Portland General Electric Company
Legal Department
121 SW Salmon Street • Portland, Oregon 97204
(503) 464-7611 • Facsimile (503) 464-2200

Richard George
Assistant General Counsel

December 28, 2011

Email / US Mail
Public Utility Commission of Oregon
Filing Center
550 Capitol Street, N.E., Ste 215
P.O. Box 2148
Salem, OR 97301-2148

RE: **PGE 2011 Renewable Portfolio Standard Implementation Plan**

Enclosed please find an original and two copies of PGE's Renewable Portfolio Standard Implementation Plan. The Plan is submitted pursuant to OAR 860-083-0400 and provides information about how PGE will meet its RPS requirement in the years 2013 through 2017.

OAR 860-083-0100 specifically describes how to calculate the incremental cost of renewable resources. Those cumulative incremental costs are then compared to the 4% cap as allowed in ORS 469A.100. This report, in compliance with OPUC rules, provides information regarding our current and planned renewable resources for the years 2013 through 2017. As such, PGE provides the levelized annual cost-based difference between "qualifying electricity" and a like amount of non-qualifying electricity (in this instance, the cost of a CCCT).

PGE is providing copies of this filing to all parties in Docket UM 1466.

If you have any questions or require further information, please call Kate Bonebrake at (503) 464-7739 or Richard George at (503) 464-7611. Please direct all formal correspondence and requests to the following email addresses: richard.george@pgn.com and pge.opuc.filings@pgn.com

Sincerely,

J. RICHARD GEORGE
Assistant General Counsel

JRG:cbm
Enclosures
cc: UM 1466 Service List

Portland General Electric
Renewable Portfolio Standard
Oregon Implementation Plan[1]
<2013-2017>

As an introduction and summary of the Implementation Plan, answer the following questions:

Why is PGE submitting an Implementation Plan?

The renewable portfolio standard (RPS), ORS 469A.052, states that at least five percent of the electricity sold by a large utility to retail electricity consumers must come from qualifying resources in each of the calendar years 2011, 2012, 2013, and 2014. In 2015 through 2019 the percentage that must come from qualifying resources increases to 15 percent.

ORS 469A.075 requires electric companies subject to ORS 469A.052 to develop an implementation plan for meeting the requirements of the standard and file the plan with the Public Utility Commission. Pursuant to OAR 860-083-0400, this second implementation plan is due January 1, 2012.

What information was used as the basis of this Implementation Plan?

This Implementation Plan is based primarily on existing qualifying renewable resources, and on PGE's 2009 Integrated Resource Plan (IRP) and its 2011 IRP Update.

How does the company intend to meet the renewable portfolio standard (RPS) target?

PGE intends to meet its portfolio standard (RPS) targets with a combination of unbundled RECs, bundled RECs from existing resources and the addition of new renewable resources. This Plan includes how PGE will comply with ORS 469.100 for the Years 2013 through 2017. Details of PGE's Implementation Plan are given in the following sections.

Provide responses below following the citation of each element of OAR 860-083-0400.

Implementation Plan

OAR 860-083-0400(2)(a)
The annual megawatt-hour target for compliance with the applicable renewable portfolio standard based on the forecast of electricity sales to its Oregon retail electricity customers.

[1] Throughout this document the term 'issued' refers to generated RECs and the term 'acquired' refers to purchased RECs (unbundled or bundled).

Response:
2013 – 1,002,146 MWh
2014 – 1,023,261 MWh
2015 – 3,117,300 MWh
2016 – 3,170,379 MWh
2017 – 3,205,802 MWh

See Attachment A, which is an Excel spreadsheet, Tab 3 – "Annual Compliance by Resource."

OAR 860-083-0400(2)(b)
An accounting of the planned method to comply with the applicable renewable portfolio standard, including number of banked RECs by year of issuance, the number of other bundled and unbundled renewable energy certificates, and alternative compliance payments.

Response:
See Attachment A, which is an Excel spreadsheet, Tab 3 – "Annual Compliance by Resource" for detail by year.

	Banked	Bundled	Unbundled	ACP
2013	1,002,146	869,804	132,342	0
2014	1,023,261	1,023,261	0	0
2015	3,117,300	3,117,300	0	0
2016	3,170,379	3,170,379	0	0
2017	3,205,802	3,205,802	0	0

OAR 860-083-0400(2)(c)
Identification of generating facilities, either owned by the company or under contract, that are expected to provide renewable energy certificates for compliance with renewable portfolio standard. Information on each generating facility must include: (A) the renewable energy source; (B) the year the facility or contract became operational or is expected to become operational; (C) the state where the facility is located or is planned to be located; and (D) expected annual megawatt-hour output for compliance from the facility for the compliance year covered by the implementation plan.

Response:

Name: Vansycle Ridge Wind Farm
Source: Wind – PPA
Year: 1997
State: Oregon
Expected MWh output: 8 MWa = 71,777 MWh

Name: North Fork (upgrade)
Source: Hydroelectric
Year: 2001
State: Oregon
Expected MWh output: .94 MWa = 8269 MWh

Name: Faraday (upgrade)
Source: Hydroelectric
Year: 2002
State: Oregon
Expected MWh output: 1.03 MWa = 9,000 MWh

Name: Klondike II Wind Farm
Source: Wind - PPA
Year: 2005
State: Oregon
Expected MWh output: 26 MWa [2] = 231,516 MWh (187,716 MWh)

Name: Pelton Round Butte
Source: Hydroelectric (certified low impact)
Year: 2007
State: Oregon
Expected Annual Qualifying MWh output: 50 MWa = 438,000 MWh

Name: Biglow Canyon Wind Farm (Phases 1, 2, and 3)
Source: Wind
Year: Phase 1 – 2008; Phase 2 – 2010; Phase 3 – 2011 (first full year of operation for each phase)
State: Oregon
Expected MWh output: (125+150+175 MW); 1.4 million MWh output (1.4GWh)

Name: SunWay 1
Source: Solar
Year: 2008
State: Oregon
Expected MWh output: 0.01 MWa[3] = 111 MWh (66 MWh)

Name: SunWay 2
Source: Solar
Year: 2009
State: Oregon
Expected MWh output: 0.13 MWa = 1,171 MWh (878 MWh)

---

[2] Currently of the 26 MWa generated, 5 MWa is allocated to PGE Rate Schedule 9, Stable Rate Pilot. Service under this schedule terminates December 31, 2011.
[3] Sunway projects are shown at full capacity. Currently a share of these projects is allocated to PGE's Clean Wind Fund at 40%, 25%, and 13% for Sunway 1-3 respectively. Values in parenthesis represent RECs available for RPS compliance.

Name: SunWay 3
Source: Solar
Year: 2010
State: Oregon
Expected MWh output: 0.34 MWa = 2,948 MWh (2,565 MWh)

Name: Bellevue Solar
Source: Solar
Year: 2011
State: Oregon
Expected MWh output: 0.22 MWa = 1,901 MWh

Name: Yamhill Solar
Source: Solar
Year: 2011
State: Oregon
Expected MWh output: 0.15 MWa = 1,297 MWh

Name: IRP Project 1[4]
Source: Wind
Year: 2013
State: Oregon
Expected MWh output: 50.5 MWa = 442,380 MWh

Name: IRP Project 2[5]
Source: Wind
Year: 2014
State: Oregon
Expected MWh output: 50.5 MWa = 442,380 MWh

Name: Solar Payment Option Program (SPO)
Source: Solar
Year: 2010 – 2015
State: Oregon
Expected MWh Output: PGE did not include expected output from the SPO program at this point. This is due to the small initial size, 21 total 2010 RECs from the program currently included in WREGIS. The RECs, and REC projections, will be incorporated in future Implementation Plans as the program develops more fully.

[4] The forecast amount and in-service year for IRP Project 1 are subject to bid(s) selected from a Request for Proposals process scheduled to begin in 2012.
[5] The forecast amount and in-service year for IRP Project 2 are subject to bids(s) selected from a Request for Proposals process scheduled to begin in 2012.

OAR 860-083-0400(2)(d)
A forecast of the expected incremental costs of new qualifying electricity for facilities or contracts planned for first operation in the compliance year, consistent with the methodology in OAR 860-083-0100.

Response:

2013:
50.5 MWa forecast to be on-line in 2013.[6] See Attachment A, Tab 2– "Incr. Cost of RECs Generated" for estimated incremental cost.

IRP Project 1: 442,380 x $15.76 = $6,973,978

2014:
50.5 MWa forecast to be on-line in 2014.[7] See Attachment A, Tab 2– "Incr. Cost of RECs Generated" for estimated incremental cost.

IRP Project 2: 442,380 x $14.64 = $6,476,765

2015:
N/A; PGE's most recently acknowledged IRP Action Plan only includes new RPS resource additions up to 2015. Any further RPS resource additions will be addressed in PGE's future IRP Action Plans.

2016:
N/A; PGE's most recently acknowledged IRP Action Plan only includes new RPS resource additions up to 2015. Any further RPS resource additions will be addressed in PGE's future IRP Action Plans

2017:
N/A; PGE's most recently acknowledged IRP Action Plan only includes new RPS resource additions up to 2015. Any further RPS resource additions will be addressed in PGE's future IRP Action Plans

OAR 860-083-0400(2)(e)
A forecast of the expected incremental costs of compliance, the costs of using unbundled renewable energy certificates and alternative compliance payments for compliance, compared to annual revenue requirements, consistent with the methodologies in OAR 860-083-0100 and 860-083-0200, absent consideration of the cost limit in OAR 860-083-0100.

[6] See footnote 3.

[7] See footnote 4.

Response:
PGE does not plan to use Alternative Compliance Payments in any of the compliance years, 2013 through 2017. For a forecast of the expected incremental costs of compliance and the costs of using unbundled renewable energy certificates for compliance compared to annual revenue requirements, see Attachment A, Tab 1 –"Incremental Cost Summary."

OAR 860-083-0400(2)(f)
A forecast of the number and cost of bundled renewable energy certificates issued, consistent with the methodology in OAR 860-083-0100.

Response:
See Attachment A, Tab 5 – "RECs Generated" for a forecast of the number of bundled renewable energy certificates issued. The forecast number of bundled RECs is based on expected generation from qualifying renewable resources.

The BPA Environmental Redispatch (ER) business practice reduced generation and REC production in 2011 for PGE's RPS qualifying wind resources located in BPA's Balancing Authority Area. This impact is included in the Implementation Plan figures for 2011. We did not forecast a reduction in generation and RECs due to BPA ER for 2012 and beyond. However, if the BPA ER business practice continues, it will likely reduce future generation and REC production from qualifying wind resources.

The BPA Dispatch Standing Order 216 (DSO 216) reduced generation and REC production in 2011 for PGE's qualifying wind resources located in BPA's Balancing Authority Area. This impact is included in the Implementation Plan figures for 2011. We did not forecast a reduction in generation and RECs due to DSO 216 for 2012 and beyond. However, if DSO 216 continues, it will likely reduce future generation and REC production from qualifying wind resources.

See Attachment A, Tab 2 – "Incr. Cost of RECs Generated" for a forecast of the cost of bundled renewable energy certificates issued. Bundled RECs are the RECs from each resource with incremental costs.

OAR 860-083-0400(4)
If there are material differences in the planned actions in [OAR 860-083-0400(2)] of this rule from the action plan in the most recently filed or updated integrated resource plan by the electric company, or if conditions have materially changed from the conditions assumed in such filing, the company must provide sufficient documentation to demonstrate how the implementation plan appropriately balances risks and expected costs as required by the integrated resource planning guidelines in 1.b and c. of Commission Order No. 07-047 and subsequent guidelines related to implementation plans set forth by the Commission. Unless provided in the most recently filed or updated integrated

resource plan, an implementation plan for an electric company subject to ORS 469A.052 must include the following information: (a) At least two forecasts for subsections (2)(d), (e), and (f) of this rule: one forecast assuming existing government incentives continue beyond their current expiration date and another forecast assuming existing government incentives do not continue beyond their current expiration date; (b) A reasonable range of estimates for the forecasts in subsections (2)(d), (e), and (f) of this rule, consistent with subsection (4)(a) of this rule and the analyses or methodologies in the company's most recently filed or updated integrated resource plan.

Response:

In response to requirement 4:

There are no material differences between the Implementation Plan and the 2009 IRP Action Plan / 2011 IRP Update, and conditions have not materially changed.

In response to requirements 4(a) and 4(b):

See Attachment A, Tab 4 – "Incremental Cost by Resource." The Biglow Canyon resources are assumed to receive government incentives currently in place.

OAR 860-083-0400(5)

Under the following circumstances , the electric company must, for the applicable compliance year, provide sufficient documentation or citations to demonstrate how the implementation plan appropriately balances risks and expected costs as required by the integrated resources planning guidelines in 1.b and c. of Commission Order No. 07-047 and subsequent guideline related to implementation plans set forth by the Commission.

(a) The sum of costs in subsection (2) (e) of this rule is expected to be four percent or more of the annual revenue required in subsection (2)(e) of this rule for any compliance year covered by the implementation plan,

(b) The company plans, for reasons other than to meet unanticipated contingencies that arise during a compliance year to use any of the following compliance methods: (A) Unbundled renewable energy certification; (B) Bundled renewable energy certificates issued between January 1 through March 31 of the year following the compliance year: or (C) Alternative compliance payment, or

(c) The company plans to sell any bundled renewable energy certificates included in the rates of Oregon retail electricity consumers.

Response:

(a):

The costs in subsection (2) (e) above are not expected to exceed four percent of the annual revenue requirement in any compliance year reported in the plan. See Attachment A, Tab 1 – "Incremental Cost Summary."

(b):

PGE plans to use unbundled RECs to meet RPS compliance targets. Pursuant to OAR 860-083-0300 (3)(b)(B), an electric utility company must use, in chronological order (from first issued to last issued) its banked RECs before using 1) RECs generated in the compliance year, and 2) RECs generated between January 1 through March 31 of the year following the compliance year. Therefore, PGE must use its 132,342 banked, unbundled RECs in the first compliance year, 2013.

Further, we do not currently forecast using unbundled RECs in years after 2013 (2014 through 2017) for the purposes of complying with RPS but we reserve the right to do so if the availability and market prices for unbundled RECs in the future warrants it.

(c):

PGE intends to continue monitoring REC markets and may purchase or sell bundled or unbundled RECs in the market when price is perceived to be a good value in relation to other means of achieving RPS compliance.

OAR 860-083-0400(6)
An implementation plan must provide a detailed explanation of how the implementation plan complies, or does not comply, with any conditions specified in a Commission acknowledgement order on the previous implementation plan and any relevant condition specified in the most recent acknowledgement order on an integrated resource plan filed or updated by the electric company.

Response:

Order 10-173 acknowledged PGE's first Implementation Plan filing, filed December 31, 2009. The order contained no conditions; however, the order recommends development of a standardized template for the 2011 filing. That form was developed jointly by OPUC Staff and the parties earlier in 2011 and is the format PGE is using for this Implementation Plan filing.

Order 10-457 acknowledged PGE's 2009 Integrated Resource Plan and 2010 Addendum, with conditions. No conditions pertain directly to implementation plan filing requirements.

OAR 860-083-0400(7)
If there are funds in holding accounts under ORS 469A.180 (4) and if there electric company has not filed a proposal for expending such finds for the purpose allowed under ORS 469A. 180(5), the implementation plan must include the electric company's plans for expending or holding such funds. If the plan is to hold such funds, the plan should indicate under what conditions such funds should be expended.

Response:
Funds described in this rule pertain to Alternative Compliance Payments (ACP). As of December 2012, PGE has made no ACP and thus has no applicable ACP funds for disposition. The rule is not applicable to PGE at this time.

Portland General Electric
Renewable Portfolio Standard
2012 Oregon Implementation Plan
2013-2017

Key Assumptions – Incremental Cost Calculation

Background

As part of its compliance with ORS 469A, Portland General Electric (PGE) is required to file an implementation plan by January 1, 2012, that provides, among other things, a forecast of incremental costs of renewable resources from 2013 through 2017. The incremental cost calculation compares the nominal levelized cost of a renewable resource against the nominal levelized cost of a proxy plant, a combined cycle combustion turbine (unless otherwise specified by the Commission). The proxy plants used in this analysis are representative of a G-class combined-cycle CT. The annual incremental cost calculation is the difference between the nominal levelized cost of the renewable resource and the nominal levelized cost of the proxy plant and is calculated over the assumed life of each qualifying resource.

Methodology

The levelized costs have been developed using the same approach used to create the supply-side resource tables in the 2009 Integrated Resource Plan (IRP). For renewable resources currently in service, the capital investment values have been updated to the values at year-end 2010 while operation and maintenance costs have been based on current forecasts. The cost for wind integration is based on the 2011 IRP Update ($9.15 in 2014 dollars per megawatt hour) for new generic wind plants.

No renewable resources under 20 megawatts have been included in the analysis because the total additions of such renewable resources for the year did not exceed the 20 megawatt threshold contained in the regulations.

As with the supply-side resource tables, capital carrying costs have been stated on a real levelized basis with the effects of inflation removed. A real discount rate of 5.17% and inflation of 1.84% have been used for new generic qualifying and corresponding proxy resources in this analysis, which is consistent with the discount rate used in the 2011 IRP Update. Please see Table 3 for details on the Biglow Canyon Plants.

Portland General Electric
Renewable Portfolio Standard
2012 Oregon Implementation Plan
2013-2017

Key Assumptions – Incremental Cost Calculation

Renewable Resources

Table 1 provides the renewable resources that are included in the incremental cost calculation of this Implementation Plan:

Table 1

Resource	Capacity Factor (Percent)	In-Service Year	Nameplate Capacity (MW)	Design Plant Life / Contract Term (Years)
Biglow Canyon 1	38%	2008	125 MW	27 years
Biglow Canyon 2	36%	2010	150 MW	27 years
Biglow Canyon 3	34%	2011	175 MW	27 years
Generic Wind 1	33%	2013	153 MW	27 years
Generic Wind 2	33%	2014	153 MW	27 years

Table 2 provides the PPA nominal prices, which are based on bid evaluation in the applicable RFP. The nominal prices do not include the cost of wind/renewable integration, which are added as adjustments to this Implementation Plan.

Table 2

Resource	Contract Term (Years)	Average Capacity (MW)	PPA Contract Price ($/MWh)
N/A			

PGE receives Production Tax Credits (PTC) associated with owned wind projects, whereas it does not from PPAs. PTC values have been adjusted as prescribed by Federal tax regulation to correspond with the in-service year of each resource.

The "cost of firming, shaping, and integrating qualifying electricity" (ORS 469A.075(2)(b)) has been included.

PGE defines wind integration cost as the incremental system operating costs that result from meeting system operational requirements to account for load following, regulation, and forecast error. PGE Integration costs ($9.15 per megawatt hour in 2014 dollars) are

from the 2011 IRP Update (Appendix A Wind Integration Study Phase II, p. 50) and have been adjusted by inflation that corresponds to the in-service year of each resource.

Firming costs reflect the cost of assuring capacity is available during peak hours. These costs are addressed as the fixed costs of a Simple Cycle Combustion Turbine (SCCT), built to a size that represents the difference between the assumed capacity factor (CF) of the wind and the assumed peak capacity value (CV) of the wind.

The shaping adjustment reflects the cost or benefit of flattening energy deliveries on a daily and seasonal basis by purchasing or selling energy at market prices. The differences between actual energy deliveries and flat energy deliveries sum to zero, but when these differences are multiplied by corresponding market prices the sum of the products is positive or negative. A positive number represents a shaping cost and a negative number represents a shaping benefit.

Capacity factors for existing renewable resources correspond to the capacity factors indicative of what would be used in setting Oregon rates, subject to then-applicable Commission orders. Generic renewables will follow the assumptions used in the most recent acknowledged or updated IRP.

Bonneville Power Administration (BPA) transmission has been included for all qualifying resources. Integration costs have been included in accordance with the IRP methodology, as described in Chapter 7, section 7.1 of the 2009 IRP, and as updated in the 2011 IRP Update.

Proxy Plants
The proxy plants are representative of a G-class combined-cycle CT. Proxy plant capital costs in the incremental cost calculation for a specific renewable resource are fixed once the decision to acquire that renewable resource has been made.

Fuel prices for the generic greenfield proxy plants are based on average Sumas/AECO prices. Fuel prices have been updated to the 2011 IRP Update assumptions beginning in 2012. Where applicable, fuel prices are based on actual market prices through 2011.

Portland General Electric
Renewable Portfolio Standard
2012 Oregon Implementation Plan
2013-2017

Key Assumptions – Incremental Cost Calculation

Table 3

Proxy Plant for Qualifying Resource	Degraded Heat Rate	Availability Factor	Overnight Capital 2011$/kW	Fixed O&M 2011$/kW year	Variable O&M 2011$/MWh	Inflation Rate	Real Discount Rate
Biglow Canyon 1	6,653	92%	$ 795	$ 14.85	$ 2.68	2.30%	5.17%
Biglow Canyon 2	6,732	92%	$ 1,454	$ 14.68	$ 2.65	1.90%	5.59%
Biglow Canyon 3	6,732	92%	$ 1,454	$ 14.68	$ 2.65	1.90%	5.59%
Generic Wind 2013	6,732	92%	$ 1,160	$ 14.65	$ 2.64	1.84%	5.17%
Generic Wind 2014	6,732	92%	$ 1,160	$ 14.65	$ 2.64	1.84%	5.17%

Scenarios considered in the analysis include:

- Medium CO2 and low proxy plant fuel costs
- Medium CO2 and medium proxy plant fuel costs
- Medium CO2 and high proxy plant fuel costs
- Low CO2 and medium proxy plant fuel costs
- High CO2 and medium proxy plant fuel costs
- No CO2 and medium proxy plant fuel costs

Proxy plant fuel costs are included in compliance with the OAR 860-083-0100(7)(b) requirement: "Proxy plant fuel prices may be based on forecasts of spot prices for fuel at an appropriate market trading hub plus an estimate of the cost of hedging as much fuel price risk as can be reasonably achieved for remainder of the time horizon of such plant." The cost of hedging is assumed to be the $.05 per mmBtu through 2016 and $.10 per mmBtu thereafter and is based on the difference between the bid and ask price in PGE's wholesale market gas curves.

Levelized Calculation

The levelized calculation is based on the year the renewable resource is placed into service. Costs per megawatt hour are escalated over the economic life of the resource. The annual cost per megawatt hour is multiplied by the expected annual generation to develop the dollar cost in each year. Once the annual costs are calculated, the net present value of such costs over the resource life is used to calculate the annual nominal levelized cost.

A similar methodology, with the same in-service date, has been applied to the proxy plant. The calculations have accounted for the different resource lives and contract terms.

Portland General Electric
Renewable Portfolio Standard
2012 Oregon Implementation Plan
2013-2017

Key Assumptions – Incremental Cost Calculation

For ease and clarity, several simplifying assumptions have been made. For example, generation has been included for the full year in the renewable resource's in-service year. Economic life of resources has been rounded to a full year. In annual megawatt hour calculations, leap year effects have been ignored.

Allocation Factor
Not Applicable.

Incremental Cost
The analysis has been completed for each of the six scenarios mentioned in the above discussion of the proxy plant.

The annual calculated nominal levelized cost of the renewable resource has been compared to the annual calculated nominal levelized cost of the proxy plant. The difference between these values is the annual incremental nominal levelized cost. The incremental nominal levelized cost is presented for each year of the compliance period.

PGE 2011 RPS Implementation Plan
Attachment A

Tab 1 - Incremental Cost Summary

	Total Incremental Cost to Comply				
Base Case (Med CO2 and Med Proxy Fuel)	**2013**	**2014**	**2015**	**2016**	**2017**
Unbundled RECS	119,108				
Biglow 1	2,308,404	2,841,835	8,359,019	7,016,822	5,593,335
Biglow 2	610,077	1,364,988	9,402,086	8,027,596	6,399,056
Biglow 3	-	17,459	8,637,903	12,188,470	9,715,823
IRP Project 1	-	-	-	2,955,077	7,843,678
IRP Project 2	-	-	-	-	3,552,088
Total Incremental Cost	**3,037,589**	**4,224,282**	**26,399,009**	**30,187,965**	**33,103,979**
Revenue Requirement ($000)	1,756,088	1,798,681	1,833,072	1,867,311	1,899,970
Percentage of Rev Requirement	**0.2%**	**0.2%**	**1.4%**	**1.6%**	**1.7%**

Case 2 (High CO2 and Med Proxy Fuel)	**2013**	**2014**	**2015**	**2016**	**2017**
Unbundled RECS	119,108				
Biglow 1	1,031,955	1,270,422	3,736,838	3,136,819	2,500,459
Biglow 2	188,928	422,708	2,911,627	2,485,977	1,981,652
Biglow 3	-	7,293	3,608,097	5,091,187	4,058,350
IRP Project 1	-	-	-	714,486	1,896,463
IRP Project 2	-	-	-	-	320,374
Total Incremental Cost	**1,339,991**	**1,700,422**	**10,256,563**	**11,428,468**	**10,757,299**
Revenue Requirement ($000)	1,756,088	1,798,681	1,833,072	1,867,311	1,899,970
Percentage of Rev Requirement	**0.1%**	**0.1%**	**0.6%**	**0.6%**	**0.6%**

Case 3 (Low CO2 and Med Proxy Fuel)	**2013**	**2014**	**2015**	**2016**	**2017**
Unbundled RECS	119,108				
Biglow 1	2,968,373	3,654,311	10,748,850	9,022,920	7,192,461
Biglow 2	846,921	1,894,904	13,052,168	11,144,073	8,883,300
Biglow 3	-	22,655	11,208,718	15,816,006	12,607,449
IRP Project 1	-	-	-	4,205,680	11,163,159
IRP Project 2	-	-	-	-	5,351,228
Total Incremental Cost	**3,934,402**	**5,571,870**	**35,009,737**	**40,188,678**	**45,197,596**
Revenue Requirement ($000)	1,756,088	1,798,681	1,833,072	1,867,311	1,899,970
Percentage of Rev Requirement	**0.2%**	**0.3%**	**1.9%**	**2.2%**	**2.4%**

Case 4 (No CO2 and Med Proxy Fuel)	**2013**	**2014**	**2015**	**2016**	**2017**
Unbundled RECS	119,108				
Biglow 1	3,401,627	4,187,681	12,317,713	10,339,873	8,242,246
Biglow 2	994,657	2,225,448	15,328,971	13,088,030	10,432,891
Biglow 3	-	26,113	12,919,552	18,230,069	14,531,776
IRP Project 1	-	-	-	4,999,363	13,269,836
IRP Project 2	-	-	-	-	6,498,696
Total Incremental Cost	**4,515,391**	**6,439,243**	**40,566,236**	**46,657,334**	**52,975,446**
Revenue Requirement ($000)	1,756,088	1,798,681	1,833,072	1,867,311	1,899,970
Percentage of Rev Requirement	**0.3%**	**0.4%**	**2.2%**	**2.5%**	**2.8%**

Case 5 (Med CO2 and High Proxy Fuel)	**2013**	**2014**	**2015**	**2016**	**2017**
Unbundled RECS	119,108				
Biglow 1	(1,025,259)	(1,262,177)	(3,712,589)	(3,116,463)	(2,484,233)
Biglow 2	(469,325)	(1,050,068)	(7,232,912)	(6,175,533)	(4,922,717)
Biglow 3	-	(7,567)	(3,743,834)	(5,282,718)	(4,211,025)
IRP Project 1	-	-	-	(2,463,920)	(6,539,997)
IRP Project 2	-	-	-	-	(4,119,982)
Total Incremental Cost	**(1,375,475)**	**(2,319,813)**	**(14,689,335)**	**(17,038,634)**	**(22,277,953)**
Revenue Requirement ($000)	1,756,088	1,798,681	1,833,072	1,867,311	1,899,970
Percentage of Rev Requirement	**-0.1%**	**-0.1%**	**-0.8%**	**-0.9%**	**-1.2%**

Case 6 (Med CO2 and Low Proxy Fuel)	**2013**	**2014**	**2015**	**2016**	**2017**
Unbundled RECS	119,108				
Biglow 1	3,755,067	4,622,795	13,597,565	11,414,220	9,098,643
Biglow 2	1,103,051	2,467,970	16,999,469	14,514,318	11,569,831
Biglow 3	-	28,466	14,083,722	19,872,765	15,841,223
IRP Project 1	-	-	-	5,482,059	14,551,059
IRP Project 2	-	-	-	-	7,144,922
Total Incremental Cost	**4,977,226**	**7,119,231**	**44,680,756**	**51,283,362**	**58,205,678**
Revenue Requirement ($000)	1,756,088	1,798,681	1,833,072	1,867,311	1,899,970
Percentage of Rev Requirement	**0.3%**	**0.4%**	**2.4%**	**2.7%**	**3.1%**

Notes:

Although the SunWay, Bellevue and Yamhill solar projects produce RECs that PGE uses for compliance, until the sum of these projects is 20 MW, they are not included in the incremental cost calcualtion (pursuant to OAR 860-083-0100(13)(a)

In addition, the following RPS resources are deemed to be zero incremental cost because they are either low-impact hydro or had an in-service date prior to June 6, 2007 (pursuant to OAR 860-083-0100(1)(i):

- North Fork Upgrade
- Faraday Upgrade
- Round Butte Upgrade
- Pelton-Round Butte Low-Impact Hydro
- PPM Klondike II
- Vansycle Ridge

Tab 2 - Incremental Cost for RECs Generated

Base Case (Med CO2 and Med Proxy Fuel)	2013	2014	2015	2016	2017
Biglow 1	4,973,151	4,973,151	4,973,151	4,986,776	4,973,151
Biglow 2	5,689,534	5,689,534	5,689,534	5,705,122	5,689,534
Biglow 3	8,638,542	8,638,542	8,638,542	8,662,209	8,638,542
IRP Project 1	6,973,978	6,973,978	6,973,978	6,993,085	6,973,978
IRP Project 2	-	6,476,765	6,476,765	6,494,510	6,476,765
Total Incremental Cost	**26,275,206**	**32,751,971**	**32,751,971**	**32,841,702**	**32,751,971**

Case 2 (High CO2 and Med Proxy Fuel)	2013	2014	2015	2016	2017
Biglow 1	2,223,211	2,223,211	2,223,211	2,229,302	2,223,211
Biglow 2	1,761,929	1,761,929	1,761,929	1,766,756	1,761,929
Biglow 3	3,608,364	3,608,364	3,608,364	3,618,250	3,608,364
IRP Project 1	1,686,185	1,686,185	1,686,185	1,690,805	1,686,185
IRP Project 2	-	584,160	584,160	585,761	584,160
Total Incremental Cost	**9,279,688**	**9,863,848**	**9,863,848**	**9,890,873**	**9,863,848**

Case 3 (Low CO2 and Med Proxy Fuel)	2013	2014	2015	2016	2017
Biglow 1	6,394,967	6,394,967	6,394,967	6,412,488	6,394,967
Biglow 2	7,898,328	7,898,328	7,898,328	7,919,967	7,898,328
Biglow 3	11,209,547	11,209,547	11,209,547	11,240,258	11,209,547
IRP Project 1	9,925,398	9,925,398	9,925,398	9,952,591	9,925,398
IRP Project 2	-	9,757,261	9,757,261	9,783,994	9,757,261
Total Incremental Cost	**35,428,241**	**45,185,502**	**45,185,502**	**45,309,298**	**45,185,502**

Case 4 (No CO2 and Med Proxy Fuel)	2013	2014	2015	2016	2017
Biglow 1	7,328,354	7,328,354	7,328,354	7,348,431	7,328,354
Biglow 2	9,276,102	9,276,102	9,276,102	9,301,516	9,276,102
Biglow 3	12,920,507	12,920,507	12,920,507	12,955,905	12,920,507
IRP Project 1	11,798,489	11,798,489	11,798,489	11,830,814	11,798,489
IRP Project 2	-	11,849,518	11,849,518	11,881,983	11,849,518
Total Incremental Cost	**41,323,452**	**53,172,970**	**53,172,970**	**53,318,649**	**53,172,970**

Case 5 (Med CO2 and High Proxy Fuel)	2013	2014	2015	2016	2017
Biglow 1	(2,208,784)	(2,208,784)	(2,208,784)	(2,214,835)	(2,208,784)
Biglow 2	(4,376,890)	(4,376,890)	(4,376,890)	(4,388,882)	(4,376,890)
Biglow 3	(3,744,110)	(3,744,110)	(3,744,110)	(3,754,368)	(3,744,110)
IRP Project 1	(5,814,848)	(5,814,848)	(5,814,848)	(5,830,779)	(5,814,848)
IRP Project 2	-	(7,512,245)	(7,512,245)	(7,532,827)	(7,512,245)
Total Incremental Cost	**(16,144,633)**	**(23,656,878)**	**(23,656,878)**	**(23,721,692)**	**(23,656,878)**

Case 6 (Med CO2 and Low Proxy Fuel)	2013	2014	2015	2016	2017
Biglow 1	8,089,794	8,089,794	8,089,794	8,111,958	8,089,794
Biglow 2	10,286,979	10,286,979	10,286,979	10,315,162	10,286,979
Biglow 3	14,084,763	14,084,763	14,084,763	14,123,351	14,084,763
IRP Project 1	12,937,652	12,937,652	12,937,652	12,973,097	12,937,652
IRP Project 2	-	13,027,827	13,027,827	13,063,519	13,027,827
Total Incremental Cost	**45,399,188**	**58,427,015**	**58,427,015**	**58,587,089**	**58,427,015**

Notes:

Although the SunWay, Bellevue and Yamhill solar projects produce RECs that PGE uses for compliance, until the sum of these projects is 20 MW, they are not included in the incremental cost calcualtion (pursuant to OAR 860-083-0100(13)(a)

In addition, the following RPS resources are deemed to be zero incremental cost because they are either low-impact hydro or had an in-service date prior to June 6, 2007 (pursuant to OAR 860-083-0100(1)(i):

- North Fork Upgrade
- Faraday Upgrade
- Round Butte Upgrade
- Pelton-Round Butte Low-Impact Hydro
- PPM Klondike II
- Vansycle Ridge

Tab 3 - Annual Compliance by Resource

Year	2013		2014		2015		2016		2017	
Facility	MWh	Vintage	MWh	Vintage	MWh	Vintage	MWh	Vintage	MWh	Vintage
Unbundled RECs	132,342	2009	-	-	-	-	-	-	-	-
Biglow 1	83,959	2008	234,075	2009	307,600	2010	412,162	2012	240,594	2013
Biglow 2	-	2008	108,547	2009	369,842	2010	468,925	2012	273,728	2013
Biglow 3	-	2008	-	2009	72,204	2010	515,953	2012	301,181	2013
North Fork Upgrade	1,820	2008	5,628	2009	8,149	2010	8,163	2012	4,765	2013
Faraday Upgrade	1,981	2008	6,126	2009	8,870	2010	8,885	2012	5,186	2013
Round Butte Upgrade	13,311	2008	41,167	2009	59,612	2010	59,710	2012	34,855	2013
Pelton-Round Butte Low-Impact Hydro		2008		2009		2010	439,200	2012	438,000	2013
PPM Klondike II	46,238	2008	126,741	2009	171,009	2010	228,555	2012	133,416	2013
Vansycle Ridge	17,241	2008	46,885	2009	73,822	2010	70,859	2012	41,363	2013
Sunway 1	-	2008	53	2009	69	2010	65	2012	38	2013
Sunway 2	-	2008	342	2009	720	2010	865	2012	505	2013
Sunway 3	-	2008	-	2009	1,008	2010	2,525	2012	1,467	2013
Bellevue Solar	-	2008	-	2009	-	2010	1,872	2012	1,084	2013
Yamhill Solar	-	2008	-	2009	-	2010	1,277	2012	739	2013
IRP Project 1	-	2008	-	2009	-	2010	-	2012	254,931	2013
IRP Project 2	-	2008	-	2009	-	2010	-	2012	-	2013
Biglow 1	109,834	2009	4,500	2010	387,666	2011	176,908	2013	228,973	2014
Biglow 2	50,933	2009	5,411	2010	407,730	2011	201,271	2013	260,506	2014
Biglow 3	-	2009	1,056	2010	442,279	2011	221,456	2013	286,633	2014
North Fork Upgrade	2,641	2009	119	2010	8,269	2011	3,504	2013	4,535	2014
Faraday Upgrade	2,874	2009	130	2010	9,000	2011	3,814	2013	4,936	2014
Round Butte Upgrade	19,317	2009	872	2010	60,484	2011	25,629	2013	33,171	2014
Pelton-Round Butte Low-Impact Hydro	438,000	2009	438,000	2010	438,000	2011		2013		2014
PPM Klondike II	59,470	2009	2,502	2010	187,716	2011	98,100	2013	126,971	2014
Vansycle Ridge	22,000	2009	1,080	2010	71,777	2011	30,414	2013	39,365	2014
Sunway 1	25	2009	1	2010	67	2011	28	2013	36	2014
Sunway 2	161	2009	11	2010	876	2011	371	2013	480	2014
Sunway 3	-	2009	15	2010	1,377	2011	1,078	2013	1,389	2014
Bellevue Solar	-	2009	-	2010	689	2011	797	2013	1,023	2014
Yamhill Solar	-	2009	-	2010	470	2011	544	2013	698	2014
IRP Project 1	-	2009	-	2010	-	2011	187,449	2013	242,617	2014
IRP Project 2	-	2009	-	2010	-	2011	-	2013	242,617	2014
Biglow 1					6,483	2012				
Biglow 2					7,376	2012				
Biglow 3					8,116	2012				
North Fork Upgrade					128	2012				
Faraday Upgrade					140	2012				
Round Butte Upgrade					939	2012				
Pelton-Round Butte Low-Impact Hydro						2012				
PPM Klondike II					3,595	2012				
Vansycle Ridge					1,115	2012				
Sunway 1					1	2012				
Sunway 2					14	2012				
Sunway 3					40	2012				
Bellevue Solar					29	2012				
Yamhill Solar					20	2012				
IRP Project 1					-	2012				
IRP Project 2					-	2012				

	2013	2014	2015	2016	2017
Facility	MWh	MWh	MWh	MWh	MWh
Unbundled RECs	132,342	-	-	-	-
Biglow 1	193,793	238,575	701,749	589,070	469,567
Biglow 2	50,933	113,958	784,947	670,196	534,235
Biglow 3	-	1,056	522,598	737,410	587,813
North Fork Upgrade	4,461	5,747	16,547	11,667	9,300
Faraday Upgrade	4,855	6,255	18,010	12,698	10,122
Round Butte Upgrade	32,628	42,039	121,035	85,339	68,027
Pelton-Round Butte Low-Impact Hydro	438,000	438,000	438,000	439,200	438,000
PPM Klondike II	105,708	129,243	362,320	326,655	260,387
Vansycle Ridge	39,240	47,965	146,714	101,273	80,728
Sunway 1	25	54	137	93	74
Sunway 2	161	353	1,610	1,236	985
Sunway 3	-	15	2,425	3,604	2,856
Bellevue Solar	-	-	719	2,668	2,107
Yamhill Solar	-	-	490	1,821	1,438
IRP Project 1	-	-	-	187,449	497,548
IRP Project 2	-	-	-	-	242,617

	Compliance Year				
Year REC Generated	2013	2014	2015	2016	2017
2008	22%				
2009	32%	68%			
2010		1%	99%		
2011			100%		
2012			2%	98%	
2013				42%	58%
2014					55%

Check	2013	2014	2015	2016	2017
Need	1,002,146	1,023,261	3,117,300	3,170,379	3,205,802
Total RECs	1,002,146	1,023,261	3,117,300	3,170,379	3,205,802
Delta	-	-	-	-	-
	-	-	-	-	-

Tab 4 - Incremental Cost by Resource

	Expected Incremental Cost of Qualifying Electricity												
	$/MWh							$000's					
	Base Case Med CO2 Med Fuel	Case 2 High CO2 Med Fuel	Case 3 Low CO2 Med Fuel	Case 4 No CO2 Med Fuel	Case 5 Med CO2 High Fuel	Case 6 Med CO2 Low Fuel	Busbar Energy (MWh)	Base Case Med CO2 Med Fuel	Case 2 High CO2 Med Fuel	Case 3 Low CO2 Med Fuel	Case 4 No CO2 Med Fuel	Case 5 Med CO2 High Fuel	Case 6 Med CO2 Low Fuel
With Government Incentives:													
Biglow 1	11.91	5.33	15.32	17.55	(5.29)	19.38	417,415	4,972	2,223	6,394	7,327	(2,208)	8,088
Biglow 2	11.98	3.71	16.63	19.53	(9.21)	21.66	474,956	5,689	1,762	7,898	9,275	(4,376)	10,286
Biglow 3	16.53	6.90	21.45	24.72	(7.16)	26.95	522,574	8,638	3,608	11,208	12,919	(3,744)	14,083
First Year of operation - 2013													
IRP Project 1	15.76	3.81	22.44	26.67	(13.14)	29.25	442,380	6,974	1,686	9,925	11,798	(5,815)	12,938
First Year of operation - 2014													
IRP Project 2	14.64	1.32	22.06	26.79	(16.98)	29.45	442,380	6,477	584	9,757	11,850	(7,512)	13,028
Without Government Incentives:													
First Year of operation - 2013													
IRP Project 1	39.16	27.20	45.83	50.06	10.25	52.64	442,380	17,322	12,034	20,273	22,146	4,533	23,285
First Year of operation - 2014													
IRP Project 2	37.65	24.33	45.06	49.79	6.03	52.46	442,380	16,654	10,762	19,935	22,027	2,665	23,206

Tab 5 - RECs Generated

RECs Generated at Busbar By Year

Facility	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Biglow 1	28,085	382,535	343,909	312,100	387,666	418,645	417,502	417,502	417,502	418,645	417,502
Biglow 2	-	-	159,481	375,252	407,730	476,301	474,999	474,999	474,999	476,301	474,999
Biglow 3	-	-	-	73,260	442,279	524,069	522,637	522,637	522,637	524,069	522,637
North Fork Upgrade	8,269	8,291	8,269	8,269	8,269	8,291	8,269	8,269	8,269	8,291	8,269
Faraday Upgrade	9,000	9,025	9,000	9,000	9,000	9,025	9,000	9,000	9,000	9,025	9,000
Round Butte Upgrade	60,484	60,650	60,484	60,484	60,484	60,650	60,484	60,484	60,484	60,650	60,484
Pelton-Round Butte Low-Impact Hydro	438,000	439,200	438,000	438,000	438,000	439,200	438,000	438,000	438,000	439,200	438,000
PPM Klondike II	112,103	210,671	186,211	173,511	187,716	232,150	231,516	231,516	231,516	232,150	231,516
Vansycle Ridge	35,000	78,552	68,885	74,902	71,777	71,974	71,777	71,777	71,777	71,974	71,777
Sunway 1		-	78	70	67	66	66	66	65	65	65
Sunway 2	-	-	503	731	876	878	876	876	876	878	876
Sunway 3				1,023	1,377	2,565	2,545	2,532	2,519	2,513	2,494
Bellevue Solar					689	1,901	1,881	1,866	1,851	1,836	1,821
Yamhill Solar					470	1,297	1,283	1,273	1,263	1,253	1,243
IRP Project 1							442,380	442,380	442,380	443,592	442,380
IRP Project 2								442,380	442,380	443,592	442,380
Total RECs Generated	690,940	1,188,924	1,274,819	1,526,601	2,016,400	2,247,012	2,683,214	3,125,555	3,125,517	3,134,034	3,125,441
Recs Generated Less P-RB LIH	252,940	749,724	836,819	1,088,601	1,578,400	1,807,812	2,245,214	2,687,555	2,687,517	2,694,834	2,687,441

Renewables used

Year	2013		2014		2015		2016		2017	
	MWh	Vintage	MWh	Vintage	MWh	Vintage	MWh	Vintage	MWh	Vintage
Banked	164,550	2008	569,565	2009	1,072,905	2010	2,219,017	2012	1,731,851	2013
	837,596	2009	453,696	2010	2,016,400	2011	951,362	2013	1,473,951	2014
					27,995	2012				
Bundled	869,804		1,023,261		3,117,300		3,170,379		3,205,802	
Unbundled	132,342	2009								
ACP	-		-		-		-		-	
Total	1,002,146		1,023,261		3,117,300		3,170,379		3,205,802	

Tab 6 - Energy Growth Rates

Year	2013	2014	2015	2016	2017
Growth Rate	2.7%	2.4%	1.9%	1.9%	1.7%

Source: September 2011 Load Forecast used in IRP Update

CERTIFICATE OF SERVICE

I hereby certify that I have this day caused **PGE 2011 RENEWABLE PORTFOLIO STANDARD IMPLEMENTATION PLAN** to be served by electronic mail to those parties whose email addresses appear on the attached service list for OPUC Docket No. UM 1466.

DATED at Portland, Oregon, this 28th day of December, 2011.

J. RICHARD GEORGE, OSB No. 974691
Assistant General Counsel
Portland General Electric Company
121 SW Salmon St., 1WTC1301
Portland, OR 97204
(503) 464-7611 (Telephone)
(503) 464-2200 (Fax)
richard.george@pgn.com

SERVICE LIST –
OPUC DOCKET # UM 1466

Janet L. Prewitt, Assistant Attorney General DEPARTMENT OF JUSTICE janet.prewitt@doj.state.or.us (*Waived Paper Service)	Vijay Satyal OREGON DEPARTMENT OF ENERGY vijay.satyal@state.or.us (*Waived Paper Service)
Rebecca Sherman OREGON DEPARTMENT OF ENERGY rebecca.sherman@state.or.us (*Waived Paper Service)	Gordon Feighner CITIZENS' UTILITY BOARD gordon@oregoncub.org (*Waived Paper Service)
Robert Jenks CITIZENS' UTILITY BOARD bob@oregoncub.org (*Waived Paper Service)	G. Catriona McCracken CITIZENS' UTILITY BOARD catriona@oregoncub.org (*Waived Paper Service)
Raymond Myers CITIZENS' UTILITY BOARD ray@oregoncub.org (*Waived Paper Service)	Irion Sanger DAVISON VAN CLEVE, P.C. mail@dvclaw.com (*Waived Paper Service)
Jason W. Jones, Assistant Attorney General DEPARTMENT OF JUSTICE jason.w.jones@state.or.us (*Waived Paper Service)	John W. Stephens ESLER STEPHENS & BUCKLEY stephens@eslerstephens.com; mec@eslerstephens.com (*Waived Paper Service)
Megan Walseth Decker, Sr Staff Counsel RENEWABLE NORTHWEST PROJECT megan@rnp.org (*Waived Paper Service)	Randall J. Falkenberg RFI CONSULTING, INC. consultrfi@aol.com (*Waived Paper Service)
David F. White TONKON TORP, LLP davidw@tonkon.com (*Waived Paper Service)	