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

W. Bill Booth
Vice Chair
Idaho

James Yost
Idaho

Pat Smith
Montana

Jennifer Anders
Montana

July 7, 2015

MEMORANDUM

TO: Council members

FROM: Tom Eckman, Ben Kujala and John Ollis

SUBJECT: Discussion of Scenario Analysis Results

BACKGROUND:

Presenter: Tom Eckman and Ben Kujala

Summary On June 26th staff presented the initial results for Scenarios 1B, 2B, 2C and 3A at a webinar for the Power Committee. At that webinar staff indicated that all of these scenarios would be re-run with updated model inputs to improve the consistency between the RPM and GENESYS models treatment of the use of hydro-system to provide short-term *peaking capacity* when additional resources that can supply *energy* are added to the system.

Staff will present revised results for four Scenarios. The scenarios that will be discussed are:

- 1B - Current policy without any incremental cost for carbon included
- 2B – Considers carbon cost equivalent to the Social Cost of Carbon
- 2C - Considers uncertainty in the cost of carbon ranging from \$0 to \$110/metric ton
- 3A – All coal plants and inefficient gas plants (i.e., plants with heat rates above 8,500 Btu/kWh) retired

In addition staff will present the results of one sensitivity study (S3). This study assumes that Demand Response resources are not available.

These results will reflect the final inputs and model revisions for these scenarios for use in the development of draft Plan.

Workplan: 1. B. Develop Seventh Power Plan and maintain analytical capability

Background: The RPM or Regional Portfolio Model was recently redeveloped by Navigant for the Council. The RPM estimates the regional costs and risks associated with pursuing resource development strategies and it uses optimization to look for strategies that minimize the estimated cost and risk. Results from the RPM will be used to inform the components of the resource strategy set forth by the Council in its Seventh Power Plan.

More Info: None at this time.

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MEMORANDUM

TO: Council members

FROM: Tom Eckman

SUBJECT: Proposed Seventh Plan Development Process and Schedule

BACKGROUND:

Presenter: Tom Eckman

Summary: Staff is proposing that the draft plan adoption be delayed one month, until October to provide additional time to conduct scenario and sensitivity study analysis and to discuss these results with the Council. Staff requested guidance from the Power Committee on this scope and schedule for scenario and sensitivity analysis at the June 26th webinar. Staff is seeking guidance from the full Council at its July meeting.

The original schedule called for final plan adoption at the December 2015 Council meeting. However, in order to provide for a 60 day comment period and sufficient time to respond to comment and accommodate holiday schedules, staff proposes that the Council use its December and January meetings to consider how it wishes to respond to public comments. Final Plan adoption would be scheduled for February of 2016 Council meeting.

Attached is a calendar showing the major milestones in the plan development process assuming that reflects the staffs' recommendation regarding the one month delay of the draft plan's adoption is acceptable to the Council. This calendar shows Council adoption of a draft plan at the October 13th - 14th meeting. To provide time to include any final editorial and conforming changes agreed to at the Council meeting the draft Plan would be released for comment the following week (October 23rd). The 60-day public comment

period, including time for hearings in each state, would close the December 18th, the Friday following the Council meeting.

Table 1, below, shows the staff's proposed scenarios and sensitivity studies.

Table 1 - Proposed Scenario and Sensitivity Analysis Schedule		
No.	Scenario Description	Completion Date
1A	Existing Policy without Uncertainty, w/o GHG reduction risk	July 10th
1B	Existing Policy with Uncertainty, w/o GHG reduction risk	July 10th
2C	Existing Policy with Uncertainty and with uncertain GHG reduction risk/target - \$0 - \$110/MMTE Carbon Cost	July 10th
2B	Existing Policy with Uncertainty and with GHG reduction target based on the GHG Damage Cost estimated by the federal Interagency Working Group on the Social Cost of Carbon.	July 10th
3A	Lowering carbon emissions with current technology	July 10th
4C	Major Resource Uncertainty – Faster Pace of Conservation Deployment	July 10th
4D	Major Resource Uncertainty – Slower Pace of Conservation Deployment	July 10th
4A	Major Resource Uncertainty - Unexpected Loss of Major Non-GHG Emitting Resource (i.e., long-term loss of generation or transmission access to generation without the ability to pre-plan for replacement resources)	July 17th
4B	Major Resource Uncertainty - Anticipated Loss of Major Non-GHG Emitting Resource (i.e., long-term loss of generation or transmission access to generation with the ability to pre-plan for replacement resources)	July 17th
5B	Southwest Market Liquidity Variability - Scenarios 1B and 2C w/Greater Access to Extra-regional Market (i.e., lower ARMs, higher limits on imports)	July 24th
3B	Lowering carbon emissions with emerging technology (e.g., storage, CO2 heat pumps, SSL, DG) - Narrative Only, Not Modeled	July 31st
No.	Sensitivity Study Description	Schedule
S1	Scenarios 1B and 2C w/o Centralia, Boardman or Valmy Retirements	July 24th
S2	Scenarios 1B and 2C w/Lower Natural Gas Prices	July 24th
S3	Scenarios 1B and 2C w/o Demand Response	July 31st
S4	Scenarios 1B and 2C w/Lower Winter Peak Contribution from Conservation	July 31st

Relevance: Development of the Regional Power and Conservation Plan is one the Council's primary obligations under the Power Act

Workplan: 1. B. Develop Seventh Power Plan and maintain analytical capability

- Define resource portfolio
- Complete draft plan resource strategy and draft action plan
- Release draft plan for comment
- Approve Final Plan/Action Plan

Background: The development of the 7th Power Plan enters a critical phase over the course of the summer and fall. At the June Power Committee meeting staff proposed a review schedule for draft sections of the draft plan and for completion of planned scenario analysis. This schedule calls for adoption of a draft plan at the September Council meeting. In order to meet this schedule it does not appear that we will have time to conduct *all* of the proposed scenario analysis and *all* of the sensitivities studies that

have been requested by the Systems Analysis Advisory Committee, the Resource Strategies Advisory Committee and other stakeholders.

While sensitivity studies use the findings of one or more prior scenario results they require a comparable amount of time to model, hence they are a about a “one-to-one” tradeoff with respect to time and staff work load.

Even allowing for a one month extension of the draft plan’s adoption, staff recommends that four of the original scenarios proposed for analysis be eliminated in favor of conducting the four sensitivity studies listed above. The four scenarios proposed for elimination and the staffs’ rationales are outline below.

- Scenario 2A - Existing Policy with Uncertainty and with certain GHG reduction risk/target. This scenario was designed to identify resource strategies that would reduce emissions to levels that could be expected to comply with EPA’s proposed Clean Power Plan regulation 111(d). In staffs’ judgment the results from Scenario 2C provide sufficient information to address this question. Moreover, since the final CPP rule is not anticipated to be released until later this summer, it is not possible to model the specific requirements of this regulation.
- Scenario 5A - Integration of Variable Resources (i.e., managing the NW Impact of the "Duck Curve"/50% CA RPS). While it does appear that California is likely to adopt a 50% Renewable Portfolio Standard, it also appears that the state is also taking steps to mitigate the impact of “oversupply and ramping” resulting from the higher RPS. (See NREL Analysis of WECC Solar and Wind Integration at: http://www.nrel.gov/electricity/transmission/western_wind.html). The impact of higher RPS in California on the Northwest market is directly related to one of the critical assumptions used as the basis for establishing the regional adequacy standards (i.e., reliance on external market supplies). Scenario 5B is designed to test the impact on resource portfolio cost and risk of alternative assumptions regarding placing greater reliance on Southwest markets. The results from Scenario 5B will provide some insights into that magnitude of the potential impact of potentially greater reliance on external markets. It may also result in recommendations to the Resource Adequacy Advisory Committee to review the assumptions underlying its assessment of regional resource adequacy. Therefore, staff recommends that modeling of this scenario be delay until its results can be considered as part of a broader discussion of the adequacy standard following plan adoption.
- Scenario 6A - Climate Change Load Impacts Resulting from Direct Effects of Climate Change. This scenario was designed to assess whether potential changes in regional load shape resulting from forecast climate change would alter the region’s resource strategy. Preliminary testing revealed that the changes in load shape (i.e., lower winter loads and higher summer loads) are limited in the near-term and thus do not alter resource decisions required within the period covered by the action plan.

- Scenario 6B – Climate Change Impacts on Hydrogeneration – This scenario was designed to assess the potential impacts of changes in hydroelectric generation resulting from potential climate change. Modeling this scenario requires a projection of changes in amount and timing of run-off. The current data on which such projections are based is both out of date (i.e., covers only 70-year water record, while RPM uses 80-year record) and has known errors. The staff recommends that this scenario be delayed until after the release of an updated set of forecast for climate impacted stream flows based on IPCC-5 is available in 2016.

The rationale for conducting the four sensitivity studies is as follows:

Sensitivity S1 - Scenario 1B and 2C w/o Centralia Boardman or Valmy Retirements

This sensitivity study and Sensitivity S2 were requested by the Public Power Council staff. Specifically, PPC staff indicated that they were interested in determining how the loss of these resources impacted the pace of regional conservation and demand response development.

Sensitivity S2 – Scenarios 1B and 2C w/Lower Natural Gas Prices

This sensitivity was requested by members of the SAAC, RSAC and PPC staff. It is designed to assess the impact on resource development of significantly lower natural gas prices.

Sensitivity S3 – Scenarios 1B and 2C w/o Demand Response (DR)

This scenario was requested by members of the SAAC and RSAC. It is designed to determine both the value of DR and the resources that would be required if developments of DR cannot be accomplished at the assumed pace or in the amount identified as achievable over the planning period.

Sensitivity S4 – Scenarios 1B and 2C w/Lower Winter Peak Contribution from Conservation

This scenario was requested by members of the SAAC and RSAC.

It is designed to determine both the value of conservation's peak capacity contribution as well as the resources that would be required if the end use load shape data used to estimate its peak reduction overstates its impacts.

If the Council determines that one or more of the scenarios recommended for elimination or additional sensitivity studies should be modeled as part of the Seventh Plan's development process it *may* be possible to conduct such analysis without extending the plan development schedule beyond what has been proposed. However, the ultimate impact on the schedule for plan adoption is contingent upon agreement among Council members that sufficient analysis and review has occurred to support the issuance of a draft plan.

More Info: See Attached Schedule

Month	Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2 - Packet Day	3	4	5	6
Jun 2015	7	8	9 Council	10 Meeting	11	12	13
	14	15	16	17	18	19 - Scenarios 1A,1B & 2C	20
	21	22	23	24	25 - Scenarios 2B & 3A	26 - Power Committee Webinar	27
	28	29	30 - Scenarios 4C & 4D	1	2	3 Holiday	4
Jul 2015	5	6	7 - Packet Day	8	9	10 - Scenarios 4A & 4B	11
	12	13	14 Council	15 Meeting	16	17	18
	19	20	21	22	23	24 - Scenario 5B and Sensitivity Studies S1 & S2	25
	26	27	28	29	30	31 - Scenario 3B and Sensitivities S3 & S4	1
Aug 2015	2	3	4 - Packet Day	5	6	7	8
	9	10	11 Council	12 Meeting	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	1	2	3	4	5
Sep 2015	6	7 - Holiday	8 - Packet Day	9	10	11	12
	13	14	15 Council	16 - Meeting	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	1	2	3

Month	Sun	Mon	Tue	Wed	Thu	Fri	Sat
	27	28	29	30	1	2	3
Oct 2015	4	5	6 - Packet Day	7	8	9	10
	11	12	13 Council	14 Meeting	15	16	17
	18	19	20 - Release Draft for Comment	21	22	23	24
	25	26	27	28	29	30	31
Nov 2015	1	2	3	4	5	6	7
	8	9	10 - Packet Day	11 Holiday	12	13	14
	15	16	17 Council	18 Meeting	19	20	21
	22	23	24	25	26 Holiday	27 Holiday	28
	29	30	1	2	3	4	5
Dec 2015	6	7	8 - Packet Day	9	10	11	12
	13	14	15 Meeting - Summary of Public Hearing Comments	16 Council - Preliminary Scope of Analysis for Draft Plan Revisions	17	18 - Close of Public Comment	19
	20	21	22	23	24	25 - Holiday	26
	27	28	29	30	31	1 - Holiday	2
Jan 2016	3	4	5 - Packet Day	6	7	8	9
	10	11	12 Council - Summary of Public Comment	13 Meeting - Discuss Proposed Revisions	14	15	16
	17	18 - Holiday	19	20	21	22	23
	24	24	26	27	28	29	30

Month	Sun	Mon	Tue	Wed	Thu	Fri	Sat
	31	1	2 - Packet Day	3	4	5	6
Feb 2016	7	8	9 Council	10 Meeting - Adopt Final Plan	11	12	13
	14	15 - Holiday	16	17	18	19	20
	21	22	23	24	25	26	27
	28	1	2	3	4	5	6

Proposed Scope and Schedule for Scenario and Sensitivity Analysis

Power Committee and Council
Meeting

July 14-15, 2015

Proposed Revision to 7th Plan Schedule

- **Draft Plan Adoption – October 13-14, 2015**
- **Public Comment – October 23 –
December 18, 2015**
- **Final Plan Adoption – February 9-10, 2016**

Rationale – Provide additional time for Council review of scenario analysis, sensitivity studies and draft plan action plan and chapters.

Proposed Revisions to Scenario Scope

Eliminate Four Scenarios

- **Scenario 2A - Existing Policy with Uncertainty and with certain GHG reduction risk/target.**
 - In staffs' judgment the results from Scenario 2C provide sufficient information to address this question. Moreover, since the final CPP rule is not anticipated to be released until later this summer, it is not possible to model the specific requirements of this regulation.
- **Scenario 5A - Integration of Variable Resources (i.e., managing the NW Impact of the "Duck Curve"/50% CA RPS).**
 - Staff recommends that modeling of this scenario be delay until its results can be considered as part of a broader discussion of the regional adequacy standard following plan adoption. This scenario requires as "WECC-wide" view of loads and resources and might be significantly impacted by the emergence of SCED/EIMs.
- **Scenario 6A - Climate Change Load Impacts Resulting from Direct Effects of Climate Change.**
 - Staff recommends that modeling this scenario be dropped since preliminary testing revealed that the changes in load shape (i.e., lower winter loads and higher summer loads) are limited in the near-term and thus do not alter resource decisions required within the period covered by the action plan and long term impacts are subject to a wide range of uncertainty.
- **Scenario 6B – Climate Change Impacts on Hydrogeneration.**
 - Modeling this scenario requires a projection of changes in amount and timing of run-off. The current data on which such projections are based in both out of date (i.e., covers only 70-year water record, while RPM uses 80-year record) and has known errors. The staff recommends that this scenario be delayed until after the release of an updated set of forecast for climate impacted stream flows based on IPPC-5 is available in 2016.

Proposed Revisions to Scenario Scope

Add Four Sensitivity Studies

- **Sensitivity S1 - Scenario 1B and 2C w/o Centralia Boardman and Valmy Retirements**
 - This sensitivity study and Sensitivity S2 were requested by the Public Power Council staff. Specifically, PPC staff indicated that they were interested in determining how the loss of these resources impacted the pace of regional conservation and demand response development.
- **Sensitivity S2 – Scenarios 1B and 2C w/Lower Natural Gas Prices**
 - This sensitivity was requested by members of the SAAC, RSAC and PPC staff. It is designed to assess the impact on resource development of significantly lower natural gas prices.
- **Sensitivity S3 – Scenarios 1B and 2C w/o Demand Response (DR)**
 - This scenario was requested by members of the SAAC and RSAC. It is designed to determine both the value of DR and the resources that would be required if developments of DR cannot be accomplished at the assumed pace or in the amount identified as achievable over the planning period.
- **Sensitivity S4 – Scenarios 1B and 2C w/Lower Winter Peak Contribution from Conservation**
 - This scenario was requested by members of the SAAC and RSAC. It is designed to determine both the value of conservation's peak capacity contribution as well as the resources that would be required if the end use load shape data used to estimate its peak reduction overstates its impacts.

Power Committee Feedback

- Okay with proposed schedule revisions
- Some concern about dropping climate change scenarios (6A and 6B)
 - Potential Impact on Hydrogeneration and Loads will be discussed in Appendix M - *Climate Change Impacts to Loads and Resources*
- Highest Priority Sensitivity Studies are S2-Lower Natural Gas Prices and DR and S3- No DR
- Lowest Priority Sensitivity Study is S1-Assume none of the announced coal plant retirements take place

Seeking Council Guidance

- **Revisions to the proposed schedule**
- **Scenario vs. Sensitivity study tradeoff**
 - Which ones are priorities
 - How to handle additional requests
 - From Council members
 - From stakeholders
- **Draft Chapter Review Process**
 - Should draft documents be publically available prior formal adoption as draft Plan?
 - If so, when?