

Exploring the Impacts of California's Renewable Portfolio Standard



System Planning Committee

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Purpose

This white paper is a starting point for outlining the potential impacts of California's Renewable Portfolio Standard on the Northwest. It identifies key concerns from the Northwest utility perspective associated with implementation of California's renewable mandate. It also acknowledges the efforts currently underway to qualitatively or quantitatively address these concerns.

Renewable power legislation is popping up in states across the Nation and the largest energy consumer in the West is revising their renewable energy plan. California has implemented a Renewables Portfolio Standard that requires 20% of the state's energy need be met with renewable power by the year 2010, and have boosted this requirement to 33% by 2020. California utilities must seek out-of-state renewables if they hope to meet this goal and surrounding states are already feeling the effects. In the Pacific Northwest wind turbines are sprouting up and much of this new generation is already bound for California.

As California's legislation and regulations are being developed, it is imperative Northwest utilities have a firm grasp on the implication of these laws and how they will affect the region's bulk electric system operations and wholesale power markets. Better understanding the impacts of California's Renewable Portfolio Standard will help the region prepare for the changes ahead and identify potential benefits of exporting renewable power.

Vocabulary

Below are terms and definitions to assist the reader in understanding California's changing renewables laws. These definitions are being refined as details in the laws are developed.

Renewable Energy Credit (REC) – A certificate of proof of the environmental attributes associated with generation from a qualifying renewable energy resource.

The California Public Utilities Commission defines a renewable energy credit as a certificate of proof, issued through the accounting system established by the Energy Commission, that one unit of electricity was generated and delivered from an eligible or qualifying renewable energy resource.

Bundled Renewable Energy Credit – A renewable energy credit sold at the same time as, and to the same purchaser of, the renewable energy generated.

Unbundled Renewable Energy Credit – A renewable energy credit sold without the renewable power generation.

Tradable Renewable Energy Credit – This term has come to the forefront in recent California materials referring to the transfer of renewable energy credits. These credits can be purchased separately from the resource they stem from. This is a California-specific term which means an unbundled renewable energy credit.

Note: California’s Senate Bill 107 requires that all power associated with renewable energy credits be scheduled for consumption within the state regardless of whether they are sold as bundled or unbundled products.

Qualifying Renewable Resource – A resource that meets the requirements of a Renewable Portfolio Standard, which vary for each state. These requirements define the types of technologies that are eligible and the vintage requirements of those technologies. California includes biomass, solar thermal, photovoltaic, wind geothermal, small hydro, renewables fuel cells, digester gas, landfill gas, municipal solid waste, ocean thermal and tidal. This also includes requirements on location of the renewable energy source, and is under debate.

Delivery/Deliverability Requirement – Defines both timing (hour, day, month, or contract year) and geographic (point of generation and point of delivery) components of power transfer associated with renewable energy credits.

California Renewable Portfolio Standard enabling legislation requires that all power associated with renewable energy credits is delivered into the state. This language has been interpreted to mean that even the power associated with unbundled or tradable Renewable Energy Credits must be delivered into the state. The California Air Resources Board is not subject to this legislative restriction as it is implementing a gubernatorial executive order under the auspices of the state’s global warming legislation.

Null Power: The power generated by a renewable resource once the renewable energy credit has been disassociated from that power. As such, it has no specific technology source identity.

System Planning Committee’s Initial Assessment

As directed by the PNUCC Board at their January 2010 meeting, the PNUCC System Planning Committee members added to their agenda the task of evaluating potential impacts to the Northwest of California’s changing renewables legislation. The group agreed that as a first step it needed to identify the host of potential impacts the region faces with changes to California’s renewables portfolio standard. The Committee also recognized that several efforts are currently underway that directly or indirectly tackle elements of the issue. They noted that in order to focus their effort on topics most in need of attention and avoid overlapping efforts it was important to identify the regional groups engaged in understanding this topic and lay out what aspects they are analyzing.

Background

California's Renewable Portfolio Standard has been evolving since 2002 when the state legislature first required investor owned utilities to meet at least 20% of their load with renewable generation by the year 2017. Their goal was to reduce overall energy use and rely on renewable energy to meet future needs. Subsequent legislation in 2006 moved the 20% renewables requirement deadline from 2017 to 2010. In 2008 and 2009, California's governor issued executive orders increasing the Renewable Portfolio Standard target to 33% by the year 2020 – this target is binding on all of California's utilities, not just investor-owned utilities. These various orders are being implemented by the California Public Utilities Commission, the California Energy Commission and the California Air Resources Board. In each of these forums there are also discussions of how much out-of-state power utilities will be able to use to meet their renewables requirement and how much unbundled or tradable renewable energy credits will be allowed. Please refer to the History section of this paper for more detailed summary of the development of California's Renewable Portfolio Standard.

Increasing California's renewable power requirement from 20% to 33% has increased the state's need for qualified renewables from an estimated 3,000 MWa to about 7,200 MWa by the year 2020. Because wind is currently the largest and most available renewable resource, the requirement could call for more than 20,000 MW of nameplate wind capacity. Out-of-state renewable generation currently comprises about 15 % of California's renewable resources. The California Public Utilities Commission ruled that in the short term until 2011 up to 25% of a utility's renewables obligation can come from out-of-state tradable renewable energy credits.

Potential Impacts to the Northwest

Time is of the essence in identifying and understanding the largest hurdles facing the Northwest as the western states work to accommodate California's renewable resource needs while meeting the region's own mandates for renewables. The Northwest is feeling the increased pressure to develop its most cost effective renewable resources to meet that need. With tools in hand that allow us to make decisions that benefit our region, we will be prepared for opportunities to help guide this process.

Operations

The intermittent nature of wind power requires a coordinated balancing of resources and creates operational challenges never before encountered. When the wind generator is scheduled to run, but the wind is not blowing, other sources of power must be activated. When the wind is blowing more than anticipated, there is pressure to reduce other generation.

The Northwest power grid is incorporating large and increasing quantities of intermittent wind power both for export to California, and to satisfy Renewable Portfolio Standards in Oregon, Washington, and Montana. Thus far wind has been established as the single largest and most available renewable power source in the region due to a combination of

maturing wind technology and government incentives. The Bonneville Power Administration's Balancing Authority estimates that over 4,000 MW of nameplate wind will be installed by 2011, over 6,000 MW by 2013 and 11,000 MW by 2019.

The installed capacity of wind BPA expects to support through within-hour balancing will soon exceed their load, which averages between 5,000 – 8,000 MW. At the point when actual wind generation exceeds BPA's load, the expectation under certain operating conditions is that wind generation will have to be sold and the wind projects will have to curtail their power production. This has the potential to hamper northwest utilities' ability to meet their own loads and RPS requirements, impact cost-recovery for wind project developers and create negative pricing.

BPA and other balancing authorities are striving to refine within-hour scheduling techniques in order to integrate the increasing wind generation in the Northwest and minimize the resources on standby to back up wind generation fluctuations. One mechanism BPA has implemented to aid in moments of insufficient balancing reserves is Dispatch Standing Order (DSO) 216, which creates a protocol for limiting the output of wind generation during times of insufficient balancing capability.

To better understand the impact of incorporating large quantities of wind into the northwest power system several concerns have been identified for further investigation.

- How will the operational changes created by increased wind generation impact the reliability of our region's power system?
- What is our current regional need for resources to balance wind generation's intermittent nature?
- What types of generation will be used to back up wind power integration now and in the future and who will pay for these balancing services as we move forward?
- Is within-hour scheduling of renewable power a possibility and will it reduce the resources that are needed on stand-by to back up intermittent wind generation?
- As more of the region's generating resources are tied up on stand-by for wind generation the region is less able to adapt to changes. What affect will this decreased flexibility have on the power system's ability to integrate even more wind generation?

Transmission

Exporting large quantities of power impacts our transmission system from the point of generation to the point of delivery in California. New generation is often located away from populated area and requires new transmission lines to be built to incorporate the power into the existing power grid. This requires miles of wire and poles and other supporting infrastructure. Once connected to the grid the new generation will flow to California through existing transmission lines. These intertie lines have existing commitments. Through these interties the Northwest delivers power to and receives

power from California. In addition these interties support the shuttling of power from Canada through the Northwest to California.

The Northwest will be better prepared to meet arising transmission challenges after investigating these key questions.

- What kinds of transmission (miles and size of cable) will be needed to support the growing renewable resources being sited in the Northwest?
- How much intertie capacity is currently available to support the export of renewable energy to California, as well as, support energy flowing through the region from Canada to California?
- What additional grid investments are required for reliability and stability?
- Will transmission corridors be constructed to the wind resource geographic areas?
- Will transmission be built to transmit power through the Northwest (e.g. from Canada to California)?

Regulation

As California pins down and implements their evolving laws there are other regulations that will modify or complicate the outcome. Regulation developed in other states and at the federal level will play a role in the potential impacts of California's renewables mandate and it is unclear how the legal overlap will play out.

A demonstration of how these regulations are changing our business occurred in October 2009 when NorthWestern Energy filed an amendment to their Open Access Transmission Tariff. The amendment would have required intermittent resources developed for exporting power out of NorthWestern's balancing authority to provide their own balancing services. The Federal Energy Regulatory Commission (FERC) rejected this proposal stating that even though NorthWestern has no generation of its own, it is still responsible to acquire the services necessary to integrate and balance the intermittent power for resources sited in their balancing authority. FERC also stated that NorthWestern Energy can pass the cost for these balancing services on to the generator.

Changes to federal and state renewable power regulations will impact the Northwest.

- What is the impact of the Federal Energy Regulatory Commission's decision regarding the balancing intermittent renewable resources for export within NorthWestern Energy's balancing authority area, including procuring the necessary ancillary services and passing these costs on to the generator requiring them?
- How do existing regional and public preference rights apply to these potential changes?
- If the Bonneville Power Administration believes it is required to integrate all new renewable resources within its balancing authority, at what point must it procure additional ancillary services for this purpose?

- What are the potential impacts of individual state renewables regulation?
- Considering the multiple jurisdictions involved (states and federal), will all wind integration costs be appropriately recovered in rates?

Resource Supply

California's rush to acquire Northwest renewables is impacting Northwest utilities' choices and availability of generating resources. As the demand for renewable generation increases across the country the most economic resources will be claimed first. Oregon, Washington and Montana utilities are all busily working to comply with each state's renewables requirements, but none of these are as aggressive as California's requirements. The Northwest Power and Conservation Council has estimated that 5,300 MW of wind will be needed in 20 years to meet the Northwest's renewable requirements alone.

We have to consider the effect that California's aggressive renewables mandate (possibly over 20,000 MW of installed wind generators) will have on our region's available resources.

- Is the supply of qualified renewables adequate to meet the future renewable energy needs of Northwest utilities?
- As competition increases over eligible locations to site renewable projects what effect will this have on Northwest utilities' ability to meet their states renewables requirements?

Market

California's renewable energy credit legislation is undergoing changes and the outcome will have a dramatic affect on the Northwest power system. Renewable power and its associated environmental attribute delivered as a unit at the time of purchase creates transmission and scheduling barriers and render most out of state renewable power purchases unachievable for California. Given this reality, California is temporarily allowing tradable renewable energy credits to be purchased separately from power and the associated power, now null of renewable value, would remain behind in the Northwest. California utilities are permitted to meet up to 25 percent of their renewables obligation this way and there a price cap on tradable RECs was set at \$50/MWh.

The market effect of this null power that may be left behind in the Northwest is unclear and needs further investigation.

- Now that renewable energy credits are temporarily allowed to be transferred or sold separately from renewable power what impact does the null power left behind have on our Northwest power system and the power markets?
- What are the likely impacts of California's tradable credits on the broader Northwest energy market and renewable energy credit market?

- What are the implications of null power due to ‘deemed’ carbon characteristic or imputed fuel mix of a short-term market purchase?
- What will be the carbon characteristics of the null power? What “carbon costs” might the purchaser of the null power be required to pay based on state and/or federal regulations?

Environment

As states create new regulations in an effort to control carbon emissions, it is important to understand the implications to the individual state, as well as the region.

It is important to be aware of the impacts new regulations have and if the regulations are achieving their intended goals.

- If the majority of the backup generation is gas-fired generation, what is the impact pre and post-carbon legislation?
- Is an unintended consequence an increasing Northwest carbon footprint?

Efforts Underway

A number studies are currently being pursued to better understand the changes ahead. Some of these efforts are directly connected to the California Renewable Portfolio Standards and the evolving implementation procedures. Other efforts focus on the challenges associated with meeting the various states’ renewable resource directives. Below is a partial list of Northwest and California efforts that focus on specific issues.

The **Bonneville Power Administration – Wind Integration Team** is currently analyzing changes in operation to facilitate the integration of wind energy into the power system and working to accommodate the transmission that new generation needs. Their key areas of focus and initiatives include:

- *Wind Integration Charge* – to be evaluated within the context of transmission rate cases.
- *Operational Controls for Variable Generators* – to implement protocols to better align wind scheduling, actual generation, and balancing reserves. It includes Dispatch Standing Order (DSO) 216.
- *Intra-Hour Scheduling* – to enable utilities to schedule within the hour and better accommodate and respond to the fluctuations in wind generation.
- *Dynamic Transfer Limits* – to identify transmission limits and assist with intra-hour scheduling.
- *Customer Supplied Generation Imbalance* – to enable wind customers to supply their own generation to balance wind.
- *Wind Forecasting* – to produce more accurate forecasting to facilitate integration.

California Air Resources Board is updating the economic analysis on the executive order of 33% renewables requirement. The order calls for the regulation on the 33% renewables requirement to be complete by July 2010.

The **California Public Utilities Commission** is actively working on California's renewable's laws. They are hearing from other regional entities and deciding how tradable renewable energy credits will be allowed and accounted for.

- BPA is tracking the ongoing discussions and processes of the California Public Utility Commission, the California Air Resources Board, the California Energy Commission and the state legislature.
- BPA submitted comments to the California Public Utilities Commission regarding tradable renewable energy credit mandates.
- As a short term measure, the California Public Utility Commission decided to allow regulated utilities to use tradable renewable energy credits to fulfill up to 25% of their renewables obligation. This decision is effective through 2011 during which time the Commission will study firming transmission contracts and associated market affects.

The **Federal Energy Regulatory Commission** has launched an inquiry to investigate where their rules and procedures may be causing roadblocks to integrating intermittent resources.

- BPA and some PNUCC members are responding to the Notice and coordinating their responses.

A **Joint Initiative** of Northern Tier Transmission Group, ColumbiaGrid and WestConnect are also addressing power system operation changes to facilitate wind integration. Including:

- Dynamic Scheduling System – Within hour scheduling

The **Northwest Power and Conservation Council's 6th Power Plan** has identified several potential impacts of renewables legislation and integration. They have specified action items to investigate issues including potential market, environmental and resource supply impacts.

- Review of the impacts and effectiveness of mandates and incentives including impacts of incentives on optimal dispatch
- Effects of an unbundled renewable energy credit market
- Impacts on the Northwest wholesale market
- Impacts on supply and cost of low-carbon resources to meet Northwest needs
- Impacts on availability and costs of balancing services
- Environmental implications (displaced resources and balancing energy)
- Impacts on voluntary renewables market

Northwest Wind Integration Forum continues to meet and discuss the issues associated with building and implementing wind in the Northwest.

The **Reliability-Based Control** effort through North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) Performance Work Group is focusing on increase the reliability of the system.

Renewable Energy Transmission Initiative is a California state wide initiative aimed at identifying transmission projects that will be needed to meet California's renewables goal.

Transmission Expansion Planning Policy Committee (TEPPC) – Western Electricity Coordinating Council (WECC) is evaluating the financial viability of different transmission lines.

Variable Generation Subcommittee – Western Electricity Coordinating Council (WECC) is working to identify potential constraints and solutions for reliably integrating intermittent resources, such as wind

The **Western Renewable Energy Zone Initiative (WREZ)**, a joint effort of the U.S. Department of Energy and the Western Governors Association, mapped potentially available renewable resources in the west along with information on supply and costs.

History

What follows are the major turning points thus far in the development of California's Renewable Portfolio Standard.

- 2002** California adopted an Energy Action Plan designed to reduce overall energy use and rely on renewables to meet future energy need. **Senate Bill 1078** created a Renewables Portfolio Standard Program, which outlined the protocol for acquiring renewable resources. It specified that utilities are expected to acquire a minimum of 1% additional renewable energy per year until 20% is reached by no later than 2017.
- 2006** California **Senate Bill 107** was passed, which revised existing language. It called for 20% of the total energy sold to retail customers to be generated by renewable resources by the year 2010, rather than 2017. In addition it extended a less stringent version of the rule to publics and municipalities. This bill also authorized the use of tradable renewable energy credits and assigned responsibility for implementing the program to the California Public Utilities Commission.
- 2009** Governor Schwarzenegger signed an **Executive Order** increasing the states renewables requirement from 20% by 2010 to 33% by the year 2020. Rulemaking for implementing 33% by 2020 was assigned to the California Air Resources Board, the state agency responsible for implementing the Global Warming Bill.

- 2009** The **California Public Utilities Commission** issued its third **proposed decision** allowing tradable renewable energy credits to be purchased separately from the power they stem from as a temporary measure to help large utilities meet their near-term renewables targets. The interpretation of this proposal deems all out-of-state renewable power purchases to be tradable renewable energy credits regardless of previous agreement or contract form. There was much discussion about whether bundled contracts (those with energy and renewable energy credit bundled and delivered within the same calendar year) prior to this decision would be considered bundled or as tradable renewable energy credits, independent of the power. For investor-owned utilities and customer choice aggregator's, tradable renewable energy credits can be acquired from out of state resources up to 40%, but prior statute language still requires delivery of power from tradable credits within the compliance year.
- 2010** On March 11, the California Public Utility Commission released its decision authorizing use of tradable renewable energy credits for compliance with the California Renewable Portfolio Standard. The three major investor-owned utilities can utilize tradable renewable energy credits for up to 25% of their compliance target, with a price cap of \$50/MWh. Both the percentage and price caps are temporary measures that will sunset December 31, 2011. The California Public Utility Commission has the prerogative to review the temporary tradable renewable energy credit usage limit and cap on payments before the limitations expire.

This decision creates a distinction between a renewable energy credit-only and a bundled renewable energy procurement. The decision states that a tradable renewable energy credit is one in which an entity purchases a renewable energy credit either without energy, or with energy that does not meet the Commission's criteria. Those that do not meet the bundled criteria include generators whose first point of interconnection with the WECC is not a California balancing authority and transactions that do not make use of dynamic transfer arrangements in a California balancing authority area.

Bibliography

1. Bonneville Power Administration, CPUC Proposed Decision Authorizing Unbundled RECs: Review & Rough Analysis of Potential Impacts on the NW, January 15, 2010 (4 pages)
 2. Bonneville Power Administration, 2009 Draft Resource Program, September 2009 (212 pages)
 3. Bonneville Power Administration, Summary of Dispatch Standing Order (DSO) 216, October 2009 (3 pages)
 4. California Air Resource Board, Plausible Compliance Scenarios for the 33% Renewable Electricity Standard, February 1, 2010 (6 pages)
 5. California Air Resource Board, Proposed Concept Outline for the California Renewable Electricity Standard, October 2009 (24 pages)
 6. California Energy Commission, Renewable Portfolio Standard Eligibility Commission Guidebook, January 2008 (111 pages)
 7. California Public Utility Commission, Decision Authorizing Use of Renewable Energy Credits for Compliance with the California Renewables Portfolio Standard, March 11, 2010 (151 pages)
 8. California Public Utility Commission, 33% Renewables Portfolio Standard Implementation Analysis Preliminary Report, June 2009 (96 pages)
 9. Federal Energy Regulatory Commission, Notice of Inquiry: Integration of Variable Energy Resources, January 21, 2010 (34 pages)
 10. Federal Energy Regulatory Commission, Order Rejecting Proposed Tariff Revisions, November 10, 2009 (13 pages)
 11. Northwest Power and Conservation Council, 6th Power Plan, February 2010 (287 pages)
 12. Snohomish PUD, Assessment of Impacts of California's RPS Program on the Northwest, January 8, 2010 (6 pages)
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