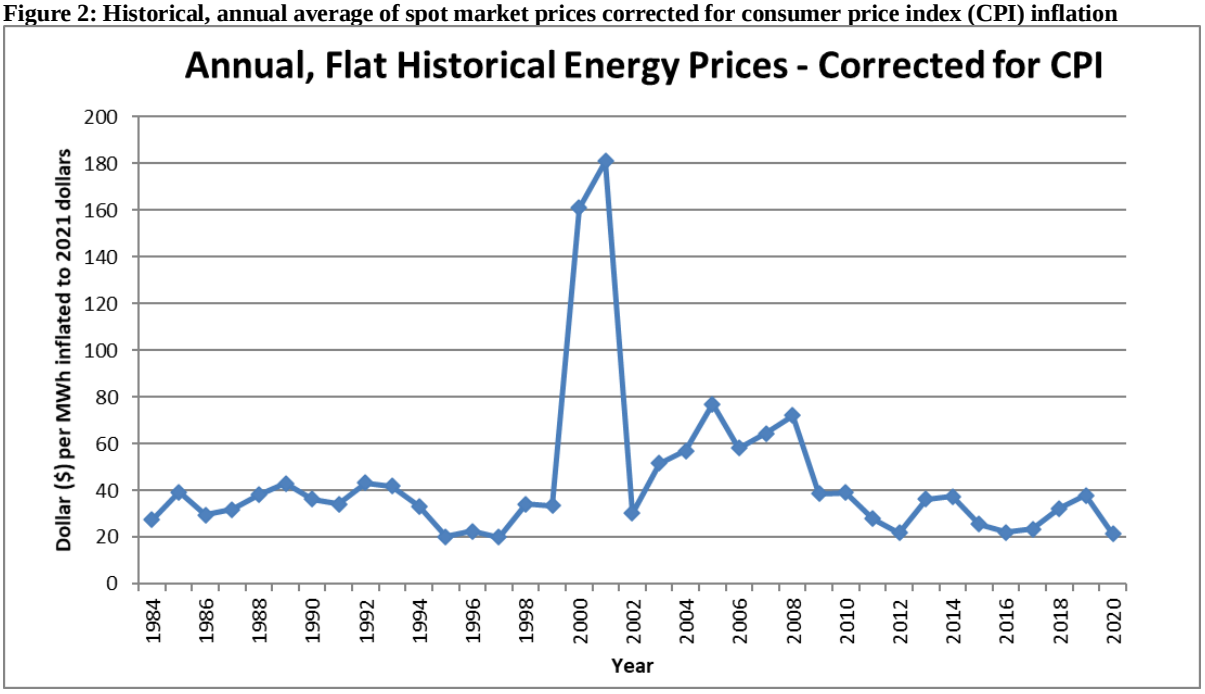
[4] During 2020, coal plant retirements in Oregon, Washington and Montana accounted for 1,834 MWs of reduced base load capacity. *https://www.nwcouncil.org/news/coal-retirements*.

During 2018 and 2019 the northwest experienced several high-priced market events. These events were mainly attributed to natural gas shortages caused by various natural gas transmission and storage issues. These shortages drive up the cost of natural gas, which in turn drives up the marginal cost of electric generation used to serve demand in the spot market. Overall spot market prices in 2018 and 2019 averaged approximately $31/MWh and $37/MWh respectively.

Though 2020 didn't include a major disruptive gas event like 2018 and 2019, we did experience a historic west coast heat event that resulted in rolling blackouts in California for the first time since the 2001 energy crisis. The event lasted several days during which northwest day-ahead prices peaked at $136/MWh. Aside from this event, spot market prices in 2020 were relatively stable. The 2020 average, annual spot market price finished near historical lows at approximately $21/MWh, substantially below the settled averages of either 2018 or 2019.

In February 2021, the northwest spot market saw another surge in prices as a nation-wide cold weather event drove up demand for energy and as such, the daily price of traded gas. This resulted in a week-long price event, causing electricity markets to jump from approximately $25/MWh to over $150/MWh.

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



Forward Markets

Current forward market prices are projected to be higher than 2020 spot market prices. The shift appears to be driven by anticipated recovery in demand for both electric and natural gas energy sources. The U.S. Energy Information Administration ("EIA") forecasts that Henry Hub[5] natural gas commodity prices will stay relatively flat through 2022[6]. As such, staff anticipates that forward power markets will continue to remain flat but marked with volatility during periods of system stress. For example, current forward markets show the highest prices during summer

[5] Henry hub (located in Louisiana) is the physical delivery point for natural gas traded on the NYMEX and ICE. As such, it generally serves as the primary benchmark reference for US natural gas commodity prices.

[6] https://www.eia.gov/todayinenergy/detail.php?id=46456

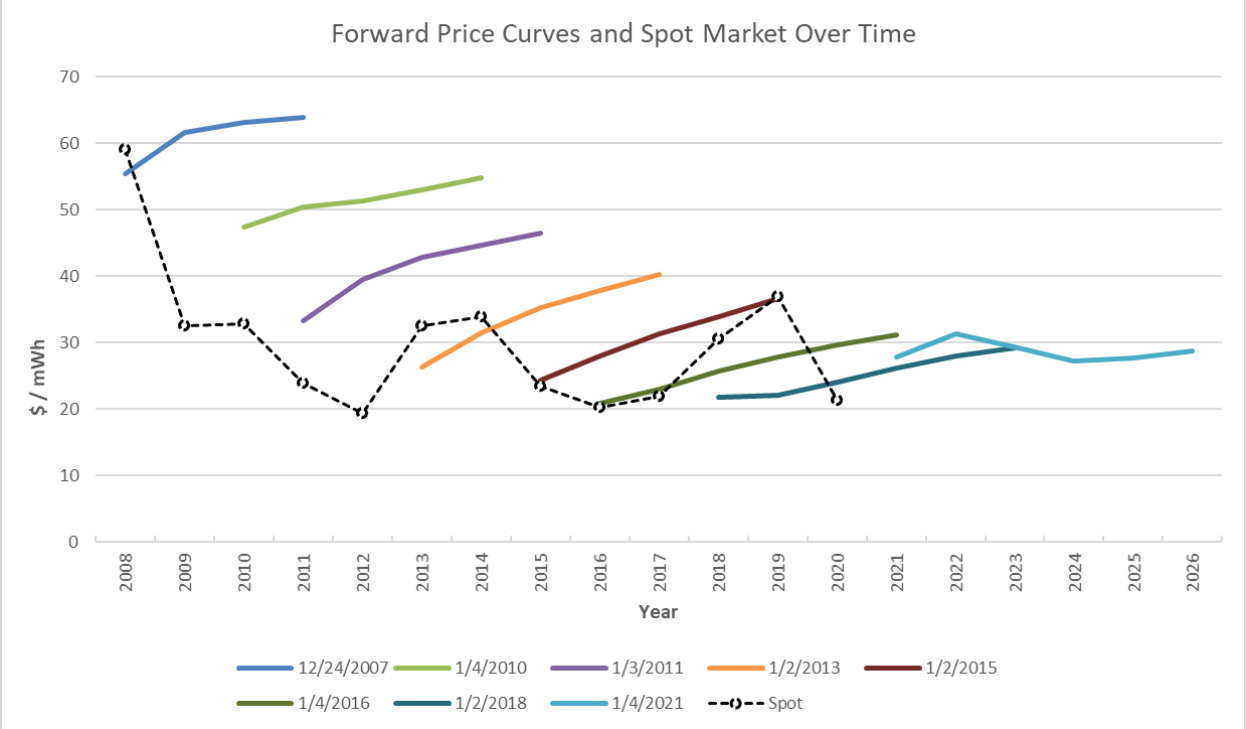
($70/MWh for Aug '21 Peak[7]) and winter ($45/MWh Dec '21 Peak) months. This shape in seasonal pricing largely mirrors the spot market history experienced over the last couple of years.

Forward markets do not account for emergent policy issues like the development of new, complementary markets such as energy imbalance, capacity, and carbon, which are expected to trade outside of traditional energy markets. The value of these emergent markets to EWEB will largely be a function of implementation. As such, staff continue to take a proactive advocacy role in all relevant regional conversations.

Finally, forward market prices are subject to change with emergent conditions. Some recent factors that are driving market uncertainty include electrification efforts (e.g., transportation and space heating), the strength of the US economy, the impact of and projected recovery from the COVID-19 pandemic, and the global oil trade (which is highly correlated with domestic natural gas production).

Figure 2, 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 at today. The first line reflects a forward curve taken at the end of 2007. The subsequent lines reflect changing forward price curves for the years that followed. For over a decade, forward market price curves experienced a period of consistent declining value. Currently, forward market curves reflect low and flat annual pricing.

Figure 2: Historical forward price curves and spot prices



7 Generally, "Peak" or "on-Peak" refers to a daily 16-hour period that coincides with the greatest amount of electrical energy usage, and the highest marginal cost of energy. https://www.naesb.org//pdf/weq_iiptf050504w6.pdf

Resource Adequacy

The periods of volatility experienced in both spot and forward markets are a function of the region's ability to maintain Resource Adequacy[8] (RA). In October 2019, staff sent correspondence to the Board which provided a background and context for the issue. The correspondence stated that staff believe that EWEB has access to adequate resources to serve their customers. However, it also noted that given the risk and impact of RA to EWEB's customer owners, that it is in the best interest to support and influence a coordinated approach to managing RA on a regional level. Since then, EWEB has actively participated in the Northwest Power Pool (NWPP) led effort to develop a shared set of standards, and a voluntary RA market, designed to promote cost effective resource adequacy for the entire region. A high-level introduction to Resource Adequacy can be found on BPA's website[9].

Questions have arisen as to whether a NWPP RA program will mean the region will avoid the kind of supply disruptions and customer outages that California experienced in the summer of 2020, and that Texas experienced this past winter. The direct answer is "not necessarily." The NWPP RA program is intended to more cost-effectively serve the region's capacity critical load hours, assuming 1-year-in-10 peak weather events. California and Texas experienced *very* extreme weather events (extreme heat in California, and extreme cold in Texas) that resulted in inadequate supply given the associated demand. No utility plans its system to serve loads under all circumstances. Therefore, all regional grids are vulnerable to extreme weather events, which seem to be more frequent with climate change. The NWPP RA program is one of several actions the region is pursuing to make such widespread disruptions less likely.

[8] An electricity system's ability to meet demand under a broad range of conditions, subject to an acceptable standard of reliability.

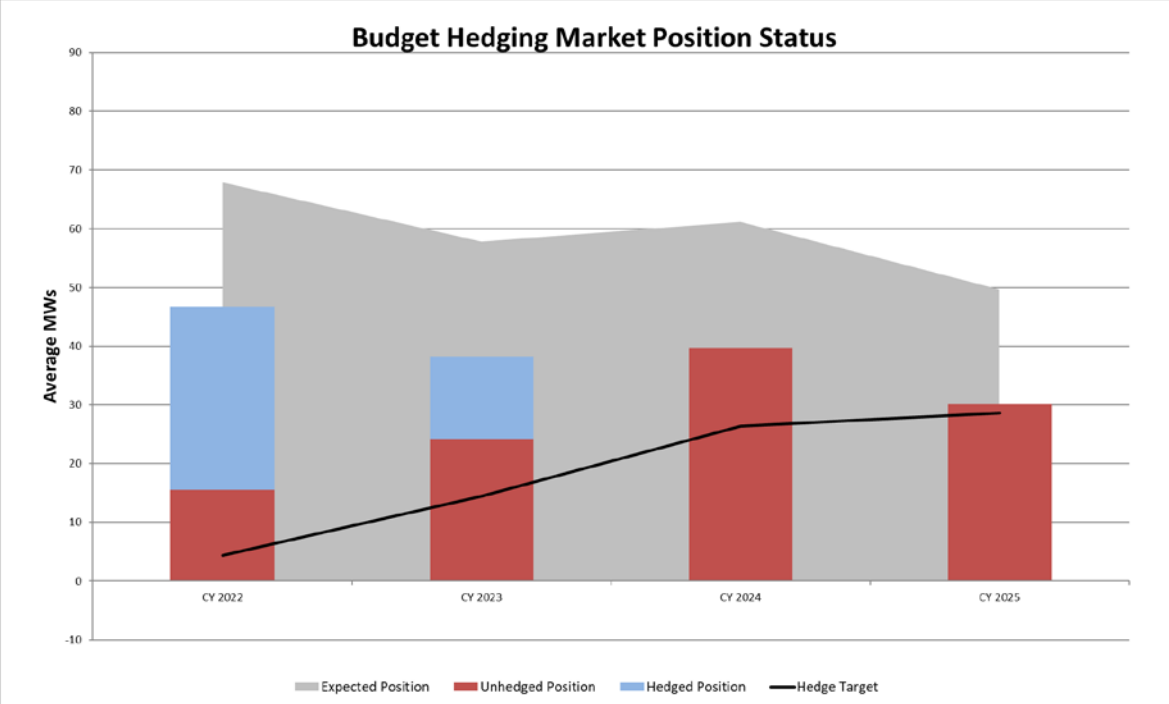
[9] https://www.bpa.gov/news/AboutUs/Hydropower-101/Pages/Resource-adequacy-Meeting-the-regions-energy-needs.aspx

Surplus Position Hedging Update

In accordance with EWEB's Risk Management Procedures, staff hedges[10] a portion of its surplus position[11] up to five years in advance. This provides two benefits: 1) it reduces financial exposure related to market prices; and, 2) it results in sales executed at various times which diversifies the sales price by "dollar cost averaging" through time. This strategy results in near-term years being fully hedged while year five is the least hedged, with interim years somewhere in between. Beyond five years EWEB does not hedge any surplus energy.

Figure 3, below, shows EWEB's surplus market position for 2022-2025 based on the budget hydro assumption which is 90% of expected hydro generation. 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 blue bar represents the volume of energy hedged by staff. The red bar represents the remaining unhedged surplus. The black line reflects the desired pace of hedging activity the Risk Management Committee (RMC) would like to achieve over time. The gray area behind the stacked columns reflects EWEB's expected surplus, without the budget hydro assumption.

Figure 3: Budget Hedging Progress



[10] 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.

[11] 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 2022-2025 there is about 40 aMWs of surplus compared to EWEB's load of about 275 aMWs

EWEB Owned-Generation Update
The Leaburg power canal and powerhouse remain offline due to canal dam safety concerns identified in late 2018. In 2020, EWEB, our consultants and representatives from FERC Dam Safety- Portland Regional Office completed a Semi-Quantitative Risk Analysis (SQRA) workshop for the Leaburg Canal. The SQRA was performed to identify and evaluate potential failure modes for the canal and their likelihood of occurrence, severity of consequences, level of confidence in the estimates and possible risk reduction measures. At the February 2021 Board Meeting, Commissioners communicated their support for continued design and deployment of risk reduction methods while engaging the community and regulators in a discussion regarding the ongoing operation or decommission of the Leaburg/Walterville Project.

Deployment activities for environmental and recreational improvements to the Carmen Smith Project in the newly issued license continued in 2020 and include design for the reconstruction for the Chinook Salmon Spawning Channel, upstream and downstream fish passage and the Trail Bridge Campground. Planned activities for 2021 include the reconstruction Spawning Channel, relocation of the transmission line in Deer Creek and installation of bird flight diverters on over-water spans of the transmission line. The powerhouse continues to operate having experienced pandemic and contractor caused delays in 2020 to the planned project to replace the first of two turbine runner/generator units. That project is now set to begin no earlier than July 2021 and run continuously through mid-2023.

Following a wet and cold February, the 2021 hydrologic year for the Oregon Cascades, which will affect EWEB's owned hydroelectric resources is tracking near or slightly above average. Staff will continue to monitor conditions through mid-April in order to determine the appropriate flow guidance to operate the Walterville facility. An update to the Board will be included in the May Board meeting materials.

EWEB's other owned generation facilities (Stone Creek Hydroelectric and Harvest Wind) continue to operate normally and are expected to do so throughout 2021. They are scheduled to have typical maintenance outages throughout the year. The Stone Creek transmission line was damaged during the Riverside Fire in late summer of 2020. Three of the damaged transmission poles have been replaced leaving 31 replacements planned for 2021.

Requested Board Action - None