

Methodology for Determining Quantifiable Environmental Costs and Benefits

Comments of the *NW Energy Coalition*

October 31, 2014

Introduction: Applying the Environmental Methodology

Section 4(e)(3)(C) of the NW Power Act requires the NW Power and Conservation Council (Council) to include a methodology for determining quantifiable environmental costs and benefits in its power plans. The Act further specifies that the plan should include all direct costs including quantifiable environmental costs and benefits directly attributable to a resource. This document contains the recommendations of the NW Energy Coalition pursuant to the public comment opportunity on the Council's Issue Paper entitled *Methodology for Determining Quantifiable Environmental Costs and Benefits* (Issue Paper).

Some discussions at the Council have indicated a narrow interpretation of the environmental methodology, applying it only to new resources. The Issue Paper does not discuss this issue directly, but in certain places seems to indicate a preference for applying the environmental methodology only to new resources, although these references are inconsistent.

The Coalition asserts that applying the environmental methodology only to new resources is not a prudent interpretation of the Council's planning responsibilities under the Act. Reading all relevant sections of the Act together, it should cover both. In fact, references from the Act relevant to this issue support consideration of the environmental costs and benefits of both existing and new resources.

839. Congressional declaration of purpose

The purposes of this chapter, together with the provisions of other laws applicable to the Federal Columbia River Power System, are all intended to be construed in a consistent manner. Such purposes are also intended to be construed in a manner consistent with applicable environmental laws. Such purposes are: . . .

839(3)(A). the development of regional plans and programs related to energy conservation, renewable resources, other resources, and protecting, mitigating, and enhancing fish and wildlife resources. [Northwest Power Act, §2(3)(A), 94 Stat. 2697.]

839(3)(B). facilitating the orderly planning of the region's power system, and [Northwest Power Act, §2(3)(B), 94 Stat. 2698.]

839(3)(C). providing environmental quality; [Northwest Power Act, §2(3)(C), 94 Stat. 2698.]

*839a(4)(A). "Cost-effective", when applied to **any measure or resource** referred to in this chapter, means that such measure or resource must be forecast-839a(4)(A)(i). to be reliable and available within the time it is needed, and [Northwest Power Act, §3(4)(A)(i), 94 Stat. 2698.]*

*839a(4)(B). For purposes of this paragraph, the term "system cost" means an estimate of all direct costs of a measure or resource **over its effective life**, including, if applicable, the cost of distribution and transmission to the consumer and, among other factors, waste disposal costs, end-of-cycle costs, and fuel costs (including projected increases), and such quantifiable environmental costs and benefits as the Administrator determines, on the basis of a methodology developed by the Council as part of the plan, or in the absence of the plan by the Administrator, are directly attributable to such measure or resource. [Northwest Power Act, §3(4)(B), 94 Stat. 2698-9.]*

*839a(19). "Resource" means-839a(19)(A). electric power, including the **actual or planned** electric power capability of generating facilities, or [Northwest Power Act, §3(19)(A), 94 Stat. 2700.]*

*839a(19)(B). **actual or planned** load reduction resulting from direct application of a renewable energy resource by a consumer, or from a conservation measure. [Northwest Power Act, §3(19)(B), 94 Stat. 2700.]*

In fact, at least in the area of existing compliance costs, the Council already has a demonstrated history updating relevant regulatory costs to existing generating resources, such as the costs for hydropower operations consistent with the current Council Fish and Wildlife program. To create a regional power plan without updating all costs according to the current environmental methodology would be inaccurate. It is appropriate to apply the environmental methodology to all resources in the plan and update known costs with each new plan. Of course, there are instances where statutory and regulatory effects on new resources are different (e.g., EPA's 111(d) and 111(b) regulations). Unless such specific differentials are identified from specific statutes or regulations, there should be no distinction between new and existing resources when updating the environmental methodology for planning purposes.

The Council could not provide an adequate analysis of the region's power system without integrating current known and updated predictive costs for all resources – new and existing. Most utility planning processes in which we participate update costs and benefits of all resources. All information including price forecasts, load

forecasts, maintenance and environmental compliance costs, etc. must be up-to-date for an accurate resource plan. Particularly in this recent era of increasing regulation on coal generating units, it is critical that the region understand the costs associated with dispatch and continued operation of these plants to provide a clear picture of how long and how much we should rely on the power generation to serve the region. Failing to integrate these costs will result in significant price and resource adequacy inaccuracies.

The following sections detail the Coalition's recommendations relevant to the establishment of the Council's methodology for determining quantifiable environmental costs and benefits for the 7th Plan. These comments follow the outline provided in the Council Issue Paper.

II. Costs of Compliance with environmental regulations

In past plans, the Council included environmental compliance costs for all resources in the plan. The Coalition agrees that this practice should continue.

Furthermore, costs of compliance used in the Power Plan analysis should be clearly distinguishable; in other words, applied costs should be attributed to the relevant regulatory source. The methodology used to apply these costs to new and existing resources in the modeling should be explained. Finally, regulatory costs utilized in the plan should be documented and available to stakeholders reviewing the Plan. Where possible, we suggest the use of cost estimates from dockets and utility planning within the region rather than national generic cost estimates.

III. Specific Issues for Comment

1. Residual environmental effects beyond regulatory controls

The Act is clear that residual environmental effects beyond those addressed directly through regulation should be considered; however, no direction is provided to guide the Council's implementation of this requirement. In the past, the Council has recognized that residual environmental effects should be considered, but has not identified sufficient information in order to do so.

Residual environmental effects should include the costs associated with the risk of species extinction and, consistent with the requirement that existing resources be included in the methodology, the costs associated with the effects of existing resources on depressed fish and wildlife populations. It also includes other environmental effects such as air and water contamination, including health costs directly associated with said environmental effects, and greenhouse gas emissions.

Residual environmental effects should be included in the Power Plan analysis to the extent possible. The Power Plan utilizes a least cost/least risk resource planning

approach. While short-term cost is a relatively straightforward component to measure, risk proves more daunting to resource planners. Known residual effects of conservation and generating resources represent some element of future risk. We know environmental harm is occurring and costs are accruing to society as a result and will most likely be paid for by future power system customers. Incorporating residual environmental effects into power planning is a quantifiable method for assessing future risk attributable to the operation of a particular type of resource and consequently improves the long-term accuracy of the plan.

Reasonable methods for quantifying the costs of residual effects are difficult to provide. There are numerous established methodologies for estimating environmental effects, such as hedonic pricing and contingent valuation. However, they have significant limitations and the recent trend is toward simplified approaches such as the benefit transfer method (used by WECC for evaluating environmental costs and benefits for new transmission; see attached resource list).

One area where specific, usable values have emerged in recent years is carbon emissions. For carbon emissions, the Council could utilize the federal social cost of carbon, which includes a comprehensive quantification of environmental effects. These values are not limited to residual effects, but include a comprehensive price for all known and quantifiable environmental effects from carbon emissions. Our recommended approach in the area of carbon emissions is discussed below in the next section.

2. Environmental effects of resources not yet subject to regulatory control

Greenhouse Gas Emissions

The Coalition recommends that the Council utilize a value that quantifies the environmental effects of carbon emissions from new and existing generating resources in the 7th Plan. Specifically, we recommend utilization of the federal social cost of carbon (SCC) (moderate value, based on the 3% discount rate analysis)¹.

The Federal social cost of carbon (SCC) is an estimate of the economic damages associated with an increase in carbon dioxide (CO₂) emissions. Federal government agencies utilize the SCC in rulemaking proceedings to quantify the environmental benefits of federal regulations that reduce carbon emissions. The SCC is regularly updated by the federal government and provides a carbon value by year. These elements make the SCC an effective measure of the environmental effects of generation resources.

It is important to note that the SCC does not quantify all damages from carbon emissions, due to current modeling and data limitations. The Intergovernmental Panel on Climate Change noted in its Fifth Assessment Report notes that the SCC

¹[Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Table A1, Interagency Working Group on Social Cost of Carbon, November 2013,](#)

likely underestimated damages. Even with these limitations, the SCC represents a comprehensive, federal assessment of the costs of carbon emissions that can effectively capture direct environmental effects of carbon emissions in the 7th Power Plan.

To clarify, the Coalition recommends the use of the social cost of carbon instead of modeling the Environmental Protection Agency's proposed 111(b) and 111(d) regulation in the base case of the 7th Power Plan. Previously, the Coalition recommended modeling the EPA draft regulations in the base case of the plan. During the public comment period of the October 2014 Council meeting, we engaged in a discussion of this recommendation with Council members. Members of the Council expressed concerns regarding the uncertainty and timing of the complicated draft regulations with the 7th Power Plan. After reflecting upon this discussion, the Coalition decided a different approach might be warranted, especially given the timing of the 7th Plan analysis and the date for the final rule.

The environmental methodology from the 6th Plan states “...where serious policy discussions are underway to change regulations, the Council attempts to reflect the potential changes in its planning.”(Sixth Power and Conservation Plan, Appendix P, Pg. 3) Read literally, this would be interpreted as an obligation to incorporate 111(d) and 111(b) draft regulations in the 7th Plan as a direct cost, rather than a risk factor. The Coalition asserts, however, that the social cost of carbon is a better method to incorporate the “potential changes” for several reasons. First, the SCC reflects a calculated estimate of specific costs that can serve as a proxy given the uncertain timing and scope of 111(d). Additionally, the SCC includes residual effect – something that has proven difficult for the Council to quantify in the past. The SCC offers the Council a comprehensive approach to adequately insert carbon costs, using values established by the Federal government, representing existing regulations, future regulations, and residual values as we know them today.

In the 6th Plan, the Council utilized a carbon price as a proxy for future expected costs of carbon emissions. Although no federal regulations have been passed to date, other regulations emerged that had a similar level of constraint on carbon emissions from coal plants. These regulations include: 1) state policies that have eliminated construction of new coal-fired generating facilities as an option for meeting future resource needs and 2) U.S. Environmental Protection Agency Mercury and Air Toxics Standards (MATS) that regulate mercury, arsenic and other toxic air pollutants on coal and oil-fired generating units greater than 25 megawatts. MATS, along with other regulations related to existing coal generating facilities, led to the closure of approximately the same level of coal-fired units assumed in the 6th Plan analysis. Proxy values served a valuable predictive purpose in the 6th Plan and this approach, utilizing a federally established value, seems appropriate for the 7th Plan.

The Coalition also notes that the carbon value for western interconnection transmission planning recently adopted by the Western Electricity Coordinating Council is at a level (\$52/short ton in 2034) similar to the moderate federal SCC

analysis. WECC staff assessed the federal SCC along with other recent western analysis including the California Energy Commission's estimate of the future range of carbon prices in the AB 32 cap-and-trade program, the Council's previous carbon assessments, LBNL, Synapse and utility IRPs.²

The Coalition recommends that in addition to utilizing the SCC as a direct cost in the base calculations for the 7th Plan, the Council run at least one or more scenarios to test regional compliance issues specific to 111(d) regulation. This will enable us to at least begin to understand how the 111(d) specific regulations will impact the region's power system, while avoiding the introduction of a high level of uncertainty in the base case for the plan. Additionally, the Council will have time to conduct scenario analysis once the final rule is completed.

In addition to utilizing the social cost of carbon in the base case for the plan, the Coalition recommends that the Council run high and/or tail-risk cases for carbon, and could use, for example, the federal SCC 3% discount rate/95% confidence level values in these model runs.

Fracking

The 7th Plan should also attempt to capture foreseeable future costs from fracking (non-CO2 costs) regulations, including water quality issues. The existing New Source Performance Standards "green completion" regulations should be factored into the 7th Plan analysis. Additionally, it is commonly understood that these regulations will not capture all of the environmental costs from fracking; consequently, the 7th Plan analysis should incorporate the risk and potential costs of future additional regulations on fracking extraction activities.

3. Quantifiable environmental benefits

Quantifying the environmental benefits of resources is critically important in the Council's power plan, particularly in the case of energy efficiency resources.

The plan evaluates energy efficiency resources on a total resource cost (TRC) basis as a result of the comprehensive definition in the Act. One of the reasons the TRC test has proven so useful is because it addresses cost-effectiveness from a broad perspective, helping to determine whether the benefits of conservation outweigh the costs for the entire service territory. This allows energy efficiency resources to be evaluated alongside supply side resources.

In order for the TRC to be most accurate, it needs to properly account for both the cost of energy efficiency measures as well as all of the participant benefits. The

² Carbon Price Forecast Discussion, WECC Data Working Group, August 7, 2014.

Regulatory Assistance Project and others³ have found that the TRC frequently fails to account for all of the measure benefits, which provides skewed and misleading results that tend to undervalue efficiency.⁴ These non-energy benefits, also referred to as ‘Other Program Impacts’ (OPIs), can be difficult to quantify.

Although the Council has sought to include all quantifiable benefits, we know there are significant benefits that are missing from the current equations. The Coalition strongly supports efforts to quantify known benefits (see attached list of resources for quantifying environmental benefits of energy efficiency resources). This benefits analysis should be done on a full fuel basis – in other words if environmental benefits or fuel reduction occurs outside of the electric sector, benefits should be counted.⁵ Similarly, if greater reliance on energy efficiency or renewable resources would also provide benefits to fish and wildlife (by, for example, reducing reliance or demand for resources that cause environmental harm), those benefits should be included and captured by the methodology.

It is important to clarify that while we encourage the quantification of environmental benefits in cost effectiveness calculations for energy efficiency measures, this does not mean that the power (utility) system should have to pay for all of these benefits. Because the TRC measures the cost to the power system and the consumer, benefits should be broader than just those benefits that accrue directly to the power system.

The recent Council work on the Wood Smoke Study is one example of the groundbreaking work in this area that should be strongly supported by the environmental methodology adopted by the council for the 7th Plan.

In the event that benefits can’t be quantified, the Council may consider establishing proxy values for specific benefits that we know exist but can’t be directly quantified based on current research (e.g. health benefits).

4. Environmental effects of new renewable resources

For the majority of renewable resources, it is unnecessary for the Council to quantify resource compliance costs. The environmental compliance costs of existing regulations are already embedded in the power cost for the main renewable generating resources included in the Power Plan. Resource prices for wind, solar

³ See, Lawrence Berkeley National Laboratory, [Assessing Natural Gas Energy Efficiency Programs in a Low-Price Environment](#), April 30, 2013 and California Public Utilities Commission. [Addressing Non-energy Benefits \(NEBs\) in the Cost-effectiveness Framework](#), June 2012.

⁴ Regulatory Assistance Project, [Energy Efficiency Cost-Effectiveness Screening: How to Properly Account for ‘Other Program Impacts’ and Environmental Compliance Costs](#), November 2012

⁵ The Coalition is aware of the constitutional prohibition against fuel switching in Washington and is not urging the Council to recommend such measures.

and other renewable resources include costs associated with wildlife monitoring, habitat mitigation costs, and impacts on threatened and endangered species.

The Council should, however, in its environmental methodology, clearly discuss the environmental effects from renewable resources and discuss how these costs are already included in the resource costs utilized in the plan.

Other renewable resources do have environmental effects that are not currently included in the resource price. Biomass, for example, has criteria air pollution effects – some of which are covered by existing regulation and some of which are residual. The Council should include costs associated with known environmental regulations governing these generating resources and should strive to include costs associated with residual effects as well.

a. Should the Council support/lead a region-wide approach to assess siting for renewable resources?

Siting for renewable resources is an important factor for determining energy and capacity values of a resource, as well as from an environmental impact perspective. There is already a tremendous amount of work going on at the federal, regional, state and local levels in the area of renewable resource siting. The Council should coordinate with state agencies and other entities undertaking this work to gather information relevant to the Power Plan. However, at this time the Coalition does not urge the Council to undertake a region-wide effort to assess the suitability of sites for new renewable resources.

Suggested Resources

California Public Utilities Commission. [Addressing Non-energy Benefits \(NEBs\) in the Cost-effectiveness Framework](#), June 2012.

The CPUC Energy Division is holding a series of workshops to update their cost-effectiveness framework, with a goal of ensuring that the costs and benefits of demand-side resources are accurately represented. This paper walks through various options for addressing NEB's within cost-effectiveness tests, with a particular focus on the TRC and PAC/UCT. Table 3 on p. 8-9 analyzes how an example project would fare under several different valuation scenarios.

Lawrence Berkeley National Laboratory, [Assessing Natural Gas Energy Efficiency Programs in a Low-Price Environment](#), April 30, 2013.

The second working paper published by LBNL takes a deeper dive into policy options for preserving natural gas efficiency programs. It focuses on economic, environmental and societal benefits that are traditionally underrepresented in current cost-benefit analyses and discusses potential screening policy changes based upon the key factors identified in their initial paper.

New Zealand Centre for Sustainable Cities. [Evaluation of the Warm Up New Zealand: Heat Smart programme](#), May 2012.

The New Zealand government has funded a \$340 million, multi-year program for insulation retrofits and clean, efficient heating grants. The Ministry of Economic Development commissioned a cost-benefit analysis of the program, which is broken into four separate papers that can be found at the link above: Cost Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme, Warming up New Zealand: Impacts of the New Zealand Insulation Fund on metered household energy use, The impact of retrofitted insulation & new heaters on health services utilization & costs, pharmaceutical costs & mortality, and Impacts of the NZ Insulation Fund on industry & employment. The health benefits in particular drove highly positive cost benefit ratios.

Optimal Energy, Inc. and Synapse Energy Economics, Inc., [Economic Impacts of Energy Efficiency Investments in Vermont—Final Report](#), August 17, 2011

Vermont has done some of the most progressive work in valuing non-energy benefits, including measuring the overall economic impact of their efficiency investments.

Regulatory Assistance Project, [Energy Efficiency Cost-Effectiveness Screening: How to Properly Account for 'Other Program Impacts' and Environmental Compliance Costs](#), November 2012.

This paper makes the case that cost effectiveness screening tests often do not capture the full value of efficiency resources, which leads to under-investment. Particular focus is given to non-energy benefits, environmental compliance costs and the choice of discount rate. The link above also features a webinar recording that provides an overview and discussion of the main concepts presented in this paper.

Tetra Tech, *Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy*

Impacts (NEI) Evaluation, August 15, 2011.

[http://www.rieermc.ri.gov/documents/evaluationstudies/2011/Tetra Tech and NMR 2011 MA Res and LI NEI Evaluation\(76\).pdf](http://www.rieermc.ri.gov/documents/evaluationstudies/2011/Tetra_Tech_and_NMR_2011_MA_Res_and_LI_NEI_Evaluation(76).pdf)

[*Methods for Incorporating Economic Values of Environmental Features/Areas in Transmission Planning*, ICF International, report for the WECC Environmental Data Task Force, November 2011.](#)

[*Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*, Interagency Working Group on Social Cost of Carbon, November 2013,](#)

[K. Arrow, M. Cropper, C. Gollier, B. Groom, G. Heal, R. Newell, W. Nordhaus, R. Pindyck, W. Pizer, P. Portney, T. Sterner, R.S.J. Tol & M.L. Weitzman, *Determining Benefits and Costs for Future Generations*, 341 Science 349 \(2013\).](#)

Cost of Carbon for Regulatory Impact Analysis under Executive Order No. 12,866. Comments submitted by: Environmental Defense Fund, Institute for Policy Integrity at New York University School of Law, Natural Resources Defense Council, and Union of Concerned Scientists, February 26, 2014.