

Bill Bradbury
Chair
Oregon

Henry Lorenzen
Oregon

W. Bill Booth
Idaho

James A. Yost
Idaho



Northwest Power and Conservation Council

Jennifer Anders
Vice Chair
Montana

Pat Smith
Montana

Tom Karier
Washington

Phil Rockefeller
Washington

September 10, 2014

Dear Interested Party:

The Council invites your comments on the accompanying issue paper on quantifying the environmental costs and benefits of generating and energy efficiency resources.

The Council has begun work on its Seventh Power Plan, which provides guidance to the region on resource development. The Northwest Power Act requires that the Council include in the power plan a method for determining quantifiable environmental costs and benefits and use that method in its analysis of new resource costs.

The issue paper highlights key issues and seeks comments to help determine the appropriate methodology to use in developing the Seventh Power Plan. The Council expects to release a draft plan next fall, at which time the public will have another opportunity to comment.

Comments may be submitted to comments@nwcouncil.org or by mail to the Council's address below through October 31, 2014. You can also arrange to meet with staff if you prefer to provide comments in person.

Thank you for your interest in the Council and its work.

Sincerely,

Steve Crow
Executive Director

Enclosure: Issue Paper: Methodology for Determining Quantifiable
Environmental Costs and Benefits

Bill Bradbury
Chair
Oregon

Henry Lorenzen
Oregon

W. Bill Booth
Idaho

James A. Yost
Idaho



Northwest Power and Conservation Council

Jennifer Anders
Vice Chair
Montana

Pat Smith
Montana

Tom Karier
Washington

Phil Rockefeller
Washington

Seventh Power Plan

Issue Paper: Methodology for Determining Quantifiable Environmental Costs and Benefits

September 2014

Introduction

The Northwest Power Act states that one of the required elements of the Council's power plan is "a methodology for determining [the] quantifiable environmental costs and benefits" of electric generating and conservation resources. Having a method for determining environmental costs and benefits is an important part of the Council's effort to estimate and compare the total costs of new resources and choose those that are the most cost-effective.

As the Council begins work on the Seventh Power Plan, some aspects of this methodology are clear, and others are open for consideration. The purpose of this issue paper is to highlight issues and considerations and seek comments on how they might be resolved by the Council. The Council will use these comments to help it decide on the methodology to include in the draft Seventh Power Plan and use to quantify environmental costs and benefits for the resource cost estimates in the draft plan. The public comment period on the draft power plan will provide another opportunity for comment on the methodology as well as on the results of its application.

This issue paper describes the relevant provisions of the Northwest Power Act; highlights the past and likely future central theme of the Council's methodology -- estimating the cost of complying with federal and state environmental regulations; and

Council Document # 2014-10

identifies four specific issues or considerations for comment. The four issues are (1) whether and how to account for the residual effects of resources on the environment after compliance with environmental regulations; (2) how to account for those environmental effects of new resources that are not yet subject to comprehensive regulatory control, especially carbon emissions; (3) how and to what extent to account for the environmental “benefits” of new resources; and (4) what is the appropriate way to account for the environmental effects of new *renewable* resources?

I. Relevant provisions of the Northwest Power Act

Section 4(e)(3)(C) of the Northwest Power Act specifies that the Council’s power plan is to include a “*methodology for determining quantifiable environmental costs and benefits under section 3(4)*.” The reference to Section 3(4) is to the Act’s definition of “cost-effective.” Under Section 4(e)(1) of the Act, the Council’s regional conservation and electric power plan is to “give priority to resources which the Council determines to be cost-effective.” The definition of “cost-effective” requires the Council to estimate and compare the “incremental system cost” of different generating and conservation resources. “System cost” is defined as:

“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.*”

Congress adopted these provisions at a time when natural resource policy was awash in considerations about the need to internalize environmental externalities when possible, to capture better the true costs to society of resource choices. The development and application of the methodology to quantify the environmental costs and benefits of resources is thus one critical part of the work the Council is required to do in the power plan when identifying the most cost-effective conservation and generating resources for the region’s power system.¹

¹ Note that the definition of “cost-effective” provides for the system cost estimates to include such quantifiable environmental costs and benefits “as the *[Bonneville] Administrator* determines” are directly attributable to the resource. That is, read strictly, the Council is to develop the methodology *in the final plan* first; then Bonneville is to use the methodology in the plan to determine what are the quantifiable environmental costs and resources to assign to particular resources, and then the Council is somehow to fold those environmental cost estimates into the total resource costs estimates necessary for the cost-effectiveness comparison of resource choices. Experience quickly showed this to be unworkable for the planning process, as it would make it impossible for the Council to prepare the power plan called for by Congress, the centerpiece of which is to be a conservation and generating resource strategy in which the resources are chosen on the basis of a cost-effectiveness comparison that begins by estimating all direct costs of the resources. In other words, the Council has to be able to develop *and apply* in the power planning process the methodology for

Key concepts embedded in the words of the Act are that the methodology is to consider costs and benefits to the “environment” as opposed to other types of costs; the costs and benefits have to be “quantifiable,” and not all environmental effects can be reduced to quantified costs and benefits; and the costs and benefits have to be part of the “direct” costs of the resource and “directly attributable” to the resource, not incidental or indirect. None of these terms is defined in the Act. In its power planning history the Council has applied a common-sense understanding of these terms, as guided by the context of the Act and the discussions in the legislative history. For the most part, whether and what costs are “environmental” in nature, or “quantifiable,” or “directly attributable” has been without significant controversy. But questions at the edge of the meaning of these concepts do occur, and at times the Council has to exercise its judgment and discretion in making these determinations.

If certain environmental effects of power resources cannot be quantified as costs or benefits, that does not mean these effects are irrelevant in the Council’s power planning process. Section 4(e)(2) separately calls for the Council to develop the scheme for implementing conservation measures and developing generating resources “with due consideration” for, among other things, “environmental quality” and the “protection, mitigation, and enhancement of fish and wildlife and related spawning grounds and habitat, including sufficient quantities and qualities of flows for successful migration, survival, and propagation of anadromous fish.” Environmental effects that cannot be quantified as hard resource cost estimates are still taken into consideration in some fashion through these provisions. This issue paper is focused on the methodology for determining quantifiable environmental costs and benefits.

II. Costs of compliance with environmental regulations

The primary element in the Council’s methodology for including quantifiable environmental costs in power planning has been to incorporate the estimated costs of compliance with existing environmental regulations in the capital and operating costs of conservation and generating resources. This has been central to the development and application of the methodology through the first six power plans, and without issue will be central in the Seventh Power Plan.

The Council’s planning assumes that all new generating resource alternatives will meet existing federal, state, tribal, and local environmental regulations. And so the Council includes in the resource cost estimates what the Council estimates to be the costs of regulatory compliance. This includes the costs of complying with regulations governing fuel extraction and production, air and water emissions, land use siting protections, waste

quantifying environmental costs and benefits, if the Council is going to be able to select the most cost-effective resources for the plan based on all direct costs. The description of the methodology in the draft Seventh Power Plan will describe both the proposed methodology and how the Council used that methodology in the resource cost estimates for the draft’s proposed resource strategy.

disposal, and fish and wildlife protection and mitigation. These reflect the environmental policy choices that already have been made by governments and society, and the costs are clearly direct and quantifiable.

III. Specific issues and considerations for comment

While general comments on the methodology for determining environmental costs and benefits are welcome, the Council is particularly interested in receiving comments on the following four issues or considerations. The Council has determined that these four issues are particularly relevant for the Council and the region for the Seventh Power Plan.

1. Residual environmental effects beyond regulatory controls. Compliance with existing environmental regulations reduces the potential effects of new resources on the environment, and the costs of that compliance can be quantified. Environmental regulation usually controls or mitigates for some portion, even a significant portion, but not all of the effects on the environment from a new resource.

The issue for the methodology is whether and how to consider any residual effects. Examples are obvious: Not all sulfur or mercury emissions from a coal-fired power plant are controlled by regulation; not all bird kills from wind turbine operations are prevented; not all the air emissions, land disturbances and water contamination from coal or uranium mining or hydraulic fracturing are prevented; not all effects on fish from a new hydropower resource are prevented or mitigated. The issue for the methodology is whether and how to consider any residual effects, and in particular whether these effects can be quantified as resource costs.

In most cases, the relevant regulatory body has determined that further reduction in environmental effects is not necessary to protect the public interests, or that the additional costs of further reduction significantly outweighs the benefits. So, one issue to consider is whether these residual effects are a damage or “cost” at all? It is equally possible to say that the relevant governments authorized to address these environmental effects have determined the environmental costs of these resources through regulation.

Even so, the Council has recognized in past power plan methodologies that residual environmental effects should be considered in power planning in some way. Quantification of these effects as resource costs is a different issue, however. The Council’s past experience has been that the methods and information have not been sufficient to allow for reasonable estimates of the costs to society of residual environmental effects that continue to exist after regulatory compliance. The issue going into the Seventh Power plan is whether that situation has changed in a material way: Will the Council be able to identify from existing information and methods the extent of residual environmental effects and assign reasonable environmental cost estimates to those effects?

Even if not quantifiable as part of the methodology, the Council still has to identify and take non-quantifiable residual environmental effects into account in some manner, as part of giving due consideration to environmental quality in deciding on the power plan's resource scheme. The issue is *how* to give these matters due consideration; the answers will likely be quite different and specific to the different resource effects.

Questions for comment:

- 1a Should the Council also consider, in crafting the methodology, the residual effects a resource might have on the environment after compliance with environmental regulations?
- 1b Are there reasonable methods for quantifying the costs of such effects?

2. Environmental effects of resources not yet subject to regulatory control, especially carbon dioxide emissions. If the Council's primary method for determining quantifiable environmental costs is to estimate the costs of compliance with regulatory controls, an obvious issue is what to do about environmental effects that are not yet the subject of a comprehensive scheme of environmental regulation. This was a major issue for the Council to address in the Sixth Power Plan with regard to carbon dioxide or carbon emissions from fossil-fueled generating plants, and clearly will be a primary issue again in the Seventh Plan. This issue is complicated by the fact that the "environmental costs and benefits" methodology applies by its logic to estimating the resource cost of *new* resources, while the issue of most interest in the region with regard to carbon emissions is how to reduce the emissions from the region's *existing* resources.

In the Sixth Power Plan, the Council considered how potential carbon policy scenarios might affect generating plant operations, deciding in the end to assume a future in which the cost of carbon emissions due to regulations could exist in a range from \$0 to \$100/ton. In each of the 750 "futures" modeled by the Council's regional portfolio model, the model selected a carbon price within that range (with a weighted average of \$47/ton) and applied that cost both to new generating resources and to the economic dispatch of existing resources. The Council's resource strategy also assumed utilities would comply with state renewable resource portfolio requirements, which dictated certain resource choices at the estimated cost of those resources. And finally, for the sake of comparison, the Council modeled a scenario that simply assumed the closing of half of the existing coal-fired generation in the region.

Now the Council is considering how to quantify the environmental effects of carbon emissions in the Seventh Power Plan, and whether and how to consider the costs. For the Seventh Plan the Council has to have an approach that allows it to assign environmental costs to new carbon-emitting resources for the purpose of the cost-effectiveness comparison to other new resources, and yet also allows the Council to help the region understand what it would cost to reduce or eliminate the carbon emissions of the existing system. The Council could use the same approach as in the Sixth Plan, or the Council could adopt an alternative approach.

Questions for comment:

- 2a A likely approach for the Seventh Plan, along with assuming continued compliance with state renewable portfolio standards, is to use regulations recently proposed by the U.S. Environmental Protection Agency to determine the environmental costs of carbon emissions. Under Section 111(b) of the Clean Air Act, EPA has proposed regulations to control the carbon emissions from *new* power plants. Should the Council estimate the costs of compliance with the 111(b) proposed regulations and use those estimates as the environmental costs associated with carbon emissions of new resources? If so, are there considerations and difficulties the Council should be aware of in developing cost estimates out of the proposed regulations?
- 2b Alternatively, should the Council use some other approach to develop environmental cost estimates for new carbon-emitting resources, such as the use of an environmental-damage or social-cost-of-carbon approach? (Note that the EPA developed its proposed regulations for both new and existing power plants using an incremental social-cost-of-carbon approach.)
- 2c EPA also proposed a complicated set of regulations under Section 111(d) of the Clean Air Act that individual states are to implement to reduce carbon emissions from the *existing* power system. While the Council does not propose to use the 111(d) draft regulations for estimating the environmental costs of new carbon-emitting resources, the region might benefit if the Council assumes, in at least some of its planning scenarios, that the existing power system must comply with the proposed 111(d) regulations. To do so should affect the amount and economic dispatch of existing carbon-emitting resources, require additional resources to make up the difference, and give the region insight into the effects and costs of compliance with Section 111(d) at a regional scale. The Council also could model other scenarios, including a scenario that does not include considerations of Section 111(d), as well as a scenario that simply assumes the elimination of some percentage or all of the carbon emissions from the region's power system and estimates the cost of that scenario as well. Should the Council consider in the planning process compliance with 111(d) regulations? If so, what scenarios should the Council run and why?
- 2d How should the Council deal with some of the uncertainties and complications of the proposed 111(d) regulations, such as the difficulty with the baseline used in the proposed rule, and the fact that this and other aspects of the proposed regulations may change in the final regulations, and the relationship of the regional approach to power planning by the Council to the state-by-state approach of the proposed regulations?

- 2e Alternatively, should the Council take a different approach (other than assuming compliance with 111(d)) to understand and factor in the carbon costs of the existing system?

3. Quantifiable environmental benefits. Under the Act, the Council's methodology is to be used to determine the quantifiable "environmental benefits" as well as environmental costs of new resources. With a couple of minor exceptions, the Council has not been able to identify or quantify the environmental benefits of new resources in past power plans. The most obvious example from past plans involved energy efficient dish and clothes washers, which also save on water and soap usage, directly to the benefit of the environment, savings that can be quantified in the resource cost estimates of the efficiency measures.

Questions for comment:

- 3a. Have methods and information developed in recent years that would allow for the quantification of environmental benefits to a broader degree for the resource cost estimates?
- 3b. Of most particular interest is whether the Council can and should factor into the costs of a *new* resource the "benefit" of being able to reduce some *existing* activity that has an environmental cost?² For example, installing energy efficiency measures in a home where wood is burned for heat may result in less wood burning and thus reduce air emissions and associated health effects. Obviously, the Council should consider these benefits to the environment and public health in some fashion in its planning. But, is it possible to quantify these kinds of environmental benefits? And can these benefits be said to be the "direct" benefits of and "directly attributable" to the new resource, or are the benefits incidental or indirect as the result of contingent behavior choices (e.g., some people might choose to burn less wood; others might choose to burn as much and be warmer)?
- 3c. Should the resource costs for all new non-fossil-fueled energy resources include a quantified estimate of the value of the environmental benefits of replacing existing fossil-fueled generating plants? Note that such an estimate would not affect the cross-comparison of the cost effectiveness of all the new non-fossil fueled resources?
- 3d. If the environmental benefits of a new resource in displacing existing activities cannot be quantified or cannot be said to be directly attributable

² The Council concluded some time ago that it would not make sense to include as a quantified "benefit" in the resource cost estimate of one new resource (e.g., a conservation measure) the fact that the region could avoid investments in another *new* resource with an environmental cost (e.g., a coal plant). As long as the environmental costs of the second new resource are properly captured in its resource cost estimates of the second new resource, that is sufficient -- to do more would constitute double counting the same quantified effect.

to the new resource, and thus not part of the methodology, how should the Council give due consideration to these environmental benefits in the plan?

4. Environmental effects of new renewable resources. Renewable generating resources have different types of effects on the environment than the air and water emissions, waste, and fuel-extraction effects of fossil-fueled and nuclear generating plants that have been the traditional subject of environmental regulations, and thus the traditional subject of the environmental cost methodology.

In the 2013-14 process to amend its fish and wildlife program, the Council received recommendations and comments from a number of state fish and wildlife agencies and tribes concerned about the adverse effects on fish and wildlife from the construction and operation of renewable generating plants and accompanying transmission. They recommended that the Council address these effects in its program and plan, to quote one example of a coordinated submission from a number of agencies and tribes:

“The NPCC should develop programs and processes to evaluate the impacts on fish and wildlife resources of all new energy sources (past, proposed, and potential) and associated transmission infrastructure. The NPCC should support a region-wide assessment of suitability for siting terrestrial and aquatic energy projects, prioritize possible sites, and examine potential site-specific and system-wide impacts to fish and wildlife. The outputs from this analysis should include a map of priority power generation development sites and power generation exclusion zones or protected areas, as was done for hydropower. The NPCC, as part of the program, should provide an explicit evaluation of transmission system expansion and its potential to impact fish and wildlife as part of development scenarios and assessments and assess, analyze, and identify appropriate mitigation measures.”

The fish and wildlife program may or may not be the proper place to consider and address the effects on the environment, and on fish and wildlife, associated with the region’s boom in renewable resource development. But these effects are squarely within the considerations required of the Council in the power plan.

Questions for comment:

- 4a For renewable resources such as wind, solar, biomass, and wave power-generating plants, how should the Council, in its methodology, properly identify the environmental effects of renewable resources, identify the relevant regulatory schemes that address those effects, and quantify the resource compliance costs?

- 4b Or, should the Council take a different or additional approach to identifying and quantifying the environmental costs of renewable resources in the methodology?

- 4c The agencies and tribes recommend the Council support and even lead a region-wide effort to assess the suitability of sites for terrestrial and aquatic energy projects, prioritize possible in a manner similar to the Council's "protected areas" for new hydropower development, and in general examine potential site-specific and system-wide impacts to fish and wildlife. Is that an appropriate role for the Council, and do others agree with the agencies and tribes that this should be a priority use of the Council's and the region's resources? How would the Council and the region conduct and fund such an assessment, which could take years?
- 4d Whether or not the Council uses the Seventh Power Plan to initiate such a major assessment effort, how should the Council give due consideration to these effects in the resource strategy for the plan?