Comments on 5th Power Plan

Dear Council:

Let me commend you on your excellent work in developing the new power plan. Your inclusion of VAR as a risk management tool is spot-on, as is your inclusion of the risks from carbon regulation. Also, modeling hourly loads profiles over the next 20 years is a tremendous analytical accomplishment. I can begin to appreciate the task you have completed given my background.[1]

I would like to address your integration of climate change into the plan. First, in spite of your efforts to include a carbon tax you do not consider the forecasted impacts of climate change itself into the plan. Excluding the forecasted impacts of climate change for a plan going out to 2025 is a major omission. As Phil Mote noted in his presentation to the Council, our best climate models forecast a roughly a 5° F increase in regional temperatures by 2050. While I have not researched interim impacts from the models for this review, it is highly likely that some of this warming will be felt in the region by the end of the planning period in 2025. Figure 1 shows the decrease in snowpack and streamflows forecasted for the region by 2050.

As you are aware, more extreme droughts (and floods) can have huge impacts on planning efforts. In addition to reducing mid to late summer hydro resources through reduced snowpack, more precipitation falling as rain rather than snow is likely to increase the probability of flooding. With greater variability in run-off, NW reservoirs will need to have greater margins of safety and reduce their storage and generating capacity. If you were to extrapolate 20 year impacts from the 50 year forecast, and then model these impacts on hydro resources, a more accurate picture of the expected margin required from other generation source would be revealed.

Second, I would like the final plan to specify in greater detail the comment on p. 7-25, *"However, it is likely that more significant carbon control measures implemented earlier in the planning period could have a more significant effect. This makes monitoring the state of climate change science and policy important as future resource decisions are made."* There is considerable evidence that once a policy has been implemented, tacking to a new course is difficult. Status quo bias, information lags, legislative delays, pressure group influence, missing or absent price signals, organizational barriers and other factors often result in the continuation of existing policies and / or prevent the implementation of new ones.

The emerging field of adaptive management can provide specified criteria that trigger the implementation of new measures or the put existing measures on hold for review. Thus, there is a need for an appropriate adaptive management module to the plan where policies

[1] All of my professional hats are thrown into the energy and environment world. In addition to being a Ph.D. student in public administration and policy at PSU and a lecturer in international environmental politics and policies there, I am a policy analyst and risk management specialist with Trexler Climate + Energy Services, and a climate educator with the Greenhouse Network.

and measures are systematically monitored and evaluated given new scientific, social, economic, and environmental information.[2] The design of these interventions then are revisited at regular periods following the evaluation of the success or failure of the interventions. In essence, an adaptive management module for the plan would operationalize the comment, *"The actual resources that are developed will depend on how the future unfolds"* (7-35). This module contain a manual with specific triggering criteria and associated response measures depending on how the future unfolds. The Council could provide much needed leadership in promoting adaptive management in the energy sector if you incorporate it into the plan.

Next, I would like to address your treatment of renewable energy in the draft plan as well as the interactions between an RPS and the cap and trade carbon regime. I propose that the plan include the probalistic representation of a future RPS in either parts of the region (OR, WA) or regionally as part of a national RPS. An aggressive RPS would cause tag prices to rise as they would be the likely instrument for suppliers to meet targets. With an RPS, future tag prices would likely behave much differently than your assumptions on p. 6-7. For instance, our modeling efforts at TC+ES indicate that a 20% RPS by 2020 would result in much higher tag prices than the $1 used in the plan. A $20-25 MWh tag price is the low end of the range expected under such a regime.

Last but not least is the interaction between renewable energy policies and the carbon cap, which is the focus of my dissertation research. There is considerable theoretical and simulation evidence that the relationship between these two regimes is a more complicated one than is accounted for in the draft plan. One of the few simulation models includes Hindsberger et al (2003) that incorporates a common electricity market in the Nordic region, a renewable energy bubble and an emissions bubble. They find evidence for a negative relationship between tag prices and carbon prices as carbon prices decrease from €18 to €6 as the with an increase in renewables from 15% to 25% in the Nordic countries (including large hydro). Notice that even in the face of a very aggressive RPS, carbon prices do not go to zero. Conversely, tag prices do not go to zero either until the carbon cap is very restrictive; much higher than is likely under McCain-Lieberman or similar legislation. Thus, the plan's assumption that future tag premiums disappear with a carbon cap is unjustified, especially given a minimum level of demand from an RPS that is likely to be implemented in the region over the planning period.[3]

Furthermore, there is evidence to suggest that a) there is a relationship between higher RPS targets and higher end-user prices. This can impact the amount of cost effective conservation that is possible in the region. b) The addition of a carbon cap and the

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[2] National Academy of Sciences (2004). *Adaptive Management for Water Resources Project Planning*. Elements of adaptive management include the revision of management objectives, an explicit model of the system being managed, a range of management choices, monitoring and evaluation of outcomes, a mechanism for incorporating learning into future decisions, and a collaborative structure for stakeholder participation and learning. The essence of adaptive management is the admission that we don't know enough at time zero to adequately design policies that will be force for decades. Rather policies and measures are a series of experiments that test the responses of economic, social, environmental and political systems to carefully designed interventions.

[3] As you know, an RPS is part of the draft recommendations for the Oregon Global Warming Initiative.

increase in supply from renewables reduces the demand from electricity from fossil sources and thus reduces spot prices.

To conclude my comments, I would like to emphasize that climate change is likely to be the largest exogenous variable impacting the portfolio over the next two decades. A warmer climate is likely to dramatically affect the hydro portion of the system and have profound impacts on how a "low-risk" portfolio should be constructed. Because of the impacts from climate change itself, as well as the inclusion of a carbon cap and renewables targets, the stakeholders in the region are likely to be chasing a moving target. The inclusion of a systematic adaptive management plan for the energy can improve response times, increase stakeholder "buy-in" and education, and improve the chances that the plan becomes flexible as the future unfolds. Finally, the relationship between a carbon cap and renewable energy deserves its own modeling efforts to account for the complicated interactions between the two policies.

I appreciate the chance to comment on the 5th power plan. If you would like to discuss in more detail any of the issues that I have raised I would be glad to do so.

Sincerely,

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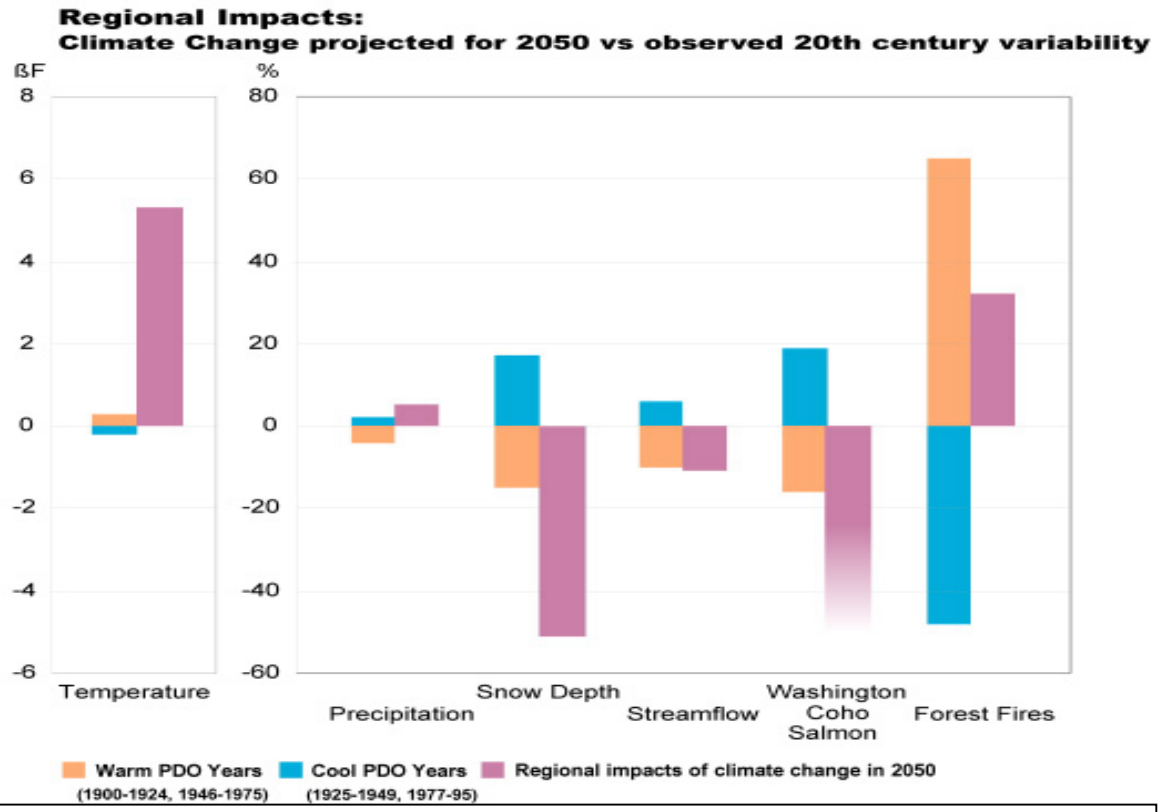

Figure 1: US Global Change Research Program Forecasted Impacts