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

April 2, 2019

MEMORANDUM

TO: **Power Committee**

FROM: **Ben Kujala**

SUBJECT: **Climate change and the 2021 power plan**

BACKGROUND:

Presenter: Ben Kujala

Summary: We will discuss how staff proposes to incorporate climate change into the quantitative analysis that supports the 2021 power plan. Then look for feedback from the Power Committee on this proposal and incorporate that feedback into the project plan and the upcoming proposal on scenarios at the May Power Committee meeting.

Relevance: The approach to incorporating climate change into the analysis for the plan will have significant impacts on both the final product and the workload for preparing the power plan.

Workplan: Prepare for the 2021 Power Plan

Background: In the Seventh Plan the Council directed continued participation in efforts to model and update climate change data [Chapter 4, COUN-11]. The Council has also undertaken the redevelopment of the GENESYS model to better capture the dynamic constraints and uncertainties on the hydroelectric system and how they interact with the rest of the power system, including refining estimates on the impacts of climate change on system reliability.

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The Council also examined how climate change would impact loads and resources in Appendix M of the Seventh Plan. The conclusion from Appendix M states:

"The physical effects of climate change have no effect on the resource acquisition or actions identified in this plan over the next six year period. However, the Council will continue to monitor and participate in regional efforts to better understand potential climate change and its effects on the power supply."

Climate Change and the 2021 Power Plan

THE 2021
NORTHWEST
POWER PLAN

FOR A SECURE & AFFORDABLE
ENERGY FUTURE

Will Climate Change Impact the Electric Sector in the next 20 years?

Several reasons we expect climate change will impact the electric sector:

- Temperatures impact the use of electricity for heating and cooling
- Precipitation and temperatures impact water runoff and the timing of the generation from the regional hydro resources
- Changes in climate could impact capacity factors and operations of generating resources including thermal, wind, and solar generation
- Other anticipated demographic and economic impacts could drive the way electricity is used

Quantitative analysis vs. qualitative assessment

- We are focused on what can be accomplished with the quantitative analysis during this initial data collection and model development phase of the power plan
  - Focus on impacting a range of possible outcomes – not deterministic
- This does not limit the power plan from considering or recommending action based on a qualitative assessment

Direct vs Indirect Effects

Direct Effects

- Estimates or forecasts that use as a primary input a climate variable (wind, temperature, precipitation)

Indirect Effects

- Estimates or forecasts that use variable that incorporates a climate-change impact

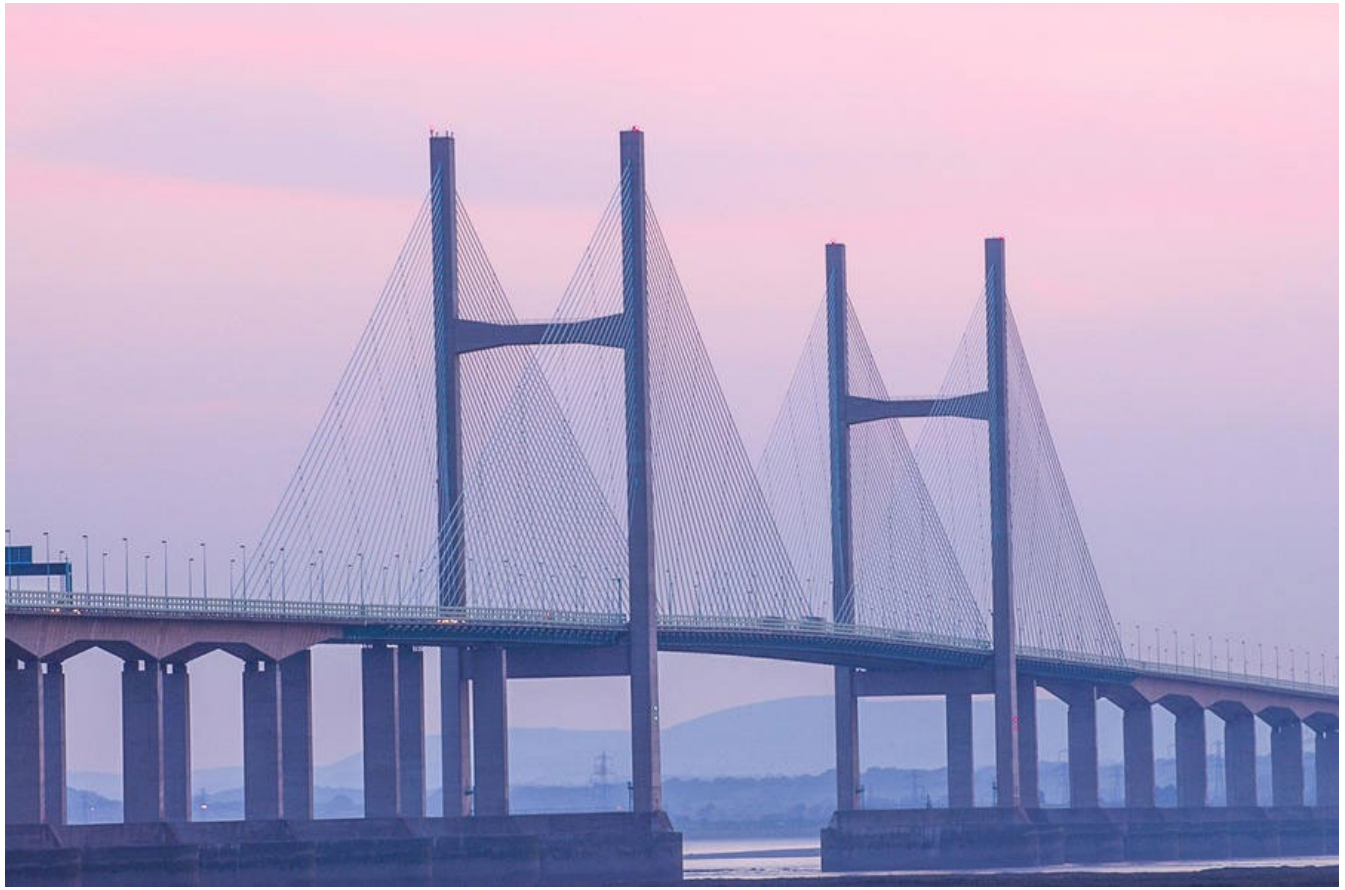
Example of Direct Impact

- RMJOC 2 Downscaling of global climate models to the region – Temperature and Precipitation
  - Increase in summer average and peak load based on projected changes in the temperature
  - Change in shape of runoff and the impact on hydro regulation

Example of Indirect Impact

- Impacts on migration in the US could lead to changes in estimate of population growth for the region
- Impacts on oceans & coastal communities
- Agricultural impacts, e.g. shifts in pumping load for watering crops
- Reduction in productivity for outdoor labor industries like construction

A bridge too far?



Comparing resource strategies with and without climate change

- Would a comparison of resource strategies with and without climate change be viewed as a Council estimate on the cost of climate change?
  - Creating a robust resource strategy considering climate change would not be the same problem as attempting to capture all the costs faced by the power system considering climate change
- This would have a large impact on staff time and limit the ability to provide other analyses or scenarios
- What other information would this comparison provide?

Proposed Approach to quantitative analysis of climate change impacts

- We recommend not providing climate change as a scenario – the comparison would be easily misinterpreted and would take considerable staff time
- Staff working with the advisory committees will get the best available information to forecast possible future conditions we will face in the power system, including the impacts of climate change
- We will highlight in every presentation what was considered and what is recommended to be included or excluded from the quantitative analyses including direct and indirect impacts related to climate change
  - The Council will provide feedback for each presentation, including on climate change related work, that will be incorporated into the plan
- Where practical, these will be included in the common assumptions that are used to analyze resource strategies

May 1 – Upcoming System Integration Forum on Climate Change

- Discuss possible approaches and data for estimating the impact of climate change with Advisory Committee members
- Leads into future advisory committee conversations about climate change
- Opportunity to bring outside expertise and utilities to get a survey of approaches taken by others in planning for the impact of climate change on the power system

"An approximate answer to the right question is worth a great deal more than a precise answer to the wrong question."

John Tukey


Questions?