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VIA EMAIL

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RE: Comments on Issue Paper re Proposed High Level Indicators of Progress on the Pacific Northwest Electric Power Planning and Conservation Act's Power Plan Goals

Renewable Northwest appreciates the opportunity to comment on the Northwest Power and Conservation Council's ("Council") issue paper titled "Proposed High Level Indicators of Progress on the Pacific Northwest Electric Power Planning and Conservation Act's Power Plan Goals" (the "Indicators Paper"). The Indicators Paper seeks comment on whether the proposed high-level indicators for the Council's Power Plan provide objective and meaningful measures of progress toward the goals set forth in the Pacific Northwest Electric Power Planning and Conservation Act (the "Act"). Our comments focus on the proposed metrics regarding renewable resource development, adequate power supply, reliable power supply, and carbon dioxide emissions.

I. Renewable Resource Development Metrics

One of the purposes of the Act is to encourage the development of renewable resources within the Pacific Northwest. As part of the effort to assess the region's progress toward carrying out this purpose of the Act, the Indicators Paper proposes three metrics related to renewable resource development: (1) cumulative renewable resource development since the Act's passage; (2) annual renewable resource contribution to total load service; and (3) annual trends in renewable resource costs. In general, these metrics do a decent job of measuring how much new renewable energy has been built in the Pacific Northwest since the Act's passage; however, they do not provide a complete picture. In order to effectively assess the region's progress in this area, the Council should establish metrics that help to inform whether the Power Plan has led us in the direction of choosing new renewable resources, and whether barriers to new renewable resources exist in the region that make it more difficult to meet the Power Plan's goals. To this end, we suggest some refinements to the proposed metrics as well as certain additional metrics.

With respect to the proposed metric on annual renewable resource contribution to total load service, we agree with the Council that *existing* renewable resources, such as hydroelectricity, should not be included in the calculation because the purpose of this set of metrics is to track progress on *new* renewable resource development since the Act's passage. At the same time, we agree with the NW Energy Coalition that the Council should track efficiency improvements to existing hydropower facilities, and that the Bonneville Power Administration is

well positioned to provide this information to the Council—at least for efficiency upgrades to federal hydroelectric generating facilities.

With respect to the proposed metric on annual trends in renewable resource costs, we are unclear as to what exactly this is measuring and whether it is relevant as an indicator. We assume that the Council's intent is to use the downward trend in capital costs for wind generation as a proxy for renewable resource costs. Though the decrease in capital costs of wind resources reinforces the notion that wind energy is a cost-effective resource that should be included in the Council's Power Plan, it is unclear to us whether this downward trend in costs is a useful metric for evaluating progress toward the Act's purposes. For example, this metric does not shed light on the question of whether we are accessing the least-cost renewable resources available to the region, especially when considering integration costs and the benefits associated with a diverse renewable energy portfolio.

If the Council decides to adopt this metric, at a minimum, we recommend that wind generation costs not be used as a proxy for all renewable resources. For solar photovoltaic ("PV") generation in particular, the Council should not wait until the resource begins to contribute material shares of regional power to add cost-trackers for the resource. Both the capital costs of solar PV and the costs of the energy it produces have been falling rapidly in recent years and warrant the observation of the Council. A useful data source would be the U.S. Department of Energy's historic, recent, and near-term projections for photovoltaic system pricing trends.[1] Another useful set of data is the Western Electricity Coordinating Council's ("WECC") recommended capital costs of power generation technologies.[2]

We propose three additional renewable resource development metrics for the Council's consideration. First, we recommend that the Council include in its metrics an analysis of how much cost-effective new renewable energy is constrained by a lack of transmission access. The Council already considers transmission cost adders for certain new renewable resources (e.g., Montana wind), but we think a more rigorous analysis of the cost of new renewable resources coupled with any requisite transmission upgrades or new builds would provide significant value in evaluating progress towards the Act's purposes.

Second, we recommend that the Council include a metric that analyzes the geographical diversity of renewable resources in the region. As with the above-described metric on access to transmission, this diversity analysis is regional in nature, and thus, is squarely within the Council's purview. Moreover, such an analysis would be fairly straightforward, as it could entail plotting the locations of regional renewable generating facilities on a map and then providing a qualitative analysis of the diversity (to the extent that there are constraints on performing a quantitative analysis).

[1] U.S. Department of Energy, Sun Shot, "Photovoltaic System Pricing Trends: Historic, Recent, and Near-Term Projections—2014 Edition," (Sept. 22, 2014), *available at* www.nrel.gov/docs/fy14osti/62558.pdf.
[2] Western Electric Coordinating Council, "Capital Costs of Power Generation Technologies—Recommendations for WECC's 10- and 20-Year Studies," (Mar. 2014), *available at* www.wecc.biz/Reliability/2014_TEPPC_Generation_CapCost_Report_E3.pdf#search=E3.

Third, we recommend that the Council include a metric that compares in dollars per megawatt-hour ("MWh") the regional renewable resource integration costs—particularly, wind and solar integration costs—to the integration costs in other regions. Such a metric is important to include, as it would also help identify potential barriers to new renewable resources being developed in the region to meet the Plan's goals. Inclusion of this metric may not require much in terms of new analysis, as the Council could synthesize the cost data included in other reports.[3]

II. Adequate Power Supply Metrics

The Council proposes to use the historical trend in its annual Resource Adequacy Assessments as the metric for measuring whether the Pacific Northwest is maintaining an adequate power supply. Assessing the adequacy of the power supply is central to one of the Act's purposes. It seems reasonable to continue to use the Loss of Load Probability ("LOLP") and the Council's Resource Adequacy Assessments in measuring regional power supply adequacy.

III. Reliable Power Supply Metrics

With respect to the Act's purpose of ensuring a reliable power supply, the Council proposes to use a metric that tracks the availability of generating resources to meet Northwest loads. It is our understanding that "availability" and "capacity factors" are already factored into the Council's adequate power supply metric as part of the LOLP assessment. Assuming this is true, we do not see what additional value the proposed "availability" metric would provide.

Looking around the WECC region, the largest outage in recent memory that had significant impacts on end-use customers was the event that occurred on September 8, 2011, in Arizona and Southern California. Instead of using the proposed availability metric, the Council should use the "Causes and Recommendations" report prepared by the Federal Energy Regulatory Commission and the North American Electric Reliability Corporation as guidance for how to assess the reliability of the Northwest power supply.[4] For example, page 7 of the report summarizes the importance of external visibility across Balancing Areas, the use of real-time tools to monitor internal and external contingencies, and communication among entities to maintain situational awareness. These and other capabilities identified in the report are appropriate metrics for assessing the reliability of the Northwest power supply. The Council could partner with regional transmission planning and reliability organizations to conduct this assessment.[5]

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[3] *See, e.g.,* K. Porter et al., "A Review of Variable Generation Integration Charges," U.S. Department of Energy – National Renewable Energy Laboratory (Mar. 2013), *available at* http://www.nrel.gov/docs/fy13osti/57583.pdf; Xcel Energy Inc. and EnerNex Corp., "Public Service Company of Colorado 2 GW and 3 GW Wind Integration Cost Study," (Aug. 19, 2011), *available at* https://www.xcelenergy.com/staticfiles/xe/Regulatory/Regulatory%20PDFs/ PSCo-ERP-2011/Attachment-2.13-1-2G-3G-Wind-Integration-Cost-Study.pdf.

[4] Federal Energy Regulatory Commission and North American Reliability Corporation Staff Report, "Arizona–Southern California Outages on September 8, 2011: Causes and Recommendations" at 5-7 (Apr. 2012), *available at* https://www.ferc.gov/legal/staff-reports/04-27-2012-ferc-nerc-report.pdf.

[5] These organizations include WECC, Peak Reliability, ColumbiaGrid, and Northern Tier Transmission Group.

In the future, the best way to ensure that the Council's Power Plan is reliable would be to conduct an iterative cost–reliability analysis in partnership with ColumbiaGrid and Northern Tier Transmission Group. In concept, the Council would run the production cost model and provide the transmission planners with a set of least-cost resource assumptions; the transmission planners would then run power flow models based on those resource assumptions and report back to the Council on any transmission issues and associated costs. This new cost information would then be used to update the Council's resource cost assumptions and could be incorporated on an iterative basis.

IV. Tracking of Carbon Dioxide Emissions

Among the questions posed by the Council in the Indicators Paper is whether the Council should track carbon dioxide emissions per MWh of electricity production. Regardless of the methodology the Council adopts to model 111(d),[6] the Council should track the greenhouse gas ("GHG") emissions per MWh of electricity production. This tracking should include the GHGs directly attributable to the excavation/mining/drilling, processing, and transportation of fossil fuels (both coal and natural gas), as well as the GHGs released during their combustion.

The effect of different GHGs on the climate can be determined by considering their "direct global warming potentials," which indicate the relative power of these gases to capture heat in the atmosphere (usually over 100 years). The United Nations' Intergovernmental Panel on Climate Change surveys the internationally available data and publishes a list of the various GHGs along with their "carbon dioxide equivalences."[7]

For example, over a hundred year timescale, one ton of methane added to the atmosphere would lead to the same amount of global warming as 25 tons of carbon dioxide—i.e., methane is 25 times more potent a greenhouse gas than carbon dioxide over a 100 years.[8] Given this, it is clear that methane leakage from coal mining, gas drilling, hydraulic fracturing ("fracking") and gas transportation can have a significant global warming effect. Recent research on this topic suggests that, given the strength of methane as a global warming greenhouse gas, for natural gas combined cycle power plants to reduce climate impacts compared to efficient coal plants, the leakage rate from the gas-well to the power station has to remain as low as 3.2%.[9] The same paper reports that the Environmental Protection Agency in 2011 calculated the amount of "fugitive" methane emissions between the well and the natural gas distribution system, finding that it represented as much as 3.1% of total production.

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[6] We discuss the methodology in our separate comments on the Council's Issue Paper regarding the "Methodology for Determining Quantifiable Environmental Costs and Benefits."

[7] Intergovernmental Panel on Climate Change, Direct Global Warming Potentials, www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html.

[8] If a 25-year timescale is used, methane is 72 times more potent during that period.

[9] Ramon A. Alvarez and Stephen W. Pacala et al., "Greater focus needed on methane leakage from natural gas infrastructure," Proceedings of the Natural Academy of Sciences of the United States of America, (Feb. 2012), *available at* www.pnas.org/content/109/17/6435.

V. Conclusion

Thank you for the opportunity to comment on the Indicators Paper. We are happy to answer questions about our comments and to participate in further discussions about the proposed metrics.

Sincerely,

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