Portland General Electric Company
121 SW Salmon Street • Portland, Oregon 97204
PortlandGeneral.com

September 30, 2013

VIA ELECTRONIC FILING AND U.S. MAIL

Oregon Public Utility Commission
Attention: Filing Center
550 Capitol Street NE, #215
PO Box 1088
Salem, OR 97308-1088

Re: UM 1182

Attention Filing Center:

Enclosed for filing in the captioned document are an original and five copies of:

- **PHASE II OPENING COMMENTS OF PORTLAND GENERAL ELECTRIC COMPANY.**

This is being filed by electronic mail with the Filing Center. The UM 1182 Service list is also being served via electronic mail.

Thank you in advance for your assistance.

Sincerely,

Patrick G. Hager
Manager, Regulatory Affairs

PGH:qal
Enclosures
cc: UM 1182 Service List

BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

UM 1182

(Phase II)

In the Matter of PUBLIC UTILITY COMMISSION OF OREGON, Investigation Regarding Competitive Bidding	**Opening Comments of Portland General Electric**

I. Introduction

In Order No. 11-001, the Commission reopened docket UM 1182 to further examine issues related to the Competitive Bidding Guidelines in two phases. In particular, the Commission requested further analysis regarding Guidelines 11 and 10(d), which address the Independent Evaluator's (IE) role and responsibilities, as well as evaluation of the unique risks and benefits of utility-ownership resources. UM 1276, Order No. 11-001 at 6-7. The docket was divided into two phases to address each guideline. UM 1182, Order No. 12-007 at 2. This second phase addresses Guideline 10(d). With respect to Guideline 10(d), the Commission invited comments regarding a "determination of the appropriate analytic framework and methodologies to use to evaluate and compare resource ownership to purchasing power from an independent power producer." Order No. 11-001 at 6.

The parties initially agreed on a list of twelve factors to consider in evaluating the risks and advantages of utility-owned resources compared to those offered by other bidders, such as independent power producers (IPP). UM 1182, Order No. 12-324 at 2. After receiving comments from the parties, the ALJ agreed with Staff's recommendation that the parties focus on three issues from the list of twelve. ALJ Ruling, dated May 30, 2012, at 4. That was later

increased to four issues: (1) construction cost over-runs; (2) heat rate degradation; (3) wind capacity factor; and (4) counterparty risk. Order No. 12-324 at 4.

In Order 13-204, the Commission rejected the use of quantitative, generic adders for each of the four risk factors. The Commission adopted qualitative changes for two: cost over-runs and wind capacity factors. *Id.* at 1. The Commission also directed the parties to address the remaining eight issues through opening and reply comments. *Id.* at 11. The Commission further advised the parties to structure their comments as follows:

> The parties' comments should follow the framework we used above to analyze each risk item. Parties should initially address whether the risk factor is related to resource ownership, and provide support for any conclusions reached. If a party believes the risk factor is related to ownership, the party should provide recommendations to help the IE's comparative analysis of that risk item for utility benchmark resources and other resource options. The parties should focus on qualitative recommendations, rather than propose quantitative adjustment.

Id. PGE will follow the Commission's direction in addressing the final eight risk factors.

II. Changes in Forced Outage Rates

This risk factor concerns potential differences between forecasted forced outage rates (FOR) in a competitive bid and actual FORs. Although ownership risk inherently includes FOR risk, this risk factor is immaterial and offset by the potential benefit that actual FOR will be less than forecasted. The scoring of PGE's benchmark bids, as well as any ownership bids, takes into account the actual cost of long-term service agreements (LTSAs) for the term of the LTSAs, and an escalated service agreement cost over the remaining life of the plant. These LTSAs include regular inspections and repair/replacement of major components. Regular maintenance reduces the likelihood that FORs will exceed the assumed rate over time.

Moreover, the risks that customers face from variations in FORs are symmetric. Customers may bear the risk of higher than assumed FORs, but they will also benefit when the actual FORs are lower than assumed.

PPAs can offer some degree of protection from FOR increases. But not all PPAs provide that protection and when they do, that protection is not complete. Some PPAs contain liquidated damages provisions to indemnify the purchaser for the cost of replacement power associated with increases in FOR. However, this is not a feature of all PPAs. Even PPAs that contain liquidated damages provisions do not provide complete protection for customers. The physical supply risk remains with the utility (and its customers), namely there may be circumstances that replacement power cannot be bought, in which case reliability is jeopardized.

Recommendation

The Commission concluded with respect to heat rate degradation (Order 13-204, p.10, Section C 2):

> "[W]e believe that the risks and benefits associated with heat rate degradation should be evaluated based on the individual characteristics of each resource."

PGE believes that this conclusion should apply to FORs as well, given the similarity of the operational risk and mitigation measures (LTSAs for FORs). Accordingly, no changes should be made to the IE's comparative analysis of utility-ownership bids versus PPA bids for this risk factor.

III. End Effects

'End Effects' refer to the residual value of a project after its 'useful' life. In general, End Effects are the differences between (1) the economic value of the project/site (the value of any remaining plant life, the scrap value of the asset (salvage value of equipment and/or steel) and

the option to repower the site) and (2) decommissioning costs. End Effects are specific to utility-ownership bids and we believe the criteria for considering this factor should be revised.

The concept of End Effects is not new in rate making. The depreciation studies used to set rates often deviate from the estimated useful life of an asset assumed in the IRP. The depreciation rates for rate making are set based on a life horizon that is often longer than the engineering estimate for generation assets. In acknowledging this difference, the OPUC recognizes that utility-ownership offers customers the benefits associated with investing additional capital to extend the life of the asset. For example, both PGE's Beaver and Boardman plants are operating and providing benefits to customers beyond their designed lifetime.

Current competitive bidding guidelines and criteria do not capture all the "End Effects" benefits associated with utility-ownership bids. Decommissioning costs and salvage values are incorporated into the financial models developed to evaluate utility-ownership bids in the RFP scoring criteria. The risk to customers associated with decommissioning costs and salvage value for ownership bids is symmetric. However, the competitive bidding guidelines and criteria do not include the option value (benefits) of repowering the site or extending the life of the plant through upgrades, component replacement, and capital improvements.

Recommendation

PGE recommends that the economic value associated with the option to repower a site or extending the life of the plant should be included in the evaluation of competitive bids. Including this option into the RFP bid evaluation process would yield results that more accurately reflect each bid's value to our customers.

IV. Environmental Regulatory Risk

Environmental Regulatory Risk is the risk that costs over the life of a contract or facility will increase significantly due to an unforeseen or unexpected change in environmental law or regulation. This risk is typically addressed through contractual "change in law" provisions.

Environmental regulatory risk is not specific to utility-owned resources. Customers are exposed to this risk for both utility-ownership and IPP bids alike. PPAs typically assign "change in law" risks to the buyer (the utility) or excuse the performance of the seller for such changes in law. Even if a contract does not shift the change-in-law risk to the buyer explicitly, the cost, if sufficiently large, of unanticipated material changes in regulation may lead to contract renegotiation or default.

In any event, the cost impact of the change in law risk does not lend itself to effective analysis for purposes of making changes to the Competitive Bidding Guidelines. Relevant data are not available to analyze this risk for either a PPA or utility-owned resource. Historic data cannot be used to determine the cost of unknown future regulations since the cost of future regulations depends on the occurrence of future unexpected events. We understand that insurance products that insure energy facilities against the risk of change in law/environmental regulations are not generally commercially available, and one would expect the cost to be significant if such a product were offered. Consequently, change-in-law risk cannot be effectively analyzed.

Recommendation

This risk is not utility-ownership specific. Moreover, data are not available to analyze the potentially most significant environmental regulatory risks. Accordingly, no improvements are needed, nor available, to assist the IE in evaluating this risk factor.

V. Changes in Fixed O&M Costs

Similar to our discussion of forced outage rates, this risk factor is not material and the competitive bidding scoring criteria already appropriately considers this risk factor.

These costs are common to both utility-owned plants and plants owned by independent power producers. Due to the availability of long-term service agreements, customer exposure to risk from variations in fixed O&M costs from projected levels, at the time of bid selection, is not materially different between utility-ownership and power purchase agreements.

Moreover, the competitive bidding scoring criteria appropriately consider this risk factor. PGE requires that all ownership and tolling agreement bids include an estimate for fixed O&M costs and, if applicable, an escalator over the term of the plant life. PGE's scoring of utility ownership bids takes into account the actual cost of LTSAs. These agreements cover a large portion of utility-owned plant fixed O&M costs. For utility-owned resources, this reduces the potential for the bidder to underestimate (bias) the cost and also the variability of realized fixed O&M costs over the life of the plant. As with FORs, customers can benefit if realized fixed O&M expenses fall below expected levels. Regulatory and audit reviews allow customers to benefit from lower than originally projected changes in fixed O&M costs over the plant's life. In contrast, under a PPA customers do not benefit if fixed O&M costs are lower than projected.

On the other hand, PPAs do not completely insulate customers from unanticipated increases in plant life-cycle O&M costs. Under "Change in Law" clauses in a typical PPA, the

utility may bear the risk of fixed O&M cost increases associated with changes in regulations. If the purchaser can dispatch the plant, the contract may include a price reopener or other terms to transfer the risk of additional wear and tear costs associated with plant dispatch to the utility.

Recommendation

PGE recommends no changes to current competitive bidding scoring criteria of bids for fixed O&M expenses. This risk factor is not material or utility-ownership specific.

VI. Capital Additions

The issue of capital additions has largely already been addressed in prior testimony concerning cost over-runs and in Commission Order No. 13-204. PGE witness, Jacobs, reviewed Mr. Monsen's analysis of "deferred construction costs" and concluded:

> Finally, Mr. Monsen suggests an adder for "deferred construction costs" that is about five times the size of the proposed over-run adder. The justification for the adder is weak, and I believe the computations that Mr. Monsen says he made to support it rely on an erroneous interpretation of FERC Form 1 data. (PGE/300, Jacobs/41, lines 1-4)

In his Reply Testimony, Staff witness Procter also stated:

> Also, if there were a major flaw in how RFP-related bid evaluation assessed construction costs for Benchmark Resource bids, Staff would expect to see some evidence of it in the IE reports and the list of winning bidders. At this point in time, Staff is not aware of any such evidence (Staff/200, Procter/17, lines 10-13)

We believe the Commission addressed this issue when it asked the IE to provide a more in-depth evaluation of the risks and benefits to customers for cost over-runs and under-runs. *See* Order No. 13-204 at 9. To the extent that capital additions are an open issue in this docket, PGE submits that customers are more likely to benefit from post-construction capital additions. To the extent this risk factor is utility-ownership specific, it is a benefit to customers.

There are two typical scenarios that may lead to post-construction capital additions:

- Changes to the design or technical specification of a plant due to a modification in the intended use of the plant.

- A plant modification intended to improve the efficiency of plant operation in order to realize net economic benefits.

An example of the first type of capital addition would be the installation of automatic generation control (AGC) at a plant to allow the plant to provide ancillary services. An example of the second type of capital addition would be the recent combustion turbine upgrade at PGE's Coyote Springs plant that resulted in cost-effective improvements in plant heat rate and capacity.

Neither of these types of capital additions represents a negative risk for customers. Any proposed change in intended use or a capital investment to increase efficiency would only be approved and undertaken if it provided a net benefit to customers. Consequently, these costs should have no effect on the original resource selection. If anything, these alternatives represent a customer benefit, because they allow customers the opportunity to benefit from options to change the plant design or operation that would not be available to customers through a PPA.

Recommendation

This risk factor has been sufficiently addressed in Order No. 13-204. The Commission need not take any further action given that for other types of capital additions, as discussed above, utility-ownership offers customer benefits when compared to purchased power.

VII. Changes in Return on Equity (ROE)

This issue is whether customers are at risk from increases in plant-related revenue requirements resulting from changes to authorized ROE over time. This is a utility-ownership specific risk factor; however, this issue was resolved in workshops.

At a prior UM 1182 workshop, Staff provided an analysis (see Appendix A) that examined historical changes in ROE and found that customer impacts were not expected to be material. Any downside risk from increases in ROE is balanced by potential customer cost

reductions from decreases in ROE. Since 1990 PGE's allowed ROE has consistently decreased, and costs to customers have decreased as a result.

Recommendation

Based on the conclusions of Staff's analysis regarding the lack of materiality and symmetry of the effects of changes in ROE, PGE recommends that the Commission take no further action for this risk factor.

VIII. Verify Output (Power) and Heat Rate

These risk factors are not utility-ownership specific. Standard power plant construction best practices include the completion of a performance test at the end of commissioning to verify the contractual guarantees for output (power) and heat rate. This best practice is implemented by both utilities and independent power producers alike. As a result, this risk is not related to ownership structure.

Recommendation

The Commission should conclude that risks related to verified output and heat rate are not related to ownership status and that no changes should be made to the IE's comparative analysis of benchmark and other resource option bids.

IX. Construction Delays

This risk factor may or may not be utility-ownership specific depending on the terms of the PPA or construction contracts for utility-owned resources. This risk factor can be mitigated in contracts under both utility-ownership bids and PPAs. Construction contracts for utility-owned resources typically contain liquidated damages provisions that incent construction contractors to meet the guaranteed substantial completion dates. The liquidated damages are

generally calculated to keep the utility whole for replacement power acquired as a result of construction delay. PPAs may also include such protections in their bids.

Recommendation

The Commission should decline to change its competitive bidding guidelines or the guidance provided to the IE for this risk factor.

DATED this 30th day of September, 2013.

Respectfully submitted,

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Rate of Return Sensitivity: CCCT

$	4.00	Gas Cost (per MMBtu)
	100	MW
	$1,200	$/kW
	6,700	Heat Rate
$	120,000,000	Total Cost
$	4,000,000	Annual Depreciation
	60%	Capacity Factor
	525,600	Expected Ann. Output (MWh)

Sudden Immediate Changes

50%	10%	Equity
50%	6%	Debt
	2%	Inflation
	39%	Taxes
	11.20%	Before-Tax Cost of Capital
	6.83%	After-Tax Cost of Capital
	4.74%	Real After-Tax Cost of Capital

Year	Depreciation	End-of-Year Balance	Return Requirement	Total Rev. Req.	Real Levelized
1	$ 4,000,000	$ 116,000,000	$ 12,988,197	$ 16,988,197	$ 10,219,909
2	$ 4,000,000	$ 112,000,000	$ 12,540,328	$ 16,540,328	$ 10,424,307
3	$ 4,000,000	$ 108,000,000	$ 12,092,459	$ 16,092,459	$ 10,632,793
4	$ 4,000,000	$ 104,000,000	$ 11,644,590	$ 15,644,590	$ 10,845,449
5	$ 4,000,000	$ 100,000,000	$ 11,196,721	$ 15,196,721	$ 11,062,358
6	$ 4,000,000	$ 96,000,000	$ 10,748,852	$ 14,748,852	$ 11,283,605
7	$ 4,000,000	$ 92,000,000	$ 10,300,984	$ 14,300,984	$ 11,509,278
8	$ 4,000,000	$ 88,000,000	$ 9,853,115	$ 13,853,115	$ 11,739,463
9	$ 4,000,000	$ 84,000,000	$ 9,405,246	$ 13,405,246	$ 11,974,252
10	$ 4,000,000	$ 80,000,000	$ 8,957,377	$ 12,957,377	$ 12,213,737
11	$ 4,000,000	$ 76,000,000	$ 8,509,508	$ 12,509,508	$ 12,458,012
12	$ 4,000,000	$ 72,000,000	$ 8,061,639	$ 12,061,639	$ 12,707,172
13	$ 4,000,000	$ 68,000,000	$ 7,613,770	$ 11,613,770	$ 12,961,316
14	$ 4,000,000	$ 64,000,000	$ 7,165,902	$ 11,165,902	$ 13,220,542
15	$ 4,000,000	$ 60,000,000	$ 6,718,033	$ 10,718,033	$ 13,484,953
16	$ 4,000,000	$ 56,000,000	$ 6,270,164	$ 10,270,164	$ 13,754,652
17	$ 4,000,000	$ 52,000,000	$ 5,822,295	$ 9,822,295	$ 14,029,745
18	$ 4,000,000	$ 48,000,000	$ 5,374,426	$ 9,374,426	$ 14,310,340
19	$ 4,000,000	$ 44,000,000	$ 4,926,557	$ 8,926,557	$ 14,596,547
20	$ 4,000,000	$ 40,000,000	$ 4,478,689	$ 8,478,689	$ 14,888,478
21	$ 4,000,000	$ 36,000,000	$ 4,030,820	$ 8,030,820	$ 15,186,247
22	$ 4,000,000	$ 32,000,000	$ 3,582,951	$ 7,582,951	$ 15,489,972
23	$ 4,000,000	$ 28,000,000	$ 3,135,082	$ 7,135,082	$ 15,799,772
24	$ 4,000,000	$ 24,000,000	$ 2,687,213	$ 6,687,213	$ 16,115,767
25	$ 4,000,000	$ 20,000,000	$ 2,239,344	$ 6,239,344	$ 16,438,082
26	$ 4,000,000	$ 16,000,000	$ 1,791,475	$ 5,791,475	$ 16,766,844
27	$ 4,000,000	$ 12,000,000	$ 1,343,607	$ 5,343,607	$ 17,102,181
28	$ 4,000,000	$ 8,000,000	$ 895,738	$ 4,895,738	$ 17,444,225
29	$ 4,000,000	$ 4,000,000	$ 447,869	$ 4,447,869	$ 17,793,109
30	$ 4,000,000	$ -	$ -	$ 4,000,000	$ 18,148,971
	$50,495,732		$108,287,557 NPV	$158,783,289	$158,783,289

Capital: Real Levelized Per MWh	Gas: Real Levelized Per MWh	Variable O&M Real Levelized Per MWh	Total Real Levelized Per MWh
$ 19.44	$ 26.80	$ 2.00	$ 48.24

Allowed Return on Equity	Return on Debt	Real Lev. Capital Cost	Delta from 10% - 6%	Percentage Delta from Total Base
8%	6%	$ 16.94	$ (2.51)	-5.2%
9%	6%	$ 18.17	$ (1.27)	-2.6%
10%	6%	$ 19.44	$ -	0.0%
11%	6%	$ 20.75	$ 1.31	2.7%
12%	6%	$ 22.09	$ 2.65	5.5%
8%	5%	$ 16.20	$ (3.24)	-6.7%
12%	7%	$ 22.93	$ 3.48	7.2%
10%	5%	$ 18.66	$ (0.78)	-1.6%
10%	6%	$ 19.44	$ -	0.0%
10%	7%	$ 20.24	$ 0.79	1.6%

"Rules of Thumb" for Sudden Immediate Changes:

1% change in equity return changes real levelized capital costs by $1.25/MWh.

1% change in debt return changes real levelized capital costs by $0.80/MWh.

Summary: Effects of Gradual Changes

		Delta from 10% - 6%	Percentage Delta from Total Base
From 10%/6% to 12%/7% Over Time:			
Real Lev. Cap. Cost:	$ 20.02	$ 0.58	1.2%
From 10%/6% to 8%/5% Over Time:			
Real Lev. Cap. Cost:	$ 18.87	$ (0.58)	-1.2%

Rate of Return Sensitivity: CCCT

From 10%/6% to 12%/7% Over Time

$	4.00	Gas Cost (per MMBtu)
	100	MW
	$1,200	$/kW
	6,700	Heat Rate
$	120,000,000	Total Cost
$	4,000,000	Annual Depreciation
	60%	Capacity Factor
	525,600	Expected Ann. Output (MWh)

	Start		End
50%	10%	Equity	12%
50%	6%	Debt	7%
	2%	Inflation	
	39%	Taxes	
	11.20%	Before-Tax Cost of Capital	
	6.83%	After-Tax Cost of Capital	
	4.74%	Real After-Tax Cost of Capital	

Year	Depreciation	End-of-Year Balance	Return Requirement	Total Rev. Req.	Real Levelized	Capital: Real Levelized Per MWh	Gas: Real Levelized Per MWh	Before Tax Cost of Capital		
1	$ 4,000,000	$ 116,000,000	$ 12,988,197	$ 16,988,197	$ 10,522,967	$ 20.02	$ 26.80	11.20%	10.00%	6.00%
2	$ 4,000,000	$ 112,000,000	$ 12,622,951	$ 16,622,951	$ 10,733,426			11.27%	10.07%	6.03%
3	$ 4,000,000	$ 108,000,000	$ 12,251,803	$ 16,251,803	$ 10,948,095	$ 19.44	Steady 10%/6% Regime	11.34%	10.14%	6.07%
4	$ 4,000,000	$ 104,000,000	$ 11,874,754	$ 15,874,754	$ 11,167,057			11.42%	10.21%	6.10%
5	$ 4,000,000	$ 100,000,000	$ 11,491,803	$ 15,491,803	$ 11,390,398			11.49%	10.28%	6.14%
6	$ 4,000,000	$ 96,000,000	$ 11,102,951	$ 15,102,951	$ 11,618,206			11.57%	10.34%	6.17%
7	$ 4,000,000	$ 92,000,000	$ 10,708,197	$ 14,708,197	$ 11,850,570			11.64%	10.41%	6.21%
8	$ 4,000,000	$ 88,000,000	$ 10,307,541	$ 14,307,541	$ 12,087,582			11.71%	10.48%	6.24%
9	$ 4,000,000	$ 84,000,000	$ 9,900,984	$ 13,900,984	$ 12,329,333			11.79%	10.55%	6.28%
10	$ 4,000,000	$ 80,000,000	$ 9,488,525	$ 13,488,525	$ 12,575,920			11.86%	10.62%	6.31%
11	$ 4,000,000	$ 76,000,000	$ 9,070,164	$ 13,070,164	$ 12,827,438			11.93%	10.69%	6.34%
12	$ 4,000,000	$ 72,000,000	$ 8,645,902	$ 12,645,902	$ 13,083,987			12.01%	10.76%	6.38%
13	$ 4,000,000	$ 68,000,000	$ 8,215,738	$ 12,215,738	$ 13,345,667			12.08%	10.83%	6.41%
14	$ 4,000,000	$ 64,000,000	$ 7,779,672	$ 11,779,672	$ 13,612,580			12.16%	10.90%	6.45%
15	$ 4,000,000	$ 60,000,000	$ 7,337,705	$ 11,337,705	$ 13,884,832			12.23%	10.97%	6.48%
16	$ 4,000,000	$ 56,000,000	$ 6,889,836	$ 10,889,836	$ 14,162,528			12.30%	11.03%	6.52%
17	$ 4,000,000	$ 52,000,000	$ 6,436,066	$ 10,436,066	$ 14,445,779			12.38%	11.10%	6.55%
18	$ 4,000,000	$ 48,000,000	$ 5,976,393	$ 9,976,393	$ 14,734,694			12.45%	11.17%	6.59%
19	$ 4,000,000	$ 44,000,000	$ 5,510,820	$ 9,510,820	$ 15,029,388			12.52%	11.24%	6.62%
20	$ 4,000,000	$ 40,000,000	$ 5,039,344	$ 9,039,344	$ 15,329,976			12.60%	11.31%	6.66%
21	$ 4,000,000	$ 36,000,000	$ 4,561,967	$ 8,561,967	$ 15,636,576			12.67%	11.38%	6.69%
22	$ 4,000,000	$ 32,000,000	$ 4,078,689	$ 8,078,689	$ 15,949,307			12.75%	11.45%	6.72%
23	$ 4,000,000	$ 28,000,000	$ 3,589,508	$ 7,589,508	$ 16,268,293			12.82%	11.52%	6.76%
24	$ 4,000,000	$ 24,000,000	$ 3,094,426	$ 7,094,426	$ 16,593,659			12.89%	11.59%	6.79%
25	$ 4,000,000	$ 20,000,000	$ 2,593,443	$ 6,593,443	$ 16,925,532			12.97%	11.66%	6.83%
26	$ 4,000,000	$ 16,000,000	$ 2,086,557	$ 6,086,557	$ 17,264,043			13.04%	11.72%	6.86%
27	$ 4,000,000	$ 12,000,000	$ 1,573,770	$ 5,573,770	$ 17,609,324			13.11%	11.79%	6.90%
28	$ 4,000,000	$ 8,000,000	$ 1,055,082	$ 5,055,082	$ 17,961,510			13.19%	11.86%	6.93%
29	$ 4,000,000	$ 4,000,000	$ 530,492	$ 4,530,492	$ 18,320,741			13.26%	11.93%	6.97%
30	$ 4,000,000	$ -	$ -	$ 4,000,000	$ 18,687,155			13.34%	12.00%	7.00%
	$50,495,732		$112,996,069 NPV	$163,491,800	$163,491,800					

Rate of Return Sensitivity: CCCT

From 10%/6% to 8%/5% Over Time

$ 4.00	Gas Cost (per MMBtu)
100	MW
$1,200	$/kW
6,700	Heat Rate
$ 120,000,000	Total Cost
$ 4,000,000	Annual Depreciation
60%	Capacity Factor
525,600	Expected Ann. Output (MWh)

Start			End
50%	10%	Equity	8%
50%	6%	Debt	5%
	2%	Inflation	
	39%	Taxes	
	11.20%	Before-Tax Cost of Capital	
	6.83%	After-Tax Cost of Capital	
	4.74%	Real After-Tax Cost of Capital	

Year	Depreciation	End-of-Year Balance	Return Requirement	Total Rev. Req.	Real Levelized	Capital: Real Levelized Per MWh	Gas: Real Levelized Per MWh		Before Tax Cost of Capital		
1	$ 4,000,000	$ 116,000,000	$ 12,988,197	$ 16,988,197	$ 9,916,851	$ 18.87	$ 26.80		11.20%	10.00%	6.00%
2	$ 4,000,000	$ 112,000,000	$ 12,457,705	$ 16,457,705	$ 10,115,188				11.12%	9.93%	5.97%
3	$ 4,000,000	$ 108,000,000	$ 11,933,115	$ 15,933,115	$ 10,317,492	$ 19.44	Steady 10%/6% Regime		11.05%	9.86%	5.93%
4	$ 4,000,000	$ 104,000,000	$ 11,414,426	$ 15,414,426	$ 10,523,842				10.98%	9.79%	5.90%
5	$ 4,000,000	$ 100,000,000	$ 10,901,639	$ 14,901,639	$ 10,734,318				10.90%	9.72%	5.86%
6	$ 4,000,000	$ 96,000,000	$ 10,394,754	$ 14,394,754	$ 10,949,005				10.83%	9.66%	5.83%
7	$ 4,000,000	$ 92,000,000	$ 9,893,770	$ 13,893,770	$ 11,167,985				10.75%	9.59%	5.79%
8	$ 4,000,000	$ 88,000,000	$ 9,398,689	$ 13,398,689	$ 11,391,345				10.68%	9.52%	5.76%
9	$ 4,000,000	$ 84,000,000	$ 8,909,508	$ 12,909,508	$ 11,619,171				10.61%	9.45%	5.72%
10	$ 4,000,000	$ 80,000,000	$ 8,426,230	$ 12,426,230	$ 11,851,555				10.53%	9.38%	5.69%
11	$ 4,000,000	$ 76,000,000	$ 7,948,852	$ 11,948,852	$ 12,088,586				10.46%	9.31%	5.66%
12	$ 4,000,000	$ 72,000,000	$ 7,477,377	$ 11,477,377	$ 12,330,358				10.39%	9.24%	5.62%
13	$ 4,000,000	$ 68,000,000	$ 7,011,803	$ 11,011,803	$ 12,576,965				10.31%	9.17%	5.59%
14	$ 4,000,000	$ 64,000,000	$ 6,552,131	$ 10,552,131	$ 12,828,504				10.24%	9.10%	5.55%
15	$ 4,000,000	$ 60,000,000	$ 6,098,361	$ 10,098,361	$ 13,085,074				10.16%	9.03%	5.52%
16	$ 4,000,000	$ 56,000,000	$ 5,650,492	$ 9,650,492	$ 13,346,776				10.09%	8.97%	5.48%
17	$ 4,000,000	$ 52,000,000	$ 5,208,525	$ 9,208,525	$ 13,613,711				10.02%	8.90%	5.45%
18	$ 4,000,000	$ 48,000,000	$ 4,772,459	$ 8,772,459	$ 13,885,986				9.94%	8.83%	5.41%
19	$ 4,000,000	$ 44,000,000	$ 4,342,295	$ 8,342,295	$ 14,163,705				9.87%	8.76%	5.38%
20	$ 4,000,000	$ 40,000,000	$ 3,918,033	$ 7,918,033	$ 14,446,979				9.80%	8.69%	5.34%
21	$ 4,000,000	$ 36,000,000	$ 3,499,672	$ 7,499,672	$ 14,735,919				9.72%	8.62%	5.31%
22	$ 4,000,000	$ 32,000,000	$ 3,087,213	$ 7,087,213	$ 15,030,637				9.65%	8.55%	5.28%
23	$ 4,000,000	$ 28,000,000	$ 2,680,656	$ 6,680,656	$ 15,331,250				9.57%	8.48%	5.24%
24	$ 4,000,000	$ 24,000,000	$ 2,280,000	$ 6,280,000	$ 15,637,875				9.50%	8.41%	5.21%
25	$ 4,000,000	$ 20,000,000	$ 1,885,246	$ 5,885,246	$ 15,950,633				9.43%	8.34%	5.17%
26	$ 4,000,000	$ 16,000,000	$ 1,496,393	$ 5,496,393	$ 16,269,645				9.35%	8.28%	5.14%
27	$ 4,000,000	$ 12,000,000	$ 1,113,443	$ 5,113,443	$ 16,595,038				9.28%	8.21%	5.10%
28	$ 4,000,000	$ 8,000,000	$ 736,393	$ 4,736,393	$ 16,926,939				9.20%	8.14%	5.07%
29	$ 4,000,000	$ 4,000,000	$ 365,246	$ 4,365,246	$ 17,265,478				9.13%	8.07%	5.03%
30	$ 4,000,000	$ -	$ -	$ 4,000,000	$ 17,610,787				9.06%	8.00%	5.00%
	$50,495,732		$103,579,046 NPV	$154,074,777	$154,074,777						

CERTIFICATE OF SERVICE

I hereby certify that I have this day caused **PHASE II, OPENING COMMENTS OF PORTLAND GENERAL ELECTRIC COMPANY** to be served by electronic mail to those parties whose email addresses appear on the attached service list and by first class U.S. Mail, postage prepaid and properly addressed, to those parties on the attached service list who have not waived paper service from OPUC Docket No. UM 1182.

DATED at Portland, Oregon this 30th day of September, 2013.

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