BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

LC 52

In the Matter of PACIFICORP dba PACIFIC POWER 2011 Integrated Resource Plan	Comments of Renewable Northwest Project

Renewable Northwest Project (RNP) appreciates the opportunity to comment on PacifiCorp's 2011 Integrated Resource Plan (IRP). RNP shares PacifiCorp's view that public policy will continue to prefer clean, renewable energy resources,[1] because we expect political leaders to push toward leadership in the clean energy economy and away from environmental and safety issues associated with risky, polluting technologies. Where the IRP favors investments in transmission modernization and renewable energy, PacifiCorp recognizes that planning for a "green future" is in the best interests of the Company and its customers.

But in other core elements of the IRP, PacifiCorp loses sight of that "green future." Its proposed actions—spending billions on coal plants, adding nearly two thousand megawatts of fossil-fueled baseload energy, and passing up leadership opportunities in advancing renewable energy—will deepen its customers' financial commitments to the business-as-usual utility model. The central assertion of the Western Grid 2050 report is timely here: "If no choice is made, investment will be driven by inertia rather than intention and the grid of 2030 and 2050 will look very much like the grid of 2010. This report asserts that making an intentional choice between the [Business As Usual] and

[1] See, *e.g.*, 2011 IRP, pages 82, 225.

[Clean Electricity Vision] trajectories now is the responsible course of action."[2] To chart a responsible course, PacifiCorp should be:

- **Scaling back from an aging coal fleet** using creative, comprehensive, and transparent economic analysis and environmental compliance planning;
- **Pushing toward a future of efficient, flexible operations** by avoiding commitments to traditional baseload resources, continuing to develop the case for new transmission's diverse benefits, engaging constructively with wind integration experts, and actively looking for ways to reduce the cost of integrating variable resources; and
- **Leading in advancement of renewable resources** by fairly evaluating the low cost of wind energy today and making real progress toward capturing the plentiful geothermal and solar resources in its service territory.

RNP very much appreciates PacifiCorp's productive engagement on market reforms and balancing area coordination. PacifiCorp has started down the path, but needs turn the corner toward the clean energy future. RNP recommends that PacifiCorp start by taking advantage of its last chance to extricate itself from continuing investment in coal.

I. The IRP is Incomplete, and Should Not Be Acknowledged, Without Complete and Transparent Analysis of Coal Upgrades.

Massive investments in coal will become a liability for customers as diverse regulation of coal plant pollutants expands. In this context, PacifiCorp's piecemeal justification of pollution control and other coal plant upgrades in rate cases is not sufficient. The Company's IRP should be required to discuss these expenditures clearly and

[2] "Western Grid 2050: Contrasting Futures, Contrasting Fortunes," Western Grid Group (August 22, 2011), page 1.

demonstrate that money spent today is still a good investment when viewed along with a reasonable forecast of the compliance costs associated with likely future regulation (and the possibility of avoiding some compliance costs with creative early shut-down plans). RNP supports the comments of Citizens' Utility Board, Sierra Club, and NW Energy Coalition in this docket; appreciates the importance that the Commission placed on this issue at the August 19 workshop; and looks forward to seeing the detailed analysis that PacifiCorp has promised.

II. Planning For A Flexible and Efficient Future Requires Aggressive Conservation, Progress on Transmission, Avoiding Premature Commitment to Multiple CCCTs, and Significant Improvement on Wind Integration.

Building a flexible and efficient operating foundation will help PacifiCorp prepare for a future in which variable renewable resources play an increasing role. Aggressive conservation is a key step, and RNP supports NW Energy Coalition's call for more energy efficiency in this IRP. Here, we address three other significant building blocks: investments in transmission infrastructure, deferring commitments to new CCCTs, and better work on wind integration.

A. Transmission: Planning Transmission for a Green Future is Appropriate.

RNP appreciates PacifiCorp's effort to produce robust economic analysis of transmission buildout scenarios. In this IRP, PacifiCorp's strategy for least costly procurement of new renewable resources is a primary driver for its economic analysis of transmission alternatives. We agree with PacifiCorp that the regulatory future will continue to favor renewable resources. Advance planning for that future is sensible, and should be expanded to include possible retirement of coal facilities.

We are pleased to see PacifiCorp conclude that transmission investments appear economic when that future is assumed. At the same time, the focus on picking up inexpensive wind resources from Wyoming shouldn't obscure the variety of system-wide benefits that flow from new transmission, including access to markets, reliability, and efficient system operations.[3] Indeed, we cannot today predict the full range of benefits and optionality that new transmission may create. As we discuss below, RNP is also concerned that failing to recognize diverse benefits in transmission analysis may result in resource planning in which new wind resources shoulder a disproportionate share of the cost of incremental transmission.

B. CCCTs: PacifiCorp Has Not Proved That CCCTs Are the Right Investment.

One of the core issues for this IRP is whether PacifiCorp needs two 600 MW combined-cycle combustion turbines (CCCTs) in the next five years—with a third planned to follow just a few years later. PacifiCorp has a capacity need that it could be expected to fill more economically with significant demand side capacity reductions and lower capital cost single cycle combustion turbines (SCCTs). Filling a capacity need with CCCTs would exacerbate an energy surplus and undermine the opportunity for new renewable energy resources to provide zero variable cost energy. And, of significant concern to RNP, CCCTs commit the system to a less flexible base of operations than might otherwise be available; deferring those commitments might better prepare PacifiCorp for a clean energy transition that demands the most flexible and responsive gas complements. As the Western Grid

[3] PacifiCorp recognizes these diverse benefits in the IRP. IRP, pages 58 and 232.

2050 report notes, a clean energy future will be significantly less reliant on baseload gas.[4] We understand that the Company is looking at how to better account for flexibility value in its modeling, and we think the Commission should require this evaluation of flexibility before it acknowledges two new baseload resources to meet a capacity need.

We note that the use of a "stochastic production cost adjustment" predisposed the portfolio selection model (System Optimizer) to prefer CCCTs over SCCTs by crediting CCCTs with a 16% capital discount.[5] The generous discount resulted in selection of more CCCTs of greater capacity than the SCCTs the adjustment was designed to replace. The difference offset more economical market purchases and resulted in a preference for baseload plants (CCCTs) rather than flexible dispatch resources suited for a world of increasing variable energy and low market prices.[6] At the IRP staff workshop on August 9, PacifiCorp staff suggested that this portfolio bias is not necessary and may not be used in the future. If the cost adjustment is no longer necessary, RNP questions why the discount was included at all for the current IRP. For this IRP, the Commission should seek to understand how significantly this bias skewed the portfolio selection toward CCCTs and away from market purchases and more flexible and lower capital cost resources.

C. Wind Integration: PacifiCorp's Study Does Not Satisfy the 2009 Acknowledgment Order—New Direction From the Commission Is Needed.

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[4] "Western Grid 2050: Contrasting Futures, Contrasting Fortunes," Western Grid Group (August 22, 2011), pages 62-69.

[5] See IRP page 118 and 180.

[6] See IRP page 180 and footnote 59. More information on the stochastic cost adjustment approach can be found in the report for the April 28, 2010, public input meeting available at http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2011IRP/20100428-2011IRP_kick_off_MeetingSummary.pdf.

In its last IRP acknowledgment order, this Commission required PacifiCorp to "complete a wind integration study that has been vetted by stakeholders through a public participation process."[7] "Vet" means "to appraise, verify, or check for accuracy, authenticity, validity, etc."[8] As one of few stakeholders who attempted to engage deeply in vetting the study, RNP does not believe that PacifiCorp met the expectations of the action item.

PacifiCorp declined to address technical flaws that have significant consequences for the study's determination of reserve requirements and, in turn, for the integration costs used for wind resources in the IRP. In these comments, RNP will detail some of the substantive flaws with the study and the process that produced it. But the most important issues are for the future: What happens next? What guidelines can give the Commission and stakeholders greater confidence in the technical accuracy of wind integration studies? And how can the IRP be used to find and evaluate ways to reduce the cost of integrating variable resources? Going forward, RNP recommends that the Commission require PacifiCorp to (1) use an independent technical review committee whose membership is approved by Commission staff (or NREL) and which is operated according to industry standard principles; and (2) take significant steps toward using the IRP to assess and plan for methods to reduce integration costs.

1. Substantive Errors Significantly Overstated Reserve Requirement.

In this section, RNP details four substantive errors with the wind study that may have resulted in the study substantially overstating wind integration costs. As Sensitivity

[7] Order No. 10-066, page 26 (Additional Action Item #5).

[8] Dictionary.com.

Case 29 indicates, the study's overestimation diminishes selection of wind resources and may result in passing on exaggerated costs to ratepayers.

a. The study relies on an incorrect mathematical formula.

To calculate the incremental reserve requirement, PacifiCorp relied on an inappropriate formula that likely overestimates the reserve requirements by up to 22%. While the Company agreed that reserves should be held to address the *combined* error of load and wind, the methodology calculates the magnitude of wind and load errors separately. After calculating the errors separately, the study combines the errors using a formula[9] that is incorrect for combining asymmetrically distributed wind and load errors.

The formula on which the Company relied assumes that wind schedule errors are normally distributed.[10] However, even PacifiCorp acknowledged that wind schedule errors are *not* normally distributed.[11] RNP repeatedly advised PacifiCorp of the error in using this formula, and even supplied a direct proof demonstrating the miscalculation and an example data set illustrating the potential severity of the error.[12] Other stakeholders, including Interwest Energy Alliance and Dr. Michael Milligan of NREL, pointed to the same

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[9] See IRP Appendix I, pages 195 and 201.

[10] As shown in Attachment A of RNP's August 26, 2010, comments:
$reserves_{total} = \sqrt{reserves_{load}^2 + reserves_{wind}^2}$ is a functional equivalent of PacifiCorp's formulation. However, this is only true for distributions where the percentiles are a fixed number of standard deviations from the mean. This is not a general result, and although many sets of numbers follow a normal distribution, wind schedule errors are typically not normal, and not well approximated by normal distributions. RNP's August 26 comments are available at: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/Wind_Integration/2010WICS-FD_RNP2_Comments-on-Draft-Study-8-26-10.pdf.

[11] PacifiCorp response to RNP's additional comments dated June 1st 2010, available at http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/Wind_Integration/PacifiCorp-ResponsetoSupplemental-RNPComments_6-21-10.pdf.

[12] See RNP comments dated April 23, 2010; May 5, 2010; Jun 1, 2010 August 26, 2010 (including RNP comments 2, example calculation), all available at http://www.pacificorp.com/es/irp/wind_integration.html.

flaw.[13] To remedy the error, the Company simply needed to calculate the desired percentile of combined load and wind error for both load following and regulation timescales. Yet, the mathematical error persists in the final study.

RNP has independently analyzed the effect of PacifiCorp's incorrect formulation. According to RNP's analysis, use of this formula overestimates regulation reserve requirements by up to 22%.[14] RNP was unable to perform the analogous calculation for the load following reserve requirements due to PacifiCorp's separate binning methodology, but expects that the overestimation of load following reserves is comparable to that of regulation reserves.

b. Duplicating wind facility data eliminates diversity benefits and undermines study credibility.

Rather than using the unique wind generation data from the facilities listed in IRP Appendix I, page 185, the wind integration study includes the output from some wind facilities several times.[15] The study excludes other facility data entirely. For example,

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[13] See Interwest's Comments on Draft Study. August 25, 2010. Page 2. Available at: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/Wind_Integration/2010WICS-FD_InterwestEnergyAllianceCommentsOnWIS_100825.pdf.
See Consulting Session Conference Call with Michael Milligan. August 26th 2010. Page 2. Available at: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/Wind_Integration/MichaelMilligan-Consultation-Session_8-26-10_MeetingSummary.pdf.

[14] RNP's analysis computed required regulation up and down by calculating the respective .985 and .015 percentile of the combined regulation error for load and 1,833 MW of wind for all calendar months in the east and west territory. The percent overestimation of PacifiCorp's computed incremental regulation reserve requirements are as follows:

	WEST	EAST
Regulation Up	22%	10%
Regulation Down	5%	1%

RNP's workpapers supporting this estimate are available, but include protected material and therefore are not attached here.

[15] This error was first identified in Randall Falkenberg's public record testimony in Wyoming Public Service Commission Docket No. 20000-384-ER-10.

generation data from the Rolling Hills, WY wind facility was included once as a 99 MW stand-alone unit, and once again as part of the Glenrock, WY wind facility generation data.[16] Likewise, Rock River, WY generation data was included as a stand alone facility, and included again in the Foote Creek, WY wind farm output.[17] The 39 MW of Glenrock III, WY purportedly included in the wind integration study was actually mistakenly excluded from the study.[18] Including generation data from a single wind facility multiple times, and excluding others, increases the calculated reserve requirements because the diversity of separate wind facilities is lost. Because wind integration studies are, in effect, a determination of net wind generation diversity, this error is very problematic.[19]

These errors demonstrate the importance of leaving time to perform essential data verification following completion of a draft study. The three weeks between the release of the draft study and its submission to the Commission was not enough time for the Company, let alone stakeholders, to catch this type of detailed error. Such careless treatment of data undermines the credibility of all the results.

c. Failure to validate synthetic data.

The wind integration study is overly reliant on simulated wind generation data that has not been validated. The study used historical data for only 23% of the wind resources modeled. The remaining resources required partial or complete fabrication of synthetic

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[16] RNP Data Request 1 (WIEC 12.14): "Rolling Hills is in fact included as a stand-alone asset and included in the data for Glenrock."

[17] See technical appendix to Randall Falkenberg's public record testimony in Wyoming Public Service Commission Docket No. 20000-384-ER-10.

[18] *Id.*

[19] In fact, some utility studies go one step further and attempt to quantify the amount of diversity each wind facility adds incrementally to the total power system. See Northwestern Energy's Wind Integration Study Available at: http://www.uwig.org/NWE_WindIntegraionStudy_FinalReport_V1_20110606.pdf.

data. The simulation methodology used was untested, and RNP, along with others, expressed misgivings about the methodology.[20]

The company's simulation methodology is based on a time-lagged correlation with existing historical data. As NREL pointed out in its April 23, 2010, comments, "The PacifiCorp proposed method of synthesizing data based on time-lagged data from existing wind plants would work if wind always blew from the same direction, at the same speed, and remained coherent over long distances. Since wind does none of these things, previous studies have found that time lagged synthesized wind data is not very good."[21] To this PacifiCorp responded on June 21, 2010, that "the data is being produced, both PacifiCorp and The Brattle Group are running diagnostics on these data that report how the developed data compare to observed data, whether the latter is metered data from existing projects or mesoscale NREL data. Once finalized, the company will document in more detail the final methods used to create the missing data and the diagnostics used to test the data."[22] To date the stakeholder community has seen no diagnostics that validate the synthetic data. Yet, the synthetic data methodology persists as a cornerstone of the final study. The methodology creates significant risk that the synthetic generation data is unduly correlated with the historical data from which it was derived. Over-correlated data will greatly

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[20] See RNP Comments April 23, 2010. NREL Comments April 23, 2010. NWPCC Comments (part 1) April 23, 2010. Utah Division of Public Utilities Comments April 23 2010. Available at: http://www.pacificorp.com/es/irp/wind_integration.html

[21] NREL Comments. April 23, 2010. Available at: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/Wind_Integration/PublicCommentsReceived_PrjMethod-04232010.pdf.

[22] PacifiCorp Response to Comments on Methodology. June 21, 2011. Page 10. Available at: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/Wind_Integration/2010WindIntegrationStudy_ResponseToComments_6-21-10.pdf.

increase the amount of reserves required for integration, because it fails to capture the short-term diversity that distinct wind facilities provide.

Relatively simple validation procedures could have been performed and were not.[23] With no analysis validating the synthetic results, the study's results lack credibility.

d. Long term planning should consider effects of certain market improvements, such as half-hour scheduling.

The need to hold reserves is dependent, in part, on the length of scheduling periods in the Northwest. Regional utilities have begun scheduling in half-hour blocks, specifically to reduce the burden of holding reserves for wind generation. This move helps increase the economic efficiency of the power system as a whole, and business practices are continuing to liberalize to allow more liquid trading in half-hour increments. Assessing reserve requirements on one-hour schedules, once the common practice, is no longer appropriate for longer-term resource planning purposes. For purposes of the IRP, RNP asked PacifiCorp to estimate the effect of scheduling in half-hour increments, which is a relatively straightforward reduction in inter-hour reserve requirements.[24] PacifiCorp did not respond to this request, except by including a single sensitivity (Case 29).

e. Effect on selection of wind resources.

To approximate the effect of these and other deficiencies on the ultimate wind integration cost, RNP proposed an alternative cost of $5.38/MWh—nearly half the $9.70/MWh rate that the Company used in all but one IRP sensitivity. Sensitivity Case 29,

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[23] See further discussion in RNP's comments dated August 26, 2010, available at http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/Wind_Integration/2010WICS-FD_RNP2_Comments-on-Draft-Study-8-26-10.pdf.

[24] See RNP and Utah Clean Energy comments dated October 5, 2010, available at http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/Wind_Integration/2010WICS-FD_RNP3-UCE-RevisedDraftLettersigs_10-6-10.pdf.

which used the alternative cost, resulted in the model selecting nearly 60% more wind resources than the single case against which it was tested.[25] Although RNP recognizes that wind integration cost is not the only factor, the results of the wind integration study are important for the selection of wind resources—and to ratepayers who may ultimately pay for a service they are not in reality receiving.

2. The Study Process Reflected Lack of Engagement With Concerns Expressed by Diverse Stakeholders.

RNP appreciates the challenge that PacifiCorp faces in engaging effectively with a broad stakeholder community on a complex topic. However, a variety of stakeholders identified material problems with the wind integration analysis as early as the first draft proposal. Although we appreciate the time that PacifiCorp took to publish written responses to these concerns, the responses did not provide a logical basis for rejecting many of these substantive concerns nor did they represent true engagement with independent experts. Frequently, the company assured stakeholders that further evidence would be subsequently presented, but the promised evidence never materialized.[26]

Moreover, there was no opportunity for productive dialogue following publication of the final draft study. The Company first released the draft results of the study on August 12, 2010. Stakeholders were invited to participate in a conference call one week later, then to submit written comments two weeks later. RNP, Interwest Energy Alliance, and Michael

[25] See IRP Page 244. Note that the base case only includes 215 MW of wind resources.

[26] See PacifiCorp's Response to Supplemental RNP comments dated June 21, 2010. Available at: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/Wind_Integration/PacifiCorp-ResponsetoSupplemental-RNPComments_6-21-10.pdf.

Milligan raised consistent substantive concerns on August 25-26.[27] Five days after receiving those comments, on September 1, 2010, the Company filed the final study without seeking more time to address any of those concerns. And, despite stating that it would "investigate substantive issues raised by stakeholders and respond appropriately during the course of the remaining 2011 IRP development schedule," the Company has made no further effort to do so. Given this compressed timeline, it is a stretch to say that the study was even capable of being "vetted by stakeholders."

3. Improved Oversight and an Expanded Focus Are Needed.

Groundhog Day is here again. The IRP is complete and, despite the efforts of RNP and others, no opportunity exists to address the flaws in the process or the 2010 study. RNP requests that the Commission attempt to prevent recurrence of this situation by providing clear direction for independent, expert oversight of future studies. In addition, the Commission should direct PacifiCorp to use the IRP to find and evaluate methods for reducing the cost of integrating variable resources.

First, in a new wind integration study to be completed before PacifiCorp's next IRP workshops begin, PacifiCorp should be required to use an independent technical review committee (TRC) with two important conditions: (1) its members must be approved by Commission staff (or possibly NREL staff) as representing the best industry expertise; and (2) the TRC must operate according to the industry standard principles developed by the

[27] Comments are available at PacifiCorp's Wind Integration Study website (http://www.pacificorp.com/es/irp/wind_integration.html), under "Comments on Draft Study (8-12-10)" and "Response to Michael Milligan Comments From 8-26-10 Meeting."

Utility Wind Integration Group and NREL.[28] At least sixty days should be left for stakeholder review and responsive revisions by the Company before the study is submitted. Establishing specific directions such as those proposed above is appropriate in light of persistent problems with effective, independent oversight of PacifiCorp's wind integration studies. Moreover, many utilities have had positive and helpful experiences working with TRCs.

Second, to improve dialogue and encourage PacifiCorp to advance as economically as possible toward a clean energy future, the Commission should direct PacifiCorp to evaluate advancements in integration well in advance of its next IRP. Several concepts should be explored and reported on before the next IRP update: (1) the IRP could use more granular modeling to recognize the value of low-cost, fast-responding reserves; (2) the Company could make stronger efforts to look at advancements in demand-side integration technologies; and (3) the Company could quantify the cost-saving value of impending market improvements (such as sub-hourly scheduling, energy imbalance market) and incorporate those into its long-term planning. Addressing these concepts can shift the dialogue away from present constraints and toward future possibilities.

III. PacifiCorp Should Lead in Planning For and Advancing Diverse New Renewable Resources.

Something went wrong in PacifiCorp's modeling of renewable resources. To arrive at a level of investment in renewable resources over the planning term that reasonably hedges regulatory risk, the Company had to adjust the preferred portfolio based on post-hoc policy and business analysis. RNP agrees with the Company that its initial modeling

[28] The document, available at http://www.uwig.org/TRCguidelines.htm, addresses several important issues such as stakeholder involvement beyond the TRC and assurance that the utility will refer to TRC involvement only if the TRC has clearly accepted and agreed with the results of the study.

included too few renewable resources to hedge policy risk, and that adding more wind resources is likely an appropriate adjustment. Nonetheless, it is important to consider whether skewed assumptions about wind resources prevented the Company's model itself from producing portfolios with appropriate levels of wind energy. It is also important to evaluate whether PacifiCorp has taken sufficient advantage of the diversity of renewable resources present in its service territory.

A. Wind: Wind Resources Costs are Overstated, In Large Part Because They Include Transmission Costs That Should Be Shared Across Resources

Wind is a cost-competitive energy resource, and we agree with PacifiCorp's ultimate conclusion that it should play a significant role in the portfolio. But RNP was troubled by the scarcity of wind in the base case portfolio results and endeavored to understand the reasons.

Several factors have contributed to dampen wind selection. For wind resources, capital costs were commensurate with those modeled in the 2008 IRP,[29] despite an explicit recognition that the cost of wind turbines has fallen.[30] At the same time, capacity factors for wind resources appear low relative to other data.[31] High capital costs for wind

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[29] In the 2008 PacifiCorp IRP, the Oregon wind's low cost estimate was $2378/kW in 2011 dollars. In 2011 those capital costs have risen to $2393/kW for Oregon sites that do not require new incremental transmission. "2008 Integrated Resource Plan Volume 1." PacifiCorp. Pg 103. Available at http://www.pacificorp.com/content/dam/pacificorp/doc/Environment/Environmental_Concerns/Integrated_Resource_Planning_3.pdf.

[30] IRP, page 112.

[31] For example, the BPA Wind-Only Bubble in Table 6.10 lists a capacity factor of 29 percent (though underlying data shows that the Company may actually have used 28 percent). Northwest Power and Conservation Council data demonstrate a historical average 30 percent wind capacity factor for projects connected to BPA from 2007 to 2010. Elliot Mainzer (BPA), Ken Dragoon (NWPCC), "Wind Energy Development in the Pacific Northwest: Checking Facts, Connecting Dots" (June 6, 2011), Slide 5, available at http://www.bpa.gov/corporate/windpower/docs/WIF_SC_Presentation_6-11.pdf.

resources were adjusted further upward (by 50 to 100 percent) by including a flawed wind integration cost and assigning additional construction costs without clear explanation.[32] PacifiCorp's $9.70/MWh wind integration cost diminishes wind selection, as evidenced by Sensitivity Case 29. And, for its cost-step analysis, the Company evenly divided each wind resource zone into three cost levels (except for Wyoming where all wind resources are in the lowest cost level). The Company has no information on which to base this even distribution among cost levels for all regions, even though the higher cost levels increase base capital costs by 20%-50%.[33]

But the primary reason for the limited selection of wind resources appears to be that wind resources bear the full burden for the costs of Energy Gateway. For the 2011 IRP, PacifiCorp profoundly transformed the modeled transmission topology. Among the two biggest changes was the insertion of the proposed Energy Gateway pathways and the introduction of wind resource bubbles.[34] Wind resource bubbles are constrained so that any wind resource built within a bubble forces an incremental investment for an Energy Gateway pathway.[35] Furthermore, the potential capacity of alternative wind siting options are severely limited, so that nearly all selected wind resources are necessarily placed in wind resource bubbles. RNP believes that this construction unfairly saddles wind resources with the full costs of Energy Gateway and is the primary reason for wind's limited selection in the base case scenarios.

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[32] IRP, page 130

[33] See PacifiCorp Response to RNP Data Request 5d.

[34] IRP, page 158.

[35] See PacifiCorp Response to Data Requests RNP 6 and RNP 19

Table 6.10 of the IRP documents the potential capacity and cost of the five wind resource zones. The two resource zones where wind may be selected without increased transmission costs are constrained so that only 400MW of cost level 1 wind can be sited there. In contrast, within the three remaining wind-only resource bubbles, more than 16,000 MW of wind in the lowest cost level are potentially available (almost entirely in Wyoming). Because resource selection within wind generation bubbles automatically assigns incremental costs for Energy Gateway, all portfolios are encouraged not to select more than 400 MW of wind. Where the model selects more than 400 MW of cost level 1 wind, PacifiCorp's modeling constraints will force the incremental costs of Energy Gateway.

Wind resources are the only resources whose selection forces incremental investment in Energy Gateway. RNP finds this constraint to be discriminatory and at odds with the broad-based benefits created by new transmission infrastructure. In its IRP, PacifiCorp makes frequent mention that "Energy Gateway will support multiple load centers, resource locations and resource types"[36] and has "emphasized that significant new transmission capacity is needed to adequately serve its customers' load and growth needs for the long-term."[37] Given the breadth of transmission benefits recognized by the Company, RNP finds it puzzling and concerning that only wind resources are constrained with the incremental costs of Energy Gateway.

RNP recognizes that Energy Gateway is an important and valuable investment that enables the development of renewable resources. However, RNP considers it unsatisfactory that the company's modeling places the entire cost burden of the project on

[36] IRP, Page 58

[37] IRP, Page 282

selected wind resources. Should PacifiCorp truly find Energy Gateway cost effective, it should include the project's expected PVRR in all portfolios and allow all resources to access it freely.

B. Geothermal: PacifiCorp Should Do More to Overcome Constraints, Perhaps Through a Geothermal-Only RFP

PacifiCorp has operating experience with geothermal resources, and they can add important diversity to the portfolio if found to be least cost, least risk. Indeed, most of the IRP's initial portfolio results contained significant geothermal resources, averaging around 300 MW.[38] This result occurred even after some effort was made to capture the cost risks of geothermal exploration in the modeling, at least for expansion of the Blundell site.[39] Yet, because of a desire to obtain legislative cost-recovery guarantees or approval of development funds, the Company ultimately eliminated all consideration of geothermal resources.[40] RNP does not discount the significance of "dry-hole" risk as a constraint on development of geothermal energy, but believes that PacifiCorp should be required to do more to overcome this constraint than merely accept geothermal bids in its all-source RFPs, as its action plan proposes. While PacifiCorp waits, other utilities have worked with

[38] IRP, pages 207 [Table 8.1], 208.

[39] The filed IRP does not discuss how the cost of geothermal was calculated, but the development and use in the IRP of a "risk-adjusted cost reflecting the investment needed to prove the [Blundell] resource" is described in an August 10, 2010, letter from PacifiCorp to the Utah Public Service Commission. The letter is available on PacifiCorp's IRP website, at http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2011IRP/PacifiCorp_GeothermalStudy2010_08-10-2010.pdf.

[40] IRP, pages 131 and 224.

developers to secure the best geothermal resources in and near PacifiCorp's service territory.[41]

The Commission should require PacifiCorp to demonstrate real progress on geothermal energy before the next IRP update. One option would be to require PacifiCorp to conduct a geothermal-only RFP. A geothermal RFP could have several benefits. First, the RFP would be able to reflect timing and terms for geothermal deals that differ considerably from those for gas, wind, and solar resources, and that make it difficult for geothermal resources to be judged according to the same parameters as other resources. Second, it could prompt PacifiCorp to intensify discussions with CalEnergy (its affiliate) about geothermal development at Blundell or elsewhere, and also provide the framework for PacifiCorp to potentially justify an affiliate transaction if it is competitive with other responses. Third, it would help overcome the inference some have drawn that PacifiCorp's justification for eliminating consideration of geothermal energy—*i.e.*, desire for cost-recovery guarantees and allocation of development funds—is because it is only considering self-build options.

Other, better methods than a geothermal-only RFP may exist for PacifiCorp to demonstrate that it is moving forward on geothermal energy. Discussions with stakeholders concerning policy options for distributing risk would be one avenue. But, whether through a geothermal-only RFP or some other means, PacifiCorp should be required to show substantial progress on geothermal resources before the next IRP update.

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[41] Black & Veatch performed a study of commercially viable geothermal projects for PacifiCorp. "Power Generation, Geothermal Resource Study," Black & Veatch for PacifiCorp (August 2010), available at http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2011IRP/PacifiCorp_GeothermalStudy2010_08-10-2010.pdf. Apart from Blundell expansion, the report describes the three other most attractive geothermal projects in or near PacifiCorp's service territory as already committed through PPAs with other utilities. *Id.* at page 1-3.

C. Solar: Solar Shows Promise and Will Continue to Improve.

With a service territory rich in solar resources, PacifiCorp should be a leader in moving solar into the generating portfolio. RNP is pleased that the Company evaluated distributed generation resources in its IRP, including solar PV and solar hot water. It is notable that, with certain cost assumptions, both could be economical resources for the Company's system. In particular, the preferred portfolio includes 30 MW of solar hot water heating resources by 2020, and we look forward to seeing the Company move quickly to implement programs to capture this efficient resource.[42] We also encourage PacifiCorp to prepare for utility-scale solar to become a more cost-competitive option for meeting RPS requirements within the next five to ten years.

IV. Conclusion and Recommended Actions

In sum, RNP believes that PacifiCorp should be scaling back from an aging coal fleet, pushing toward a future of efficient, flexible operations, and leading on advancement of diverse renewable resources. RNP specifically recommends that the Commission:

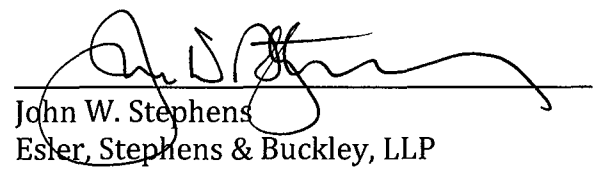
- Not acknowledge the IRP without complete, transparent analysis of continued investment in aging coal plants;
- Defer acknowledgment of a second CCCT unless PacifiCorp can better demonstrate why it is the best resource to meet its capacity need;
- Require PacifiCorp, for its next wind integration study, to use an independent technical review committee composed and operated consistent with industry standards;
- Require PacifiCorp's next IRP update to explore opportunities for reducing integration costs and modeling likely cost savings in its next IRP; and
- Require PacifiCorp to conduct a geothermal-only RFP, or otherwise to demonstrate progress on geothermal resources, before its next IRP update.

[42] IRP, pages 230 [Table 8.16], 254.

RNP appreciates the opportunity to comment on PacifiCorp's 2011 IRP, and looks forward to working with the Company, Staff, and other stakeholders in this docket to evaluate additional analysis of PacifiCorp's coal fleet investments.

DATED this 25th day of August, 2011.

Respectfully submitted,



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CERTIFICATE OF SERVICE

I hereby certify that I served the foregoing **COMMENTS OF RENEWABLE NORTHWEST PROJECT** on the following persons on August 25, 2011, by hand-delivering, faxing, e-mailing, or mailing (as indicated below) to each a copy thereof, and if mailed, contained in a sealed envelope, with postage paid, addressed to said attorneys at the last known address of each shown below and deposited in the post office on said day at Portland, Oregon:

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