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

April 3, 2018

MEMORANDUM

TO: **Power Committee**

FROM: **Charlie Grist, John Ollis, Kevin Smit, Tina Jayaweera**

SUBJECT: **Introduction to Bonneville Resource Program**

BACKGROUND:

Presenters: Bonneville staff: Rob Petty, Tyler Llewellyn, Danielle Walker, and Lee Hall

Summary:

Rob Petty will set the stage with the context for the Resource Program. Bonneville's Resource Program develops forecasts of federal system energy, capacity, and balancing needs and evaluates resource development solutions to meet those needs. The Resource Program is used to evaluate resource strategies for Bonneville, which is analogous to the resource strategy that the Council develops for the region in its power plans. But the Bonneville Resource Program covers a sub-set of the region, specifically Federal system resources and Federal system load obligations. The timeframe for the Bonneville Resource Program is 2020-2039, which aligns with beginning of the next rate case. The Seventh Power Plan covered the years 2016-2035.

The Bonneville Resource Program has been through several iterations. The last Bonneville Resource Program was conducted in 2013 and focused on evaluating capacity-related issues. The current effort intends to improve the analysis and make it germane to future Bonneville resource decisions. This version of the Resource Program reviews the metrics used to estimate energy, capacity, and balancing needs. It also aims to enhance methods for load forecasting, to develop Bonneville-specific

conservation and demand response potential assessments, and to develop a new tool for resource portfolio analysis and optimization.

The Resource Program informs future Bonneville resource acquisition strategy including energy efficiency, demand response, contract purchases, and generation. But it is not a decision-making process, nor a decision document. One key driver of the Resource Program for Bonneville is to assess the agency's conservation and demand response plans based on Bonneville-specific loads and resources and risk profile.

How Bonneville's Resource Program relates to the Council's Power Plan

Bonneville's resource acquisition strategy is also a subject for the Council's power plan under the Northwest Power Act. The Council's power plan is to set forth a scheme for implementing conservation and developing resources to meet Bonneville's obligation (section 4e2); include a conservation program to be implemented by Bonneville under the Act (section 4e3A); and include a forecast of the amount of power resources estimated by the Council to be required to meet Bonneville's obligations in each of the priority categories (section 4e3D).

In turn, the Act specifies that all of Bonneville actions to acquire resources under Section 6 of the Act are to be consistent with the Council's power plan except as otherwise specifically provided for in the Act (sections 4d2, 6b1). This includes acquiring resources through conservation and implementing conservation measures consistent with the power plan (section 6a1); acquiring other than major resources either consistent with the power plan or, if not consistent with the plan at least consistent with the Act's criteria for resources in the plan (section 6b2); and acquiring major resources through a process for determining consistency with Council's power plan or otherwise authorized by Congress (section 6c). These are strong substantive provisions tying Bonneville's resource acquisition decisions to conservation and generation resource measures for Bonneville in the Council's power plan.

In the last few power plans, including the Seventh, the Council has focused more attention on the regional aspect of its power planning responsibility, with a particular emphasis on regional conservation goals. With regard to Bonneville, the Council has been stating in the plan an expectation that Bonneville meet its "share" of the regional conservation target. The power plan has also included a set of other actions the Council would like to see Bonneville take to improve the implementation of conservation measures and evaluate other resource possibilities, including most recently demand response measures - all of these at a fairly general or qualitative level.

Our understanding of the current iteration of Bonneville's Resource Program is that it is intended to work within that framework, to be an inquiry by Bonneville into needs and resource possibilities at a level of detail and specificity the Council has not gone into in the power plan. The Council's ultimate interest under the Act is in seeing Bonneville make resource decisions that are as consistent as can be with the Council's power plan, even as Bonneville takes that inquiry into more specificity.

At the April meeting, Bonneville will update the Council on three elements of the Resource Program: the Needs Assessment, the Conservation Potential Assessment, and the Demand Response Potential Assessment. These three elements are key inputs to the analysis and development of a resource strategy.

Bonneville and Council staff have been meeting periodically to discuss the analysis the agency is preparing for the Resource Program. These discussions have focused on Bonneville's methodology. Bonneville has also shared initial results of its assessments of need, conservation, and demand response. Staff review of needs and demand response assessments has been limited to high-level review of methodology and review of initial outputs. For energy efficiency, Bonneville did make detailed analysis inputs available for review and recommendations by Council staff.

The three elements of need, conservation, and demand response potential are inputs to the resource strategy modeling tool that Bonneville uses – Aurora. These inputs, along with the load forecast and costs and availability of all the resource options, will be used to identify optimal resource strategies for Bonneville. Council staff have not yet seen results of any resource strategy analysis as of the date of this packet but will have a chance to review those results soon.

Needs Assessment

Tyler Llewellyn will present on the Bonneville's recently-completed needs assessment. The Needs Assessment provides forecasts of Federal system energy, capacity, and balancing reserve needs over a 20-year study horizon (2020-2039) while considering federal system resource and load obligations. The needs assessment looks at five primary metrics: Annual Energy, P10 Heavy Load Hour, P10 Super Peak, 18-Hour Capacity and Balancing Reserve. The evaluation of annual energy needs assumes 1937 critical water conditions and expected Columbia Generating Station output and loads. The 18-hour capacity assessment evaluates the ability of federal system to meet 3-day extreme weather event. Results from the Needs Assessment feed into the resource optimization part of the Resource Program planning process analogous to how the Council uses the Adequacy Reserve Margin and Associated System Capacity Contribution metrics to ensure power system adequacy is being considered in the Regional Portfolio Model (RPM) resource strategy decisions.

The initial results presented by Bonneville to staff have has several differences in approach when compared to the Seventh Power Plan. While the following observations are not necessarily true of what will be included in Bonneville's draft Resource Program, they are informative for the Council members in starting a conversation with Bonneville about the current work on the needs assessment.

First, the needs assessment does not focus on a single-hour capacity need, but rather a consecutive 3-day event featuring six extreme load hours each day. This differs from the Council's development of an Adequacy Reserve Margin for Capacity (ARM_C), which conveys to the RPM capacity required to ensure the system meets the Council's 5 percent LOLP adequacy standard.

Second, Bonneville evaluates energy adequacy based on 1937 critical water conditions, while the Council focuses on energy required to meet the Council's adequacy standard through the Adequacy Reserve Margin for Energy (ARM_E).

Third, Bonneville uses detailed hydro modeling in the Needs Assessment; much like the Council does with GENESYS in the Adequacy Assessment. However, Bonneville does not pass any information about dynamic nature of the hydro system to shape the system to meet their needs after the addition of new resources. This differs from the Council approach of calculating an Associated System Capacity Contribution (ASCC), which calculates the capability of the hydro system interact with different new resources to make a system adequate. The ASCC is a way of crediting or penalizing a resource's capacity contribution based on how they help the hydro system meet adequacy needs.

Conservation Potential Assessment

Danielle Walker will present on Bonneville's conservation potential assessment (CPA). The study estimates the amount and cost of technically-achievable conservation potential for the Bonneville service area for 2020 to 2039.

The Bonneville CPA was conducted using the energy efficiency measures, ramp rates, and cost assumptions from the Council's Seventh Plan. Bonneville replaced regional estimates with Bonneville-specific estimates of the number of residential customers, the commercial floor area, and industrial loads. Key customer characteristics that influence conservation potential, like space- and water-heating fuel shares were also updated where data were available to differentiate between Bonneville territory and the region. Most characteristics adjustments were made in the residential sector where data from the Residential Building Stock Assessment could be used to differentiate key characteristics of residential customers between Bonneville and the region. For the other sectors, fewer data are available to make similar differentiation. In the commercial and industrial sectors, conservation estimates for Bonneville are similar to Seventh Plan estimates adjusted for Bonneville's share of regional electric sales. For the agricultural sector, differentiation is based on portion of farms by zip code, derived from the USDA Census of Agriculture.

One of the significant differences between the Council Plan and the Bonneville CPA, is the shift in the study timeframe start date from 2016 to 2020. The ramification of this timeframe shift is that Bonneville is using a significantly different baseline from the Council plan for both its conservation potential and its load forecast. Bonneville's conservation assessment removes forecast 2016-2019 conservation accomplishments and federal standards – including the expanded EISA lighting standards – that were not enacted at the time of the 7th Plan. This is appropriate for a 2020-2039 time frame and it reduces conservation potential relative to the Power Plan. Corresponding reductions should also be reflected in the Bonneville's load forecast.

To accommodate the start date time-shift Bonneville updated cost and savings information from measures that have been through review by the Regional Technical Forum (RTF) since the Plan's release, up to September 2017. Bonneville's CPA includes one new measure adopted by the RTF since the Seventh Plan; however, it did

not capture all new measures now available to programs. Additionally, significant cost reductions that have occurred for residential and commercial LED lighting and heat pump water heaters that were reviewed by the RTF since September 2017 are not in the Bonneville analysis. Thus levelized costs for these measures, which are a large part of the supply curve, are higher than actual levelized costs today.

Demand Response Potential Assessment

Lee Hall will present on Bonneville's recently completed demand response potential study. The study's scope includes Bonneville's public power portion of the region, divided into east and west of the Cascades. The study estimates the amount of technically achievable potential over 20 years (2020-2039) from demand response resources (DR) for both regions for summer and winter. The achievability is based on benchmarking with other regions as well as on the companion barriers study that was presented to Power Committee in December 2017. Like the conservation potential assessment, this DR potential assessment will help inform Bonneville on what products and programs they may want to pursue for long-term planning (through the Resource Program) as well as for meeting locational capacity needs. The potential assessment includes a wide-range of DR products.

Differences from the Seventh Power Plan include the type of DR products assessed and the valuation of costs and benefits of DR. The Seventh Plan only included firm (i.e. controllable) DR, while the BPA study also considers non-firm (i.e. tariff-based) DR, expanding the options considered in the resource program. On the valuation side, Bonneville's levelized costs will be relatively higher than those in the Council's plan. In the Seventh Plan, the Council decided not include the entire incentive amount into the levelized cost calculation. The idea was that part of the incentive is meant to offset loss of utility by the end-use customer, so is considered a transfer payment. BPA is including the full incentive amount, which reflects more of a utility cost test, rather than the total resource cost test. Another difference is the Seventh Plan included the value of deferred transmission in the levelized cost, while BPA is not incorporating, based on review of draft results.

Relevance: The Resource Program is an inquiry by Bonneville into needs and resource possibilities at a level of detail and specificity the Council has not gone into in the power plan. The Council's ultimate interest under the Act is in seeing Bonneville make resource decisions that are as consistent as can be with the Council's power plan, even as Bonneville takes that inquiry into more specificity.

Workplan: Monitor and Report to Council on BPA Resource Program. Action items BPA-2, BPA-4, ANLYS-11.