

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON**

**LC 43**

In the Matter of PORTLAND GENERAL ELECTRIC 2007 Integrated Resource Plan	Reply Comments of Portland General Electric Company
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Introduction:

Comments by parties to this docket were due on October 19, 2007. Renewables Northwest Project (RNP) was the only party to comment. PGE appreciates the input provided by RNP, and offers the following reply comments addressing points raised by RNP. We organize them according to the Oregon Public Utility Commission (Commission) guidelines for Integrated Resource Plans (IRP) contained in Order No. 07-002. This is consistent with Administrative Law Judge Patrick Power's October 3, 2007, directive concerning parties' organization of comments.

Guideline 1: (a) Evaluation of all resources on a consistent and comparable basis. On Page 2 of their comments, RNP states generally that PGE's IRP "does not give sufficient attention to solar energy resources," and then makes several related comments. PGE responds as follows:

PGE recognizes the value of diversity in our resource portfolio, and all else being equal, we would prefer to diversify our renewables by adding solar and other renewable resources rather than relying predominantly on new wind to meet the Oregon Renewable Energy Standard targets. As such, we will welcome the opportunity to examine additional solar resources submitted in our upcoming Request for Proposals process.

On June 25, 2007, four days before the PGE's IRP was published and had already gone to print, the Oregon legislature passed HB 3201 to expand the scope of Oregon's existing Business Energy Tax Credit (BETC). The legislation increased the cap on eligible project costs from \$10 million to \$20 million and the credit limitation percentage from 35 percent to 50 percent. Thus the legislation effectively increased the maximum credit available under the BETC from \$3.5 million to \$10 million.

The BETC increase, which applies to (among other items) facilities that use or produce renewable energy, has significantly enhanced the economics of and outlook for solar energy in Oregon. Since the IRP was filed, PGE has received a number of unsolicited inquiries regarding both utility-scale and distributed solar projects, including solar photovoltaic (PV) and solar thermal technologies. In addition, PGE attended the Solar Power 2007 conference in September 2007, and has joined the Solar Electric Power

Association's<sup>1</sup> working group on utility solar business models. However, because the 30% federal investment tax credit for solar energy property does not currently apply to utilities, PGE is limited in its ability to take advantage of the favorable tax incentives for solar. We are actively lobbying for an extension of the federal investment tax credit for solar and removal of the utility exemption.

In its comments, RNP correctly states that costs for solar PV remain relatively high on a per kilowatt basis. RNP also states that IRP analysis should include only the solar resource costs born by the utility. As with all resources modeled in the 2007 IRP, PGE only includes costs actually born by the utility. Our analysis on solar also takes into account all applicable tax credits and incentives.

RNP further suggests that costs for solar PV are expected to decrease significantly over the time period modeled by the IRP. Current costs are approximately \$8 - \$9 per watt for installed residential solar systems, \$6.00 - \$6.50 per watt for commercial systems, and potentially lower for large-scale utility projects and CSP projects. Several large PV manufacturers have stated publicly that they intend to reduce installed solar system costs by 50% by 2012. Such decreases could potentially be achieved both via improvements in efficiencies and economies of scale as production increases to meet growing demand. However, the future of such potential cost reductions remains uncertain. If Congress fails to pass an extension of the federal investment tax credit for solar, demand for solar energy could drop dramatically, as it did for wind in years in which the PTC was in jeopardy or not extended, thus threatening the development of the solar industry and its ability to meet stated cost goals. While PGE generally agrees with RNP that costs for solar are likely to decrease over the time period modeled by this IRP, such decreases are difficult to quantify in scale and timing. PGE believes that we will have better insights regarding the future costs of solar resources in our next IRP.

Regarding RNP's comments about solar hot water and including on-site solar generation as a demand-side resource in the IRP, the ETO considers solar water heating to be an efficiency measure; therefore it is included in the technical assessment the ETO is charged with conducting. PGE uses the ETO's results for demand side resource planning. In the ETO's 2006 Resource Assessment, residential solar water heating systems for new construction and for existing homes did not pass the cost effectiveness threshold; however, they continue to update assumptions and are currently developing their 2008 Assessment.

PGE is also interested in RNP's source for 12 to 25 MWa potential for residential solar water heating. While PGE would like to see such potential from a sustainable resource, our data suggests a somewhat lower potential. According to our 2003 Residential Appliance Saturation Survey (RASS), approximately 50% of our residential customers have electric water heat, and this percentage is declining. The single family market is the most feasible for rooftop installations, and as such, makes up about 50% of those with electric water heat. PGE's earlier solar water heating demonstration, conducted in the early 1990's, resulted in about 1,200 to 1,500 kWh savings per year for a family of four.

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<sup>1</sup> PGE became a member of SEPA in 2007.

Nevertheless, using RNP's 2,400 kWh/yr savings and 20% penetration rate PGE estimates the achievable potential to be at the low end of RNP's range. Solar hot water is a resource well worth pursuing. As RNP acknowledges, PGE focused on other renewable resources in the 2006 IRP because of current cost considerations. However, we do not intend to ignore the potential for solar water heating in the future.

Working together, PGE and the ETO have taken significant steps in the past several years to help develop the local solar market. For example, PGE facilitates net metering and was very supportive of the Kettle Foods PV installation. As new information and opportunities present themselves, PGE and the ETO will continue to work together in new directions for solar energy.

RNP's final comment is that distributed solar PV and hot water systems generate the most energy during peak load hours and this should be taken into account when developing an appropriate value for solar. PGE has examined the coincidence of hourly solar PV output in the region to an estimate of forward hourly peak power prices and found that the solar output does not exactly match our peaks. In the winter peak (January through March), the solar output generally peaks around noon to 1:00 p.m., whereas loads peak in the morning (i.e. around 7:00 a.m.) and evening (i.e. around 6:00 p.m.). In the summer peak (July through September), solar output peaks during the shoulder hours of 1:00 to 3:00 p.m., whereas PGE's load peaks around 5:00 p.m. As a result, the value of solar production in the region compares favorably to flat (24 x 7) average annual prices, but falls below the average annual, on-peak prices.

Guideline 4: (e) Identification and estimated costs of all resource options.

On Page 3 of its Comments, RNP states that "the cost of wind integration was not adequately addressed," and that this "may have driven PGE's Energy Action Plan to unnecessarily limit the amount of wind resources to that required for compliance with the Oregon Renewable Energy Standard." PGE appreciates this concern and has discussed some of the more technical aspects of wind integration cost forecasting with Ken Dragoon of RNP.

PGE's proposed Energy Action Plan includes 105 MWa of wind power from Phases 2 and 3 of Biglow Canyon. It also includes 218 MWa of additional renewable resources, much of which may ultimately come from wind. Finally, the Energy Action Plan includes 192 MWa of medium-term (6 to 10-year) power purchases. These medium-term purchases provide an opportunity for new and developing resource technologies to mature and for new policy initiatives to become clearer. As a result, PGE will be in a position to make new resource decisions in the future that are better informed and responsive to our changing environment. Building in the option to re-assess a portion of our resource needs in the future via a bridging strategy is an integral component of PGE's 2007 IRP. We will also be able to adjust our strategy in the near term based on the bids we receive in our requests for proposals (RFP), the first of which we will release in 2008.

For purposes of setting rates, parties to Docket UE 192 stipulated that PGE use \$5.50 per MWh as the assumed cost to integrate power from Phase 1 of Biglow Canyon during the

2008 test year. Regarding the specific calculation in the IRP of expected wind integration costs, PGE is continuing its work to complete a wind study. We currently must decide which specific model(s) to use to evaluate the likely impact of wind resource additions on overall power costs. Then we will run sensitivities if appropriate

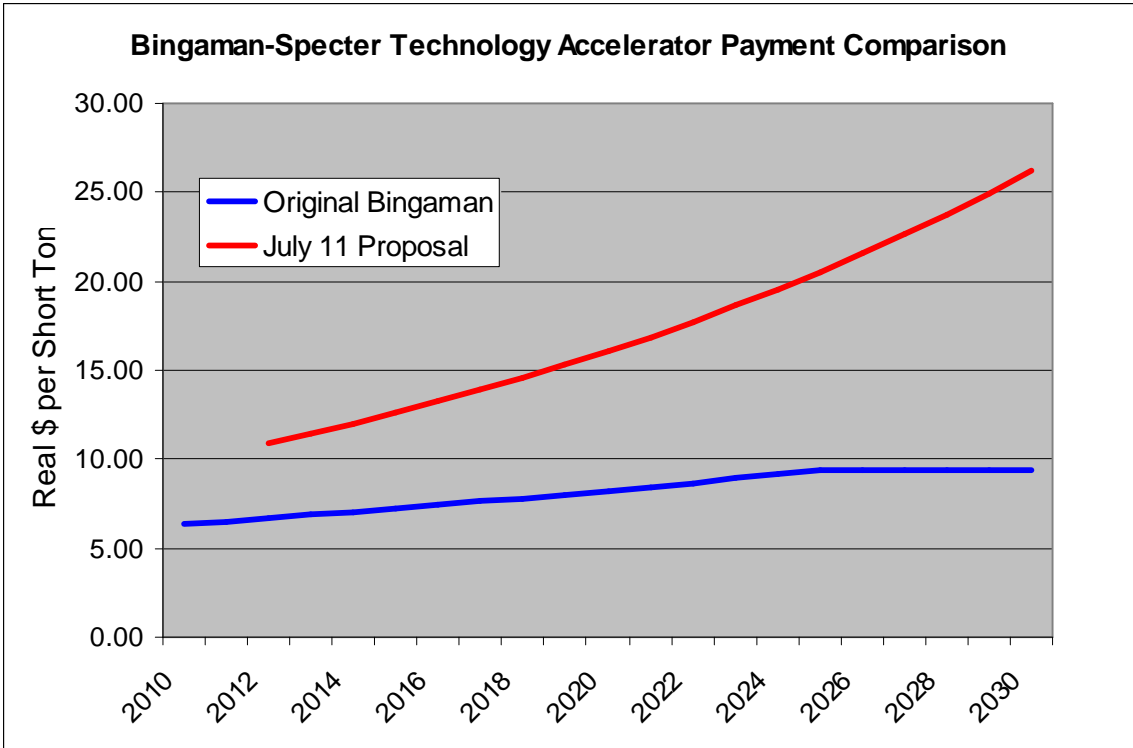
Guideline 8: Environmental costs.

RNP makes several comments on environmental costs on Pages 3 and 4 of its Comments. These comments are in three primary categories – base case CO<sub>2</sub> tax assumption, range of CO<sub>2</sub> tax assumptions, and Oregon law concerning greenhouse gas emissions. We address each of these categories below.

Base case CO<sub>2</sub> tax assumption:

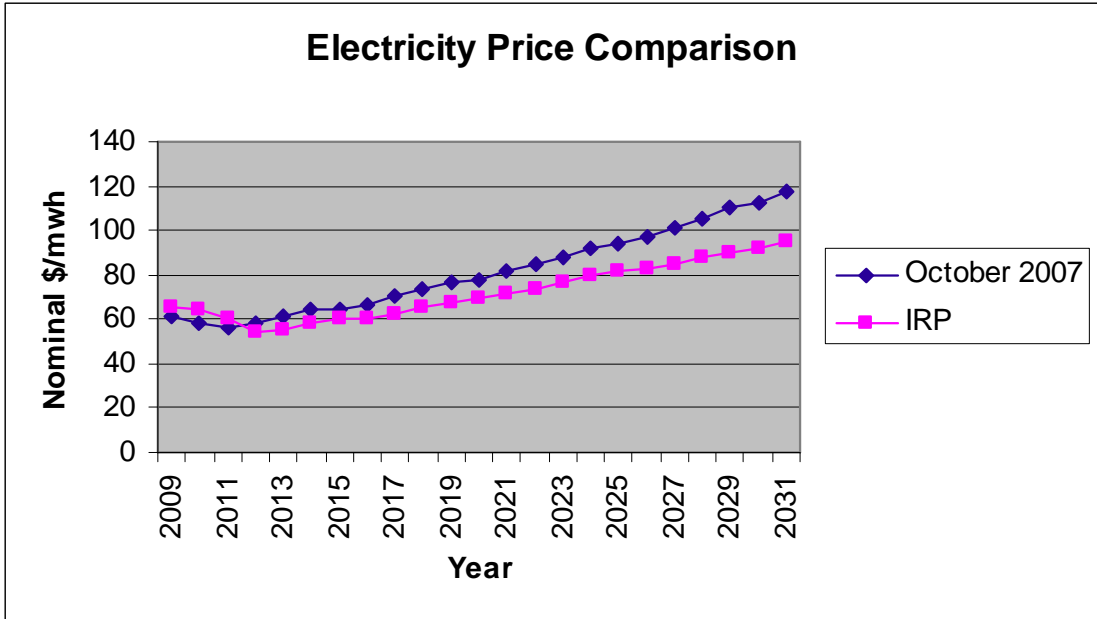
RNP asserts that PGE's IRP does not reflect the "current" policy environment for assumed base case CO<sub>2</sub> adder values. On July 11, 2007, Senators Bingaman and Specter introduced an updated federal CO<sub>2</sub> proposal, the Low Carbon Economy Act of 2007. This occurred after we finalized our IRP submittal. The revised approach was immediately endorsed by the National Commission on Energy Policy. PGE also endorses the July 11 proposal. In mid-June, we were aware that a new legislative proposal was being developed, as indicated on page 91 of our 2007 IRP, submitted on June 29. However, we were unsure at that time what provisions and prices the final legislative proposal would contain. Thus, PGE's analysis was current at the point of IRP publication, based on legislation that PGE publicly endorsed in December 2006 (see PGE's IRP, page 91). With respect to the base case CO<sub>2</sub> adder, RNP's assertion that "PGE acknowledges that this value is based on an out-of-date cap-and-trade policy" is incorrect.

The new legislative proposal increased the initial safety valve price (now called a Technology Accelerator Payment) from \$7 per metric ton in \$2010 to \$12 per metric ton in \$2012. It also increased the annual escalation from a 5% per year nominal increase to 5% a year above the rate of inflation. The year-to-year increase continues indefinitely in the July 11 proposal, whereas in the original proposal the price no longer changed after 2025. The cumulative effect of these changes is to approximately *double* the real levelized cost of the tax during our 2012 to 2031 study period. Hence, the new proposal represents a substantive increase. The following graph illustrates the safety valve pricing of the original vs. the July 11 proposal:



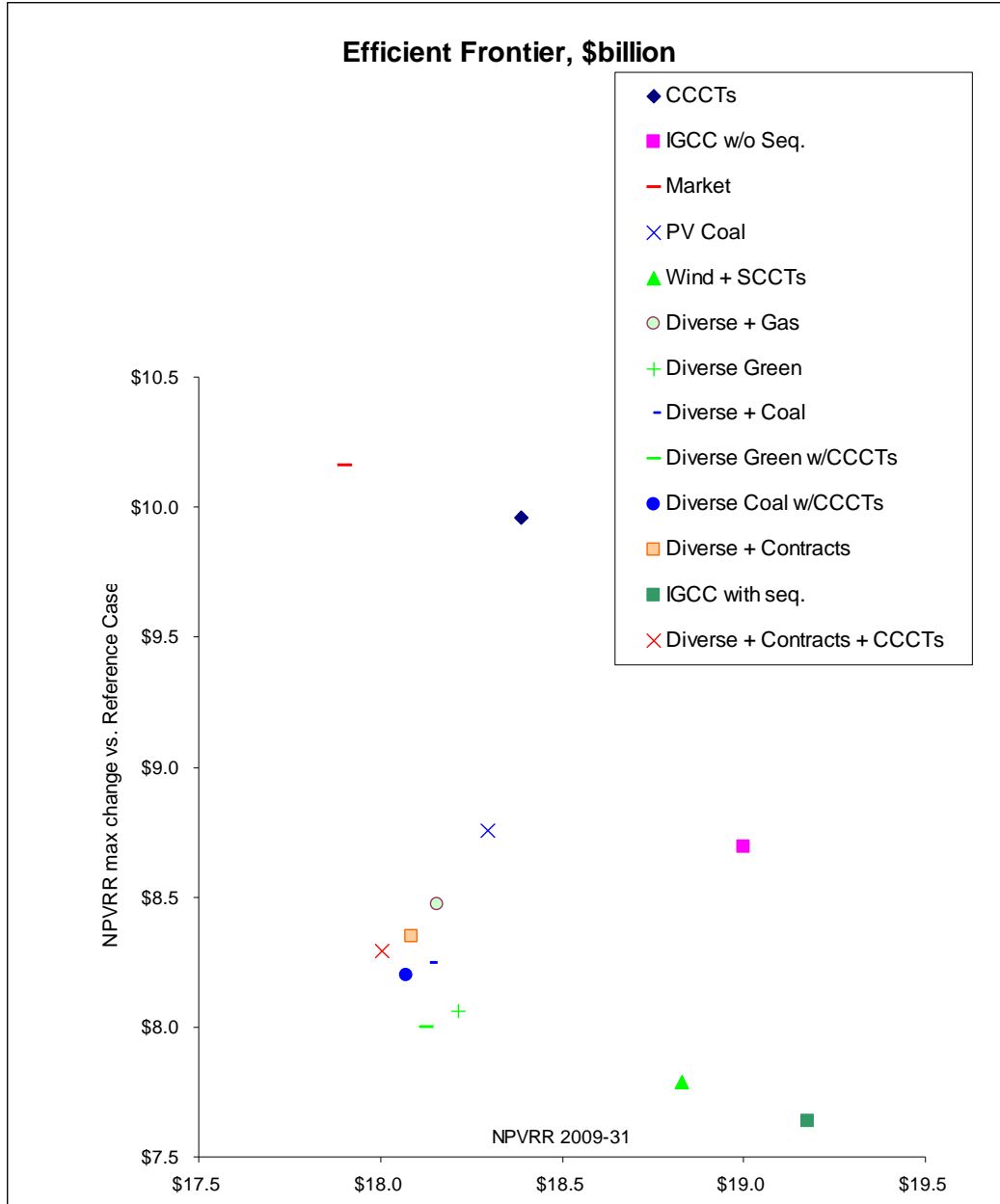
We have subsequently updated our deterministic analysis to incorporate the July 11 Bingaman-Specter proposal, using the \$12 per metric ton CO<sub>2</sub> adder in 2012, growing at 5% above the rate of inflation. In preparing this study, we also updated natural gas prices to reflect the most recent PIRA forecast. The updated gas prices for Sumas are approximately \$.65/mmbtu higher on a real levelized basis (2012-2020) than the prices used in the IRP.

In addition, we created a new WECC economic long-term expansion similar to that described in chapter 10 of our IRP. This allows us to establish new WECC-wide electricity prices based on higher gas prices and a modified resource expansion. The impact on electricity prices is shown below:



The result of the higher gas prices and higher CO<sub>2</sub> cost are shown in the Efficient Frontier graph shown below:

(next page)



When compared to Figure ES-3 on Page 9 of the Executive Summary of our Integrated Resource Plan, there is no material difference in the relative performance of the portfolios. The portfolios, reflecting higher prices, increase in cost by approximately \$1.0 billion on average. The efficient frontier is also now more bowed – that is, portfolios that do not rely heavily on fossil fuels are less affected, whereas portfolios that are fossil fuel-heavy become more affected.<sup>2</sup> Portfolios that emphasize renewables perform somewhat better. After conducting this updated analysis, our preferred portfolio

<sup>2</sup> In addition, the entire curve shifts down by approximately \$1.0 billion, as the vertical axis is the maximum change, or difference between the expected and most expensive cases. The expected case increases by approximately \$1.0 billion, whereas the most expensive case does not change. This results in a decrease of approximately \$1.0 billion in the maximum change.

remains unchanged. Two factors explain why this decision does not change. First, our proposed Action Plan does not rely on new coal or long-term gas in the first place. This update reinforces our original conclusion that our proposed Action Plan hedges reasonably well against CO<sub>2</sub> risk. Second, the Bingaman-Specter proposal is not so high as to cause dramatic changes in the expected dispatch of existing resources.

Range of CO<sub>2</sub> tax assumptions:

RNP asserts that PGE's *range* of CO<sub>2</sub> tax adder values does not reflect the current policy environment. They cite their opening comments in Docket UM 1302, dated July 26, 2007 (about a month *after* our filing), in which they present a survey of adders currently under discussion. By contrast, PGE followed OPUC Order No. 93-695, which called for adders of \$10, \$25, and \$40 (in \$1990) per ton. PGE has three observations about RNP's assertion:

1. PGE's modeling of the \$40 (in \$1990, or \$57.6 in \$2006) per ton adder is sufficiently high to both discourage new coal generation construction and to impact the dispatch of existing coal generation. From a modeling impact perspective, there is little to be gained from including higher prices.
2. PGE's plan does not rely on new coal, because our existing range of CO<sub>2</sub> tax adders was adequate to show it to be risky. Hence, higher CO<sub>2</sub> tax values do not cause a change in our preferred portfolio because our preferred portfolio does not include fossil fueled resources in the first place.
3. In assessing portfolio performance, we also looked at other impacts and risks beyond the CO<sub>2</sub> tax. For renewables, these included capital requirements, rate impacts, intermittency, and technology maturity and durability. We do not believe that it is appropriate to treat the CO<sub>2</sub> tax as the sole risk to consider in portfolio scenario analysis.

RNP also points out that the new Bingaman-Specter proposes a higher tax than the \$10 per ton (\$1990) sensitivity, contrary to what we say at the bottom of page 91 of our IRP. The intent of our statement on Page 91 of the IRP was to convey that the first several years of the \$10 per ton (\$1990) sensitivity are higher than the new Bingaman-Specter proposal. Eventually, the 5% real rate of growth of the latter overtakes the former. Our objective was to point out that the difference between the two, on a real levelized basis, is not large.

Oregon law on greenhouse gas emissions:

RNP asserts that our June 29, 2007, IRP Energy Action Plan "falls short of being a proactive blueprint for resource development consistent with state targets for GHG reductions" that were subsequently signed into Oregon law August 6, 2007. Aside from the difficulty of considering targets that were not yet established when we developed our



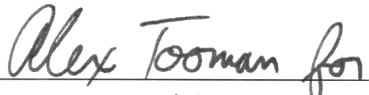
Action Plan, the law referred to sets out GHG reduction targets to be reached 13 years from now and establishes a Commission, but lacks a concrete plan for implementation. It also is not limited to the energy sector, and does not have definitive standards like the Oregon Renewable Energy Standard legislation. Without greater certainty with respect to the State's goals, PGE is unsure how to measure whether our action plan is or is not an appropriate blueprint for resource development consistent with state GHG reduction target.

In its September 13 "Carbon Dioxide Footprint of the Northwest Power System," the Northwest Power and Conservation Council (NPCC) addresses the difficulty of stabilizing emissions in a region which already has low carbon emissions on a per MWh basis compared to other regions of the U.S. We are participating in the NPCC's overall process for consideration of GHG targets and remain proactive in working with State and regional interests to address emissions associated with the energy sector.

## CERTIFICATE OF SERVICE

I hereby certify that on November 9, 2007, I caused Portland General Electric's **REPLY COMMENTS** to be served by electronic mail to those whose email addresses appear on the attached Service List, and by First Class US Mail, postage prepaid and properly addressed, to those parties who have not waived paper service in OPUC Docket LC 43.

Dated at Portland, Oregon, this 9<sup>th</sup> day of November, 2007

  
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