



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

December 31, 2015

Via Email / US Mail

Public Utility Commission of Oregon
Filing Center
PO Box 1088
Salem, OR 97308-1088

RE: UM 1755 - PGE 2016 Renewable Portfolio Standard Implementation Plan

Attention Filing Center:

Enclosed please find PGE's 2016 Renewable Portfolio Standard Implementation Plan. This Plan is pursuant to OAR 860-083-0400 and provides information about how PGE will meet its RPS requirement in the years 2017 through 2021.

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.

The confidential Work Papers containing the underlying models used to prepare the analyses presented in the 2016 RPS Implementation Plan will be provided upon issuance of the Protective Order.

Electronic notification of this filing is being provided to the UM 1683 Service List.

If you have any questions or require further information, please call Rebecca Brown at (503) 464-8545. Please direct all formal correspondence and requests to the following email address: pge.opuc.filings@pgn.com.

Sincerely,

A handwritten signature in blue ink that reads "Jay Tinker".

Jay Tinker
Director, Regulatory Policy and Affairs

JT:sp
cc: UM 1683 Service List
Encl.

Portland General Electric
2016 Renewable Portfolio Standard Implementation Plan
<2017-2021>

As an introduction and summary of PGE's 2016 Renewable Portfolio Standard Implementation Plan, answer the following questions:

Why is PGE submitting this 2016 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 through 2014. In 2015 through 2019 the percentage that must come from qualifying resources increases to 15 percent. Beginning in 2020 that percentage further increases to 20 percent of retail load through 2024.

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 implementation plan covering 2017 through 2021, is due January 1, 2016.

What information was used as the basis of this implementation plan (2017-2021 Plan)?

This 2017-2021 Plan is based primarily on existing qualifying renewable resources, and on PGE's 2013 Integrated Resource Plan (IRP) Update, filed December 2, 2015.

How does the company intend to meet the RPS target?

This implementation plan describes PGE's plan to comply with ORS 469.100 for the years 2017 through 2021. For planning purposes, PGE intends to meet its RPS obligations in these years with primarily bundled RECs from existing resources. Details of PGE's 2017- 2021 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:

2017 – 2,882,040 MWh
2018 – 2,890,800 MWh
2019 – 2,899,560 MWh
2020 – 3,900,096 MWh
2021 – 3,950,760 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.

	<u>Banked</u>	<u>Bundled</u>	<u>Unbundled</u>	<u>ACP</u>
2017	2,882,040	2,882,040	0	0
2018	2,890,800	2,890,800	0	0
2019	2,899,560	2,899,560	0	0
2020	3,900,096	3,900,096	0	0
2021	3,950,760	3,950,760	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: 8.12 MWa = 71,163 MWh

Name: North Fork (upgrade)
Source: Hydroelectric

Year: 2001
State: Oregon
Expected MWh output: 0.53 MWa = 4,679 MWh

Name: Faraday (upgrade)
Source: Hydroelectric
Year: various
State: Oregon
Expected MWh output: 0.52 MWa = 4,303 MWh

Name: Sullivan (upgrade)
Source: Hydroelectric
Year: various
State: Oregon
Expected MWh output: 0.80 MWa = 7,005 MWh

Name: River Mill (upgrade)
Source: Hydroelectric
Year: 1996-1997
State: Oregon
Expected MWh output: 0.17 MWa = 1,480 MWh

Name: Round Butte (upgrade)
Source: Hydroelectric
Year: 2002-2003
State: Oregon
Expected MWh output: 9.51 MWa = 83,318 MWh

Name: Klondike II Wind Farm
Source: Wind - PPA
Year: 2005
State: Oregon
Expected MWh output: 24.82 MWa = 217,434 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)
Expected MWh output: 205.48 MWa = 1.18 million MWh (1.18 GWh)

Name: SunWay 1 & 2
Source: Solar
Year: 2008 & 2009
State: Oregon
Expected MWh output: 0.15 MWa = 1,278 MWh

Name: SunWay 3
Source: Solar
Year: 2010
State: Oregon
Expected MWh output: 0.33 MWa = 2,896 MWh

Name: Bellevue Solar
Source: Solar
Year: 2011
State: Oregon
Expected MWh output: 0.22 MWa = 1,896 MWh

Name: Yamhill Solar
Source: Solar
Year: 2011
State: Oregon
Expected MWh output: 0.15 MWa = 1,273 MWh

Name: Tucannon River Wind Farm
Source: Wind
Year: 2014
State: Oregon
Expected MWh output: 101.91 MWa = 892,764 MWh

Name: Solar Payment Option Program (SPO)
Source: Solar
Year: 2010 – 2015
State: Oregon
Expected MWh Output: 1.86 MWa = 16,316 MWh

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:

2017 through 2021:

N/A; PGE's recently filed 2013 IRP Update includes no new RPS resource additions through 2021. Any further RPS resource additions will be addressed in PGE's 2016 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.

Response:

PGE does not plan to use Alternative Compliance Payments (ACP) in any of the compliance years, 2017 through 2021. 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.

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 OAR 860-083-0400 (4):

There are no material differences between this 2017-2021 Plan and PGE's 2013 IRP Update and conditions have not materially changed.

In response to requirements OAR 860-083-0400 (4)(a) and (4)(b):

See Attachment A, Tab 4 – "Incremental Cost by Resource." The Biglow Canyon and Tucannon 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 PGE's response to OAR 860-083-0400 (2)(e) are provided in Attachment A, Tab 1 – "Incremental Cost Summary." The forecasted incremental cost of compliance will not exceed four percent of the annual revenue requirement in the reference gas/reference CO₂ scenario. Incremental cost is forecasted to exceed four percent of the annual revenue requirement in only one scenario, reference gas/no CO₂, and only in the latter years of the period reviewed. Consistent with PGE's 2013 IRP Update, we have modeled the CO₂ adder starting in 2020 and the RPS target increases in 2020.

(b): For planning purposes, PGE does not forecast the use of unbundled RECs to meet RPS compliance targets within future compliance years 2017 through 2021; however, PGE reserves the right to do so if the availability and market prices for unbundled RECs warrants it in the future. See PGE's 2013 IRP Update for further discussion.

In OPUC Order No. 14-265 acknowledging PGE's 2015-2019 Plan, filed December 31, 2013 (covering the period 2015-2019), OPUC directed PGE to include a scenario in future implementation plans under the reference case that assumes PGE uses unbundled RECs equal to 20% of its annual requirement assuming an unbundled REC price equal to the weighted average price paid for unbundled RECs used in its last compliance report for each year analyzed in the 2017-2021 Plan. Attachment B, which is confidential and subject to protective order, calculates incremental costs based on retiring unbundled RECs during the period covered.

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.

- (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, 2011-2015 Plan, 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.

Order No. 12-271, dated July 2, 2012, acknowledged PGE's second implementation plan, 2013-2017 Plan, filed December 28, 2011. OPUC required PGE to not include shaping costs in its next implementation plan (2015-2019 Plan), which we have complied with.

Order 10-457 acknowledged PGE's 2009 Integrated Resource Plan and 2010 Addendum, with conditions. No conditions pertain directly to implementation plan filing requirements. PGE filed its Draft 2013 Integrated Resource Plan on November 22, 2013.

Order 14-265, dated July 22, 2014, acknowledged PGE's 2015-2019 Plan, filed December 31, 2013. OPUC directed PGE to include a scenario in future implementation plans under the reference case that assumes PGE uses unbundled RECs equal to 20% of

its annual requirement assuming an unbundled REC price equal to the weighted average price paid for unbundled RECs used in its last compliance report for each year analyzed in the implementation plan. We have complied with that requirement in this 2017-2021 Plan.

OAR 860-083-0400(7)

If there are funds in holding accounts under ORS 469A.180(4) and if the electric company has not filed a proposal for expending such funds 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 ACP. As of December 2015, PGE has made no ACP and thus has no applicable ACP funds for disposition. The rule is not applicable to PGE at this time.

PGE 2016 RPS Implementation Plan

Attachment A

Incremental Cost of Compliance
2017-2021

Tab 1 - Incremental Cost Summary

Base Case (RefGas-RefCO2)	Total Incremental Cost to Comply				
	2017	2018	2019	2020	2021
Unbundled RECS					
Biglow Canyon I	\$ 22,977,677	\$ 17,778,460	\$ 12,831,269	\$ 17,907,753	\$ 18,177,431
Biglow Canyon II	19,039,730	20,637,656	16,622,711	23,267,338	23,617,728
Biglow Canyon III	23,153,111	19,574,517	15,362,189	21,504,664	21,828,509
Tucannon River	194,622	3,807,657	9,343,141	13,278,222	13,478,183
Purchased Bundled	221,037	-	-	-	-
Total Incremental Cost	\$ 65,586,177	\$ 61,798,289	\$ 54,159,310	\$ 75,957,977	\$ 77,101,851
Revenue Requirement (\$000)	\$ 1,839,632	\$ 1,885,037	\$ 1,928,893	\$ 1,975,263	\$ 2,046,174
Percentage of Rev Requirement	3.6%	3.3%	2.8%	3.8%	3.8%

Case 2 (RefGas-NoCO2)					
Unbundled RECS					
Biglow Canyon I	\$ 24,995,530	\$ 19,339,728	\$ 13,958,085	\$ 19,480,375	\$ 19,773,736
Biglow Canyon II	21,423,528	23,221,516	18,703,895	26,180,437	26,574,696
Biglow Canyon III	26,476,872	22,384,551	17,567,519	24,591,781	24,962,116
Tucannon River	327,740	6,412,022	15,733,673	22,360,275	22,697,005
Purchased Bundled	221,037	-	-	-	-
Total Incremental Cost	\$ 73,444,706	\$ 71,357,816	\$ 65,963,172	\$ 92,612,868	\$ 94,007,554
Revenue Requirement (\$000)	\$ 1,839,632	\$ 1,885,037	\$ 1,928,893	\$ 1,975,263	\$ 2,046,174
Percentage of Rev Requirement	4.0%	3.8%	3.4%	4.7%	4.6%

Case 3 (HighGas-NoCO2)					
Unbundled RECS					
Biglow Canyon I	\$ 19,094,126	\$ 14,773,650	\$ 10,662,604	\$ 14,881,090	\$ 15,105,189
Biglow Canyon II	13,402,330	14,527,132	11,700,957	16,378,201	16,624,846
Biglow Canyon III	16,009,312	13,534,879	10,622,248	14,869,487	15,093,411
Tucannon River	(56,540)	(1,106,166)	(2,714,286)	(3,857,471)	(3,915,562)
Purchased Bundled	221,037	-	-	-	-
Total Incremental Cost	\$ 48,670,265	\$ 41,729,494	\$ 30,271,523	\$ 42,271,308	\$ 42,907,885
Revenue Requirement (\$000)	\$ 1,839,632	\$ 1,885,037	\$ 1,928,893	\$ 1,975,263	\$ 2,046,174
Percentage of Rev Requirement	2.6%	2.2%	1.6%	2.1%	2.1%

Case 4 (HighGas-RefCO2)					
Unbundled RECS					
Biglow Canyon I	\$ 16,870,986	\$ 13,053,545	\$ 9,421,151	\$ 13,148,477	\$ 13,346,484
Biglow Canyon II	10,570,816	11,457,981	9,228,893	12,917,975	13,112,511
Biglow Canyon III	12,176,956	10,294,860	8,079,463	11,309,985	11,480,306
Tucannon River	(201,663)	(3,945,398)	(9,681,127)	(13,758,559)	(13,965,753)
Purchased Bundled	221,037	-	-	-	-
Total Incremental Cost	\$ 39,638,133	\$ 30,860,989	\$ 17,048,380	\$ 23,617,878	\$ 23,973,547
Revenue Requirement (\$000)	\$ 1,839,632	\$ 1,885,037	\$ 1,928,893	\$ 1,975,263	\$ 2,046,174
Percentage of Rev Requirement	2.2%	1.6%	0.9%	1.2%	1.2%

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 calculation (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 (RefGas-RefCO2)	2017	2018	2019	2020	2021
Biglow Canyon I	12,980,666	12,980,666	12,980,666	13,016,229	12,980,666
Biglow Canyon II	16,865,630	16,865,630	16,865,630	16,911,837	16,865,630
Biglow Canyon III	15,587,933	15,587,933	15,587,933	15,630,640	15,587,933
Tucannon River	9,624,891	9,624,891	9,624,891	9,651,260	9,624,891
Total Incremental Cost	55,059,119	55,059,119	55,059,119	55,209,966	55,059,119

Case 2 (RefGas-NoCO2)	2017	2018	2019	2020	2021
Biglow Canyon I	14,120,601	14,120,601	14,120,601	14,159,288	14,120,601
Biglow Canyon II	18,977,227	18,977,227	18,977,227	19,029,220	18,977,227
Biglow Canyon III	17,825,670	17,825,670	17,825,670	17,874,507	17,825,670
Tucannon River	16,208,134	16,208,134	16,208,134	16,252,539	16,208,134
Total Incremental Cost	67,131,632	67,131,632	67,131,632	67,315,554	67,131,632

Case 3 (HighGas-NoCO2)	2017	2018	2019	2020	2021
Biglow Canyon I	10,786,750	10,786,750	10,786,750	10,816,303	10,786,750
Biglow Canyon II	11,871,951	11,871,951	11,871,951	11,904,476	11,871,951
Biglow Canyon III	10,778,339	10,778,339	10,778,339	10,807,869	10,778,339
Tucannon River	(2,796,137)	(2,796,137)	(2,796,137)	(2,803,798)	(2,796,137)
Total Incremental Cost	30,640,903	30,640,903	30,640,903	30,724,850	30,640,903

Case 4 (HighGas-RefCO2)	2017	2018	2019	2020	2021
Biglow Canyon I	9,530,843	9,530,843	9,530,843	9,556,955	9,530,843
Biglow Canyon II	9,363,761	9,363,761	9,363,761	9,389,415	9,363,761
Biglow Canyon III	8,198,189	8,198,189	8,198,189	8,220,650	8,198,189
Tucannon River	(9,973,069)	(9,973,069)	(9,973,069)	(10,000,392)	(9,973,069)
Total Incremental Cost	17,119,724	17,119,724	17,119,724	17,166,627	17,119,724

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 calculation (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

Compliance Year	2017		2018		2019		2020		2021		
	Facility	MWh	Vintage	MWh	Vintage	MWh	Vintage	MWh	Vintage	MWh	Vintage
Unbundled RECs	-	-	-	-	-	-	-	-	-	-	-
Pelton-Round Butte LIH	438,000	2009	438,000	2009	263,872	2009	439,200	2010	438,000	2010	
Pelton-Round Butte LIH	-	2010	-	2010	174,128	2010	-	2011	-	2011	
Biglow Canyon I	47,162	2012	145,661	2014	10,163	2015	15,023	2016	226,647	2018	
Biglow Canyon II	57,355	2012	165,864	2014	11,974	2015	19,604	2016	295,763	2018	
Biglow Canyon III	50,400	2012	160,830	2014	10,593	2015	17,395	2016	262,427	2018	
Tucannon River	-	2012	13,397	2014	10,741	2015	39,320	2016	593,217	2018	
Vansycle Ridge	9,713	2012	28,604	2014	1,910	2015	3,134	2016	47,286	2018	
PPM Klondike II	29,626	2012	94,986	2014	6,426	2015	9,577	2016	144,479	2018	
Hydro Upgrades	14,622	2012	39,541	2014	3,016	2015	5,005	2016	75,513	2018	
Bellevue Solar	525	2012	1,424	2014	107	2015	110	2016	1,659	2018	
Yamhill Solar	350	2012	1,014	2014	100	2015	161	2016	2,431	2018	
Outback Solar	190	2012	8,901	2014	654	2015	876	2016	13,053	2018	
ETO and Other Solar	1,939	2012	10,209	2014	657	2015	293	2016	4,398	2018	
Purchased Bundled	-	2012	-	2014	-	2015	-	2016	-	2018	
Biglow Canyon I	360,342	2013	321,505	2015	327,005	2016	341,094	2017	251,002	2019	
Biglow Canyon II	221,626	2013	378,794	2015	426,724	2016	445,109	2017	327,544	2019	
Biglow Canyon III	319,493	2013	335,117	2015	378,629	2016	394,941	2017	290,627	2019	
Tucannon River	-	2013	339,785	2015	855,890	2016	892,764	2017	656,962	2019	
Vansycle Ridge	63,442	2013	60,416	2015	68,223	2016	71,163	2017	52,367	2019	
PPM Klondike II	210,810	2013	203,300	2015	208,453	2016	217,434	2017	160,004	2019	
Hydro Upgrades	86,896	2013	95,405	2015	108,950	2016	113,644	2017	83,628	2019	
Bellevue Solar	3,646	2013	3,393	2015	2,393	2016	2,496	2017	1,837	2019	
Yamhill Solar	2,634	2013	3,172	2015	3,508	2016	3,659	2017	2,692	2019	
Outback Solar	21,352	2013	20,698	2015	19,060	2016	19,762	2017	14,368	2019	
ETO and Other Solar	20,070	2013	20,784	2015	6,384	2016	6,638	2017	4,855	2019	
Purchased Bundled	18,425	2013	-	2015	-	2016	-	2017	-	2019	
Biglow Canyon I	196,282	2014	-	2016	-	2017	114,446	2018	-	-	
Biglow Canyon II	223,506	2014	-	2016	-	2017	149,346	2018	-	-	
Biglow Canyon III	216,722	2014	-	2016	-	2017	132,514	2018	-	-	
Tucannon River	18,052	2014	-	2016	-	2017	299,547	2018	-	-	
Vansycle Ridge	38,544	2014	-	2016	-	2017	23,877	2018	-	-	
PPM Klondike II	127,996	2014	-	2016	-	2017	72,955	2018	-	-	
Hydro Upgrades	53,282	2014	-	2016	-	2017	38,131	2018	-	-	
Bellevue Solar	1,918	2014	-	2016	-	2017	838	2018	-	-	
Yamhill Solar	1,366	2014	-	2016	-	2017	1,228	2018	-	-	
Outback Solar	11,995	2014	-	2016	-	2017	6,591	2018	-	-	
ETO and Other Solar	13,757	2014	-	2016	-	2017	2,221	2018	-	-	
Purchased Bundled	-	2014	-	2016	-	2017	-	2018	-	-	
Total Annual Compliance	2,882,040		2,890,800		2,899,560		3,900,096		3,950,760		

Compliance Year	2017	2018	2019	2020	2021
Facility	MWh	MWh	MWh	MWh	MWh
Pelton-Round Butte LIH	438,000	438,000	438,000	439,200	438,000
Biglow Canyon I	603,786	467,166	337,168	470,563	477,650
Biglow Canyon II	502,487	544,659	438,698	614,060	623,307
Biglow Canyon III	586,615	495,947	389,222	544,849	553,055
Tucannon River	18,052	353,182	866,630	1,231,632	1,250,179
Vansycle Ridge	111,700	89,020	70,133	98,174	99,652
PPM Klondike II	368,432	298,286	214,879	299,965	304,483
Hydro Upgrades	154,800	134,946	111,966	156,780	159,141
Bellevue Solar	6,090	4,817	2,500	3,444	3,496
Yamhill Solar	4,350	4,186	3,608	5,048	5,124
Outback Solar	33,537	29,599	19,714	27,229	27,421
ETO and Other Solar	35,766	30,993	7,041	9,152	9,253
Purchased Bundled	18,425	0	0	0	0

Tab 4 - Incremental Cost by Resource

Expected Incremental Cost of Qualifying Electricity									
\$/MWh				2017 Busbar Energy (MWh)	\$000's				
Base Case RefGas- RefCO2	Case 2 RefGas- NoCO2	Case 3 HighGas- NoCO2	Case 4 HighGas- RefCO2		Base Case RefGas- RefCO2	Case 2 RefGas- NoCO2	Case 3 HighGas- NoCO2	Case 4 HighGas- RefCO2	
With Government Incentives:									
Biglow Canyon I	38.06	41.40	31.62	27.94	341,094	\$ 12,981	\$ 14,121	\$ 10,787	\$ 9,531
Biglow Canyon II	37.89	42.64	26.67	21.04	445,109	16,866	18,977	11,872	9,364
Biglow Canyon III	39.47	45.14	27.29	20.76	394,941	15,588	17,826	10,778	8,198
Tucannon River	10.78	18.16	(3.13)	(11.17)	892,764	9,625	16,208	(2,796)	(9,973)

Tab 5 - RECs Generated

RECs Available By Vintage Year														
Facility	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Biglow Canyon I	-	314,497	312,099	355,370	337,470	360,342	341,943	331,667	342,028	341,094	341,094	341,094	342,028	341,094
Biglow Canyon II	-	159,480	375,252	375,689	410,406	221,626	389,370	390,768	446,329	445,109	445,109	445,109	446,329	445,109
Biglow Canyon III	-	-	73,259	384,679	360,639	319,493	377,552	345,710	396,023	394,941	394,941	394,941	396,023	394,941
Tucannon River	-	-	-	-	-	-	31,449	350,526	895,210	892,764	892,764	892,764	895,210	892,764
Vansycle Ridge	-	59,617	74,902	81,054	69,504	63,442	67,148	62,326	71,358	71,163	71,163	71,163	71,358	71,163
PPM Klondike II	-	172,863	173,511	198,956	211,993	210,810	222,982	209,726	218,030	217,434	217,434	217,434	218,030	217,434
Pelton-Round Butte LIH	439,200	438,000	438,000	438,000	439,200	438,000	438,000	438,000	439,200	438,000	438,000	438,000	439,200	438,000
Hydro Upgrades	-	85,765	108,981	114,834	104,627	86,896	92,823	98,421	113,956	113,644	113,644	113,644	113,956	113,644
Bellevue Solar	-	-	-	-	3,760	3,646	3,342	3,500	2,503	2,496	2,496	2,496	2,503	2,496
Yamhill Solar	-	-	-	-	2,502	2,634	2,380	3,272	3,669	3,659	3,659	3,659	3,669	3,659
Outback Solar	-	-	-	-	1,360	21,352	20,896	21,352	19,936	19,762	19,643	19,526	19,462	19,292
ETO and Other Solar	-	1,079	2,309	9,146	13,878	20,070	23,966	21,441	6,677	6,638	6,618	6,598	108,242	107,926
Purchased Bundled	-	-	-	-	-	18,425	-	-	-	-	-	-	-	-
Total RECs	439,200	1,231,301	1,558,313	1,957,728	1,955,339	1,766,736	2,011,851	2,276,711	2,954,918	2,946,704	2,946,566	2,946,428	3,056,008	3,047,522

Renewables used

Year	2017		2018		2019		2020		2021	
	MWh	Vintage	MWh	Vintage	MWh	Vintage	MWh	Vintage	MWh	Vintage
Banked	438,000	2009	438,000	2009	263,872	2009	439,200	2010	438,000	2010
	211,883	2010	670,430	2014	174,128	2010	110,498	2016	1,666,872	2018
	1,328,736	2011	1,782,370	2015	56,341	2015	2,508,704	2017	1,845,888	2019
	903,421	2012	-	2016	2,405,219	2016	841,693	2018	-	2020
Total Banked	2,882,040		2,890,800		2,899,560		3,900,096		3,950,760	
Bundled	2,882,040		2,890,800		2,899,560		3,900,096		3,950,760	
Unbundled	-		-		-		-		-	
ACP	-		-		-		-		-	
Total	2,882,040		2,890,800		2,899,560		3,900,096		3,950,760	

Tab 6 - Energy Growth Rates

Year	2017	2018	2019	2020	2021
Growth Rate	0.56%	0.48%	0.35%	0.42%	1.58%