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March 30, 2021

## **MEMORANDUM**

**TO: Power Committee**

**FROM: Ben Kujala**

**SUBJECT: Power Plan Status, Power Plan Reflections and Expectations**

### **BACKGROUND:**

**Presenter:** Ben Kujala and Chad Madron

**Summary:** While we are not yet at the finish line for the draft 2021 Power Plan and thus not even close to the finish for the final plan, this presentation is an opportunity to reflect on the last two years of working on the 2021 Power Plan and to expand on what we've learned thus far.

We know that at this point, the analysis for the plan will be revolutionary and break new ground in:

- Incorporating Climate Change risk at every level of input and analysis
- Detailing the role of hydro generation with unprecedented fidelity
- Capturing transformation in the mix of technologies relied on for electric generation in the Western Electric Grid and the associated market impacts
- Allowing for resource decisions that are responsive to the Social Cost of Carbon
- Surfacing portfolio economics that have flipped the narrative on renewable resources role

This presentation will be an opportunity to reflect on where the draft plan is headed and lay out upcoming milestones to get to the release of a draft plan.

#### Background:

In February 2019, we held a webinar to officially kick-off the 2021 Power Plan. We have now passed the two-year mark working on this plan. In the early stages we planned the approach, looking at how to organize and align the plan with the Power Act. We worked through a huge array of inputs, pushing forward with the idea that the impacts of climate change would need to be estimated and quantified in this plan at every stage and in every one of the collected inputs. We discussed the different audiences for the plan and how the plan is driven by both the Council's legacy and its governing statute.

Reflecting on my thoughts at this early stage of the plan, I saw what we were doing as evolutionary not revolutionary. We documented extensively how a power plan is prepared, something that serves us well still. My hope was that we brought more people inside the planning process where stakeholders could see the early stages and be part of every step in pulling together the power plan.

In October of 2019, the Power Committee got a first look at the price of solar generation and discussed the approach to how we set the potential for new solar generation to be added to the regional power system. The drop in costs was notable if not even shocking, though we'd had the mid-term assessment of the 7<sup>th</sup> plan to step into the reduction. At this point, the pebble was in the air and headed toward the pond. The ripples were inevitable but also yet to be seen.

Then in early 2020, Covid-19 changed the world. The power plan process is such a small part of what has transpired around the globe, but as Covid-19 impacted almost every aspect of daily life, that included how we worked on the plan and engaged with the advisory committees. I am extremely proud of how the team pulled together and became a remote team overnight. In addition, we adapted our advisory process to maintain and even expand the public involvement in the plan.

We then hit what I see as a significant turning point for the plan. In August of 2020, we presented a draft price forecast to the Power Committee. This was the cumulative result of countless hours collecting policy targets, loads, resource costs, etc. The preliminary result had a forecast of building 50 GW of new natural gas generation in the Western Electric Grid which did not sit well with our advisory committees or the Power Committee.

The forecast still had elements of how we'd forecast prices in the 7<sup>th</sup> plan, and in the 5<sup>th</sup> and 6<sup>th</sup> plan as well. It used methods prevalent in utility industry that have been through dozens if not hundreds of utility Integrated Resource Plans. But we had hit a point where standard practices diverged starkly from the policy landscape in the West. The Power Committee asked for an alternative perspective that limited new natural gas generation and over the next four months we struggled to find a forecast that balanced adequacy with heavy limitations on new natural gas generation.

The result forecasted a resource build of renewable resources and storage that far exceeded my expectation, building hundreds of Gigawatts nameplate – more than the entire currently installed nameplate capacity in the Western Electric Grid. But it held amazingly close to the results California was getting for their system. Yet it was still missing targets for clean energy in the late 2030's and into the 2040's. Consensus slowly emerged among the team, stakeholders, and advisory committee members – that the build represented the aggregation of public policy and a power system that moved beyond natural gas generation as a technology to replace retiring resources and support new load. A smaller build relying on the same technologies was either more expensive because of the technology mix or less adequate and thus degraded the reliability of the electric grid.

Many things preceded the electricity price forecast that foreshadowed the result, but in November, I finally started to realize that we were working on a plan that would look very different than any of our previous plans.

Two things frequently discussed but beyond our analytical reach in the 7<sup>th</sup> plan set the stage for revolutionary change in how we look at the Northwest power system, climate change and the duck curve. The price forecast is the duck curve writ large – expanded far beyond what drove the concern in the 7<sup>th</sup> plan. Understanding that solar was going to impact prices wasn't the issue. We've had substantial clarity on that for a while. How the regional system reacts to the need for ramping and flexibility beyond our borders was the challenge. Adding climate change concerns about impacts to the hydro system took us down a path of redeveloping our GENESYS model to better understand the dynamic interaction of the hydro system with the rest of the western generating fleet.

When the electricity price forecast and climate change hydro were combined in the redeveloped GENESYS model, something solidified in my expectation for this plan. I do not expect the results or the analysis to look anything like the previous plan. But I also do not expect the future electric grid to look anything like the grid of the past. And the Council, through a combination of planning and luck, has the analytical framework to answer important questions about the future electric grid, without the all too common mistake of misrepresenting the role of hydro generation. A mistake that is highly consequential in a world without additional thermal resources fulfilling the role of providing reserves and reliability to the system.

We certainly have challenges ahead. How to maintain reliability in an altered grid? How to find a robust resource plan when so much uncertainty lies outside the regions' borders? This plan will likely leave us with a full slate of new questions and future analytical challenges.

Still, I expect a revolutionary plan that breaks with the past and I believe it will meet the moment.

# Power Plan Reflections and Expectations

2021 NW Power Plan Status



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THE 2021  
NORTHWEST  
POWER PLAN

FOR A SECURE & AFFORDABLE  
ENERGY FUTURE

# Two Years in the Rearview Mirror

Reflecting back on the path to develop the plan we have come far and know this plan will be a unique and revolutionary analysis including:

- Incorporating Climate Change risk at every level of input and analysis
- Detailing the role of hydro generation with unprecedented fidelity
- Capturing transformation in the mix of technologies relied on for electric generation in the Western Electric Grid and the associated market impacts
- Allowing for resource decisions that are responsive to the Social Cost of Carbon
- Surfacing portfolio economics that have flipped the narrative on renewable resources role



# Topics From Last 3 Months

- January 28
  - [Update](#) on Power Plan Needs Assessment (Adequacy Reserve Margin)
  - Baseline Conditions Modeling [Results Update](#)
  - [Relative costs](#) of resources and update on Robustness of EE scenario approach
- February 9 + 10
  - [Robustness of EE Scenario Findings](#)
  - [State of Utilities Report](#) and Update on 2020 Loads and Covid Impacts
  - [Summary](#) of Baseline Condition Modeling Results for Power Plan
- March 9+10
  - [Update](#) on Power Plan Needs Assessment (ASCC)
  - [Summary](#) of System Integration Forum's exploration of energy equity in the 2021 Power Plan
  - [Rates and Bills](#) Modeling and Regional Portfolio Model (RPM)
  - Robustness of EE Scenario Full Council [Summary](#)
- March 24
  - Coal Retirement [Scenario Discussion](#)
  - [Extra Regional Markets](#) and Adequacy
  - [Update](#) on Scenarios and the Plan Process
- Other past [Plan Related Presentations to the Power Committee or Full Council...](#)



# Plan Related Topics This Month

## Power Committee

- Seasonality and Market Prices
- Markets for Energy/Capacity
- Early look at the Bonneville Portfolio Scenario
- Power Plan Timing Update

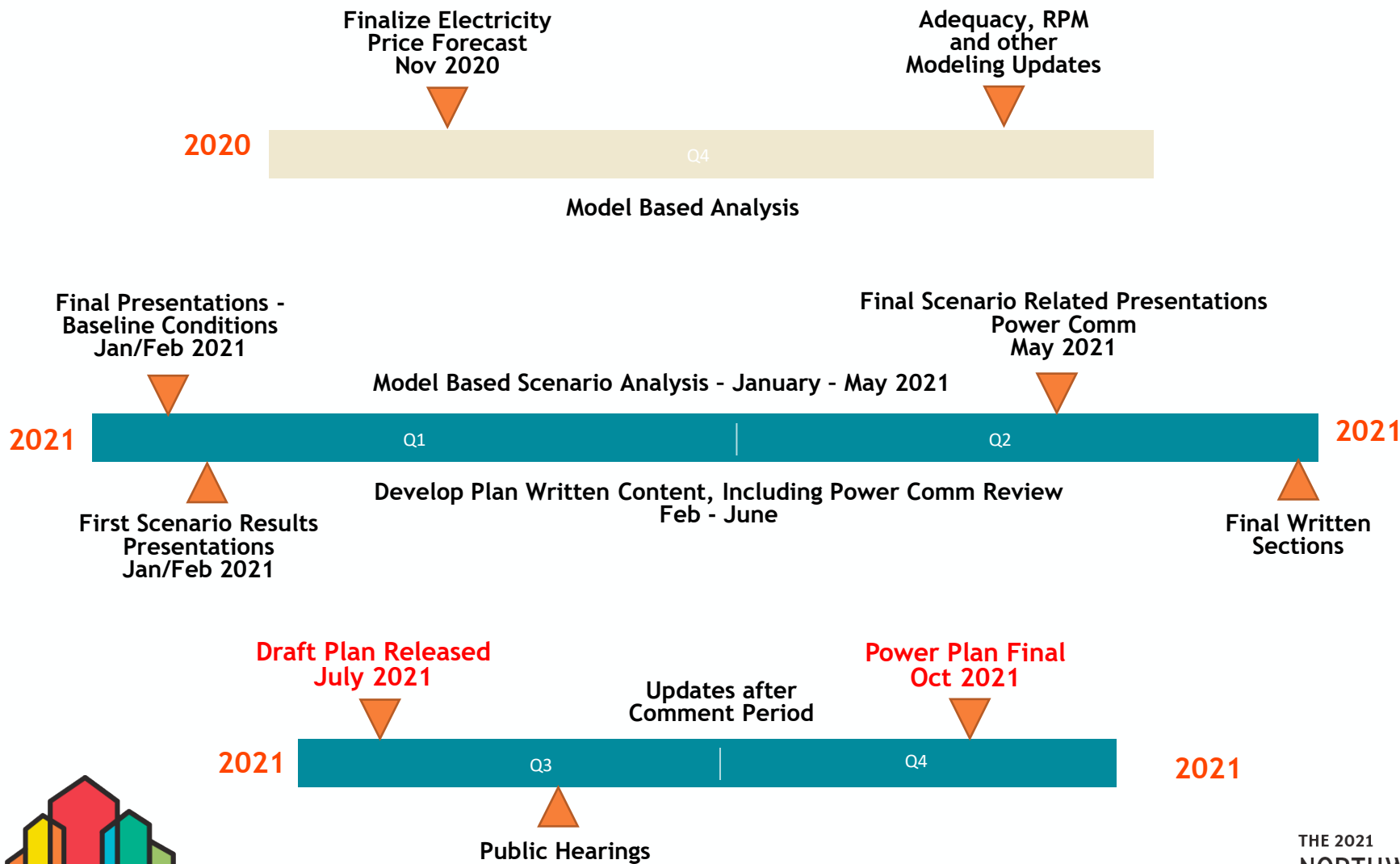
## Full Council

- Coal Retirement Scenario Summary



# 2021 Power Plan Work Schedule

Revised December 2020





## April

- Markets for Energy and Capacity
- Early Look at Bonneville Portfolio Scenario

## Late April

- Bonneville Portfolio Scenario
- Greenhouse Gas Tipping Point
- Pathways to Decarbonization inputs

## May

- Bonneville Portfolio Scenario Wrap Up
- Overview of Pathways to Decarbonization Scenario

## Late May

- Pathways to Decarbonization
- Written material for plan review

## June/Late June

- Scenario discussion wrap up
- Written material for plan review

## July


- Written material for plan review
- Release of Draft Plan



These dates subject to change

A photograph of a mountainous landscape shrouded in mist. In the foreground, a dark lake is visible. The mountains are covered in green and brown vegetation. A white geometric frame, resembling a house or a stylized structure, is overlaid on the right side of the image. The word "Questions?" is written in a large, black, sans-serif font on the left side of the image.

Questions?



**Extra Slides for  
Reference**

# Plan Related Presentations to Power Committee or Full Council

- Scenario Analysis
  - Coal Retirement [Scenario Discussion](#) (03/24/2021)
  - [Extra Regional Markets](#) and Adequacy (03/24/2021)
  - Robustness of EE Scenario Full Council [Summary](#) (03/10/2021)
  - [Summary](#) of Baseline Condition Modeling Results for Power Plan (02/2021)
  - [Robustness of EE Scenario Findings](#) (02/2021)
  - [Relative costs](#) of resources and update on Robustness of EE scenario approach (01/28/2021)
  - BPA scenario [update](#) (06/2020)
  - [Review](#) of Plan Scenarios – Part 1 (01/2020) & Part 2 (02/2020)
  - Scenarios proposed for [inclusion](#) (07/2019)
- Resource Strategy
  - [Rates and Bills](#) Modeling and Regional Portfolio Model (RPM) (03/09/2021)
  - [Update](#) on Power Plan Needs Assessment (ASCC) (03/09/2021)
  - [Update](#) on Power Plan Needs Assessment (Adequacy Reserve Margin) (01/28/2021)
  - Baseline Conditions Modeling [Results Update](#) (01/28/2021)
  - [Exports/Imports in RPM](#) (01/2021)
  - [Review](#) of Baseline Conditions Modeling Results (01/2021)
  - [First look](#) at Baseline Conditions RPM Results (12/15/2020)
  - [Adequacy results](#) from Redeveloped GENESYS (12/15/2020)
  - [Overview](#) of updates to Regional Portfolio Model (12/15/2020)



# Plan Related Presentations to Power Committee or Full Council

- Resource Strategy Continued
  - [First look](#) at redeveloped GENESYS result (12/03/2020)
  - Wholesale Electricity Price Forecast [Update](#) (11/2020)
  - Electricity Price Forecast [Updates](#) (10/2020)
  - Wholesale Electricity Forecast [Results](#) Part 2 (09/2020)
  - Challenges with RPM [Methodology](#) (09/2020)
  - Adequacy [Update](#) (ASCC/ARM) for 2021 Power Plan Part 2
  - Electricity Price [Forecast](#) Part 1 (08/2020)
  - Adequacy [Update](#) (ASCC/ARM) for 2021 Power Plan Part 1 (08/2020)
  - Briefings on Power Plan Analytical Process (02 - 04/2020)
  - [Updates](#) to RPM Methodologies (01/2020)
  - [Overview](#) of Plan and how the proposed resource strategy is developed (05/2019)



# Plan Related Presentations to Power Committee or Full Council

- Conservation and Energy Efficiency
  - [Comments](#) on Draft Framework for Conservation Program (10/2020)
  - [Initial Conservation Target Framework](#) (08/2020)
  - [EE Supply Curves](#) for Baseline and for Scenario Analysis (05/2020)
  - EE Typical [Meteorological Year Adjustment](#) (04/2020)
  - Draft EE Supply Curves (03/2020)
  - [Briefing](#) on Lighting Standards and Considerations for the 2021 Power Plan (02/2020)
  - [Update](#) on planning parameters for EE supply curves (08/2019)
- Generation Resources
  - [Update](#) on WECC-Wide Clean Policy Wrap Up (08/2020)
  - [Summary](#) of primary generating resource reference plants and emerging tech reference plant for draft 2021 Power Plan (06/2020)
  - [Update](#) on Existing System, Coal Retirements, and Policies (05/2020)
  - [Update](#) on historical regional greenhouse gas emissions (04/2020)
  - [Draft natural gas reference plants](#) & [Draft conventional geothermal reference plant](#) (02/2020)
  - [Draft Pumped storage reference plant](#) (12/2019)
  - [Onshore Wind Generation Reference Plant](#) (11/2019)
  - Solar, Battery Storage, and Solar + Battery Storage [Reference Plants](#) (10/2019)
  - [Review](#) of Existing System and WECC-Wide Coal Retirements (09/2019)



# Plan Related Presentations to Power Committee or Full Council

- Load and Price Forecasts
  - Load Forecast [Updates](#) (08/2020)
  - [Briefing](#) on upstream methane in Power Plan (06/2020)
  - [BPA Load forecast](#) (04/2020)
  - [Out-of-region load forecast and California climate-inclusive load forecast](#) (04/2020)
  - [Updates](#) to load and other forecasts based on GCM Selection (02/2020)
  - Further Detail on [Load Forecast](#) (10/2019)
  - [Forecast](#) of Draft Loads w/Frozen Efficiency for 2021 Power Plan/Related GCMs, (09/2019)
  - [Economic drivers](#) for the plan (04/2019)
  - [Upstream Methane](#) (01/2020)
  - [Update](#) on Wholesale Electricity Price Forecast and Avoided Emissions Rate (11/2019)
  - Natural Gas Price [Forecast](#) for 2021 Power Plan (11/2019)
- Climate Change
  - [Update](#) on Climate Scenario Selection (04/2020)
  - [General Circulation Model](#) Scenario Selection (11/2019)
  - Intro to [Climate change](#) and the 2021 power plan (04/2019)



# Plan Related Presentations to the Power Committee or Full Council

PLUS:

- [Summary](#) of System Integration Forum's exploration of energy equity in the 2021 Power Plan (03/09/2021)
- [State of Utilities Report](#) and Update on 2020 Loads and Covid Impacts (02/2021)
- [Overview](#) of Hydrogen (01/2021)
- [State of Electric Utilities 2019](#) (12/2020)
- [DEI at Advisory Committees](#) - key takeaways (12/2020)
- [Results](#) from stakeholder survey on use of previous power plan content (08/2020)
- [Development](#) of technical written material for the Power Plan (07/2020)
- [Stakeholder survey](#) regarding use of previous plan's written content and supporting materials (07/2020)
- [Update](#) on New Version of GENESYS (05/2020)
- Draft DR Supply Curves (03/2020)
- Review State Clean Energy Policies and Impact on 2021 Plan Analysis
- [Briefing](#) on methodology for quantifying the environmental costs and benefits of new resources for the 2021 Power Plan (09/2019)
- [Environmental Methodology](#) Development Primer (8/2019)
- Establishing global financial and economic [assumptions](#) for the 2021 Power Plan (07/2019)
- [Establish existing system parameters and interpret state policies](#) (07/2019)
- [Consistent Treatment](#) of Quantifiable Resource Costs (03/2019)
- [Proposed discount rate](#) for the 2021 Power Plan (02/2019)

