

August 18, 2017

### Via Electronic Filing

Oregon Public Utility Commission Attention: Filing Center PO Box 1088 Salem OR 97308-1088

Re: UM 1728 – PORTLAND GENERAL ELECTRIC COMPANY's Application to Update Schedule 201 Qualifying Facility Information – Compliance Filing

Attention Filing Center:

Portland General Electric Company (PGE) submits this filing pursuant to Oregon Administrative Rules 860-029-0040(4)(a) and 860-001-0420 and Order Nos. 10-488, 11-505, and 14-058.

This filing revises Schedule 201, Qualifying Facility Power Purchase Information for Qualifying Facilities 10 MW or Less, Sheet Nos. 201-1 through Sheet Nos. 201-23. This filing also includes a Motion for Temporary Relief from Schedule 201 Prices (Motion) with an accompanying Declaration of Robert Macfarlane.

The enclosed Schedule 201 shows a requested effective date of <u>September 18, 2017</u>, which is consistent with OAR 860-029-0040(4)(a) and the primary relief requested in PGE's Motion. If the Commission denies the primary relief requested in the Motion but grants the alternative relief, the enclosed Schedule 201 will have an effective date of **August 8, 2017**.

This filing changes prices only. The major drivers for the price changes to Schedule 201 in this filing are as follows:

- The deficiency periods start in a later year.
- For both Standard and Renewable Avoided Costs, overnight capital costs are lower using the costs from the 2016 IRP.

Attachment A provides a description of standard avoided costs.

Attachment B provides a description of renewable avoided costs.

Attachment C provides a list of sources for various assumptions used to calculate prices.

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In addition, on July 20, 2017, PGE filed for changes to Schedule 201 in compliance with Commission Order No. 17-256 in UM 1805. Those changes have not been approved and are not yet effective. PGE will include the changes from that filing in Schedule 201 when the changes become effective.

Also provided as a courtesy are redlined versions of Sheet Nos. 201-1 through Sheet Nos. 201-23.

Should you have any questions or comments regarding this filing, please contact Rob Macfarlane at (503) 464-8954.

Please direct all formal correspondence and requests to the following email address pge.opuc.filings@pgn.com.

Thank you in advance for your assistance.

Sincerely,

V. Denise Saunders

Associate General Counsel

VDS:bop

Enclosures

cc: Service List UM 1610

## UM 1728 Application to Update Schedule 201 Qualifying Facility Information

(Effective date September 18, 2017)

# SCHEDULE 201 QUALIFYING FACILITY 10 MW or LESS AVOIDED COST POWER PURCHASE INFORMATION

#### **PURPOSE**

To provide information about Standard Avoided Costs and Renewable Avoided Costs, Standard Power Purchase Agreements (PPA) and Negotiated PPAs, power purchase prices and price options for power delivered by a Qualifying Facility (QF) to the Company with nameplate capacity of 10,000 kW (10MW) or less.

#### **AVAILABLE**

To owners of QFs making sales of electricity to the Company in the State of Oregon (Seller).

#### **APPLICABLE**

For power purchased from small power production or cogeneration facilities that are QFs as defined in 18 Code of Federal Regulations (CFR) Section 292, that meet the eligibility requirements described herein and where the energy is delivered to the Company's system and made available for Company purchase pursuant to a Standard PPA.

#### **ESTABLISHING CREDITWORTHINESS**

The Seller must establish creditworthiness prior to service under this schedule. For a Standard PPA, a Seller may establish creditworthiness with a written acknowledgment that it is current on all existing debt obligations and that it was not a debtor in a bankruptcy proceeding within the preceding 24 months. If the Seller is not able to establish creditworthiness, the Seller must provide security deemed sufficient by the Company as set forth in the Standard PPA.

#### POWER PURCHASE INFORMATION

A Seller may call the Power Production Coordinator at (503) 464-8000 to obtain more information about being a Seller or how to apply for service under this schedule.

#### **PPA**

In accordance with terms set forth in this schedule and the Commission's Rules as applicable, the Company will purchase any Energy in excess of station service (power necessary to produce generation) and amounts attributable to conversion losses, which are made available from the Seller.

A Seller must execute a PPA with the Company prior to delivery of power to the Company. The agreement will have a term of up to 20 years as selected by the QF.

A QF with a nameplate capacity rating of 10 MW or less as defined herein may elect the option of a Standard PPA.

### PPA (Continued)

Any Seller may elect to negotiate a PPA with the Company. Such negotiation will comply with the requirements of the Federal Energy Regulatory Commission (FERC), and the Commission including the guidelines in Order No. 07-360, and Schedule 202. Negotiations for power purchase pricing will be based on either the filed Standard Avoided Costs or Renewable Avoided Costs in effect at that time.

#### STANDARD PPA (Nameplate capacity of 10 MW or less)

A Seller choosing a Standard PPA will complete all informational and price option selection requirements in the applicable Standard PPA and submit the executed Agreement to the Company prior to service under this schedule. The Standard PPA is available at <a href="https://www.portlandgeneral.com">www.portlandgeneral.com</a>. The available Standard PPAs are:

- Standard In-System Non-Variable Power Purchase Agreement
- Standard Off-System Non-Variable Power Purchase Agreement
- Standard In-System Variable Power Purchase Agreement
- Standard Off-System Variable Power Purchase Agreement
- Standard Renewable In-System Non-Variable Power Purchase Agreement
- Standard Renewable Off-System Non-Variable Power Purchase Agreement
- Standard Renewable In-System Variable Power Purchase Agreement
- Standard Renewable Off-System Variable Power Purchase Agreement

The Standard PPAs applicable to variable resources are available only to QFs utilizing wind, solar or run of river hydro as the primary motive force.

#### **GUIDELINES FOR 10 MW OR LESS FACILITIES ELECTING STANDARD PPA**

To execute the Standard PPA the Seller must complete all of the general project information requested in the applicable Standard PPA.

When all information required in the Standard PPA has been received in writing from the Seller, the Company will respond within 15 business days with a draft Standard PPA.

The Seller may request in writing that the Company prepare a final draft Standard PPA. The Company will respond to this request within 15 business days. In connection with such request, the QF must provide the Company with any additional or clarified project information that the Company reasonably determines to be necessary for the preparation of a final draft Standard PPA.

When both parties are in full agreement as to all terms and conditions of the draft Standard PPA, the Company will prepare and forward to the Seller a final executable version of the agreement within 15 business days. Following the Company's execution, an executed copy will be returned to the Seller. Prices and other terms and conditions in the PPA will not be final and binding until the Standard PPA has been executed by both parties.

#### OFF-SYSTEM PPA

A Seller with a facility that interconnects with an electric system other than the Company's electric system may enter into a PPA with the Company after following the applicable Standard or Negotiated PPA guidelines and making the arrangements necessary for transmission of power to the Company's system.

#### BASIS FOR POWER PURCHASE PRICE

#### AVOIDED COST SUMMARY

The power purchase prices are based on either the Company's Standard Avoided Costs or Renewable Avoided Costs in effect at the time the agreement is executed. Avoided Costs are defined in 18 CFR 292.101(6) as "the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the qualifying facility or qualifying facilities, such utility would generate itself or purchase from another source."

Monthly On-Peak prices are included in both the Standard Avoided Costs as listed in Tables 1a, 2a, and 3a and Renewable Avoided Costs as listed in Tables 4a, 5a, and 6a. Monthly Off-Peak prices are included in both the Standard Avoided Costs as listed in Tables 1b, 2b, and 3b and Renewable Avoided Costs as listed in Tables 4b, 5b, and 6b.

#### **ON-PEAK PERIOD**

The On-Peak period is 6:00 a.m. until 10:00 p.m., Monday through Saturday.

#### **OFF-PEAK PERIOD**

The Off-Peak period is 10:00 p.m. until 6:00 a.m., Monday through Saturday, and all day on Sunday.

Standard Avoided Costs are based on forward market price estimates through the Resource Sufficiency Period, the period of time during which the Company's Standard Avoided Costs are associated with incremental purchases of Energy and capacity from the market. For the Resource Deficiency Period, the Standard Avoided Costs reflect the fully allocated costs of a natural gas fueled combined cycle combustion turbine (CCCT) including fuel and capital costs. The CCCT Avoided Costs are based on the variable cost of Energy plus capitalized Energy costs at a 93% capacity factor based on a natural gas price forecast, with prices modified for shrinkage and transportation costs.

Renewable Avoided Costs are based on forward market price estimates through the Renewable Resource Sufficiency Period, the period of time during which the Company's Renewable Avoided Costs are associated with incremental purchases of energy and capacity from the market. For the Renewable Resource Deficiency Period, the Renewable Avoided Costs reflect the fully allocated costs of a wind plant including capital costs.

#### PRICING FOR STANDARD PPA

Pricing represents the purchase price per MWh the Company will pay for electricity delivered to a Point of Delivery (POD) within the Company's service territory pursuant to a Standard PPA up to the nameplate rating of the QF in any hour. Any Energy delivered in excess of the nameplate rating will be purchased at the applicable Off-Peak Prices for the selected pricing option.

The Standard PPA pricing will be based on either the Standard or Renewable Avoided Costs in effect at the time the agreement is executed.

The Company will pay the Seller either the Off-Peak Standard Avoided Cost pursuant to Tables 1b, 2b, or 3b or the Off-Peak Renewable Avoided Costs pursuant to Tables 4b, 5b, or 6b for: (a) all Net Output delivered prior to the Commercial Operation Date; (b) all Net Output deliveries greater than Maximum Net Output in any PPA year; (c) any generation subject to and as adjusted by the provisions of Section 4.3 of the Standard PPA; (d) Net Output delivered in the Off-Peak Period; and (e) deliveries above the nameplate capacity in any hour. The Company will pay the Seller either the On-Peak Standard Avoided Cost pursuant to Tables 1a, 2a, or 3a or the On-Peak Renewable Avoided Costs pursuant to Tables 4a, 5a, or 6a for all other Net Output. (See the PPA for defined terms.)

### 1) Standard Fixed Price Option

The Standard Fixed Price Option is based on Standard Avoided Costs including forecasted natural gas prices. It is available to all QFs.

This option is available for a maximum term of 15 years. Prices will be as established at the time the Standard PPA is executed and will be equal to the Standard Avoided Costs in Tables 1a and 1b, 2a and 2b, or 3a and 3c, depending on the type of QF, effective at execution. QFs using any resource type other than wind and solar are assumed to be Base Load QFs.

Prices paid to the Seller under the Standard Fixed Price Option include adjustments for the capacity contribution of the QF resource type relative to that of the avoided proxy resource. Both the Base Load QF resources (Tables 1a and 1b) and the avoided proxy resource, the basis used to determine Standard Avoided Costs for the Standard Fixed Price Option, are assumed to have a capacity contribution to peak of 100%. The capacity contribution for Wind QF resources (Tables 2a and 2b) is assumed to be 18.59%. The capacity contribution for Solar QF resources (Tables 3a and 3b) is assumed to be 15.33%.

Prices paid to the Seller under the Standard Fixed Price Option for Wind and Solar QFs (Tables 2a, 2b, 3a, and 3b) include a reduction for the integration costs in Table 7. However, if the Wind or Solar QF is outside of PGE's Balancing Authority Area as contemplated in the Commission's Order No. 14-058, the Seller is paid the integration charges in Table 7, in addition to the prices listed in Tables 2a and 2b or 3a and 3b, for a net-zero effect.

PRICING OPTIONS FOR STANDARD PPA (Continued)
Standard Fixed Price Option (Continued)

Sellers with PPAs exceeding 15 years will receive pricing equal to the Mid-C Index Price for all years up to five in excess of the initial 15.

					-	TABLE 1a	<u> </u>					
						oided Co						
			S	Standard	Fixed Pri	ce Optior	for Base	e Load Q	F			
				(	On-Peak	Forecast	(\$/MWH)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								34.81	29.46	26.91	27.42	33.53
2018	32.01	29.46	25.38	21.14	20.62	21.14	30.01	33.42	31.06	25.63	27.67	32.27
2019	31.18	29.49	23.89	19.25	18.62	19.53	30.14	34.47	31.43	26.91	28.93	34.34
2020	32.84	31.06	25.15	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16
2021	34.60	32.72	26.46	21.28	20.58	21.61	33.44	38.27	34.87	29.82	32.09	38.13
2022	36.47	34.48	27.88	22.42	21.68	22.76	35.25	40.34	36.75	31.44	33.81	40.19
2023	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07
2024	36.16	34.47	31.84	26.04	23.28	16.27	29.02	32.72	35.73	35.93	36.83	39.19
2025	57.28	57.40	57.49	56.78	56.75	56.67	56.77	56.85	56.97	57.07	57.81	57.92
2026	59.17	59.29	59.34	58.62	58.63	58.69	58.79	58.89	59.03	59.16	60.03	60.15
2027	61.01	61.13	61.04	60.30	60.44	60.19	60.29	60.39	60.52	61.27	59.92	60.04
2028	61.23	61.31	61.19	60.52	60.66	60.78	60.88	61.00	61.12	61.26	62.44	62.57
2029	64.03	64.16	64.28	63.58	63.76	64.88	65.00	65.13	65.28	65.40	66.74	66.88
2030	69.60	70.59	70.73	70.05	70.25	70.41	70.56	70.72	70.89	71.77	72.44	72.62
2031	74.30	74.48	74.10	73.00	73.15	73.04	73.18	73.34	73.51	73.69	74.85	75.02
2032	76.53	76.62	76.32	75.09	75.30	75.49	75.64	75.81	76.00	76.25	77.82	78.02
2033	80.07	80.28	80.02	78.86	79.09	79.29	79.46	79.64	79.85	80.26	81.68	81.90
2034	83.89	84.11	82.95	81.61	81.86	82.07	82.25	82.45	82.67	82.91	84.66	84.89
2035	86.73	86.97	85.83	84.45	84.70	84.37	84.55	84.75	84.99	85.49	86.97	87.42
2036	89.63	89.87	88.67	87.20	87.49	87.12	87.32	87.54	87.78	88.31	89.86	90.33
2037	92.90	93.16	91.91	90.37	90.65	90.28	90.48	90.71	90.95	91.53	93.15	93.66
2038	96.17	96.45	95.12	93.50	93.81	93.42	93.63	93.87	94.14	94.74	96.45	96.97
2039	99.60	99.87	98.49	96.79	97.11	96.69	96.92	97.17	97.45	98.09	99.87	100.43
2040	103.14	103.43	101.98	100.19	100.53	100.09	100.34	100.59	100.89	101.55	103.43	104.02
2041	106.88	107.19	105.65	103.77	104.11	103.66	103.92	104.18	104.50	105.20	107.17	107.79
2042	110.75	111.07	109.46	107.49	107.86	107.38	107.63	107.92	108.25	108.98	111.07	111.71

						TABLE 1b						
			•	tandard				a Load Ol	=			
						Forecast						
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Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				-	Ì			24.51	24.72	23.85	24.11	27.42
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.4
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	27.96	28.08	28.17	27.46	27.43	27.35	27.45	27.53	27.65	27.75	28.49	28.60
2026	29.26	29.39	29.43	28.71	28.72	28.79	28.89	28.99	29.12	29.25	30.12	30.24
2027	30.50	30.63	30.54	29.80	29.94	29.69	29.79	29.89	30.01	30.76	29.41	29.54
2028	30.11	30.19	30.08	29.41	29.55	29.66	29.77	29.88	30.01	30.15	31.33	31.45
2029	32.29	32.42	32.54	31.85	32.02	33.14	33.26	33.39	33.54	33.66	35.01	35.15
2030	37.23	38.22	38.36	37.68	37.88	38.04	38.19	38.35	38.52	39.40	40.07	40.25
2031	41.28	41.46	41.08	39.98	40.13	40.02	40.16	40.32	40.49	40.67	41.83	42.00
2032	43.06	43.15	42.85	41.62	41.84	42.02	42.17	42.35	42.54	42.79	44.35	44.55
2033	45.72	45.92	45.67	44.51	44.74	44.94	45.11	45.28	45.50	45.91	47.33	47.54
2034	48.74	48.96	47.80	46.46	46.71	46.91	47.10	47.29	47.51	47.76	49.51	49.74
2035	50.99	51.23	50.09	48.70	48.96	48.62	48.81	49.01	49.25	49.75	51.23	51.68
2036	53.29	53.53	52.33	50.86	51.15	50.78	50.98	51.20	51.45	51.97	53.52	53.99
2037	55.72	55.98	54.72	53.19	53.47	53.09	53.30	53.52	53.77	54.35	55.97	56.48
2038	58.24	58.52	57.19	55.57	55.88	55.49	55.70	55.94	56.21	56.81	58.52	59.04
2039	60.91	61.18	59.80	58.11	58.42	58.01	58.24	58.48	58.77	59.40	61.18	61.74
2040	63.68	63.97	62.52	60.73	61.07	60.63	60.88	61.12	61.43	62.09	63.97	64.55
2041	66.63	66.94	65.40	63.52	63.86	63.41	63.66	63.93	64.25	64.95	66.92	67.54
2042	69.70	70.02	68.40	66.43	66.80	66.33	66.57	66.86	67.20	67.93	70.02	70.66

						FABLE 2a						
				Standar		oided Cos Price Opt		ind OE				
						Forecast						
					JII-F Cak	i Orecasi	(\$/1414411)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				·	·			33.96	28.61	26.06	26.57	32.6
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.4
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.4
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.2
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.2
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.2
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.1
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.2
2025	41.62	41.74	41.83	41.12	41.09	41.01	41.11	41.20	41.32	41.42	42.16	42.2
2026	43.20	43.32	43.37	42.65	42.66	42.72	42.82	42.92	43.06	43.19	44.06	44.1
2027	44.72	44.84	44.75	44.02	44.15	43.90	44.00	44.11	44.23	44.98	43.63	43.7
2028	44.62	44.70	44.58	43.91	44.05	44.16	44.27	44.38	44.51	44.65	45.83	45.9
2029	47.09	47.22	47.33	46.64	46.82	47.94	48.05	48.18	48.34	48.45	49.80	49.9
2030	52.32	53.31	53.45	52.77	52.97	53.13	53.28	53.44	53.61	54.49	55.16	55.3
2031	56.67	56.86	56.48	55.37	55.52	55.41	55.56	55.72	55.89	56.06	57.23	57.4
2032	58.66	58.75	58.45	57.22	57.43	57.62	57.77	57.95	58.13	58.38	59.95	60.1
2033	61.73	61.93	61.68	60.52	60.75	60.95	61.12	61.30	61.51	61.92	63.34	63.5
2034	65.13	65.35	64.19	62.85	63.10	63.31	63.49	63.68	63.91	64.15	65.90	66.1
2035	67.65	67.89	66.75	65.37	65.62	65.29	65.48	65.68	65.91	66.42	67.89	68.3
2036	70.22	70.47	69.26	67.80	68.08	67.72	67.92	68.14	68.38	68.91	70.45	70.9
2037	73.05	73.32	72.06	70.53	70.80	70.43	70.64	70.86	71.11	71.69	73.30	73.8
2038	75.92	76.20	74.87	73.25	73.56	73.17	73.38	73.62	73.89	74.49	76.20	76.7
2039	78.95	79.22	77.84	76.15	76.46	76.04	76.27	76.52	76.81	77.44	79.22	79.7
2040	82.07	82.36	80.91	79.13	79.46	79.02	79.27	79.52	79.83	80.49	82.36	82.9
2041	85.39	85.70	84.16	82.28	82.62	82.17	82.43	82.70	83.01	83.71	85.69	86.3
2042	88.84	89.16	87.55	85.58	85.94	85.47	85.72	86.01	86.34	87.07	89.16	89.8

					-	TABLE 2b	)					
						oided Co						
						Price Opt						
					Off-Peak	Forecast	(\$/MWH)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	Jan	165	IVICI	Дрі	iviay	Juli	Jui	23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	26.96	27.08	27.17	26.46	26.43	26.35	26.45	26.53	26.65	26.75	27.49	27.60
2026	28.24	28.37	28.41	27.69	27.70	27.77	27.87	27.97	28.10	28.23	29.10	29.22
2027	29.46	29.59	29.50	28.76	28.90	28.65	28.75	28.85	28.97	29.72	28.37	28.50
2028	29.05	29.13	29.02	28.35	28.49	28.60	28.71	28.82	28.95	29.09	30.27	30.39
2029	31.21	31.34	31.46	30.77	30.94	32.06	32.18	32.31	32.46	32.58	33.93	34.07
2030	36.13	37.12	37.26	36.58	36.78	36.94	37.09	37.25	37.42	38.30	38.97	39.15
2031	40.16	40.34	39.96	38.86	39.01	38.90	39.04	39.20	39.37	39.55	40.71	40.88
2032	41.92	42.01	41.71	40.48	40.70	40.88	41.03	41.21	41.40	41.65	43.21	43.41
2033	44.55	44.75	44.50	43.34	43.57	43.77	43.94	44.11	44.33	44.74	46.16	46.37
2034	47.55	47.77	46.61	45.27	45.52	45.72	45.91	46.10	46.32	46.57	48.32	48.55
2035	49.78	50.02	48.88	47.49	47.75	47.41	47.60	47.80	48.04	48.54	50.02	50.47
2036	52.05	52.29	51.09	49.62	49.91	49.54	49.74	49.96	50.21	50.73	52.28	52.75
2037	54.46	54.72	53.46	51.93	52.21	51.83	52.04	52.26	52.51	53.09	54.71	55.22
2038	56.95	57.23	55.90	54.28	54.59	54.20	54.41	54.65	54.92	55.52	57.23	57.75
2039	59.60	59.87	58.49	56.80	57.11	56.70	56.93	57.17	57.46	58.09	59.87	60.43
2040	62.34	62.63	61.18	59.39	59.73	59.29	59.54	59.78	60.09	60.75	62.63	63.21
2041	65.26	65.57	64.03	62.15	62.49	62.04	62.29	62.56	62.88	63.58	65.55	66.17
2042	68.31	68.63	67.01	65.04	65.41	64.94	65.18	65.47	65.81	66.54	68.63	69.27

						FABLE 3a oided Cos						
				Standar		Price Opt		olar QF				
						Forecast						
							,					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								33.96	28.61	26.06	26.57	32.6
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.4
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.4
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.2
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.2
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.2
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.1
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.2
2025	38.93	39.05	39.13	38.43	38.39	38.32	38.42	38.50	38.62	38.72	39.46	39.5
2026	40.45	40.57	40.62	39.90	39.91	39.97	40.07	40.17	40.31	40.44	41.31	41.4
2027	41.91	42.04	41.95	41.21	41.35	41.10	41.20	41.30	41.43	42.17	40.83	40.9
2028	41.75	41.84	41.72	41.05	41.19	41.30	41.41	41.52	41.65	41.79	42.97	43.1
2029	44.17	44.30	44.42	43.72	43.90	45.02	45.14	45.27	45.42	45.54	46.88	47.0
2030	49.34	50.33	50.48	49.79	49.99	50.15	50.31	50.46	50.63	51.51	52.18	52.3
2031	53.64	53.82	53.44	52.34	52.49	52.37	52.52	52.68	52.85	53.02	54.19	54.3
2032	55.58	55.67	55.37	54.14	54.36	54.54	54.69	54.87	55.06	55.31	56.87	57.0
2033	58.57	58.78	58.52	57.36	57.59	57.79	57.96	58.14	58.35	58.76	60.18	60.4
2034	61.90	62.12	60.96	59.62	59.87	60.07	60.26	60.45	60.67	60.92	62.66	62.9
2035	64.37	64.61	63.46	62.08	62.34	62.00	62.19	62.39	62.63	63.13	64.61	65.0
2036	66.88	67.12	65.92	64.46	64.74	64.38	64.58	64.80	65.04	65.57	67.11	67.5
2037	69.64	69.90	68.64	67.11	67.38	67.01	67.22	67.44	67.69	68.27	69.88	70.4
2038	72.43	72.71	71.39	69.77	70.08	69.68	69.89	70.13	70.40	71.01	72.71	73.2
2039	75.39	75.66	74.28	72.59	72.90	72.49	72.72	72.96	73.25	73.88	75.66	76.2
2040	78.44	78.74	77.28	75.50	75.83	75.39	75.64	75.89	76.20	76.86	78.74	79.3
2041	81.69	82.00	80.46	78.58	78.92	78.47	78.72	78.99	79.31	80.01	81.98	82.6
2042	85.07	85.39	83.77	81.80	82.17	81.70	81.94	82.23	82.57	83.30	85.39	86.0

						FABLE 3b						
				01		oided Cos		- I OF				
						Price Opt						
					Оп-Реак	Forecast	(\$/IVIVV H)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.8
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	26.96	27.08	27.17	26.46	26.43	26.35	26.45	26.53	26.65	26.75	27.49	27.60
2026	28.24	28.37	28.41	27.69	27.70	27.77	27.87	27.97	28.10	28.23	29.10	29.22
2027	29.46	29.59	29.50	28.76	28.90	28.65	28.75	28.85	28.97	29.72	28.37	28.50
2028	29.05	29.13	29.02	28.35	28.49	28.60	28.71	28.82	28.95	29.09	30.27	30.39
2029	31.21	31.34	31.46	30.77	30.94	32.06	32.18	32.31	32.46	32.58	33.93	34.07
2030	36.13	37.12	37.26	36.58	36.78	36.94	37.09	37.25	37.42	38.30	38.97	39.15
2031	40.16	40.34	39.96	38.86	39.01	38.90	39.04	39.20	39.37	39.55	40.71	40.88
2032	41.92	42.01	41.71	40.48	40.70	40.88	41.03	41.21	41.40	41.65	43.21	43.4
2033	44.55	44.75	44.50	43.34	43.57	43.77	43.94	44.11	44.33	44.74	46.16	46.37
2034	47.55	47.77	46.61	45.27	45.52	45.72	45.91	46.10	46.32	46.57	48.32	48.55
2035	49.78	50.02	48.88	47.49	47.75	47.41	47.60	47.80	48.04	48.54	50.02	50.47
2036	52.05	52.29	51.09	49.62	49.91	49.54	49.74	49.96	50.21	50.73	52.28	52.75
2037	54.46	54.72	53.46	51.93	52.21	51.83	52.04	52.26	52.51	53.09	54.71	55.22
2038	56.95	57.23	55.90	54.28	54.59	54.20	54.41	54.65	54.92	55.52	57.23	57.75
2039	59.60	59.87	58.49	56.80	57.11	56.70	56.93	57.17	57.46	58.09	59.87	60.43
2040	62.34	62.63	61.18	59.39	59.73	59.29	59.54	59.78	60.09	60.75	62.63	63.2
2041	65.26	65.57	64.03	62.15	62.49	62.04	62.29	62.56	62.88	63.58	65.55	66.17
2042	68.31	68.63	67.01	65.04	65.41	64.94	65.18	65.47	65.81	66.54	68.63	69.27

PRICING OPTIONS FOR STANDARD PPA (Continued)

#### 2) Renewable Fixed Price Option

The Renewable Fixed Price Option is based on Renewable Avoided Costs. It is available only to Renewable QFs that generate electricity from a renewable energy source that may be used by the Company to comply with the Oregon Renewable Portfolio Standard as set forth in ORS 469A.005 to 469A.210.

This option is available for a maximum term of 15 years. Prices will be as established at the time the Standard PPA is executed and will be equal to the Renewable Avoided Costs in Tables 4a and 4b, 5a and 5b, or 6a and 6b, depending on the type of QF, effective at execution. QFs using any resource type other than wind and solar are assumed to be Base Load QFs.

Sellers will retain all Environmental Attributes generated by the facility during the Renewable Resource Sufficiency Period. A Renewable QF choosing the Renewable Fixed Price Option must cede all RPS Attributes generated by the facility to the Company from the start of the Renewable Resource Deficiency Period through the remainder of the PPA term.

Prices paid to the Seller under the Renewable Fixed Price Option include adjustments for the capacity contribution of the QF resource type relative to that of the avoided proxy resource. Both Wind QF resources (Tables 5a and 5b) and the avoided proxy resource, the basis used to determine Renewable Avoided Costs for the Renewable Fixed Price Option, are assumed to have a capacity contribution to peak of 18.59%. The capacity contribution for Solar QF resources (Tables 6a and 6b) is assumed to be 15.33%. The capacity contribution for Base Load QF resources (Tables 4a and 4b) is assumed to be 100%.

The Renewable Avoided Costs during the Renewable Resource Deficiency Period reflect an increase for avoided wind integration costs, shown in Table 7.

Prices paid to the Seller under the Renewable Fixed Price Option for Wind and solar QFs (Tables 5a, 5b, 6a, and 6b) include a reduction for the integration costs in Table 7, which cancels out integration costs included in the Renewable Avoided Costs during the Renewable Resource Deficiency Period. However, if the Wind or Solar QF is outside of PGE's Balancing Authority Area as contemplated in the Commission's Order No. 14-058, the Seller is paid the integration charges in Table 7, in addition to the prices listed in Tables 5a and 5b or 6a and 6b.

Sellers with PPAs exceeding 15 years will receive pricing equal to the Mid-C Index Price for all years up to five in excess of the initial 15.

## PRICING OPTIONS FOR STANDARD PPA (Continued)

Renewable Fixed Price Option (Continued)

					-	ΓABLE 4a									
							ed Costs								
			R	enewable	Fixed Pr	ice Optic	n for Bas	se Load C	(F						
					On-Peak	Forecast	(\$/MWH)								
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
2017								34.81	29.46	26.91	27.42	33.53			
2018	32.01	29.46	25.38	21.14	20.62	21.14	30.01	33.42	31.06	25.63	27.67	32.27			
2019	31.18	29.49	23.89	19.25	18.62	19.53	30.14	34.47	31.43	26.91	28.93	34.34			
2020	32.84	31.06	25.15	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16			
2021	34.60	32.72	26.46	21.28	20.58	21.61	33.44	38.27	34.87	29.82	32.09	38.13			
2022	36.47	34.48	27.88	22.42	21.68	22.76	35.25	40.34	36.75	31.44	33.81	40.19			
2023	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07			
2024	<b>2024</b> 36.16 34.47 31.84 26.04 23.28 16.27 29.02 32.72 35.73 35.93 36.83 39.														
2025	<b>2025</b> 36.28 36.45 32.07 27.15 25.16 20.76 31.18 33.59 36.96 36.50 36.17 3														
2026	38.02	38.42	34.69	28.61	23.72	19.90	33.16	36.49	39.07	39.98	39.93	41.34			
2027	40.65	40.65	35.03	29.55	25.62	19.81	33.68	38.68	40.37	41.18	39.95	42.49			
2028	41.59	39.62	35.61	29.31	24.13	18.69	35.04	39.47	41.56	42.04	42.77	45.50			
2029	130.46	122.16	114.93	99.44	91.28	66.74	111.72	123.40	130.72	125.77	127.43	137.59			
2030	131.08	128.53	117.83	98.71	84.69	62.99	114.81	124.72	133.57	132.78	130.81	140.19			
2031	131.64	130.86	120.44	98.71	91.59	75.33	113.41	127.20	134.67	132.63	129.43	138.99			
2032	134.62	132.28	119.05	100.89	89.34	66.65	119.99	136.17	137.32	134.74	138.45	144.33			
2033	137.25	136.91	119.61	101.75	86.72	86.02	122.63	133.68	138.82	137.65	139.72	144.28			
2034	142.85	142.41	123.71	103.53	88.59	73.28	127.14	137.57	142.77	143.43	144.85	150.81			
2035	148.82	142.53	126.90	103.23	91.63	67.83	123.14	139.46	145.86	143.75	142.41	153.08			
2036	149.95	144.47	128.97	105.99	82.91	55.60	131.13	142.04	150.30	148.99	147.58	158.25			
2037	150.31	149.85	132.81	104.38	91.13	77.19	129.68	144.87	152.33	149.48	149.48	159.99			
2038	153.59	155.69	131.34	104.62	84.94	70.00	139.81	155.20	158.10	155.40	156.18	165.33			
2039	155.36	153.84	130.69	105.47	94.56	80.72	140.16	151.56	157.69	151.05	155.29	162.46			
2040	157.59	155.79	132.79	114.89	87.55	75.00	145.49	156.16	163.50	158.77	161.06	169.93			
2041	161.95	158.31	139.08	119.78	109.77	63.50	144.74	159.21	165.49	156.15	156.63	168.47			
2042	164.72	162.40	143.32	120.89	93.22	64.66	149.09	163.83	169.34	163.16	161.00	175.92			

					-	ΓABLE 4k	<u> </u>					
					Renewak	ole Avoid	ed Costs					
			Re	enewable					(F			
					Off-Peak	Forecast	(\$/MWH)					
Year	lan	Fab	Mor	A	Mov	lum	led	A	Con	004	Nov	Doo
2017	Jan	Feb	Mar	Apr	May	Jun	Jul	<b>Aug</b> 24.51	<b>Sep</b> 24.72	Oct 23.85	24.11	<b>Dec</b> 27.42
2017	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.31	24.72	22.51	23.69	27.42
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2019	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.33	26.84	31.72
2020	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2021	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	33.70	32.17	29.76	25.01	21.99	19.00	26.39	30.90	33.57	33.77	33.61	34.83
2026	35.44	35.59	31.64	27.21	22.20	15.26	28.97	33.61	36.07	35.46	35.51	37.70
2027	36.66	35.71	32.22	27.60	23.64	18.12	29.40	34.72	37.35	37.55	36.31	38.40
2028	38.09	37.21	33.20	27.82	23.65	17.34	31.56	36.38	38.22	38.77	39.08	40.92
2029	87.39	83.14	79.75	60.89	56.60	30.37	68.86	84.70	91.46	89.10	90.05	95.00
2030	90.66	87.81	81.88	62.46	52.25	31.31	75.55	87.01	93.96	93.87	94.23	96.33
2031	94.53	91.33	79.90	66.32	59.86	41.01	74.22	87.92	95.40	93.03	92.05	96.31
2032	95.12	90.63	85.26	64.49	46.09	33.03	81.76	88.62	98.19	95.17	97.79	103.88
2033	96.72	93.73	84.37	65.02	55.14	44.09	81.80	90.25	98.91	96.03	97.55	104.35
2034	100.64	96.93	84.22	63.90	50.21	33.88	82.22	94.26	101.29	101.38	105.38	107.75
2035	103.38	100.59	93.20	71.90	61.31	46.52	81.06	99.14	104.45	99.35	103.56	106.09
2036	111.16	105.72	94.24	72.48	61.23	31.45	82.90	100.58	110.79	104.85	108.44	114.13
2037	110.15	107.49	96.32	79.57	59.61	38.00	86.10	101.85	110.09	103.94	105.91	113.12
2038	113.74	110.37	97.67	79.06	51.82	34.44	88.62	103.26	110.27	107.20	111.44	117.93
2039	110.16	108.78	96.61	84.94	62.94	60.33	93.55	103.97	110.69	110.48	115.32	122.80
2040	116.99	108.93	94.17	91.82	59.51	40.97	95.01	110.61	112.45	116.09	118.19	121.07
2041	116.50	110.73	111.72	97.32	66.46	37.99	97.97	109.98	123.17	113.27	119.57	123.40
2042	126.11	116.45	107.55	85.50	62.50	40.12	105.67	116.39	125.76	123.46	122.21	128.97

						TABLE 5a ole Avoide						
							eu Costs tion for \	Wind OF				
							(\$/MWH)					
					on roun	. 0. 00401	(ψ/ )	'				
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								33.96	28.61	26.06	26.57	32.68
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.4
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.2
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.2
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.1
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.2
2025	35.28	35.45	31.07	26.15	24.16	19.76	30.18	32.59	35.96	35.50	35.17	37.88
2026	37.00	37.40	33.67	27.59	22.70	18.88	32.14	35.47	38.05	38.96	38.91	40.32
2027	39.61	39.61	33.99	28.51	24.58	18.77	32.64	37.64	39.33	40.14	38.91	41.4
2028	40.53	38.56	34.55	28.25	23.07	17.63	33.98	38.41	40.50	40.98	41.71	44.4
2029	113.52	105.21	97.99	82.50	74.34	49.80	94.77	106.45	113.77	108.83	110.48	120.6
2030	113.80	111.24	100.54	81.43	67.41	45.70	97.52	107.44	116.29	115.50	113.53	122.9°
2031	114.02	113.23	102.81	81.08	73.97	57.71	95.79	109.57	117.04	115.01	111.80	121.3
2032	116.76	114.41	101.18	83.02	71.47	48.78	102.12	118.30	119.45	116.88	120.58	126.4
2033	118.91	118.57	101.27	83.40	68.38	67.68	104.29	115.34	120.47	119.31	121.38	125.9
2034	124.09	123.65	104.95	84.77	69.82	54.52	108.37	118.81	124.01	124.67	126.09	132.0
2035	129.75	123.46	107.82	84.16	72.56	48.75	104.07	120.39	126.78	124.67	123.33	134.0
2036	130.55	125.06	109.57	86.58	63.51	36.20	111.72	122.63	130.90	129.59	128.17	138.8
2037	130.46	130.00	112.97	84.54	71.28	57.35	109.83	125.02	132.49	129.63	129.63	140.14
2038	133.34	135.44	111.09	84.37	64.69	49.75	119.56	134.95	137.85	135.16	135.93	145.08
2039	134.72	133.19	110.04	84.82	73.91	60.08	119.52	130.91	137.04	130.40	134.64	141.8
2040	136.52	134.72	111.73	93.82	66.49	53.93	124.43	135.10	142.44	137.70	140.00	148.87
2041	140.47	136.82	117.59	98.30	88.28	42.01	123.25	137.72	144.00	134.66	135.14	146.9
2042	142.81	140.48	121.41	98.97	71.31	42.74	127.18	141.92	147.43	141.25	139.09	154.0

						TABLE 5						
					Renewak	ole Avoid	ed Costs					
				Renewal	ble Fixed	Price Op	tion for \	Nind QF				
					Off-Peak	Forecast	(\$/MWH)	)				
								-				_
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017		04.00	40.00	4404	44.0=	10.01	40.74	23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	32.70	31.17	28.76	24.01	20.99	18.00	25.39	29.90	32.57	32.77	32.61	33.83
2026	34.42	34.57	30.62	26.19	21.18	14.24	27.95	32.59	35.05	34.44	34.49	36.68
2027	35.62	34.67	31.18	26.56	22.60	17.08	28.36	33.68	36.31	36.51	35.27	37.36
2028	37.03	36.15	32.14	26.76	22.59	16.28	30.50	35.32	37.16	37.71	38.02	39.86
2029	86.31	82.06	78.67	59.81	55.52	29.29	67.78	83.62	90.38	88.02	88.97	93.92
2030	89.56	86.71	80.78	61.36	51.15	30.21	74.45	85.91	92.86	92.77	93.13	95.23
2031	93.41	90.21	78.78	65.20	58.74	39.89	73.10	86.80	94.28	91.91	90.93	95.19
2032	93.98	89.49	84.12	63.35	44.95	31.89	80.62	87.48	97.05	94.03	96.65	102.74
2033	95.55	92.56	83.20	63.85	53.97	42.92	80.63	89.08	97.74	94.86	96.38	103.18
2034	99.45	95.74	83.03	62.71	49.02	32.69	81.03	93.07	100.10	100.19	104.19	106.56
2035	102.17	99.38	91.99	70.69	60.10	45.31	79.85	97.93	103.24	98.14	102.35	104.88
2036	109.92	104.48	93.00	71.24	59.99	30.21	81.66	99.34	109.55	103.61	107.20	112.89
2037	108.89	106.23	95.06	78.31	58.35	36.74	84.84	100.59	108.83	102.68	104.65	111.86
2038	112.45	109.08	96.38	77.77	50.53	33.15	87.33	101.97	108.98	105.91	110.15	116.64
2039	108.85	107.47	95.30	83.63	61.63	59.02	92.24	102.66	109.38	109.17	114.01	121.49
2040	115.65	107.59	92.83	90.48	58.17	39.63	93.67	109.27	111.11	114.75	116.85	119.73
2041	115.13	109.36	110.35	95.95	65.09	36.62	96.60	108.61	121.80	111.90	118.20	122.03
2042	124.72	115.06	106.16	84.11	61.11	38.73	104.28	115.00	124.37		120.82	127.58

						TABLE 6	ed Costs					
							eu Cosis ition for S					
							(\$/MWH)					
					on roun	. Or COUCL	(ψ/1010011)	<u>'</u>				
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				_				33.96	28.61	26.06	26.57	32.68
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.46
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.21
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.25
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.11
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.21
2025	35.28	35.45	31.07	26.15	24.16	19.76	30.18	32.59	35.96	35.50	35.17	37.88
2026	37.00	37.40	33.67	27.59	22.70	18.88	32.14	35.47	38.05	38.96	38.91	40.32
2027	39.61	39.61	33.99	28.51	24.58	18.77	32.64	37.64	39.33	40.14	38.91	41.45
2028	40.53	38.56	34.55	28.25	23.07	17.63	33.98	38.41	40.50	40.98	41.71	44.44
2029	110.60	102.29	95.07	79.58	71.42	46.88	91.85	103.54	110.85	105.91	107.56	117.72
2030	110.82	108.27	97.57	78.45	64.43	42.73	94.55	104.46	113.31	112.52	110.55	119.93
2031	110.98	110.19	99.78	78.05	70.93	54.67	92.75	106.54	114.01	111.97	108.77	118.33
2032	113.68	111.33	98.10	79.95	68.40	45.70	99.05	115.22	116.37	113.80	117.51	123.38
2033	115.75	115.41	98.11	80.25	65.22	64.52	101.13	112.18	117.32	116.15	118.22	122.78
2034	120.86	120.42	101.71	81.54	66.59	51.28	105.14	115.58	120.78	121.43	122.86	128.82
2035	126.46	120.17	104.54	80.87	69.27	45.47	100.78	117.10	123.50	121.38	120.05	130.72
2036	127.20	121.72	106.23	83.24	60.16	32.86	108.38	119.29	127.56	126.25	124.83	135.50
2037	127.04	126.58	109.55	81.12	67.86	53.93	106.42	121.60	129.07	126.21	126.21	136.72
2038	129.86	131.95	107.60	80.88	61.20	46.26	116.08	131.46	134.36	131.67	132.45	141.59
2039	131.16	129.64	106.49	81.27	70.35	56.52	115.96	127.36	133.49	126.84	131.09	138.25
2040	132.90	131.10	108.10	90.19	62.86	50.30	120.80	131.47	138.81	134.08	136.37	145.24
2041	136.76	133.12	113.89	94.59	84.58	38.31	119.55	134.02	140.30	130.96	131.44	143.28
2042	139.03	136.71	117.63	95.20	67.53	38.97	123.41	138.15	143.66	137.47	135.31	150.23

						TABLE 6						
					Renewak	ole Avoid	ed Costs					
				Renewal	ble Fixed	Price Op	tion for S	Solar QF				
					Off-Peak	Forecast	(\$/MWH)					
										1		1
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	32.70	31.17	28.76	24.01	20.99	18.00	25.39	29.90	32.57	32.77	32.61	33.83
2026	34.42	34.57	30.62	26.19	21.18	14.24	27.95	32.59	35.05	34.44	34.49	36.68
2027	35.62	34.67	31.18	26.56	22.60	17.08	28.36	33.68	36.31	36.51	35.27	37.36
2028	37.03	36.15	32.14	26.76	22.59	16.28	30.50	35.32	37.16	37.71	38.02	39.86
2029	86.31	82.06	78.67	59.81	55.52	29.29	67.78	83.62	90.38	88.02	88.97	93.92
2030	89.56	86.71	80.78	61.36	51.15	30.21	74.45	85.91	92.86	92.77	93.13	95.23
2031	93.41	90.21	78.78	65.20	58.74	39.89	73.10	86.80	94.28	91.91	90.93	95.19
2032	93.98	89.49	84.12	63.35	44.95	31.89	80.62	87.48	97.05	94.03	96.65	102.74
2033	95.55	92.56	83.20	63.85	53.97	42.92	80.63	89.08	97.74	94.86	96.38	103.18
2034	99.45	95.74	83.03	62.71	49.02	32.69	81.03	93.07	100.10	100.19	104.19	106.56
2035	102.17	99.38	91.99	70.69	60.10	45.31	79.85	97.93	103.24	98.14	102.35	104.88
2036	109.92	104.48	93.00	71.24	59.99	30.21	81.66	99.34	109.55	103.61	107.20	112.89
2037	108.89	106.23	95.06	78.31	58.35	36.74	84.84	100.59	108.83	102.68	104.65	111.86
2038	112.45	109.08	96.38	77.77	50.53	33.15	87.33	101.97	108.98	105.91	110.15	116.64
2039	108.85	107.47	95.30	83.63	61.63	59.02	92.24	102.66	109.38	109.17	114.01	121.49
2040	115.65	107.59	92.83	90.48	58.17	39.63	93.67	109.27	111.11	114.75	116.85	119.73
2041	115.13	109.36	110.35	95.95	65.09	36.62	96.60	108.61	121.80	111.90	118.20	122.03
2042	124.72	115.06	106.16	84.11	61.11	38.73	104.28	115.00	124.37		120.82	127.58

### WIND AND SOLAR INTEGRATION

TABLE 7										
Inte	gration C	osts								
Year	Wind	Solar								
2017	0.85	0.85								
2018	0.87	0.87								
2019	0.88	0.88								
2020	0.90	0.90								
2021	0.92	0.92								
2022	0.94	0.94								
2023	0.96	0.96								
2024	0.98	0.98								
2025	1.00	1.00								
2026	1.02	1.02								
2027	1.04	1.04								
2028	1.06	1.06								
2029	1.08	1.08								
2030	1.10	1.10								
2031	1.12	1.12								
2032	1.14	1.14								
2033	1.17	1.17								
2034	1.19	1.19								
2035	1.21	1.21								
2036	1.24	1.24								
2037	1.26	1.26								
2038	1.29	1.29								
2039	1.31	1.31								
2040	1.34	1.34								
2041	1.37	1.37								
2042	1.39	1.39								

#### MONTHLY SERVICE CHARGE

Each separately metered QF not associated with a retail Customer account will be charged \$10.00 per month.

#### **INSURANCE REQUIREMENTS**

The following insurance requirements are applicable to Sellers with a Standard PPA:

- 1) QFs with nameplate capacity ratings greater than 200 kW are required to secure and maintain a prudent amount of general liability insurance. The Seller must certify to the Company that it is maintaining general liability insurance coverage for each QF at prudent amounts. A prudent amount will be deemed to mean liability insurance coverage for both bodily injury and property damage liability in the amount of not less than \$1,000,000 each occurrence combined single limit, which limits may be required to be increased or decreased by the Company as the Company determines in its reasonable judgment, that economic conditions or claims experience may warrant.
- 2) Such insurance will include an endorsement naming the Company as an additional insured insofar as liability arising out of operations under this schedule and a provision that such liability policies will not be canceled or their limits reduced without 30 days' written notice to the Company. The Seller will furnish the Company with certificates of insurance together with the endorsements required herein. The Company will have the right to inspect the original policies of such insurance.
- 3) QFs with a design capacity of 200 kW or less are encouraged to pursue liability insurance on their own. The Oregon Public Utility Commission in Order No. 05-584 determined that it is inappropriate to require QFs that have a design capacity of 200 kW or less to obtain general liability insurance.

#### TRANSMISSION AGREEMENTS

If the QF is located outside the Company's service territory, the Seller is responsible for the transmission of power at its cost to the Company's service territory.

#### INTERCONNECTION REQUIREMENTS

Except as otherwise provided in a generation Interconnection Agreement between the Company and Seller, if the QF is located within the Company's service territory, switching equipment capable of isolating the QF from the Company's system will be accessible to the Company at all times. At the Company's option, the Company may operate the switching equipment described above if, in the sole opinion of the Company, continued operation of the QF in connection with the utility's system may create or contribute to a system emergency.

#### INTERCONNECTION REQUIREMENTS (Continued)

The QF owner interconnecting with the Company's distribution system must comply with all requirements for interconnection as established pursuant to Commission rule, in the Company's Rules and Regulations (Rule C) or the Company's Interconnection Procedures contained in its FERC Open Access Transmission Tariff (OATT), as applicable. The Seller will bear full responsibility for the installation and safe operation of the interconnection facilities.

## DEFINITION OF A SMALL COGENERATION FACILITY OR SMALL POWER PRODUCTION FACILITY ELIGIBLE TO RECEIVE PRICING UNDER THE STANDARD PPA

A QF will be eligible to receive pricing under the Standard PPA if the nameplate capacity of the QF, together with any other electric generating facility using the same motive force, owned or controlled by the Same Person(s) or Affiliated Person(s), and located at the Same Site, does not exceed 10 MW. A Community-Based or Family-Owned QF is exempt from these restrictions.

### **Definition of Community-Based**

- a. A community project (or a community sponsored project) must have a recognized and established organization located within the county of the project or within 50 miles of the project that has a genuine role in helping the project be developed and must have some not insignificant continuing role with or interest in the project after it is completed and placed in service.
- b. After excluding the passive investor whose ownership interests are primarily related to green tag values and tax benefits as the primary ownership benefit, the equity (ownership) interests in a community sponsored project must be owned in substantial percentage (80 percent or more) by the following persons (individuals and entities): (i) the sponsoring organization, or its controlled affiliates; (ii) members of the sponsoring organization (if it is a membership organization) or owners of the sponsorship organization (if it is privately owned); (iii) persons who live in the county in which the project is located or who live a county adjoining the county in which the project is located; or (iv) units of local government, charities, or other established nonprofit organizations active either in the county in which the project is located or active in a county adjoining the county in which the project is located.

#### **Definition of Family-Owned**

After excluding the ownership interest of the passive investor whose ownership interests are primarily related to green tag values and tax benefits as the primary ownership benefit, five or fewer individuals own 50 percent or more of the equity of the project entity, or fifteen or fewer individuals own 90 percent or more of the project entity. A "look through" rule applies to closely held entities that hold the project entity, so that equity held by LLCs, trusts, estates, corporations, partnerships or other similar entities is considered held by the equity owners of the look through entity. An individual is a natural person. In counting to five or fifteen, spouses or children of an equity owner of the project owner who also have an equity interest are aggregated and counted as a single individual.

DEFINITION OF A SMALL COGENERATION FACILITY OR SMALL POWER PRODUCTION FACILITY ELIGIBLE TO RECEIVE PRICING UNDER THE STANDARD PPA (Continued)

#### **Definition of Person(s) or Affiliated Person(s)**

As used above, the term "Same Person(s)" or "Affiliated Person(s)" means a natural person or persons or any legal entity or entities sharing common ownership, management or acting jointly or in concert with or exercising influence over the policies or actions of another person or entity. However, two facilities will not be held to be owned or controlled by the Same Person(s) or Affiliated Person(s) solely because they are developed by a single entity.

Furthermore, two facilities will not be held to be owned or controlled by the Same Person(s) or Affiliated Person(s) if such common person or persons is a "passive investor" whose ownership interest in the QF is primarily related to utilizing production tax credits, green tag values and MACRS depreciation as the primary ownership benefit and the facilities at issue are independent family-owned or community-based projects. A unit of Oregon local government may also be a "passive investor" in a community-based project if the local governmental unit demonstrates that it will not have an equity ownership interest in or exercise any control over the management of the QF and that its only interest is a share of the cash flow from the QF, which share will not exceed 20%. The 20% cash flow share limit may only be exceeded for good cause shown and only with the prior approval of the Commission.

#### **Definition of Same Site**

For purposes of the foregoing, generating facilities are considered to be located at the same site as the QF for which qualification for pricing under the Standard PPA is sought if they are located within a five-mile radius of any generating facilities or equipment providing fuel or motive force associated with the QF for which qualification for pricing under the Standard PPA is sought.

#### **Definition of Shared Interconnection and Infrastructure**

QFs otherwise meeting the above-described separate ownership test and thereby qualified for entitlement to pricing under the Standard PPA will not be disqualified by utilizing an interconnection or other infrastructure not providing motive force or fuel that is shared with other QFs qualifying for pricing under the Standard PPA so long as the use of the shared interconnection complies with the interconnecting utility's safety and reliability standards, interconnection agreement requirements and Prudent Electrical Practices as that term is defined in the interconnecting utility's approved Standard PPA.

#### OTHER DEFINITIONS

#### Mid-C Index Price

As used in this schedule, the daily Mid-C Index Price shall be the Day Ahead Intercontinental Exchange ("ICE") for the bilateral OTC market for energy at the Mid-C Physical for Average

#### OTHER DEFINITIONS (Continued)

On-Peak Power and Average Off-Peak Power found on the following website: <a href="https://www.theice.com/products/OTC/Physical-Energy/Electricity">https://www.theice.com/products/OTC/Physical-Energy/Electricity</a>. In the event ICE no longer publishes this index, PGE and the Seller agree to select an alternative successor index representative of the Mid-C trading hub.

#### **Definition of RPS Attributes**

As used in this schedule, RPS Attributes means all attributes related to the Net Output generated by the Facility that are required in order to provide PGE with "qualifying electricity," as that term is defined in Oregon's Renewable Portfolio Standard Act, Ore. Rev. Stat. 469A.010, in effect at the time of execution of this Agreement. RPS Attributes do not include Environmental Attributes that are greenhouse gas offsets from methane capture not associated with the generation of electricity and not needed to ensure that there are zero net emissions associated with the generation of electricity.

#### **Definition of Environmental Attributes**

As used in this schedule, Environmental Attributes shall mean any and all claims, credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, resulting from the avoidance of the emission of any gas, chemical, or other substance to the air, soil or water. Environmental Attributes include but are not limited to: (1) any avoided emissions of pollutants to the air, soil, or water such as (subject to the foregoing) sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), and other pollutants; and (2) any avoided emissions of carbon dioxide (CO2), methane (CH4), and other greenhouse gases (GHGs) that have been determined by the United Nations Intergovernmental Panel on Climate Change to contribute to the actual or potential threat of altering the Earth's climate by trapping heat in the atmosphere.

#### **Definition of Resource Sufficiency Period**

This is the period from the current year through 2024.

#### **Definition of Resource Deficiency Period**

This is the period from 2025.

#### **Definition of Renewable Resource Sufficiency Period**

This is the period from the current year through 2028.

#### **Definition of Renewable Resource Deficiency Period**

This is the period from 2029.

#### SCHEDULE 201 (Concluded)

#### **DISPUTE RESOLUTION**

Upon request, the QF will provide the purchasing utility with documentation verifying the ownership, management and financial structure of the QF in reasonably sufficient detail to allow the utility to make an initial determination of whether or not the QF meets the above-described criteria for entitlement to pricing under the Standard PPA.

The QF may present disputes to the Commission for resolution using the following process:

The QF may file a complaint asking the Commission to adjudicate disputes regarding the formation of the standard contract. The QF may not file such a complaint during any 15-day period in which the utility has the obligation to respond, but must wait until the 15-day period has passed.

The utility may respond to the complaint within ten days of service.

The Commission will limit its review to the issues identified in the complaint and response, and utilize a process similar to the arbitration process adopted to facilitate the execution of interconnection agreements among telecommunications carriers. See OAR 860, Division 016. The administrative law judge will not act as an arbitrator.

#### **SPECIAL CONDITIONS**

- 1. Delivery of energy by Seller will be at a voltage, phase, frequency, and power factor as specified by the Company.
- If the Seller also receives retail Electricity Service from the Company at the same location, any payments under this schedule will be credited to the Seller's retail Electricity Service bill. At the option of the Customer, any net credit over \$10.00 will be paid by check to the Customer.
- 3. Unless required by state or federal law, if the 1978 Public Utility Regulatory Policies Act (PURPA) is repealed, PPAs entered into pursuant to this schedule will not terminate prior to the Standard or Negotiated PPA's termination date.

#### **TERM OF AGREEMENT**

Not less than one year and not to exceed 20 years.

## UM 1728 Application to Update Schedule 201 Qualifying Facility Information

Redlined Version (Effective date September 18, 2017)

# SCHEDULE 201 QUALIFYING FACILITY 10 MW or LESS AVOIDED COST POWER PURCHASE INFORMATION

#### **PURPOSE**

To provide information about Standard Avoided Costs and Renewable Avoided Costs, Standard Power Purchase Agreements (PPA) and Negotiated PPAs, power purchase prices and price options for power delivered by a Qualifying Facility (QF) to the Company with nameplate capacity of 10,000 kW (10MW) or less.

#### **AVAILABLE**

To owners of QFs making sales of electricity to the Company in the State of Oregon (Seller).

#### **APPLICABLE**

For power purchased from small power production or cogeneration facilities that are QFs as defined in 18 Code of Federal Regulations (CFR) Section 292, that meet the eligibility requirements described herein and where the energy is delivered to the Company's system and made available for Company purchase pursuant to a Standard PPA.

#### **ESTABLISHING CREDITWORTHINESS**

The Seller must establish creditworthiness prior to service under this schedule. For a Standard PPA, a Seller may establish creditworthiness with a written acknowledgment that it is current on all existing debt obligations and that it was not a debtor in a bankruptcy proceeding within the preceding 24 months. If the Seller is not able to establish creditworthiness, the Seller must provide security deemed sufficient by the Company as set forth in the Standard PPA.

#### POWER PURCHASE INFORMATION

A Seller may call the Power Production Coordinator at (503) 464-8000 to obtain more information about being a Seller or how to apply for service under this schedule.

#### **PPA**

In accordance with terms set forth in this schedule and the Commission's Rules as applicable, the Company will purchase any Energy in excess of station service (power necessary to produce generation) and amounts attributable to conversion losses, which are made available from the Seller.

A Seller must execute a PPA with the Company prior to delivery of power to the Company. The agreement will have a term of up to 20 years as selected by the QF.

A QF with a nameplate capacity rating of 10 MW or less as defined herein may elect the option of a Standard PPA.

#### PPA (Continued)

Any Seller may elect to negotiate a PPA with the Company. Such negotiation will comply with the requirements of the Federal Energy Regulatory Commission (FERC), and the Commission including the guidelines in Order No. 07-360, and Schedule 202. Negotiations for power purchase pricing will be based on either the filed Standard Avoided Costs or Renewable Avoided Costs in effect at that time.

#### STANDARD PPA (Nameplate capacity of 10 MW or less)

A Seller choosing a Standard PPA will complete all informational and price option selection requirements in the applicable Standard PPA and submit the executed Agreement to the Company prior to service under this schedule. The Standard PPA is available at <a href="https://www.portlandgeneral.com">www.portlandgeneral.com</a>. The available Standard PPAs are:

- Standard In-System Non-Variable Power Purchase Agreement
- Standard Off-System Non-Variable Power Purchase Agreement
- Standard In-System Variable Power Purchase Agreement
- Standard Off-System Variable Power Purchase Agreement
- Standard Renewable In-System Non-Variable Power Purchase Agreement
- Standard Renewable Off-System Non-Variable Power Purchase Agreement
- Standard Renewable In-System Variable Power Purchase Agreement
- Standard Renewable Off-System Variable Power Purchase Agreement

The Standard PPAs applicable to variable resources are available only to QFs utilizing wind, solar or run of river hydro as the primary motive force.

#### **GUIDELINES FOR 10 MW OR LESS FACILITIES ELECTING STANDARD PPA**

To execute the Standard PPA the Seller must complete all of the general project information requested in the applicable Standard PPA.

When all information required in the Standard PPA has been received in writing from the Seller, the Company will respond within 15 business days with a draft Standard PPA.

The Seller may request in writing that the Company prepare a final draft Standard PPA. The Company will respond to this request within 15 business days. In connection with such request, the QF must provide the Company with any additional or clarified project information that the Company reasonably determines to be necessary for the preparation of a final draft Standard PPA.

When both parties are in full agreement as to all terms and conditions of the draft Standard PPA, the Company will prepare and forward to the Seller a final executable version of the agreement within 15 business days. Following the Company's execution, an executed copy will be returned to the Seller. Prices and other terms and conditions in the PPA will not be final and binding until the Standard PPA has been executed by both parties.

#### **OFF-SYSTEM PPA**

A Seller with a facility that interconnects with an electric system other than the Company's electric system may enter into a PPA with the Company after following the applicable Standard or Negotiated PPA guidelines and making the arrangements necessary for transmission of power to the Company's system.

#### **BASIS FOR POWER PURCHASE PRICE**

#### AVOIDED COST SUMMARY

The power purchase prices are based on either the Company's Standard Avoided Costs or Renewable Avoided Costs in effect at the time the agreement is executed. Avoided Costs are defined in 18 CFR 292.101(6) as "the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the qualifying facility or qualifying facilities, such utility would generate itself or purchase from another source."

Monthly On-Peak prices are included in both the Standard Avoided Costs as listed in Tables 1a, 2a, and 3a and Renewable Avoided Costs as listed in Tables 4a, 5a, and 6a. Monthly Off-Peak prices are included in both the Standard Avoided Costs as listed in Tables 1b, 2b, and 3b and Renewable Avoided Costs as listed in Tables 4b, 5b, and 6b.

#### **ON-PEAK PERIOD**

The On-Peak period is 6:00 a.m. until 10:00 p.m., Monday through Saturday.

#### **OFF-PEAK PERIOD**

The Off-Peak period is 10:00 p.m. until 6:00 a.m., Monday through Saturday, and all day on Sunday.

Standard Avoided Costs are based on forward market price estimates through the Resource Sufficiency Period, the period of time during which the Company's Standard Avoided Costs are associated with incremental purchases of Energy and capacity from the market. For the Resource Deficiency Period, the Standard Avoided Costs reflect the fully allocated costs of a natural gas fueled combined cycle combustion turbine (CCCT) including fuel and capital costs. The CCCT Avoided Costs are based on the variable cost of Energy plus capitalized Energy costs at a 93% capacity factor based on a natural gas price forecast, with prices modified for shrinkage and transportation costs.

Renewable Avoided Costs are based on forward market price estimates through the Renewable Resource Sufficiency Period, the period of time during which the Company's Renewable Avoided Costs are associated with incremental purchases of energy and capacity from the market. For the Renewable Resource Deficiency Period, the Renewable Avoided Costs reflect the fully allocated costs of a wind plant including capital costs.

#### PRICING FOR STANDARD PPA

Pricing represents the purchase price per MWh the Company will pay for electricity delivered to a Point of Delivery (POD) within the Company's service territory pursuant to a Standard PPA up to the nameplate rating of the QF in any hour. Any Energy delivered in excess of the nameplate rating will be purchased at the applicable Off-Peak Prices for the selected pricing option.

The Standard PPA pricing will be based on either the Standard or Renewable Avoided Costs in effect at the time the agreement is executed.

The Company will pay the Seller either the Off-Peak Standard Avoided Cost pursuant to Tables 1b, 2b, or 3b or the Off-Peak Renewable Avoided Costs pursuant to Tables 4b, 5b, or 6b for: (a) all Net Output delivered prior to the Commercial Operation Date; (b) all Net Output deliveries greater than Maximum Net Output in any PPA year; (c) any generation subject to and as adjusted by the provisions of Section 4.3 of the Standard PPA; (d) Net Output delivered in the Off-Peak Period; and (e) deliveries above the nameplate capacity in any hour. The Company will pay the Seller either the On-Peak Standard Avoided Cost pursuant to Tables 1a, 2a, or 3a or the On-Peak Renewable Avoided Costs pursuant to Tables 4a, 5a, or 6a for all other Net Output. (See the PPA for defined terms.)

### 1) Standard Fixed Price Option

The Standard Fixed Price Option is based on Standard Avoided Costs including forecasted natural gas prices. It is available to all QFs.

This option is available for a maximum term of 15 years. Prices will be as established at the time the Standard PPA is executed and will be equal to the Standard Avoided Costs in Tables 1a and 1b, 2a and 2b, or 3a and 3c, depending on the type of QF, effective at execution. QFs using any resource type other than wind and solar are assumed to be Base Load QFs.

Prices paid to the Seller under the Standard Fixed Price Option include adjustments for the capacity contribution of the QF resource type relative to that of the avoided proxy resource. Both the Base Load QF resources (Tables 1a and 1b) and the avoided proxy resource, the basis used to determine Standard Avoided Costs for the Standard Fixed Price Option, are assumed to have a capacity contribution to peak of 100%. The capacity contribution for Wind QF resources (Tables 2a and 2b) is assumed to be 18.595%. The capacity contribution for Solar QF resources (Tables 3a and 3b) is assumed to be 515.33%.

Prices paid to the Seller under the Standard Fixed Price Option for Wind and Solar QFs (Tables 2a, and 2b, 3a, and 3b) include a reduction for the wind integration costs in Table 7. However, if the Wind or Solar QF is outside of PGE's Balancing Authority Area as contemplated in the Commission's Order No. 14-058, the Seller is paid the wind integration charges in Table 7, in addition to the prices listed in Tables 2a and 2b or 3a and 3b, for a net-zero effect.

PRICING OPTIONS FOR STANDARD PPA (Continued)
Standard Fixed Price Option (Continued)

Sellers with PPAs exceeding 15 years will receive pricing equal to the Mid-C Index Price for all years up to five in excess of the initial 15.

	TABLE 1a												
						oided Co							
			S	Standard	Fixed Pri	ce Optior	for Base	e Load Q	F				
				(	On-Peak	Forecast	(\$/MWH)						
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2017								34.81	29.46	26.91	27.42	33.53	
2018	32.01	29.46	25.38	21.14	20.62	21.14	30.01	33.42	31.06	25.63	27.67	32.27	
2019	31.18	29.49	23.89	19.25	18.62	19.53	30.14	34.47	31.43	26.91	28.93	34.34	
2020	32.84	31.06	25.15	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16	
2021	34.60	32.72	26.46	21.28	20.58	21.61	33.44	38.27	34.87	29.82	32.09	38.13	
2022	36.47	34.48	27.88	22.42	21.68	22.76	35.25	40.34	36.75	31.44	33.81	40.19	
2023	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07	
2024	36.16	34.47	31.84	26.04	23.28	16.27	29.02	32.72	35.73	35.93	36.83	39.19	
2025	57.28	57.40	57.49	56.78	56.75	56.67	56.77	56.85	56.97	57.07	57.81	57.92	
2026	59.17	59.29	59.34	58.62	58.63	58.69	58.79	58.89	59.03	59.16	60.03	60.15	
2027	61.01	61.13	61.04	60.30	60.44	60.19	60.29	60.39	60.52	61.27	59.92	60.04	
2028	61.23	61.31	61.19	60.52	60.66	60.78	60.88	61.00	61.12	61.26	62.44	62.57	
2029	64.03	64.16	64.28	63.58	63.76	64.88	65.00	65.13	65.28	65.40	66.74	66.88	
2030	69.60	70.59	70.73	70.05	70.25	70.41	70.56	70.72	70.89	71.77	72.44	72.62	
2031	74.30	74.48	74.10	73.00	73.15	73.04	73.18	73.34	73.51	73.69	74.85	75.02	
2032	76.53	76.62	76.32	75.09	75.30	75.49	75.64	75.81	76.00	76.25	77.82	78.02	
2033	80.07	80.28	80.02	78.86	79.09	79.29	79.46	79.64	79.85	80.26	81.68	81.90	
2034	83.89	84.11	82.95	81.61	81.86	82.07	82.25	82.45	82.67	82.91	84.66	84.89	
2035	86.73	86.97	85.83	84.45	84.70	84.37	84.55	84.75	84.99	85.49	86.97	87.42	
2036	89.63	89.87	88.67	87.20	87.49	87.12	87.32	87.54	87.78	88.31	89.86	90.33	
2037	92.90	93.16	91.91	90.37	90.65	90.28	90.48	90.71	90.95	91.53	93.15	93.66	
2038	96.17	96.45	95.12	93.50	93.81	93.42	93.63	93.87	94.14	94.74	96.45	96.97	
2039	99.60	99.87	98.49	96.79	97.11	96.69	96.92	97.17	97.45	98.09	99.87	100.43	
2040	103.14	103.43	101.98	100.19	100.53	100.09	100.34	100.59	100.89	101.55	103.43	104.02	
2041	106.88	107.19	105.65	103.77	104.11	103.66	103.92	104.18	104.50	105.20	107.17	107.79	
2042	110.75	111.07	109.46	107.49	107.86	107.38	107.63	107.92	108.25	108.98	111.07	111.71	

						ΓABLE 1b						
						oided Co						
			S	tandard					=			
					Off-Peak	Forecast	(\$/MWH)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				•				24.51	24.72	23.85	24.11	27.42
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.41
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	27.96	28.08	28.17	27.46	27.43	27.35	27.45	27.53	27.65	27.75	28.49	28.60
2026	29.26	29.39	29.43	28.71	28.72	28.79	28.89	28.99	29.12	29.25	30.12	30.24
2027	30.50	30.63	30.54	29.80	29.94	29.69	29.79	29.89	30.01	30.76	29.41	29.54
2028	30.11	30.19	30.08	29.41	29.55	29.66	29.77	29.88	30.01	30.15	31.33	31.45
2029	32.29	32.42	32.54	31.85	32.02	33.14	33.26	33.39	33.54	33.66	35.01	35.15
2030	37.23	38.22	38.36	37.68	37.88	38.04	38.19	38.35	38.52	39.40	40.07	40.25
2031	41.28	41.46	41.08	39.98	40.13	40.02	40.16	40.32	40.49	40.67	41.83	42.00
2032	43.06	43.15	42.85	41.62	41.84	42.02	42.17	42.35	42.54	42.79	44.35	44.55
2033	45.72	45.92	45.67	44.51	44.74	44.94	45.11	45.28	45.50	45.91	47.33	47.54
2034	48.74	48.96	47.80	46.46	46.71	46.91	47.10	47.29	47.51	47.76	49.51	49.74
2035	50.99	51.23	50.09	48.70	48.96	48.62	48.81	49.01	49.25	49.75	51.23	51.68
2036	53.29	53.53	52.33	50.86	51.15	50.78	50.98	51.20	51.45	51.97	53.52	53.99
2037	55.72	55.98	54.72	53.19	53.47	53.09	53.30	53.52	53.77	54.35	55.97	56.48
2038	58.24	58.52	57.19	55.57	55.88	55.49	55.70	55.94	56.21	56.81	58.52	59.04
2039	60.91	61.18	59.80	58.11	58.42	58.01	58.24	58.48	58.77	59.40	61.18	61.74
2040	63.68	63.97	62.52	60.73	61.07	60.63	60.88	61.12	61.43	62.09	63.97	64.55
2041	66.63	66.94	65.40	63.52	63.86	63.41	63.66	63.93	64.25	64.95	66.92	67.54
2042	69.70	70.02	68.40	66.43	66.80	66.33	66.57	66.86	67.20	67.93	70.02	70.66

					-	ΓABLE 2a	<u> </u>					
					Ave	oided Co	sts					
				Standa	rd Fixed I	Price Opt	ion for W	ind QF				
					On-Peak	Forecast	(\$/MWH)					
											1	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								33.96	28.61	26.06	26.57	32.68
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.46
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.21
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.25
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.11
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.21
2025	41.62	41.74	41.83	41.12	41.09	41.01	41.11	41.20	41.32	41.42	42.16	42.27
2026	43.20	43.32	43.37	42.65	42.66	42.72	42.82	42.92	43.06	43.19	44.06	44.18
2027	44.72	44.84	44.75	44.02	44.15	43.90	44.00	44.11	44.23	44.98	43.63	43.76
2028	44.62	44.70	44.58	43.91	44.05	44.16	44.27	44.38	44.51	44.65	45.83	45.96
2029	47.09	47.22	47.33	46.64	46.82	47.94	48.05	48.18	48.34	48.45	49.80	49.94
2030	52.32	53.31	53.45	52.77	52.97	53.13	53.28	53.44	53.61	54.49	55.16	55.34
2031	56.67	56.86	56.48	55.37	55.52	55.41	55.56	55.72	55.89	56.06	57.23	57.40
2032	58.66	58.75	58.45	57.22	57.43	57.62	57.77	57.95	58.13	58.38	59.95	60.15
2033	61.73	61.93	61.68	60.52	60.75	60.95	61.12	61.30	61.51	61.92	63.34	63.55
2034	65.13	65.35	64.19	62.85	63.10	63.31	63.49	63.68	63.91	64.15	65.90	66.13
2035	67.65	67.89	66.75	65.37	65.62	65.29	65.48	65.68	65.91	66.42	67.89	68.34
2036	70.22	70.47	69.26	67.80	68.08	67.72	67.92	68.14	68.38	68.91	70.45	70.93
2037	73.05	73.32	72.06	70.53	70.80	70.43	70.64	70.86	71.11	71.69	73.30	73.81
2038	75.92	76.20	74.87	73.25	73.56	73.17	73.38	73.62	73.89	74.49	76.20	76.72
2039	78.95	79.22	77.84	76.15	76.46	76.04	76.27	76.52	76.81	77.44	79.22	79.78
2040	82.07	82.36	80.91	79.13	79.46	79.02	79.27	79.52	79.83	80.49	82.36	82.95
2041	85.39	85.70	84.16	82.28	82.62	82.17	82.43	82.70	83.01	83.71	85.69	86.30
2042	88.84	89.16	87.55	85.58	85.94	85.47	85.72	86.01	86.34	87.07	89.16	89.80

						TABLE 2b						
				Ct a mala		oided Cos		in a OF				
						Price Opt						
				•	Оп-Реак	Forecast	(2\IVIVV H)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	26.96	27.08	27.17	26.46	26.43	26.35	26.45	26.53	26.65	26.75	27.49	27.60
2026	28.24	28.37	28.41	27.69	27.70	27.77	27.87	27.97	28.10	28.23	29.10	29.22
2027	29.46	29.59	29.50	28.76	28.90	28.65	28.75	28.85	28.97	29.72	28.37	28.50
2028	29.05	29.13	29.02	28.35	28.49	28.60	28.71	28.82	28.95	29.09	30.27	30.39
2029	31.21	31.34	31.46	30.77	30.94	32.06	32.18	32.31	32.46	32.58	33.93	34.07
2030	36.13	37.12	37.26	36.58	36.78	36.94	37.09	37.25	37.42	38.30	38.97	39.15
2031	40.16	40.34	39.96	38.86	39.01	38.90	39.04	39.20	39.37	39.55	40.71	40.88
2032	41.92	42.01	41.71	40.48	40.70	40.88	41.03	41.21	41.40	41.65	43.21	43.41
2033	44.55	44.75	44.50	43.34	43.57	43.77	43.94	44.11	44.33	44.74	46.16	46.37
2034	47.55	47.77	46.61	45.27	45.52	45.72	45.91	46.10	46.32	46.57	48.32	48.55
2035	49.78	50.02	48.88	47.49	47.75	47.41	47.60	47.80	48.04	48.54	50.02	50.47
2036	52.05	52.29	51.09	49.62	49.91	49.54	49.74	49.96	50.21	50.73	52.28	52.75
2037	54.46	54.72	53.46	51.93	52.21	51.83	52.04	52.26	52.51	53.09	54.71	55.22
2038	56.95	57.23	55.90	54.28	54.59	54.20	54.41	54.65	54.92	55.52	57.23	57.75
2039	59.60	59.87	58.49	56.80	57.11	56.70	56.93	57.17	57.46	58.09	59.87	60.43
2040	62.34	62.63	61.18	59.39	59.73	59.29	59.54	59.78	60.09	60.75	62.63	63.21
2041	65.26	65.57	64.03	62.15	62.49	62.04	62.29	62.56	62.88	63.58	65.55	66.17
2042	68.31	68.63	67.01	65.04	65.41	64.94	65.18	65.47	65.81	66.54	68.63	69.27

						FABLE 3a oided Cos						
				Standa		Price Opt		olar OE				
						Forecast						
					on reak	i oi coast	(ψ/1010 011)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				-				33.96	28.61	26.06	26.57	32.6
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.4
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.4
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.2
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.2
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.2
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.1
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.2
2025	38.93	39.05	39.13	38.43	38.39	38.32	38.42	38.50	38.62	38.72	39.46	39.5
2026	40.45	40.57	40.62	39.90	39.91	39.97	40.07	40.17	40.31	40.44	41.31	41.4
2027	41.91	42.04	41.95	41.21	41.35	41.10	41.20	41.30	41.43	42.17	40.83	40.9
2028	41.75	41.84	41.72	41.05	41.19	41.30	41.41	41.52	41.65	41.79	42.97	43.1
2029	44.17	44.30	44.42	43.72	43.90	45.02	45.14	45.27	45.42	45.54	46.88	47.0
2030	49.34	50.33	50.48	49.79	49.99	50.15	50.31	50.46	50.63	51.51	52.18	52.3
2031	53.64	53.82	53.44	52.34	52.49	52.37	52.52	52.68	52.85	53.02	54.19	54.3
2032	55.58	55.67	55.37	54.14	54.36	54.54	54.69	54.87	55.06	55.31	56.87	57.0
2033	58.57	58.78	58.52	57.36	57.59	57.79	57.96	58.14	58.35	58.76	60.18	60.4
2034	61.90	62.12	60.96	59.62	59.87	60.07	60.26	60.45	60.67	60.92	62.66	62.9
2035	64.37	64.61	63.46	62.08	62.34	62.00	62.19	62.39	62.63	63.13	64.61	65.0
2036	66.88	67.12	65.92	64.46	64.74	64.38	64.58	64.80	65.04	65.57	67.11	67.5
2037	69.64	69.90	68.64	67.11	67.38	67.01	67.22	67.44	67.69	68.27	69.88	70.4
2038	72.43	72.71	71.39	69.77	70.08	69.68	69.89	70.13	70.40	71.01	72.71	73.2
2039	75.39	75.66	74.28	72.59	72.90	72.49	72.72	72.96	73.25	73.88	75.66	76.2
2040	78.44	78.74	77.28	75.50	75.83	75.39	75.64	75.89	76.20	76.86	78.74	79.3
2041	81.69	82.00	80.46	78.58	78.92	78.47	78.72	78.99	79.31	80.01	81.98	82.6
2042	85.07	85.39	83.77	81.80	82.17	81.70	81.94	82.23	82.57	83.30	85.39	86.0

					-	TABLE 3b	<u> </u>					
						oided Cos						
				Standar			ion for So	olar QF				
							(\$/MWH)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	26.96	27.08	27.17	26.46	26.43	26.35	26.45	26.53	26.65	26.75	27.49	27.60
2026	28.24	28.37	28.41	27.69	27.70	27.77	27.87	27.97	28.10	28.23	29.10	29.22
2027	29.46	29.59	29.50	28.76	28.90	28.65	28.75	28.85	28.97	29.72	28.37	28.50
2028	29.05	29.13	29.02	28.35	28.49	28.60	28.71	28.82	28.95	29.09	30.27	30.39
2029	31.21	31.34	31.46	30.77	30.94	32.06	32.18	32.31	32.46	32.58	33.93	34.07
2030	36.13	37.12	37.26	36.58	36.78	36.94	37.09	37.25	37.42	38.30	38.97	39.15
2031	40.16	40.34	39.96	38.86	39.01	38.90	39.04	39.20	39.37	39.55	40.71	40.88
2032	41.92	42.01	41.71	40.48	40.70	40.88	41.03	41.21	41.40	41.65	43.21	43.41
2033	44.55	44.75	44.50	43.34	43.57	43.77	43.94	44.11	44.33	44.74	46.16	46.37
2034	47.55	47.77	46.61	45.27	45.52	45.72	45.91	46.10	46.32	46.57	48.32	48.55
2035	49.78	50.02	48.88	47.49	47.75	47.41	47.60	47.80	48.04	48.54	50.02	50.47
2036	52.05	52.29	51.09	49.62	49.91	49.54	49.74	49.96	50.21	50.73	52.28	52.75
2037	54.46	54.72	53.46	51.93	52.21	51.83	52.04	52.26	52.51	53.09	54.71	55.22
2038	56.95	57.23	55.90	54.28	54.59	54.20	54.41	54.65	54.92	55.52	57.23	57.75
2039	59.60	59.87	58.49	56.80	57.11	56.70	56.93	57.17	57.46	58.09	59.87	60.43
2040	62.34	62.63	61.18	59.39	59.73	59.29	59.54	59.78	60.09	60.75	62.63	63.21
2041	65.26	65.57	64.03	62.15	62.49	62.04	62.29	62.56	62.88	63.58	65.55	66.17
2042	68.31	68.63	67.01	65.04	65.41	64.94	65.18	65.47	65.81	66.54	68.63	69.27

PRICING OPTIONS FOR STANDARD PPA (Continued)

#### 2) Renewable Fixed Price Option

The Renewable Fixed Price Option is based on Renewable Avoided Costs. It is available only to Renewable QFs that generate electricity from a renewable energy source that may be used by the Company to comply with the Oregon Renewable Portfolio Standard as set forth in ORS 469A.005 to 469A.210.

This option is available for a maximum term of 15 years. Prices will be as established at the time the Standard PPA is executed and will be equal to the Renewable Avoided Costs in Tables 4a and 4b, 5a and 5b, or 6a and 6b, depending on the type of QF, effective at execution. QFs using any resource type other than wind and solar are assumed to be Base Load QFs.

Sellers will retain all Environmental Attributes generated by the facility during the Renewable Resource Sufficiency Period. A Renewable QF choosing the Renewable Fixed Price Option must cede all RPS Attributes generated by the facility to the Company from the start of the Renewable Resource Deficiency Period through the remainder of the PPA term.

Prices paid to the Seller under the Renewable Fixed Price Option include adjustments for the capacity contribution of the QF resource type relative to that of the avoided proxy resource. Both Wind QF resources (Tables 5a and 5b) and the avoided proxy resource, the basis used to determine Renewable Avoided Costs for the Renewable Fixed Price Option, are assumed to have a capacity contribution to peak of \$\frac{518.59}{18.59}\%. The capacity contribution for Solar QF resources (Tables 6a and 6b) is assumed to be \$\frac{515.33}{18.59}\%. The capacity contribution for Base Load QF resources (Tables 4a and 4b) is assumed to be 100%.

The Renewable Avoided Costs during the Renewable Resource Deficiency Period reflect an increase for avoided wind integration costs, shown in Table 7.

Prices paid to the Seller under the Renewable Fixed Price Option for Wind and solar QFs (Tables 5a, and 5b, 6a, and 6b) include a reduction for the wind integration costs in Table 7, which cancels out wind integration costs included in the Renewable Avoided Costs during the Renewable Resource Deficiency Period. However, if the Wind or Solar QF is outside of PGE's Balancing Authority Area as contemplated in the Commission's Order No. 14-058, the Seller is paid the wind integration charges in Table 7, in addition to the prices listed in Tables 5a and 5b or 6a and 6b.

Sellers with PPAs exceeding 15 years will receive pricing equal to the Mid-C Index Price for all years up to five in excess of the initial 15.

## PRICING OPTIONS FOR STANDARD PPA (Continued)

Renewable Fixed Price Option (Continued)

					-	TABLE 4a	1					
					Renewak	ole Avoid	ed Costs					
			R		Fixed Pr				(F			
				-	On-Peak	Forecast	(\$/MWH)					
V		E.L		A			11	A	0	0-1	NI	
Year 2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	<b>Sep</b> 29.46	Oct 26.91	<b>Nov</b> 27.42	Dec
2017	32.01	29.46	25.38	21.14	20.62	21.14	30.01	34.81				33.53 32.27
2019	31.18	29.46	23.89	19.25	18.62	19.53	30.01	33.42 34.47	31.06 31.43	25.63 26.91	27.67 28.93	34.34
2019	32.84	31.06	25.09	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16
2020	34.60	32.72	26.46				33.44	38.27	34.87	29.82		38.13
2021	36.47	34.48	27.88	21.28 22.42	20.58 21.68	21.61 22.76	35.25	40.34	36.75	31.44	32.09 33.81	40.19
2022	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07
2023	36.16	34.47	31.84	26.04	23.14	16.27	29.02	32.72	35.73	35.93		39.19
2024	36.28	36.45	32.07	27.15	25.26	20.76	31.18	33.59	36.96	36.50	36.83 36.17	38.88
2025	38.02	38.42	34.69	28.61	23.72	19.90	33.16	36.49	39.07	39.98	39.93	41.34
2027	40.65	40.65	35.03	29.55	25.62	19.81	33.68	38.68	40.37	41.18	39.95	42.49
2028	41.59	39.62	35.61	29.31	24.13	18.69	35.04	39.47	41.56	42.04	42.77	45.50
2029	130.46	122.16	114.93	99.44	91.28	66.74	111.72	123.40	130.72	125.77	127.43	137.59
2030	131.08	128.53	117.83	98.71	84.69	62.99	114.81	124.72	133.57	132.78	130.81	140.19
2031	131.64	130.86	120.44	98.71	91.59	75.33	113.41	127.20	134.67	132.63	129.43	138.99
2032	134.62	132.28	119.05	100.89	89.34	66.65	119.99	136.17	137.32	134.74	138.45	144.33
2033	137.25	136.91	119.61	101.75	86.72	86.02	122.63	133.68	138.82	137.65	139.72	144.28
2034	142.85	142.41	123.71	103.53	88.59	73.28	127.14	137.57	142.77	143.43	144.85	150.81
2035	148.82	142.53	126.90	103.23	91.63	67.83	123.14	139.46	145.86	143.75	142.41	153.08
2036	149.95	144.47	128.97	105.99	82.91	55.60	131.13	142.04	150.30	148.99	147.58	158.25
2037	150.31	149.85	132.81	104.38	91.13	77.19	129.68	144.87	152.33	149.48	149.48	159.99
2038	153.59	155.69	131.34	104.62	84.94	70.00	139.81	155.20	158.10	155.40	156.18	165.33
2039	155.36	153.84	130.69	105.47	94.56	80.72	140.16	151.56	157.69	151.05	155.29	162.46
2040	157.59	155.79	132.79	114.89	87.55	75.00	145.49	156.16	163.50	158.77	161.06	169.93
2041	161.95	158.31	139.08	119.78	109.77	63.50	144.74	159.21	165.49	156.15	156.63	168.47
2042	164.72	162.40	143.32	120.89	93.22	64.66	149.09	163.83	169.34	163.16	161.00	175.92

						TABLE 4b						
			R	enewable				se I oad C	F			
						Forecast			<u>.                                    </u>			
							(+	•				
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								24.51	24.72	23.85	24.11	27.42
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.41
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	33.70	32.17	29.76	25.01	21.99	19.00	26.39	30.90	33.57	33.77	33.61	34.83
2026	35.44	35.59	31.64	27.21	22.20	15.26	28.97	33.61	36.07	35.46	35.51	37.70
2027	36.66	35.71	32.22	27.60	23.64	18.12	29.40	34.72	37.35	37.55	36.31	38.40
2028	38.09	37.21	33.20	27.82	23.65	17.34	31.56	36.38	38.22	38.77	39.08	40.92
2029	87.39	83.14	79.75	60.89	56.60	30.37	68.86	84.70	91.46	89.10	90.05	95.00
2030	90.66	87.81	81.88	62.46	52.25	31.31	75.55	87.01	93.96	93.87	94.23	96.33
2031	94.53	91.33	79.90	66.32	59.86	41.01	74.22	87.92	95.40	93.03	92.05	96.31
2032	95.12	90.63	85.26	64.49	46.09	33.03	81.76	88.62	98.19	95.17	97.79	103.88
2033	96.72	93.73	84.37	65.02	55.14	44.09	81.80	90.25	98.91	96.03	97.55	104.35
2034	100.64	96.93	84.22	63.90	50.21	33.88	82.22	94.26	101.29	101.38	105.38	107.75
2035	103.38	100.59	93.20	71.90	61.31	46.52	81.06	99.14	104.45	99.35	103.56	106.09
2036	111.16	105.72	94.24	72.48	61.23	31.45	82.90	100.58	110.79	104.85	108.44	114.13
2037	110.15	107.49	96.32	79.57	59.61	38.00	86.10	101.85	110.09	103.94	105.91	113.12
2038	113.74	110.37	97.67	79.06	51.82	34.44	88.62	103.26	110.27	107.20	111.44	117.93
2039	110.16	108.78	96.61	84.94	62.94	60.33	93.55	103.97	110.69	110.48	115.32	122.80
2040	116.99	108.93	94.17	91.82	59.51	40.97	95.01	110.61	112.45	116.09	118.19	121.07
2041	116.50	110.73	111.72	97.32	66.46	37.99	97.97	109.98	123.17	113.27	119.57	123.40
2042	126.11	116.45	107.55	85.50	62.50	40.12	105.67	116.39	125.76	123.46	122.21	128.97

						TABLE 5	ed Costs					
							tion for \ (\$/MWH)					
					OII-I Cak	i oi ecasi	(ψ/1010 0 1 1)	<u>'</u>				
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								33.96	28.61	26.06	26.57	32.68
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.4
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.40
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.2
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.25
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.1
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.2
2025	35.28	35.45	31.07	26.15	24.16	19.76	30.18	32.59	35.96	35.50	35.17	37.88
2026	37.00	37.40	33.67	27.59	22.70	18.88	32.14	35.47	38.05	38.96	38.91	40.32
2027	39.61	39.61	33.99	28.51	24.58	18.77	32.64	37.64	39.33	40.14	38.91	41.45
2028	40.53	38.56	34.55	28.25	23.07	17.63	33.98	38.41	40.50	40.98	41.71	44.4
2029	113.52	105.21	97.99	82.50	74.34	49.80	94.77	106.45	113.77	108.83	110.48	120.64
2030	113.80	111.24	100.54	81.43	67.41	45.70	97.52	107.44	116.29	115.50	113.53	122.9
2031	114.02	113.23	102.81	81.08	73.97	57.71	95.79	109.57	117.04	115.01	111.80	121.36
2032	116.76	114.41	101.18	83.02	71.47	48.78	102.12	118.30	119.45	116.88	120.58	126.46
2033	118.91	118.57	101.27	83.40	68.38	67.68	104.29	115.34	120.47	119.31	121.38	125.94
2034	124.09	123.65	104.95	84.77	69.82	54.52	108.37	118.81	124.01	124.67	126.09	132.0
2035	129.75	123.46	107.82	84.16	72.56	48.75	104.07	120.39	126.78	124.67	123.33	134.0
2036	130.55	125.06	109.57	86.58	63.51	36.20	111.72	122.63	130.90	129.59	128.17	138.84
2037	130.46	130.00	112.97	84.54	71.28	57.35	109.83	125.02	132.49	129.63	129.63	140.1
2038	133.34	135.44	111.09	84.37	64.69	49.75	119.56	134.95	137.85	135.16	135.93	145.08
2039	134.72	133.19	110.04	84.82	73.91	60.08	119.52	130.91	137.04	130.40	134.64	141.8
2040	136.52	134.72	111.73	93.82	66.49	53.93	124.43	135.10	142.44	137.70	140.00	148.8
2041	140.47	136.82	117.59	98.30	88.28	42.01	123.25	137.72	144.00	134.66	135.14	146.98
2042	142.81	140.48	121.41	98.97	71.31	42.74	127.18	141.92	147.43	141.25	139.09	154.01

						TABLE 5	ed Costs					
							ea Costs otion for \					
							(\$/MWH)					
					JII-F Cak	i Oi ecasi	(φ/1414411)	)				
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				_				23.66	23.87	23.00	23.26	26.5
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.5
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.5
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.8
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.0
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.3
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.8
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.8
2025	32.70	31.17	28.76	24.01	20.99	18.00	25.39	29.90	32.57	32.77	32.61	33.8
2026	34.42	34.57	30.62	26.19	21.18	14.24	27.95	32.59	35.05	34.44	34.49	36.6
2027	35.62	34.67	31.18	26.56	22.60	17.08	28.36	33.68	36.31	36.51	35.27	37.3
2028	37.03	36.15	32.14	26.76	22.59	16.28	30.50	35.32	37.16	37.71	38.02	39.8
2029	86.31	82.06	78.67	59.81	55.52	29.29	67.78	83.62	90.38	88.02	88.97	93.9
2030	89.56	86.71	80.78	61.36	51.15	30.21	74.45	85.91	92.86	92.77	93.13	95.2
2031	93.41	90.21	78.78	65.20	58.74	39.89	73.10	86.80	94.28	91.91	90.93	95.1
2032	93.98	89.49	84.12	63.35	44.95	31.89	80.62	87.48	97.05	94.03	96.65	102.7
2033	95.55	92.56	83.20	63.85	53.97	42.92	80.63	89.08	97.74	94.86	96.38	103.1
2034	99.45	95.74	83.03	62.71	49.02	32.69	81.03	93.07	100.10	100.19	104.19	106.5
2035	102.17	99.38	91.99	70.69	60.10	45.31	79.85	97.93	103.24	98.14	102.35	104.8
2036	109.92	104.48	93.00	71.24	59.99	30.21	81.66	99.34	109.55	103.61	107.20	112.8
2037	108.89	106.23	95.06	78.31	58.35	36.74	84.84	100.59	108.83	102.68	104.65	111.8
2038	112.45	109.08	96.38	77.77	50.53	33.15	87.33	101.97	108.98	105.91	110.15	116.6
2039	108.85	107.47	95.30	83.63	61.63	59.02	92.24	102.66	109.38	109.17	114.01	121.4
2040	115.65	107.59	92.83	90.48	58.17	39.63	93.67	109.27	111.11	114.75	116.85	119.7
2041	115.13	109.36	110.35	95.95	65.09	36.62	96.60	108.61	121.80	111.90	118.20	122.0
2042	124.72	115.06	106.16	84.11	61.11	38.73	104.28	115.00	124.37	122.07	120.82	127.5

						TABLE 6a						
							ed Costs					
							tion for S					
					On-Peak	Forecast	(\$/MWH)					
.,				_					•	<b>.</b> .		_
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	04.44	00.50	04.54	00.07	40.75	00.07	00.44	33.96	28.61	26.06	26.57	32.68
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.46
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.21
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.25
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.11
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.21
2025	35.28	35.45	31.07	26.15	24.16	19.76	30.18	32.59	35.96	35.50	35.17	37.88
2026	37.00	37.40	33.67	27.59	22.70	18.88	32.14	35.47	38.05	38.96	38.91	40.32
2027	39.61	39.61	33.99	28.51	24.58	18.77	32.64	37.64	39.33	40.14	38.91	41.45
2028	40.53	38.56	34.55	28.25	23.07	17.63	33.98	38.41	40.50	40.98	41.71	44.44
2029	110.60	102.29	95.07	79.58	71.42	46.88	91.85	103.54	110.85	105.91	107.56	117.72
2030	110.82	108.27	97.57	78.45	64.43	42.73	94.55	104.46	113.31	112.52	110.55	119.93
2031	110.98	110.19	99.78	78.05	70.93	54.67	92.75	106.54	114.01	111.97	108.77	118.33
2032	113.68	111.33	98.10	79.95	68.40	45.70	99.05	115.22	116.37	113.80	117.51	123.38
2033	115.75	115.41	98.11	80.25	65.22	64.52	101.13	112.18	117.32	116.15	118.22	122.78
2034	120.86	120.42	101.71	81.54	66.59	51.28	105.14	115.58	120.78	121.43	122.86	128.82
2035	126.46	120.17	104.54	80.87	69.27	45.47	100.78	117.10	123.50	121.38	120.05	130.72
2036	127.20	121.72	106.23	83.24	60.16	32.86	108.38	119.29	127.56	126.25	124.83	135.50
2037	127.04	126.58	109.55	81.12	67.86	53.93	106.42	121.60	129.07	126.21	126.21	136.72
2038	129.86	131.95	107.60	80.88	61.20	46.26	116.08	131.46	134.36	131.67	132.45	141.59
2039	131.16	129.64	106.49	81.27	70.35	56.52	115.96	127.36	133.49	126.84	131.09	138.25
2040	132.90	131.10	108.10	90.19	62.86	50.30	120.80	131.47	138.81	134.08	136.37	145.24
2041	136.76	133.12	113.89	94.59	84.58	38.31	119.55	134.02	140.30	130.96	131.44	143.28
2042	139.03	136.71	117.63	95.20	67.53	38.97	123.41	138.15	143.66	137.47	135.31	150.23

					-	TABLE 6k	<u> </u>					
							ed Costs					
							tion for S					
				(	Off-Peak	Forecast	(\$/MWH)					
							•					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	32.70	31.17	28.76	24.01	20.99	18.00	25.39	29.90	32.57	32.77	32.61	33.83
2026	34.42	34.57	30.62	26.19	21.18	14.24	27.95	32.59	35.05	34.44	34.49	36.68
2027	35.62	34.67	31.18	26.56	22.60	17.08	28.36	33.68	36.31	36.51	35.27	37.36
2028	37.03	36.15	32.14	26.76	22.59	16.28	30.50	35.32	37.16	37.71	38.02	39.86
2029	86.31	82.06	78.67	59.81	55.52	29.29	67.78	83.62	90.38	88.02	88.97	93.92
2030	89.56	86.71	80.78	61.36	51.15	30.21	74.45	85.91	92.86	92.77	93.13	95.23
2031	93.41	90.21	78.78	65.20	58.74	39.89	73.10	86.80	94.28	91.91	90.93	95.19
2032	93.98	89.49	84.12	63.35	44.95	31.89	80.62	87.48	97.05	94.03	96.65	102.74
2033	95.55	92.56	83.20	63.85	53.97	42.92	80.63	89.08	97.74	94.86	96.38	103.18
2034	99.45	95.74	83.03	62.71	49.02	32.69	81.03	93.07	100.10	100.19	104.19	106.56
2035	102.17	99.38	91.99	70.69	60.10	45.31	79.85	97.93	103.24	98.14	102.35	104.88
2036	109.92	104.48	93.00	71.24	59.99	30.21	81.66	99.34	109.55	103.61	107.20	112.89
2037	108.89	106.23	95.06	78.31	58.35	36.74	84.84	100.59	108.83	102.68	104.65	111.86
2038	112.45	109.08	96.38	77.77	50.53	33.15	87.33	101.97	108.98	105.91	110.15	116.64
2039	108.85	107.47	95.30	83.63	61.63	59.02	92.24	102.66	109.38	109.17	114.01	121.49
2040	115.65	107.59	92.83	90.48	58.17	39.63	93.67	109.27	111.11	114.75	116.85	119.73
2041	115.13	109.36	110.35	95.95	65.09	36.62	96.60	108.61	121.80	111.90	118.20	122.03
2042	124.72	115.06	106.16	84.11	61.11	38.73	104.28	115.00	124.37	122.07	120.82	127.58

## WIND AND SOLAR INTEGRATION

TABLE 7											
Inte	gration C	osts									
Year	Wind	Solar									
2017	0.85	0.85									
2018	0.87	0.87									
2019	0.88	0.88									
2020	0.90	0.90									
2021	0.92	0.92									
2022	0.94	0.94									
2023	0.96	0.96									
2024	0.98	0.98									
2025	1.00	1.00									
2026	1.02	1.02									
2027	1.04	1.04									
2028	1.06	1.06									
2029	1.08	1.08									
2030	1.10	1.10									
2031	1.12	1.12									
2032	1.14	1.14									
2033	1.17	1.17									
2034	1.19	1.19									
2035	1.21	1.21									
2036	1.24	1.24									
2037	1.26	1.26									
2038	1.29	1.29									
2039	1.31	1.31									
2040	1.34	1.34									
2041	1.37	1.37									
2042	1.39	1.39									

#### MONTHLY SERVICE CHARGE

Each separately metered QF not associated with a retail Customer account will be charged \$10.00 per month.

#### **INSURANCE REQUIREMENTS**

The following insurance requirements are applicable to Sellers with a Standard PPA:

- 1) QFs with nameplate capacity ratings greater than 200 kW are required to secure and maintain a prudent amount of general liability insurance. The Seller must certify to the Company that it is maintaining general liability insurance coverage for each QF at prudent amounts. A prudent amount will be deemed to mean liability insurance coverage for both bodily injury and property damage liability in the amount of not less than \$1,000,000 each occurrence combined single limit, which limits may be required to be increased or decreased by the Company as the Company determines in its reasonable judgment, that economic conditions or claims experience may warrant.
- 2) Such insurance will include an endorsement naming the Company as an additional insured insofar as liability arising out of operations under this schedule and a provision that such liability policies will not be canceled or their limits reduced without 30 days' written notice to the Company. The Seller will furnish the Company with certificates of insurance together with the endorsements required herein. The Company will have the right to inspect the original policies of such insurance.
- 3) QFs with a design capacity of 200 kW or less are encouraged to pursue liability insurance on their own. The Oregon Public Utility Commission in Order No. 05-584 determined that it is inappropriate to require QFs that have a design capacity of 200 kW or less to obtain general liability insurance.

#### TRANSMISSION AGREEMENTS

If the QF is located outside the Company's service territory, the Seller is responsible for the transmission of power at its cost to the Company's service territory.

#### INTERCONNECTION REQUIREMENTS

Except as otherwise provided in a generation Interconnection Agreement between the Company and Seller, if the QF is located within the Company's service territory, switching equipment capable of isolating the QF from the Company's system will be accessible to the Company at all times. At the Company's option, the Company may operate the switching equipment described above if, in the sole opinion of the Company, continued operation of the QF in connection with the utility's system may create or contribute to a system emergency.

#### INTERCONNECTION REQUIREMENTS (Continued)

The QF owner interconnecting with the Company's distribution system must comply with all requirements for interconnection as established pursuant to Commission rule, in the Company's Rules and Regulations (Rule C) or the Company's Interconnection Procedures contained in its FERC Open Access Transmission Tariff (OATT), as applicable. The Seller will bear full responsibility for the installation and safe operation of the interconnection facilities.

## DEFINITION OF A SMALL COGENERATION FACILITY OR SMALL POWER PRODUCTION FACILITY ELIGIBLE TO RECEIVE PRICING UNDER THE STANDARD PPA

A QF will be eligible to receive pricing under the Standard PPA if the nameplate capacity of the QF, together with any other electric generating facility using the same motive force, owned or controlled by the Same Person(s) or Affiliated Person(s), and located at the Same Site, does not exceed 10 MW. A Community-Based or Family-Owned QF is exempt from these restrictions.

#### **Definition of Community-Based**

- a. A community project (or a community sponsored project) must have a recognized and established organization located within the county of the project or within 50 miles of the project that has a genuine role in helping the project be developed and must have some not insignificant continuing role with or interest in the project after it is completed and placed in service.
- b. After excluding the passive investor whose ownership interests are primarily related to green tag values and tax benefits as the primary ownership benefit, the equity (ownership) interests in a community sponsored project must be owned in substantial percentage (80 percent or more) by the following persons (individuals and entities): (i) the sponsoring organization, or its controlled affiliates; (ii) members of the sponsoring organization (if it is a membership organization) or owners of the sponsorship organization (if it is privately owned); (iii) persons who live in the county in which the project is located or who live a county adjoining the county in which the project is located; or (iv) units of local government, charities, or other established nonprofit organizations active either in the county in which the project is located or active in a county adjoining the county in which the project is located.

#### **Definition of Family-Owned**

After excluding the ownership interest of the passive investor whose ownership interests are primarily related to green tag values and tax benefits as the primary ownership benefit, five or fewer individuals own 50 percent or more of the equity of the project entity, or fifteen or fewer individuals own 90 percent or more of the project entity. A "look through" rule applies to closely held entities that hold the project entity, so that equity held by LLCs, trusts, estates, corporations, partnerships or other similar entities is considered held by the equity owners of the look through entity. An individual is a natural person. In counting to five or fifteen, spouses or children of an equity owner of the project owner who also have an equity interest are aggregated and counted as a single individual.

DEFINITION OF A SMALL COGENERATION FACILITY OR SMALL POWER PRODUCTION FACILITY ELIGIBLE TO RECEIVE PRICING UNDER THE STANDARD PPA (Continued)

#### **Definition of Person(s) or Affiliated Person(s)**

As used above, the term "Same Person(s)" or "Affiliated Person(s)" means a natural person or persons or any legal entity or entities sharing common ownership, management or acting jointly or in concert with or exercising influence over the policies or actions of another person or entity. However, two facilities will not be held to be owned or controlled by the Same Person(s) or Affiliated Person(s) solely because they are developed by a single entity.

Furthermore, two facilities will not be held to be owned or controlled by the Same Person(s) or Affiliated Person(s) if such common person or persons is a "passive investor" whose ownership interest in the QF is primarily related to utilizing production tax credits, green tag values and MACRS depreciation as the primary ownership benefit and the facilities at issue are independent family-owned or community-based projects. A unit of Oregon local government may also be a "passive investor" in a community-based project if the local governmental unit demonstrates that it will not have an equity ownership interest in or exercise any control over the management of the QF and that its only interest is a share of the cash flow from the QF, which share will not exceed 20%. The 20% cash flow share limit may only be exceeded for good cause shown and only with the prior approval of the Commission.

#### **Definition of Same Site**

For purposes of the foregoing, generating facilities are considered to be located at the same site as the QF for which qualification for pricing under the Standard PPA is sought if they are located within a five-mile radius of any generating facilities or equipment providing fuel or motive force associated with the QF for which qualification for pricing under the Standard PPA is sought.

### **Definition of Shared Interconnection and Infrastructure**

QFs otherwise meeting the above-described separate ownership test and thereby qualified for entitlement to pricing under the Standard PPA will not be disqualified by utilizing an interconnection or other infrastructure not providing motive force or fuel that is shared with other QFs qualifying for pricing under the Standard PPA so long as the use of the shared interconnection complies with the interconnecting utility's safety and reliability standards, interconnection agreement requirements and Prudent Electrical Practices as that term is defined in the interconnecting utility's approved Standard PPA.

#### OTHER DEFINITIONS

#### Mid-C Index Price

As used in this schedule, the daily Mid-C Index Price shall be the Day Ahead Intercontinental Exchange ("ICE") for the bilateral OTC market for energy at the Mid-C Physical for Average

### OTHER DEFINITIONS (Continued)

On-Peak Power and Average Off-Peak Power found on the following website: <a href="https://www.theice.com/products/OTC/Physical-Energy/Electricity">https://www.theice.com/products/OTC/Physical-Energy/Electricity</a>. In the event ICE no longer publishes this index, PGE and the Seller agree to select an alternative successor index representative of the Mid-C trading hub.

#### **Definition of RPS Attributes**

As used in this schedule, RPS Attributes means all attributes related to the Net Output generated by the Facility that are required in order to provide PGE with "qualifying electricity," as that term is defined in Oregon's Renewable Portfolio Standard Act, Ore. Rev. Stat. 469A.010, in effect at the time of execution of this Agreement. RPS Attributes do not include Environmental Attributes that are greenhouse gas offsets from methane capture not associated with the generation of electricity and not needed to ensure that there are zero net emissions associated with the generation of electricity.

#### **Definition of Environmental Attributes**

As used in this schedule, Environmental Attributes shall mean any and all claims, credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, resulting from the avoidance of the emission of any gas, chemical, or other substance to the air, soil or water. Environmental Attributes include but are not limited to: (1) any avoided emissions of pollutants to the air, soil, or water such as (subject to the foregoing) sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), and other pollutants; and (2) any avoided emissions of carbon dioxide (CO2), methane (CH4), and other greenhouse gases (GHGs) that have been determined by the United Nations Intergovernmental Panel on Climate Change to contribute to the actual or potential threat of altering the Earth's climate by trapping heat in the atmosphere.

#### **Definition of Resource Sufficiency Period**

This is the period from the current year through <del>2020</del>2024.

#### **Definition of Resource Deficiency Period**

This is the period from 2021 through 20345.

#### **Definition of Renewable Resource Sufficiency Period**

This is the period from the current year through 20192028.

#### **Definition of Renewable Resource Deficiency Period**

This is the period from 2020 through 20349.

#### SCHEDULE 201 (Concluded)

#### **DISPUTE RESOLUTION**

Upon request, the QF will provide the purchasing utility with documentation verifying the ownership, management and financial structure of the QF in reasonably sufficient detail to allow the utility to make an initial determination of whether or not the QF meets the above-described criteria for entitlement to pricing under the Standard PPA.

The QF may present disputes to the Commission for resolution using the following process:

The QF may file a complaint asking the Commission to adjudicate disputes regarding the formation of the standard contract. The QF may not file such a complaint during any 15-day period in which the utility has the obligation to respond, but must wait until the 15-day period has passed.

The utility may respond to the complaint within ten days of service.

The Commission will limit its review to the issues identified in the complaint and response, and utilize a process similar to the arbitration process adopted to facilitate the execution of interconnection agreements among telecommunications carriers. See OAR 860, Division 016. The administrative law judge will not act as an arbitrator.

#### **SPECIAL CONDITIONS**

- 1. Delivery of energy by Seller will be at a voltage, phase, frequency, and power factor as specified by the Company.
- If the Seller also receives retail Electricity Service from the Company at the same location, any payments under this schedule will be credited to the Seller's retail Electricity Service bill. At the option of the Customer, any net credit over \$10.00 will be paid by check to the Customer.
- 3. Unless required by state or federal law, if the 1978 Public Utility Regulatory Policies Act (PURPA) is repealed, PPAs entered into pursuant to this schedule will not terminate prior to the Standard or Negotiated PPA's termination date.

#### **TERM OF AGREEMENT**

Not less than one year and not to exceed 20 years.

## UM 1728 Application to Update Schedule 201 Qualifying Facility Information

Alternative Version (Effective date August 8, 2017)

# SCHEDULE 201 QUALIFYING FACILITY 10 MW or LESS AVOIDED COST POWER PURCHASE INFORMATION

#### **PURPOSE**

To provide information about Standard Avoided Costs and Renewable Avoided Costs, Standard Power Purchase Agreements (PPA) and Negotiated PPAs, power purchase prices and price options for power delivered by a Qualifying Facility (QF) to the Company with nameplate capacity of 10,000 kW (10MW) or less.

#### **AVAILABLE**

To owners of QFs making sales of electricity to the Company in the State of Oregon (Seller).

#### **APPLICABLE**

For power purchased from small power production or cogeneration facilities that are QFs as defined in 18 Code of Federal Regulations (CFR) Section 292, that meet the eligibility requirements described herein and where the energy is delivered to the Company's system and made available for Company purchase pursuant to a Standard PPA.

#### **ESTABLISHING CREDITWORTHINESS**

The Seller must establish creditworthiness prior to service under this schedule. For a Standard PPA, a Seller may establish creditworthiness with a written acknowledgment that it is current on all existing debt obligations and that it was not a debtor in a bankruptcy proceeding within the preceding 24 months. If the Seller is not able to establish creditworthiness, the Seller must provide security deemed sufficient by the Company as set forth in the Standard PPA.

#### POWER PURCHASE INFORMATION

A Seller may call the Power Production Coordinator at (503) 464-8000 to obtain more information about being a Seller or how to apply for service under this schedule.

#### **PPA**

In accordance with terms set forth in this schedule and the Commission's Rules as applicable, the Company will purchase any Energy in excess of station service (power necessary to produce generation) and amounts attributable to conversion losses, which are made available from the Seller.

A Seller must execute a PPA with the Company prior to delivery of power to the Company. The agreement will have a term of up to 20 years as selected by the QF.

A QF with a nameplate capacity rating of 10 MW or less as defined herein may elect the option of a Standard PPA.

### PPA (Continued)

Any Seller may elect to negotiate a PPA with the Company. Such negotiation will comply with the requirements of the Federal Energy Regulatory Commission (FERC), and the Commission including the guidelines in Order No. 07-360, and Schedule 202. Negotiations for power purchase pricing will be based on either the filed Standard Avoided Costs or Renewable Avoided Costs in effect at that time.

### STANDARD PPA (Nameplate capacity of 10 MW or less)

A Seller choosing a Standard PPA will complete all informational and price option selection requirements in the applicable Standard PPA and submit the executed Agreement to the Company prior to service under this schedule. The Standard PPA is available at <a href="https://www.portlandgeneral.com">www.portlandgeneral.com</a>. The available Standard PPAs are:

- Standard In-System Non-Variable Power Purchase Agreement
- Standard Off-System Non-Variable Power Purchase Agreement
- Standard In-System Variable Power Purchase Agreement
- Standard Off-System Variable Power Purchase Agreement
- Standard Renewable In-System Non-Variable Power Purchase Agreement
- Standard Renewable Off-System Non-Variable Power Purchase Agreement
- Standard Renewable In-System Variable Power Purchase Agreement
- Standard Renewable Off-System Variable Power Purchase Agreement

The Standard PPAs applicable to variable resources are available only to QFs utilizing wind, solar or run of river hydro as the primary motive force.

#### **GUIDELINES FOR 10 MW OR LESS FACILITIES ELECTING STANDARD PPA**

To execute the Standard PPA the Seller must complete all of the general project information requested in the applicable Standard PPA.

When all information required in the Standard PPA has been received in writing from the Seller, the Company will respond within 15 business days with a draft Standard PPA.

The Seller may request in writing that the Company prepare a final draft Standard PPA. The Company will respond to this request within 15 business days. In connection with such request, the QF must provide the Company with any additional or clarified project information that the Company reasonably determines to be necessary for the preparation of a final draft Standard PPA.

When both parties are in full agreement as to all terms and conditions of the draft Standard PPA, the Company will prepare and forward to the Seller a final executable version of the agreement within 15 business days. Following the Company's execution, an executed copy will be returned to the Seller. Prices and other terms and conditions in the PPA will not be final and binding until the Standard PPA has been executed by both parties.

#### **OFF-SYSTEM PPA**

A Seller with a facility that interconnects with an electric system other than the Company's electric system may enter into a PPA with the Company after following the applicable Standard or Negotiated PPA guidelines and making the arrangements necessary for transmission of power to the Company's system.

#### **BASIS FOR POWER PURCHASE PRICE**

#### AVOIDED COST SUMMARY

The power purchase prices are based on either the Company's Standard Avoided Costs or Renewable Avoided Costs in effect at the time the agreement is executed. Avoided Costs are defined in 18 CFR 292.101(6) as "the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the qualifying facility or qualifying facilities, such utility would generate itself or purchase from another source."

Monthly On-Peak prices are included in both the Standard Avoided Costs as listed in Tables 1a, 2a, and 3a and Renewable Avoided Costs as listed in Tables 4a, 5a, and 6a. Monthly Off-Peak prices are included in both the Standard Avoided Costs as listed in Tables 1b, 2b, and 3b and Renewable Avoided Costs as listed in Tables 4b, 5b, and 6b.

#### **ON-PEAK PERIOD**

The On-Peak period is 6:00 a.m. until 10:00 p.m., Monday through Saturday.

#### **OFF-PEAK PERIOD**

The Off-Peak period is 10:00 p.m. until 6:00 a.m., Monday through Saturday, and all day on Sunday.

Standard Avoided Costs are based on forward market price estimates through the Resource Sufficiency Period, the period of time during which the Company's Standard Avoided Costs are associated with incremental purchases of Energy and capacity from the market. For the Resource Deficiency Period, the Standard Avoided Costs reflect the fully allocated costs of a natural gas fueled combined cycle combustion turbine (CCCT) including fuel and capital costs. The CCCT Avoided Costs are based on the variable cost of Energy plus capitalized Energy costs at a 93% capacity factor based on a natural gas price forecast, with prices modified for shrinkage and transportation costs.

Renewable Avoided Costs are based on forward market price estimates through the Renewable Resource Sufficiency Period, the period of time during which the Company's Renewable Avoided Costs are associated with incremental purchases of energy and capacity from the market. For the Renewable Resource Deficiency Period, the Renewable Avoided Costs reflect the fully allocated costs of a wind plant including capital costs.

#### PRICING FOR STANDARD PPA

Pricing represents the purchase price per MWh the Company will pay for electricity delivered to a Point of Delivery (POD) within the Company's service territory pursuant to a Standard PPA up to the nameplate rating of the QF in any hour. Any Energy delivered in excess of the nameplate rating will be purchased at the applicable Off-Peak Prices for the selected pricing option.

The Standard PPA pricing will be based on either the Standard or Renewable Avoided Costs in effect at the time the agreement is executed.

The Company will pay the Seller either the Off-Peak Standard Avoided Cost pursuant to Tables 1b, 2b, or 3b or the Off-Peak Renewable Avoided Costs pursuant to Tables 4b, 5b, or 6b for: (a) all Net Output delivered prior to the Commercial Operation Date; (b) all Net Output deliveries greater than Maximum Net Output in any PPA year; (c) any generation subject to and as adjusted by the provisions of Section 4.3 of the Standard PPA; (d) Net Output delivered in the Off-Peak Period; and (e) deliveries above the nameplate capacity in any hour. The Company will pay the Seller either the On-Peak Standard Avoided Cost pursuant to Tables 1a, 2a, or 3a or the On-Peak Renewable Avoided Costs pursuant to Tables 4a, 5a, or 6a for all other Net Output. (See the PPA for defined terms.)

### 1) Standard Fixed Price Option

The Standard Fixed Price Option is based on Standard Avoided Costs including forecasted natural gas prices. It is available to all QFs.

This option is available for a maximum term of 15 years. Prices will be as established at the time the Standard PPA is executed and will be equal to the Standard Avoided Costs in Tables 1a and 1b, 2a and 2b, or 3a and 3c, depending on the type of QF, effective at execution. QFs using any resource type other than wind and solar are assumed to be Base Load QFs.

Prices paid to the Seller under the Standard Fixed Price Option include adjustments for the capacity contribution of the QF resource type relative to that of the avoided proxy resource. Both the Base Load QF resources (Tables 1a and 1b) and the avoided proxy resource, the basis used to determine Standard Avoided Costs for the Standard Fixed Price Option, are assumed to have a capacity contribution to peak of 100%. The capacity contribution for Wind QF resources (Tables 2a and 2b) is assumed to be 18.59%. The capacity contribution for Solar QF resources (Tables 3a and 3b) is assumed to be 15.33%.

Prices paid to the Seller under the Standard Fixed Price Option for Wind and Solar QFs (Tables 2a, 2b, 3a, and 3b) include a reduction for the integration costs in Table 7. However, if the Wind or Solar QF is outside of PGE's Balancing Authority Area as contemplated in the Commission's Order No. 14-058, the Seller is paid the integration charges in Table 7, in addition to the prices listed in Tables 2a and 2b or 3a and 3b, for a net-zero effect.

PRICING OPTIONS FOR STANDARD PPA (Continued)
Standard Fixed Price Option (Continued)

Sellers with PPAs exceeding 15 years will receive pricing equal to the Mid-C Index Price for all years up to five in excess of the initial 15.

						TABLE 1a	1					
					Av	oided Co	sts					
			S	Standard	Fixed Pri	ce Optior	for Base	Load Q	F			
					On-Peak	Forecast	(\$/MWH)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								34.81	29.46	26.91	27.42	33.53
2018	32.01	29.46	25.38	21.14	20.62	21.14	30.01	33.42	31.06	25.63	27.67	32.27
2019	31.18	29.49	23.89	19.25	18.62	19.53	30.14	34.47	31.43	26.91	28.93	34.34
2020	32.84	31.06	25.15	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16
2021	34.60	32.72	26.46	21.28	20.58	21.61	33.44	38.27	34.87	29.82	32.09	38.13
2022	36.47	34.48	27.88	22.42	21.68	22.76	35.25	40.34	36.75	31.44	33.81	40.19
2023	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07
2024	36.16	34.47	31.84	26.04	23.28	16.27	29.02	32.72	35.73	35.93	36.83	39.19
2025	57.28	57.40	57.49	56.78	56.75	56.67	56.77	56.85	56.97	57.07	57.81	57.92
2026	59.17	59.29	59.34	58.62	58.63	58.69	58.79	58.89	59.03	59.16	60.03	60.15
2027	61.01	61.13	61.04	60.30	60.44	60.19	60.29	60.39	60.52	61.27	59.92	60.04
2028	61.23	61.31	61.19	60.52	60.66	60.78	60.88	61.00	61.12	61.26	62.44	62.57
2029	64.03	64.16	64.28	63.58	63.76	64.88	65.00	65.13	65.28	65.40	66.74	66.88
2030	69.60	70.59	70.73	70.05	70.25	70.41	70.56	70.72	70.89	71.77	72.44	72.62
2031	74.30	74.48	74.10	73.00	73.15	73.04	73.18	73.34	73.51	73.69	74.85	75.02
2032	76.53	76.62	76.32	75.09	75.30	75.49	75.64	75.81	76.00	76.25	77.82	78.02
2033	80.07	80.28	80.02	78.86	79.09	79.29	79.46	79.64	79.85	80.26	81.68	81.90
2034	83.89	84.11	82.95	81.61	81.86	82.07	82.25	82.45	82.67	82.91	84.66	84.89
2035	86.73	86.97	85.83	84.45	84.70	84.37	84.55	84.75	84.99	85.49	86.97	87.42
2036	89.63	89.87	88.67	87.20	87.49	87.12	87.32	87.54	87.78	88.31	89.86	90.33
2037	92.90	93.16	91.91	90.37	90.65	90.28	90.48	90.71	90.95	91.53	93.15	93.66
2038	96.17	96.45	95.12	93.50	93.81	93.42	93.63	93.87	94.14	94.74	96.45	96.97
2039	99.60	99.87	98.49	96.79	97.11	96.69	96.92	97.17	97.45	98.09	99.87	100.43
2040	103.14	103.43	101.98	100.19	100.53	100.09	100.34	100.59	100.89	101.55	103.43	104.02
2041	106.88	107.19	105.65	103.77	104.11	103.66	103.92	104.18	104.50	105.20	107.17	107.79
2042	110.75	111.07	109.46	107.49	107.86	107.38	107.63	107.92	108.25	108.98	111.07	111.71

						TABLE 1b						
						oided Co						
			S	tandard			-		F			
					Off-Peak	Forecast	(\$/MWH)					
		F-1- T	N.F	A		1		A 1	0	0-1	Maria	D
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	07.40	04.07	00.00	45.40	10.10	40.00	40.50	24.51	24.72	23.85	24.11	27.42
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.41
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	27.96	28.08	28.17	27.46	27.43	27.35	27.45	27.53	27.65	27.75	28.49	28.60
2026	29.26	29.39	29.43	28.71	28.72	28.79	28.89	28.99	29.12	29.25	30.12	30.24
2027	30.50	30.63	30.54	29.80	29.94	29.69	29.79	29.89	30.01	30.76	29.41	29.54
2028	30.11	30.19	30.08	29.41	29.55	29.66	29.77	29.88	30.01	30.15	31.33	31.45
2029	32.29	32.42	32.54	31.85	32.02	33.14	33.26	33.39	33.54	33.66	35.01	35.15
2030	37.23	38.22	38.36	37.68	37.88	38.04	38.19	38.35	38.52	39.40	40.07	40.25
2031	41.28	41.46	41.08	39.98	40.13	40.02	40.16	40.32	40.49	40.67	41.83	42.00
2032	43.06	43.15	42.85	41.62	41.84	42.02	42.17	42.35	42.54	42.79	44.35	44.55
2033	45.72	45.92	45.67	44.51	44.74	44.94	45.11	45.28	45.50	45.91	47.33	47.54
2034	48.74	48.96	47.80	46.46	46.71	46.91	47.10	47.29	47.51	47.76	49.51	49.74
2035	50.99	51.23	50.09	48.70	48.96	48.62	48.81	49.01	49.25	49.75	51.23	51.68
2036	53.29	53.53	52.33	50.86	51.15	50.78	50.98	51.20	51.45	51.97	53.52	53.99
2037	55.72	55.98	54.72	53.19	53.47	53.09	53.30	53.52	53.77	54.35	55.97	56.48
2038	58.24	58.52	57.19	55.57	55.88	55.49	55.70	55.94	56.21	56.81	58.52	59.04
2039	60.91	61.18	59.80	58.11	58.42	58.01	58.24	58.48	58.77	59.40	61.18	61.74
2040	63.68	63.97	62.52	60.73	61.07	60.63	60.88	61.12	61.43	62.09	63.97	64.55
2041	66.63	66.94	65.40	63.52	63.86	63.41	63.66	63.93	64.25	64.95	66.92	67.54
2042	69.70	70.02	68.40	66.43	66.80	66.33	66.57	66.86	67.20	67.93	70.02	70.66

						FADI E O						
						TABLE 2a						
				Standa		Price Opt		lind OE				
						Forecast						
					OII I Cak	i oi coast	(ψ/1010011)	<u> </u>				
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				-				33.96	28.61	26.06	26.57	32.68
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.46
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.21
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.25
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.11
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.21
2025	41.62	41.74	41.83	41.12	41.09	41.01	41.11	41.20	41.32	41.42	42.16	42.27
2026	43.20	43.32	43.37	42.65	42.66	42.72	42.82	42.92	43.06	43.19	44.06	44.18
2027	44.72	44.84	44.75	44.02	44.15	43.90	44.00	44.11	44.23	44.98	43.63	43.76
2028	44.62	44.70	44.58	43.91	44.05	44.16	44.27	44.38	44.51	44.65	45.83	45.96
2029	47.09	47.22	47.33	46.64	46.82	47.94	48.05	48.18	48.34	48.45	49.80	49.94
2030	52.32	53.31	53.45	52.77	52.97	53.13	53.28	53.44	53.61	54.49	55.16	55.34
2031	56.67	56.86	56.48	55.37	55.52	55.41	55.56	55.72	55.89	56.06	57.23	57.40
2032	58.66	58.75	58.45	57.22	57.43	57.62	57.77	57.95	58.13	58.38	59.95	60.15
2033	61.73	61.93	61.68	60.52	60.75	60.95	61.12	61.30	61.51	61.92	63.34	63.55
2034	65.13	65.35	64.19	62.85	63.10	63.31	63.49	63.68	63.91	64.15	65.90	66.13
2035	67.65	67.89	66.75	65.37	65.62	65.29	65.48	65.68	65.91	66.42	67.89	68.34
2036	70.22	70.47	69.26	67.80	68.08	67.72	67.92	68.14	68.38	68.91	70.45	70.93
2037	73.05	73.32	72.06	70.53	70.80	70.43	70.64	70.86	71.11	71.69	73.30	73.81
2038	75.92	76.20	74.87	73.25	73.56	73.17	73.38	73.62	73.89	74.49	76.20	76.72
2039	78.95	79.22	77.84	76.15	76.46	76.04	76.27	76.52	76.81	77.44	79.22	79.78
2040	82.07	82.36	80.91	79.13	79.46	79.02	79.27	79.52	79.83	80.49	82.36	82.95
2041	85.39	85.70	84.16	82.28	82.62	82.17	82.43	82.70	83.01	83.71	85.69	86.30
2042	88.84	89.16	87.55	85.58	85.94	85.47	85.72	86.01	86.34	87.07	89.16	89.80

						TABLE 2b						
				Ct a mala		oided Cos		in a OF				
						Price Opt						
				•	оп-Реак	Forecast	(2\IVIVV H)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	26.96	27.08	27.17	26.46	26.43	26.35	26.45	26.53	26.65	26.75	27.49	27.60
2026	28.24	28.37	28.41	27.69	27.70	27.77	27.87	27.97	28.10	28.23	29.10	29.22
2027	29.46	29.59	29.50	28.76	28.90	28.65	28.75	28.85	28.97	29.72	28.37	28.50
2028	29.05	29.13	29.02	28.35	28.49	28.60	28.71	28.82	28.95	29.09	30.27	30.39
2029	31.21	31.34	31.46	30.77	30.94	32.06	32.18	32.31	32.46	32.58	33.93	34.07
2030	36.13	37.12	37.26	36.58	36.78	36.94	37.09	37.25	37.42	38.30	38.97	39.15
2031	40.16	40.34	39.96	38.86	39.01	38.90	39.04	39.20	39.37	39.55	40.71	40.88
2032	41.92	42.01	41.71	40.48	40.70	40.88	41.03	41.21	41.40	41.65	43.21	43.41
2033	44.55	44.75	44.50	43.34	43.57	43.77	43.94	44.11	44.33	44.74	46.16	46.37
2034	47.55	47.77	46.61	45.27	45.52	45.72	45.91	46.10	46.32	46.57	48.32	48.55
2035	49.78	50.02	48.88	47.49	47.75	47.41	47.60	47.80	48.04	48.54	50.02	50.47
2036	52.05	52.29	51.09	49.62	49.91	49.54	49.74	49.96	50.21	50.73	52.28	52.75
2037	54.46	54.72	53.46	51.93	52.21	51.83	52.04	52.26	52.51	53.09	54.71	55.22
2038	56.95	57.23	55.90	54.28	54.59	54.20	54.41	54.65	54.92	55.52	57.23	57.75
2039	59.60	59.87	58.49	56.80	57.11	56.70	56.93	57.17	57.46	58.09	59.87	60.43
2040	62.34	62.63	61.18	59.39	59.73	59.29	59.54	59.78	60.09	60.75	62.63	63.21
2041	65.26	65.57	64.03	62.15	62.49	62.04	62.29	62.56	62.88	63.58	65.55	66.17
2042	68.31	68.63	67.01	65.04	65.41	64.94	65.18	65.47	65.81	66.54	68.63	69.27

						FABLE 3a oided Cos						
				Standar				olar QF				
	Standard Fixed Price Option for Solar QF On-Peak Forecast (\$/MWH)											
`												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								33.96	28.61	26.06	26.57	32.6
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.4
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.4
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.20
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.2
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.2
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.1
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.2
2025	38.93	39.05	39.13	38.43	38.39	38.32	38.42	38.50	38.62	38.72	39.46	39.5
2026	40.45	40.57	40.62	39.90	39.91	39.97	40.07	40.17	40.31	40.44	41.31	41.4
2027	41.91	42.04	41.95	41.21	41.35	41.10	41.20	41.30	41.43	42.17	40.83	40.9
2028	41.75	41.84	41.72	41.05	41.19	41.30	41.41	41.52	41.65	41.79	42.97	43.1
2029	44.17	44.30	44.42	43.72	43.90	45.02	45.14	45.27	45.42	45.54	46.88	47.0
2030	49.34	50.33	50.48	49.79	49.99	50.15	50.31	50.46	50.63	51.51	52.18	52.3
2031	53.64	53.82	53.44	52.34	52.49	52.37	52.52	52.68	52.85	53.02	54.19	54.3
2032	55.58	55.67	55.37	54.14	54.36	54.54	54.69	54.87	55.06	55.31	56.87	57.0
2033	58.57	58.78	58.52	57.36	57.59	57.79	57.96	58.14	58.35	58.76	60.18	60.4
2034	61.90	62.12	60.96	59.62	59.87	60.07	60.26	60.45	60.67	60.92	62.66	62.9
2035	64.37	64.61	63.46	62.08	62.34	62.00	62.19	62.39	62.63	63.13	64.61	65.0
2036	66.88	67.12	65.92	64.46	64.74	64.38	64.58	64.80	65.04	65.57	67.11	67.5
2037	69.64	69.90	68.64	67.11	67.38	67.01	67.22	67.44	67.69	68.27	69.88	70.4
2038	72.43	72.71	71.39	69.77	70.08	69.68	69.89	70.13	70.40	71.01	72.71	73.2
2039	75.39	75.66	74.28	72.59	72.90	72.49	72.72	72.96	73.25	73.88	75.66	76.2
2040	78.44	78.74	77.28	75.50	75.83	75.39	75.64	75.89	76.20	76.86	78.74	79.3
2041	81.69	82.00	80.46	78.58	78.92	78.47	78.72	78.99	79.31	80.01	81.98	82.6
2042	85.07	85.39	83.77	81.80	82.17	81.70	81.94	82.23	82.57	83.30	85.39	86.0

						FABLE 3b						
				01		oided Cos		- I OF				
	Standard Fixed Price Option for Solar QF											
Off-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.8
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	26.96	27.08	27.17	26.46	26.43	26.35	26.45	26.53	26.65	26.75	27.49	27.60
2026	28.24	28.37	28.41	27.69	27.70	27.77	27.87	27.97	28.10	28.23	29.10	29.22
2027	29.46	29.59	29.50	28.76	28.90	28.65	28.75	28.85	28.97	29.72	28.37	28.50
2028	29.05	29.13	29.02	28.35	28.49	28.60	28.71	28.82	28.95	29.09	30.27	30.39
2029	31.21	31.34	31.46	30.77	30.94	32.06	32.18	32.31	32.46	32.58	33.93	34.07
2030	36.13	37.12	37.26	36.58	36.78	36.94	37.09	37.25	37.42	38.30	38.97	39.15
2031	40.16	40.34	39.96	38.86	39.01	38.90	39.04	39.20	39.37	39.55	40.71	40.88
2032	41.92	42.01	41.71	40.48	40.70	40.88	41.03	41.21	41.40	41.65	43.21	43.41
2033	44.55	44.75	44.50	43.34	43.57	43.77	43.94	44.11	44.33	44.74	46.16	46.37
2034	47.55	47.77	46.61	45.27	45.52	45.72	45.91	46.10	46.32	46.57	48.32	48.55
2035	49.78	50.02	48.88	47.49	47.75	47.41	47.60	47.80	48.04	48.54	50.02	50.47
2036	52.05	52.29	51.09	49.62	49.91	49.54	49.74	49.96	50.21	50.73	52.28	52.75
2037	54.46	54.72	53.46	51.93	52.21	51.83	52.04	52.26	52.51	53.09	54.71	55.22
2038	56.95	57.23	55.90	54.28	54.59	54.20	54.41	54.65	54.92	55.52	57.23	57.75
2039	59.60	59.87	58.49	56.80	57.11	56.70	56.93	57.17	57.46	58.09	59.87	60.43
2040	62.34	62.63	61.18	59.39	59.73	59.29	59.54	59.78	60.09	60.75	62.63	63.2
2041	65.26	65.57	64.03	62.15	62.49	62.04	62.29	62.56	62.88	63.58	65.55	66.17
2042	68.31	68.63	67.01	65.04	65.41	64.94	65.18	65.47	65.81	66.54	68.63	69.27

PRICING OPTIONS FOR STANDARD PPA (Continued)

#### 2) Renewable Fixed Price Option

The Renewable Fixed Price Option is based on Renewable Avoided Costs. It is available only to Renewable QFs that generate electricity from a renewable energy source that may be used by the Company to comply with the Oregon Renewable Portfolio Standard as set forth in ORS 469A.005 to 469A.210.

This option is available for a maximum term of 15 years. Prices will be as established at the time the Standard PPA is executed and will be equal to the Renewable Avoided Costs in Tables 4a and 4b, 5a and 5b, or 6a and 6b, depending on the type of QF, effective at execution. QFs using any resource type other than wind and solar are assumed to be Base Load QFs.

Sellers will retain all Environmental Attributes generated by the facility during the Renewable Resource Sufficiency Period. A Renewable QF choosing the Renewable Fixed Price Option must cede all RPS Attributes generated by the facility to the Company from the start of the Renewable Resource Deficiency Period through the remainder of the PPA term.

Prices paid to the Seller under the Renewable Fixed Price Option include adjustments for the capacity contribution of the QF resource type relative to that of the avoided proxy resource. Both Wind QF resources (Tables 5a and 5b) and the avoided proxy resource, the basis used to determine Renewable Avoided Costs for the Renewable Fixed Price Option, are assumed to have a capacity contribution to peak of 18.59%. The capacity contribution for Solar QF resources (Tables 6a and 6b) is assumed to be 15.33%. The capacity contribution for Base Load QF resources (Tables 4a and 4b) is assumed to be 100%.

The Renewable Avoided Costs during the Renewable Resource Deficiency Period reflect an increase for avoided wind integration costs, shown in Table 7.

Prices paid to the Seller under the Renewable Fixed Price Option for Wind and solar QFs (Tables 5a, 5b, 6a, and 6b) include a reduction for the integration costs in Table 7, which cancels out integration costs included in the Renewable Avoided Costs during the Renewable Resource Deficiency Period. However, if the Wind or Solar QF is outside of PGE's Balancing Authority Area as contemplated in the Commission's Order No. 14-058, the Seller is paid the integration charges in Table 7, in addition to the prices listed in Tables 5a and 5b or 6a and 6b.

Sellers with PPAs exceeding 15 years will receive pricing equal to the Mid-C Index Price for all years up to five in excess of the initial 15.

## PRICING OPTIONS FOR STANDARD PPA (Continued)

Renewable Fixed Price Option (Continued)

					-	TABLE 4a	1					
					Renewak	ole Avoid	ed Costs					
	Renewable Fixed Price Option for Base Load QF											
	On-Peak Forecast (\$/MWH)											
V		F-1-		A			11	A	0	0-1	NI	
Year 2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	<b>Sep</b> 29.46	Oct 26.91	<b>Nov</b> 27.42	Dec
2017	32.01	29.46	25.38	21.14	20.62	21.14	30.01	34.81				33.53 32.27
2019	31.18	29.46	23.89	19.25	18.62	19.53	30.01	33.42 34.47	31.06 31.43	25.63 26.91	27.67 28.93	34.34
2019	32.84	31.06	25.09	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16
2021 2022	34.60 36.47	32.72 34.48	26.46 27.88	21.28 22.42	20.58 21.68	21.61 22.76	33.44 35.25	38.27 40.34	34.87 36.75	29.82 31.44	32.09 33.81	38.13 40.19
2022	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07
2023	36.16	34.47	31.84	26.04	23.14	16.27	29.02	32.72	35.73	35.93		39.19
2024	36.28	36.45	32.07	27.15	25.26	20.76	31.18	33.59	36.96	36.50	36.83 36.17	38.88
2025	38.02	38.42	34.69	28.61	23.72	19.90	33.16	36.49	39.07	39.98	39.93	41.34
2027	40.65	40.65	35.03	29.55	25.62	19.81	33.68	38.68	40.37	41.18	39.95	42.49
2028	41.59	39.62	35.61	29.31	24.13	18.69	35.04	39.47	41.56	42.04	42.77	45.50
2029	130.46	122.16	114.93	99.44	91.28	66.74	111.72	123.40	130.72	125.77	127.43	137.59
2030	131.08	128.53	117.83	98.71	84.69	62.99	114.81	124.72	133.57	132.78	130.81	140.19
2031	131.64	130.86	120.44	98.71	91.59	75.33	113.41	127.20	134.67	132.63	129.43	138.99
2032	134.62	132.28	119.05	100.89	89.34	66.65	119.99	136.17	137.32	134.74	138.45	144.33
2033	137.25	136.91	119.61	101.75	86.72	86.02	122.63	133.68	138.82	137.65	139.72	144.28
2034	142.85	142.41	123.71	103.53	88.59	73.28	127.14	137.57	142.77	143.43	144.85	150.81
2035	148.82	142.53	126.90	103.23	91.63	67.83	123.14	139.46	145.86	143.75	142.41	153.08
2036	149.95	144.47	128.97	105.99	82.91	55.60	131.13	142.04	150.30	148.99	147.58	158.25
2037	150.31	149.85	132.81	104.38	91.13	77.19	129.68	144.87	152.33	149.48	149.48	159.99
2038	153.59	155.69	131.34	104.62	84.94	70.00	139.81	155.20	158.10	155.40	156.18	165.33
2039	155.36	153.84	130.69	105.47	94.56	80.72	140.16	151.56	157.69	151.05	155.29	162.46
2040	157.59	155.79	132.79	114.89	87.55	75.00	145.49	156.16	163.50	158.77	161.06	169.93
2041	161.95	158.31	139.08	119.78	109.77	63.50	144.74	159.21	165.49	156.15	156.63	168.47
2042	164.72	162.40	143.32	120.89	93.22	64.66	149.09	163.83	169.34	163.16	161.00	175.92

					-	FADLE 4						
						TABLE 4	ed Costs					
			R						F			
	Renewable Fixed Price Option for Base Load QF Off-Peak Forecast (\$/MWH)											
	(4)											
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								24.51	24.72	23.85	24.11	27.42
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.41
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	33.70	32.17	29.76	25.01	21.99	19.00	26.39	30.90	33.57	33.77	33.61	34.83
2026	35.44	35.59	31.64	27.21	22.20	15.26	28.97	33.61	36.07	35.46	35.51	37.70
2027	36.66	35.71	32.22	27.60	23.64	18.12	29.40	34.72	37.35	37.55	36.31	38.40
2028	38.09	37.21	33.20	27.82	23.65	17.34	31.56	36.38	38.22	38.77	39.08	40.92
2029	87.39	83.14	79.75	60.89	56.60	30.37	68.86	84.70	91.46	89.10	90.05	95.00
2030	90.66	87.81	81.88	62.46	52.25	31.31	75.55	87.01	93.96	93.87	94.23	96.33
2031	94.53	91.33	79.90	66.32	59.86	41.01	74.22	87.92	95.40	93.03	92.05	96.31
2032	95.12	90.63	85.26	64.49	46.09	33.03	81.76	88.62	98.19	95.17	97.79	103.88
2033	96.72	93.73	84.37	65.02	55.14	44.09	81.80	90.25	98.91	96.03	97.55	104.35
2034	100.64	96.93	84.22	63.90	50.21	33.88	82.22	94.26	101.29	101.38	105.38	107.75
2035	103.38	100.59	93.20	71.90	61.31	46.52	81.06	99.14	104.45	99.35	103.56	106.09
2036	111.16	105.72	94.24	72.48	61.23	31.45	82.90	100.58	110.79	104.85	108.44	114.13
2037	110.15	107.49	96.32	79.57	59.61	38.00	86.10	101.85	110.09	103.94	105.91	113.12
2038	113.74	110.37	97.67	79.06	51.82	34.44	88.62	103.26	110.27	107.20	111.44	117.93
2039	110.16	108.78	96.61	84.94	62.94	60.33	93.55	103.97	110.69	110.48	115.32	122.80
2040	116.99	108.93	94.17	91.82	59.51	40.97	95.01	110.61	112.45	116.09	118.19	121.07
2041	116.50	110.73	111.72	97.32	66.46	37.99	97.97	109.98	123.17	113.27	119.57	123.40
2042	126.11	116.45	107.55	85.50	62.50	40.12	105.67	116.39	125.76	123.46	122.21	128.97

						TABLE 5						
	Renewable Avoided Costs Renewable Fixed Price Option for Wind QF On-Peak Forecast (\$/MWH)											
	OII-F Can I OICCASL (WINIMIT)											
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								33.96	28.61	26.06	26.57	32.68
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.46
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.21
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.25
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.11
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.21
2025	35.28	35.45	31.07	26.15	24.16	19.76	30.18	32.59	35.96	35.50	35.17	37.88
2026	37.00	37.40	33.67	27.59	22.70	18.88	32.14	35.47	38.05	38.96	38.91	40.32
2027	39.61	39.61	33.99	28.51	24.58	18.77	32.64	37.64	39.33	40.14	38.91	41.45
2028	40.53	38.56	34.55	28.25	23.07	17.63	33.98	38.41	40.50	40.98	41.71	44.44
2029	113.52	105.21	97.99	82.50	74.34	49.80	94.77	106.45	113.77	108.83	110.48	120.64
2030	113.80	111.24	100.54	81.43	67.41	45.70	97.52	107.44	116.29	115.50	113.53	122.91
2031	114.02	113.23	102.81	81.08	73.97	57.71	95.79	109.57	117.04	115.01	111.80	121.36
2032	116.76	114.41	101.18	83.02	71.47	48.78	102.12	118.30	119.45	116.88	120.58	126.46
2033	118.91	118.57	101.27	83.40	68.38	67.68	104.29	115.34	120.47	119.31	121.38	125.94
2034	124.09	123.65	104.95	84.77	69.82	54.52	108.37	118.81	124.01	124.67	126.09	132.05
2035	129.75	123.46	107.82	84.16	72.56	48.75	104.07	120.39	126.78	124.67	123.33	134.01
2036	130.55	125.06	109.57	86.58	63.51	36.20	111.72	122.63	130.90	129.59	128.17	138.84
2037	130.46	130.00	112.97	84.54	71.28	57.35	109.83	125.02	132.49	129.63	129.63	140.14
2038	133.34	135.44	111.09	84.37	64.69	49.75	119.56	134.95	137.85	135.16	135.93	145.08
2039	134.72	133.19	110.04	84.82	73.91	60.08	119.52	130.91	137.04	130.40	134.64	141.81
2040	136.52	134.72	111.73	93.82	66.49	53.93	124.43	135.10	142.44	137.70	140.00	148.87
2041	140.47	136.82	117.59	98.30	88.28	42.01	123.25	137.72	144.00	134.66	135.14	146.98
2042	142.81	140.48	121.41	98.97	71.31	42.74	127.18	141.92	147.43	141.25	139.09	154.01

						TABLE 5	ed Costs					
	Renewable Fixed Price Option for Wind QF Off-Peak Forecast (\$/MWH)											
	(4)											
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				_				23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	32.70	31.17	28.76	24.01	20.99	18.00	25.39	29.90	32.57	32.77	32.61	33.83
2026	34.42	34.57	30.62	26.19	21.18	14.24	27.95	32.59	35.05	34.44	34.49	36.68
2027	35.62	34.67	31.18	26.56	22.60	17.08	28.36	33.68	36.31	36.51	35.27	37.36
2028	37.03	36.15	32.14	26.76	22.59	16.28	30.50	35.32	37.16	37.71	38.02	39.86
2029	86.31	82.06	78.67	59.81	55.52	29.29	67.78	83.62	90.38	88.02	88.97	93.92
2030	89.56	86.71	80.78	61.36	51.15	30.21	74.45	85.91	92.86	92.77	93.13	95.23
2031	93.41	90.21	78.78	65.20	58.74	39.89	73.10	86.80	94.28	91.91	90.93	95.19
2032	93.98	89.49	84.12	63.35	44.95	31.89	80.62	87.48	97.05	94.03	96.65	102.74
2033	95.55	92.56	83.20	63.85	53.97	42.92	80.63	89.08	97.74	94.86	96.38	103.18
2034	99.45	95.74	83.03	62.71	49.02	32.69	81.03	93.07	100.10	100.19	104.19	106.56
2035	102.17	99.38	91.99	70.69	60.10	45.31	79.85	97.93	103.24	98.14	102.35	104.88
2036	109.92	104.48	93.00	71.24	59.99	30.21	81.66	99.34	109.55	103.61	107.20	112.89
2037	108.89	106.23	95.06	78.31	58.35	36.74	84.84	100.59	108.83	102.68	104.65	111.86
2038	112.45	109.08	96.38	77.77	50.53	33.15	87.33	101.97	108.98	105.91	110.15	116.64
2039	108.85	107.47	95.30	83.63	61.63	59.02	92.24	102.66	109.38	109.17	114.01	121.49
2040	115.65	107.59	92.83	90.48	58.17	39.63	93.67	109.27	111.11	114.75	116.85	119.73
2041	115.13	109.36	110.35	95.95	65.09	36.62	96.60	108.61	121.80	111.90	118.20	122.03
2042	124.72	115.06	106.16	84.11	61.11	38.73	104.28	115.00	124.37	122.07	120.82	127.58

						TABLE 6a						
							ed Costs					
	Renewable Fixed Price Option for Solar QF											
	On-Peak Forecast (\$/MWH)											
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				-				33.96	28.61	26.06	26.57	32.68
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.46
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.21
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.25
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.11
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.21
2025	35.28	35.45	31.07	26.15	24.16	19.76	30.18	32.59	35.96	35.50	35.17	37.88
2026	37.00	37.40	33.67	27.59	22.70	18.88	32.14	35.47	38.05	38.96	38.91	40.32
2027	39.61	39.61	33.99	28.51	24.58	18.77	32.64	37.64	39.33	40.14	38.91	41.45
2028	40.53	38.56	34.55	28.25	23.07	17.63	33.98	38.41	40.50	40.98	41.71	44.44
2029	110.60	102.29	95.07	79.58	71.42	46.88	91.85	103.54	110.85	105.91	107.56	117.72
2030	110.82	108.27	97.57	78.45	64.43	42.73	94.55	104.46	113.31	112.52	110.55	119.93
2031	110.98	110.19	99.78	78.05	70.93	54.67	92.75	106.54	114.01	111.97	108.77	118.33
2032	113.68	111.33	98.10	79.95	68.40	45.70	99.05	115.22	116.37	113.80	117.51	123.38
2033	115.75	115.41	98.11	80.25	65.22	64.52	101.13	112.18	117.32	116.15	118.22	122.78
2034	120.86	120.42	101.71	81.54	66.59	51.28	105.14	115.58	120.78	121.43	122.86	128.82
2035	126.46	120.17	104.54	80.87	69.27	45.47	100.78	117.10	123.50	121.38	120.05	130.72
2036	127.20	121.72	106.23	83.24	60.16	32.86	108.38	119.29	127.56	126.25	124.83	135.50
2037	127.04	126.58	109.55	81.12	67.86	53.93	106.42	121.60	129.07	126.21	126.21	136.72
2038	129.86	131.95	107.60	80.88	61.20	46.26	116.08	131.46	134.36	131.67	132.45	141.59
2039	131.16	129.64	106.49	81.27	70.35	56.52	115.96	127.36	133.49	126.84	131.09	138.25
2040	132.90	131.10	108.10	90.19	62.86	50.30	120.80	131.47	138.81	134.08	136.37	145.24
2041	136.76	133.12	113.89	94.59	84.58	38.31	119.55	134.02	140.30	130.96	131.44	143.28
2042	139.03	136.71	117.63	95.20	67.53	38.97	123.41	138.15	143.66	137.47	135.31	150.23

						FABLE 6k						
				Deneuvol	Renewak			Salar OF				
	Renewable Fixed Price Option for Solar QF Off-Peak Forecast (\$/MWH)											
	OII-LEAK LOIGCOST (AMMAN L)											
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	32.70	31.17	28.76	24.01	20.99	18.00	25.39	29.90	32.57	32.77	32.61	33.83
2026	34.42	34.57	30.62	26.19	21.18	14.24	27.95	32.59	35.05	34.44	34.49	36.68
2027	35.62	34.67	31.18	26.56	22.60	17.08	28.36	33.68	36.31	36.51	35.27	37.36
2028	37.03	36.15	32.14	26.76	22.59	16.28	30.50	35.32	37.16	37.71	38.02	39.86
2029	86.31	82.06	78.67	59.81	55.52	29.29	67.78	83.62	90.38	88.02	88.97	93.92
2030	89.56	86.71	80.78	61.36	51.15	30.21	74.45	85.91	92.86	92.77	93.13	95.23
2031	93.41	90.21	78.78	65.20	58.74	39.89	73.10	86.80	94.28	91.91	90.93	95.19
2032	93.98	89.49	84.12	63.35	44.95	31.89	80.62	87.48	97.05	94.03	96.65	102.74
2033	95.55	92.56	83.20	63.85	53.97	42.92	80.63	89.08	97.74	94.86	96.38	103.18
2034	99.45	95.74	83.03	62.71	49.02	32.69	81.03	93.07	100.10	100.19	104.19	106.56
2035	102.17	99.38	91.99	70.69	60.10	45.31	79.85	97.93	103.24	98.14	102.35	104.88
2036	109.92	104.48	93.00	71.24	59.99	30.21	81.66	99.34	109.55	103.61	107.20	112.89
2037	108.89	106.23	95.06	78.31	58.35	36.74	84.84	100.59	108.83	102.68	104.65	111.86
2038	112.45	109.08	96.38	77.77	50.53	33.15	87.33	101.97	108.98	105.91	110.15	116.64
2039	108.85	107.47	95.30	83.63	61.63	59.02	92.24	102.66	109.38	109.17	114.01	121.49
2040	115.65	107.59	92.83	90.48	58.17	39.63	93.67	109.27	111.11	114.75	116.85	119.73
2041	115.13	109.36	110.35	95.95	65.09	36.62	96.60	108.61	121.80	111.90	118.20	122.03
2042	124.72	115.06	106.16	84.11	61.11	38.73	104.28	115.00	124.37	122.07	120.82	127.58

### WIND AND SOLAR INTEGRATION

TABLE 7											
Inte	Integration Costs										
Year	Wind	Solar									
2017	0.85	0.85									
2018	0.87	0.87									
2019	0.88	0.88									
2020	0.90	0.90									
2021	0.92	0.92									
2022	0.94	0.94									
2023	0.96	0.96									
2024	0.98	0.98									
2025	1.00	1.00									
2026	1.02	1.02									
2027	1.04	1.04									
2028	1.06	1.06									
2029	1.08	1.08									
2030	1.10	1.10									
2031	1.12	1.12									
2032	1.14	1.14									
2033	1.17	1.17									
2034	1.19	1.19									
2035	1.21	1.21									
2036	1.24	1.24									
2037	1.26	1.26									
2038	1.29	1.29									
2039	1.31	1.31									
2040	1.34	1.34									
2041	1.37	1.37									
2042	1.39	1.39									

#### MONTHLY SERVICE CHARGE

Each separately metered QF not associated with a retail Customer account will be charged \$10.00 per month.

#### **INSURANCE REQUIREMENTS**

The following insurance requirements are applicable to Sellers with a Standard PPA:

- 1) QFs with nameplate capacity ratings greater than 200 kW are required to secure and maintain a prudent amount of general liability insurance. The Seller must certify to the Company that it is maintaining general liability insurance coverage for each QF at prudent amounts. A prudent amount will be deemed to mean liability insurance coverage for both bodily injury and property damage liability in the amount of not less than \$1,000,000 each occurrence combined single limit, which limits may be required to be increased or decreased by the Company as the Company determines in its reasonable judgment, that economic conditions or claims experience may warrant.
- Such insurance will include an endorsement naming the Company as an additional insured insofar as liability arising out of operations under this schedule and a provision that such liability policies will not be canceled or their limits reduced without 30 days' written notice to the Company. The Seller will furnish the Company with certificates of insurance together with the endorsements required herein. The Company will have the right to inspect the original policies of such insurance.
- 3) QFs with a design capacity of 200 kW or less are encouraged to pursue liability insurance on their own. The Oregon Public Utility Commission in Order No. 05-584 determined that it is inappropriate to require QFs that have a design capacity of 200 kW or less to obtain general liability insurance.

#### TRANSMISSION AGREEMENTS

If the QF is located outside the Company's service territory, the Seller is responsible for the transmission of power at its cost to the Company's service territory.

#### INTERCONNECTION REQUIREMENTS

Except as otherwise provided in a generation Interconnection Agreement between the Company and Seller, if the QF is located within the Company's service territory, switching equipment capable of isolating the QF from the Company's system will be accessible to the Company at all times. At the Company's option, the Company may operate the switching equipment described above if, in the sole opinion of the Company, continued operation of the QF in connection with the utility's system may create or contribute to a system emergency.

#### INTERCONNECTION REQUIREMENTS (Continued)

The QF owner interconnecting with the Company's distribution system must comply with all requirements for interconnection as established pursuant to Commission rule, in the Company's Rules and Regulations (Rule C) or the Company's Interconnection Procedures contained in its FERC Open Access Transmission Tariff (OATT), as applicable. The Seller will bear full responsibility for the installation and safe operation of the interconnection facilities.

## DEFINITION OF A SMALL COGENERATION FACILITY OR SMALL POWER PRODUCTION FACILITY ELIGIBLE TO RECEIVE PRICING UNDER THE STANDARD PPA

A QF will be eligible to receive pricing under the Standard PPA if the nameplate capacity of the QF, together with any other electric generating facility using the same motive force, owned or controlled by the Same Person(s) or Affiliated Person(s), and located at the Same Site, does not exceed 10 MW. A Community-Based or Family-Owned QF is exempt from these restrictions.

#### **Definition of Community-Based**

- a. A community project (or a community sponsored project) must have a recognized and established organization located within the county of the project or within 50 miles of the project that has a genuine role in helping the project be developed and must have some not insignificant continuing role with or interest in the project after it is completed and placed in service.
- b. After excluding the passive investor whose ownership interests are primarily related to green tag values and tax benefits as the primary ownership benefit, the equity (ownership) interests in a community sponsored project must be owned in substantial percentage (80 percent or more) by the following persons (individuals and entities): (i) the sponsoring organization, or its controlled affiliates; (ii) members of the sponsoring organization (if it is a membership organization) or owners of the sponsorship organization (if it is privately owned); (iii) persons who live in the county in which the project is located or who live a county adjoining the county in which the project is located; or (iv) units of local government, charities, or other established nonprofit organizations active either in the county in which the project is located or active in a county adjoining the county in which the project is located.

#### **Definition of Family-Owned**

After excluding the ownership interest of the passive investor whose ownership interests are primarily related to green tag values and tax benefits as the primary ownership benefit, five or fewer individuals own 50 percent or more of the equity of the project entity, or fifteen or fewer individuals own 90 percent or more of the project entity. A "look through" rule applies to closely held entities that hold the project entity, so that equity held by LLCs, trusts, estates, corporations, partnerships or other similar entities is considered held by the equity owners of the look through entity. An individual is a natural person. In counting to five or fifteen, spouses or children of an equity owner of the project owner who also have an equity interest are aggregated and counted as a single individual.

DEFINITION OF A SMALL COGENERATION FACILITY OR SMALL POWER PRODUCTION FACILITY ELIGIBLE TO RECEIVE PRICING UNDER THE STANDARD PPA (Continued)

### **Definition of Person(s) or Affiliated Person(s)**

As used above, the term "Same Person(s)" or "Affiliated Person(s)" means a natural person or persons or any legal entity or entities sharing common ownership, management or acting jointly or in concert with or exercising influence over the policies or actions of another person or entity. However, two facilities will not be held to be owned or controlled by the Same Person(s) or Affiliated Person(s) solely because they are developed by a single entity.

Furthermore, two facilities will not be held to be owned or controlled by the Same Person(s) or Affiliated Person(s) if such common person or persons is a "passive investor" whose ownership interest in the QF is primarily related to utilizing production tax credits, green tag values and MACRS depreciation as the primary ownership benefit and the facilities at issue are independent family-owned or community-based projects. A unit of Oregon local government may also be a "passive investor" in a community-based project if the local governmental unit demonstrates that it will not have an equity ownership interest in or exercise any control over the management of the QF and that its only interest is a share of the cash flow from the QF, which share will not exceed 20%. The 20% cash flow share limit may only be exceeded for good cause shown and only with the prior approval of the Commission.

#### **Definition of Same Site**

For purposes of the foregoing, generating facilities are considered to be located at the same site as the QF for which qualification for pricing under the Standard PPA is sought if they are located within a five-mile radius of any generating facilities or equipment providing fuel or motive force associated with the QF for which qualification for pricing under the Standard PPA is sought.

#### **Definition of Shared Interconnection and Infrastructure**

QFs otherwise meeting the above-described separate ownership test and thereby qualified for entitlement to pricing under the Standard PPA will not be disqualified by utilizing an interconnection or other infrastructure not providing motive force or fuel that is shared with other QFs qualifying for pricing under the Standard PPA so long as the use of the shared interconnection complies with the interconnecting utility's safety and reliability standards, interconnection agreement requirements and Prudent Electrical Practices as that term is defined in the interconnecting utility's approved Standard PPA.

#### OTHER DEFINITIONS

#### Mid-C Index Price

As used in this schedule, the daily Mid-C Index Price shall be the Day Ahead Intercontinental Exchange ("ICE") for the bilateral OTC market for energy at the Mid-C Physical for Average

#### OTHER DEFINITIONS (Continued)

On-Peak Power and Average Off-Peak Power found on the following website: <a href="https://www.theice.com/products/OTC/Physical-Energy/Electricity">https://www.theice.com/products/OTC/Physical-Energy/Electricity</a>. In the event ICE no longer publishes this index, PGE and the Seller agree to select an alternative successor index representative of the Mid-C trading hub.

#### **Definition of RPS Attributes**

As used in this schedule, RPS Attributes means all attributes related to the Net Output generated by the Facility that are required in order to provide PGE with "qualifying electricity," as that term is defined in Oregon's Renewable Portfolio Standard Act, Ore. Rev. Stat. 469A.010, in effect at the time of execution of this Agreement. RPS Attributes do not include Environmental Attributes that are greenhouse gas offsets from methane capture not associated with the generation of electricity and not needed to ensure that there are zero net emissions associated with the generation of electricity.

#### **Definition of Environmental Attributes**

As used in this schedule, Environmental Attributes shall mean any and all claims, credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, resulting from the avoidance of the emission of any gas, chemical, or other substance to the air, soil or water. Environmental Attributes include but are not limited to: (1) any avoided emissions of pollutants to the air, soil, or water such as (subject to the foregoing) sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), and other pollutants; and (2) any avoided emissions of carbon dioxide (CO2), methane (CH4), and other greenhouse gases (GHGs) that have been determined by the United Nations Intergovernmental Panel on Climate Change to contribute to the actual or potential threat of altering the Earth's climate by trapping heat in the atmosphere.

#### **Definition of Resource Sufficiency Period**

This is the period from the current year through 2024.

#### **Definition of Resource Deficiency Period**

This is the period from 2025.

#### **Definition of Renewable Resource Sufficiency Period**

This is the period from the current year through 2028.

#### **Definition of Renewable Resource Deficiency Period**

This is the period from 2029.

#### SCHEDULE 201 (Concluded)

#### **DISPUTE RESOLUTION**

Upon request, the QF will provide the purchasing utility with documentation verifying the ownership, management and financial structure of the QF in reasonably sufficient detail to allow the utility to make an initial determination of whether or not the QF meets the above-described criteria for entitlement to pricing under the Standard PPA.

The QF may present disputes to the Commission for resolution using the following process:

The QF may file a complaint asking the Commission to adjudicate disputes regarding the formation of the standard contract. The QF may not file such a complaint during any 15-day period in which the utility has the obligation to respond, but must wait until the 15-day period has passed.

The utility may respond to the complaint within ten days of service.

The Commission will limit its review to the issues identified in the complaint and response, and utilize a process similar to the arbitration process adopted to facilitate the execution of interconnection agreements among telecommunications carriers. See OAR 860, Division 016. The administrative law judge will not act as an arbitrator.

#### **SPECIAL CONDITIONS**

- 1. Delivery of energy by Seller will be at a voltage, phase, frequency, and power factor as specified by the Company.
- If the Seller also receives retail Electricity Service from the Company at the same location, any payments under this schedule will be credited to the Seller's retail Electricity Service bill. At the option of the Customer, any net credit over \$10.00 will be paid by check to the Customer.
- 3. Unless required by state or federal law, if the 1978 Public Utility Regulatory Policies Act (PURPA) is repealed, PPAs entered into pursuant to this schedule will not terminate prior to the Standard or Negotiated PPA's termination date.

#### **TERM OF AGREEMENT**

Not less than one year and not to exceed 20 years.

# UM 1728 Application to Update Schedule 201 Qualifying Facility Information

Redlined Alternative Version (Effective date August 8, 2017)

# SCHEDULE 201 QUALIFYING FACILITY 10 MW or LESS AVOIDED COST POWER PURCHASE INFORMATION

#### **PURPOSE**

To provide information about Standard Avoided Costs and Renewable Avoided Costs, Standard Power Purchase Agreements (PPA) and Negotiated PPAs, power purchase prices and price options for power delivered by a Qualifying Facility (QF) to the Company with nameplate capacity of 10,000 kW (10MW) or less.

#### **AVAILABLE**

To owners of QFs making sales of electricity to the Company in the State of Oregon (Seller).

#### **APPLICABLE**

For power purchased from small power production or cogeneration facilities that are QFs as defined in 18 Code of Federal Regulations (CFR) Section 292, that meet the eligibility requirements described herein and where the energy is delivered to the Company's system and made available for Company purchase pursuant to a Standard PPA.

#### **ESTABLISHING CREDITWORTHINESS**

The Seller must establish creditworthiness prior to service under this schedule. For a Standard PPA, a Seller may establish creditworthiness with a written acknowledgment that it is current on all existing debt obligations and that it was not a debtor in a bankruptcy proceeding within the preceding 24 months. If the Seller is not able to establish creditworthiness, the Seller must provide security deemed sufficient by the Company as set forth in the Standard PPA.

#### POWER PURCHASE INFORMATION

A Seller may call the Power Production Coordinator at (503) 464-8000 to obtain more information about being a Seller or how to apply for service under this schedule.

#### **PPA**

In accordance with terms set forth in this schedule and the Commission's Rules as applicable, the Company will purchase any Energy in excess of station service (power necessary to produce generation) and amounts attributable to conversion losses, which are made available from the Seller.

A Seller must execute a PPA with the Company prior to delivery of power to the Company. The agreement will have a term of up to 20 years as selected by the QF.

A QF with a nameplate capacity rating of 10 MW or less as defined herein may elect the option of a Standard PPA.

#### PPA (Continued)

Any Seller may elect to negotiate a PPA with the Company. Such negotiation will comply with the requirements of the Federal Energy Regulatory Commission (FERC), and the Commission including the guidelines in Order No. 07-360, and Schedule 202. Negotiations for power purchase pricing will be based on either the filed Standard Avoided Costs or Renewable Avoided Costs in effect at that time.

#### STANDARD PPA (Nameplate capacity of 10 MW or less)

A Seller choosing a Standard PPA will complete all informational and price option selection requirements in the applicable Standard PPA and submit the executed Agreement to the Company prior to service under this schedule. The Standard PPA is available at <a href="https://www.portlandgeneral.com">www.portlandgeneral.com</a>. The available Standard PPAs are:

- Standard In-System Non-Variable Power Purchase Agreement
- Standard Off-System Non-Variable Power Purchase Agreement
- Standard In-System Variable Power Purchase Agreement
- Standard Off-System Variable Power Purchase Agreement
- Standard Renewable In-System Non-Variable Power Purchase Agreement
- Standard Renewable Off-System Non-Variable Power Purchase Agreement
- Standard Renewable In-System Variable Power Purchase Agreement
- Standard Renewable Off-System Variable Power Purchase Agreement

The Standard PPAs applicable to variable resources are available only to QFs utilizing wind, solar or run of river hydro as the primary motive force.

#### **GUIDELINES FOR 10 MW OR LESS FACILITIES ELECTING STANDARD PPA**

To execute the Standard PPA the Seller must complete all of the general project information requested in the applicable Standard PPA.

When all information required in the Standard PPA has been received in writing from the Seller, the Company will respond within 15 business days with a draft Standard PPA.

The Seller may request in writing that the Company prepare a final draft Standard PPA. The Company will respond to this request within 15 business days. In connection with such request, the QF must provide the Company with any additional or clarified project information that the Company reasonably determines to be necessary for the preparation of a final draft Standard PPA.

When both parties are in full agreement as to all terms and conditions of the draft Standard PPA, the Company will prepare and forward to the Seller a final executable version of the agreement within 15 business days. Following the Company's execution, an executed copy will be returned to the Seller. Prices and other terms and conditions in the PPA will not be final and binding until the Standard PPA has been executed by both parties.

#### **OFF-SYSTEM PPA**

A Seller with a facility that interconnects with an electric system other than the Company's electric system may enter into a PPA with the Company after following the applicable Standard or Negotiated PPA guidelines and making the arrangements necessary for transmission of power to the Company's system.

#### BASIS FOR POWER PURCHASE PRICE

#### AVOIDED COST SUMMARY

The power purchase prices are based on either the Company's Standard Avoided Costs or Renewable Avoided Costs in effect at the time the agreement is executed. Avoided Costs are defined in 18 CFR 292.101(6) as "the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the qualifying facility or qualifying facilities, such utility would generate itself or purchase from another source."

Monthly On-Peak prices are included in both the Standard Avoided Costs as listed in Tables 1a, 2a, and 3a and Renewable Avoided Costs as listed in Tables 4a, 5a, and 6a. Monthly Off-Peak prices are included in both the Standard Avoided Costs as listed in Tables 1b, 2b, and 3b and Renewable Avoided Costs as listed in Tables 4b, 5b, and 6b.

#### **ON-PEAK PERIOD**

The On-Peak period is 6:00 a.m. until 10:00 p.m., Monday through Saturday.

#### **OFF-PEAK PERIOD**

The Off-Peak period is 10:00 p.m. until 6:00 a.m., Monday through Saturday, and all day on Sunday.

Standard Avoided Costs are based on forward market price estimates through the Resource Sufficiency Period, the period of time during which the Company's Standard Avoided Costs are associated with incremental purchases of Energy and capacity from the market. For the Resource Deficiency Period, the Standard Avoided Costs reflect the fully allocated costs of a natural gas fueled combined cycle combustion turbine (CCCT) including fuel and capital costs. The CCCT Avoided Costs are based on the variable cost of Energy plus capitalized Energy costs at a 93% capacity factor based on a natural gas price forecast, with prices modified for shrinkage and transportation costs.

Renewable Avoided Costs are based on forward market price estimates through the Renewable Resource Sufficiency Period, the period of time during which the Company's Renewable Avoided Costs are associated with incremental purchases of energy and capacity from the market. For the Renewable Resource Deficiency Period, the Renewable Avoided Costs reflect the fully allocated costs of a wind plant including capital costs.

#### PRICING FOR STANDARD PPA

Pricing represents the purchase price per MWh the Company will pay for electricity delivered to a Point of Delivery (POD) within the Company's service territory pursuant to a Standard PPA up to the nameplate rating of the QF in any hour. Any Energy delivered in excess of the nameplate rating will be purchased at the applicable Off-Peak Prices for the selected pricing option.

The Standard PPA pricing will be based on either the Standard or Renewable Avoided Costs in effect at the time the agreement is executed.

The Company will pay the Seller either the Off-Peak Standard Avoided Cost pursuant to Tables 1b, 2b, or 3b or the Off-Peak Renewable Avoided Costs pursuant to Tables 4b, 5b, or 6b for: (a) all Net Output delivered prior to the Commercial Operation Date; (b) all Net Output deliveries greater than Maximum Net Output in any PPA year; (c) any generation subject to and as adjusted by the provisions of Section 4.3 of the Standard PPA; (d) Net Output delivered in the Off-Peak Period; and (e) deliveries above the nameplate capacity in any hour. The Company will pay the Seller either the On-Peak Standard Avoided Cost pursuant to Tables 1a, 2a, or 3a or the On-Peak Renewable Avoided Costs pursuant to Tables 4a, 5a, or 6a for all other Net Output. (See the PPA for defined terms.)

### 1) Standard Fixed Price Option

The Standard Fixed Price Option is based on Standard Avoided Costs including forecasted natural gas prices. It is available to all QFs.

This option is available for a maximum term of 15 years. Prices will be as established at the time the Standard PPA is executed and will be equal to the Standard Avoided Costs in Tables 1a and 1b, 2a and 2b, or 3a and 3c, depending on the type of QF, effective at execution. QFs using any resource type other than wind and solar are assumed to be Base Load QFs.

Prices paid to the Seller under the Standard Fixed Price Option include adjustments for the capacity contribution of the QF resource type relative to that of the avoided proxy resource. Both the Base Load QF resources (Tables 1a and 1b) and the avoided proxy resource, the basis used to determine Standard Avoided Costs for the Standard Fixed Price Option, are assumed to have a capacity contribution to peak of 100%. The capacity contribution for Wind QF resources (Tables 2a and 2b) is assumed to be 18.595%. The capacity contribution for Solar QF resources (Tables 3a and 3b) is assumed to be 515.33%.

Prices paid to the Seller under the Standard Fixed Price Option for Wind and Solar QFs (Tables 2a, and 2b, 3a, and 3b) include a reduction for the wind integration costs in Table 7. However, if the Wind or Solar QF is outside of PGE's Balancing Authority Area as contemplated in the Commission's Order No. 14-058, the Seller is paid the wind integration charges in Table 7, in addition to the prices listed in Tables 2a and 2b or 3a and 3b, for a net-zero effect.

PRICING OPTIONS FOR STANDARD PPA (Continued)
Standard Fixed Price Option (Continued)

Sellers with PPAs exceeding 15 years will receive pricing equal to the Mid-C Index Price for all years up to five in excess of the initial 15.

					-	TABLE 1a	<u> </u>								
						oided Co									
			S	Standard	Fixed Pri	ce Optior	for Base	e Load Q	F						
				(	On-Peak	Forecast	(\$/MWH)								
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
2017								34.81	29.46	26.91	27.42	33.53			
2018	32.01	29.46	25.38	21.14	20.62	21.14	30.01	33.42	31.06	25.63	27.67	32.27			
2019	31.18	29.49	23.89	19.25	18.62	19.53	30.14	34.47	31.43	26.91	28.93	34.34			
2020	32.84	31.06	25.15	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16			
2021	34.60	32.72	26.46	21.28	20.58	21.61	33.44	38.27	34.87	29.82	32.09	38.13			
2022	36.47	34.48	27.88	22.42	21.68	22.76	35.25	40.34	36.75	31.44	33.81	40.19			
2023	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07			
2024	36.16	34.47	31.84	26.04	23.28	16.27	29.02	32.72	35.73	35.93	36.83	39.19			
2025	<b>25</b> 57.28 57.40 57.49 56.78 56.75 56.67 56.77 56.85 56.97 57.07 57.81 57.92														
2026	59.17	59.29	59.34	58.62	58.63	58.69	58.79	58.89	59.03	59.16	60.03	60.15			
2027	61.01	61.13	61.04	60.30	60.44	60.19	60.29	60.39	60.52	61.27	59.92	60.04			
2028	61.23	61.31	61.19	60.52	60.66	60.78	60.88	61.00	61.12	61.26	62.44	62.57			
2029	64.03	64.16	64.28	63.58	63.76	64.88	65.00	65.13	65.28	65.40	66.74	66.88			
2030	69.60	70.59	70.73	70.05	70.25	70.41	70.56	70.72	70.89	71.77	72.44	72.62			
2031	74.30	74.48	74.10	73.00	73.15	73.04	73.18	73.34	73.51	73.69	74.85	75.02			
2032	76.53	76.62	76.32	75.09	75.30	75.49	75.64	75.81	76.00	76.25	77.82	78.02			
2033	80.07	80.28	80.02	78.86	79.09	79.29	79.46	79.64	79.85	80.26	81.68	81.90			
2034	83.89	84.11	82.95	81.61	81.86	82.07	82.25	82.45	82.67	82.91	84.66	84.89			
2035	86.73	86.97	85.83	84.45	84.70	84.37	84.55	84.75	84.99	85.49	86.97	87.42			
2036	89.63	89.87	88.67	87.20	87.49	87.12	87.32	87.54	87.78	88.31	89.86	90.33			
2037	92.90	93.16	91.91	90.37	90.65	90.28	90.48	90.71	90.95	91.53	93.15	93.66			
2038	96.17	96.45	95.12	93.50	93.81	93.42	93.63	93.87	94.14	94.74	96.45	96.97			
2039	99.60	99.87	98.49	96.79	97.11	96.69	96.92	97.17	97.45	98.09	99.87	100.43			
2040	103.14	103.43	101.98	100.19	100.53	100.09	100.34	100.59	100.89	101.55	103.43	104.02			
2041	106.88	107.19	105.65	103.77	104.11	103.66	103.92	104.18	104.50	105.20	107.17	107.79			
2042	110.75	111.07	109.46	107.49	107.86	107.38	107.63	107.92	108.25	108.98	111.07	111.71			

						TABLE 1b						
						oided Cos						
			S				for Base		<u> </u>			
					Off-Peak	Forecast	(\$/MWH)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				•				24.51	24.72	23.85	24.11	27.42
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.41
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	27.96	28.08	28.17	27.46	27.43	27.35	27.45	27.53	27.65	27.75	28.49	28.60
2026	29.26	29.39	29.43	28.71	28.72	28.79	28.89	28.99	29.12	29.25	30.12	30.24
2027	30.50	30.63	30.54	29.80	29.94	29.69	29.79	29.89	30.01	30.76	29.41	29.54
2028	30.11	30.19	30.08	29.41	29.55	29.66	29.77	29.88	30.01	30.15	31.33	31.45
2029	32.29	32.42	32.54	31.85	32.02	33.14	33.26	33.39	33.54	33.66	35.01	35.15
2030	37.23	38.22	38.36	37.68	37.88	38.04	38.19	38.35	38.52	39.40	40.07	40.25
2031	41.28	41.46	41.08	39.98	40.13	40.02	40.16	40.32	40.49	40.67	41.83	42.00
2032	43.06	43.15	42.85	41.62	41.84	42.02	42.17	42.35	42.54	42.79	44.35	44.55
2033	45.72	45.92	45.67	44.51	44.74	44.94	45.11	45.28	45.50	45.91	47.33	47.54
2034	48.74	48.96	47.80	46.46	46.71	46.91	47.10	47.29	47.51	47.76	49.51	49.74
2035	50.99	51.23	50.09	48.70	48.96	48.62	48.81	49.01	49.25	49.75	51.23	51.68
2036	53.29	53.53	52.33	50.86	51.15	50.78	50.98	51.20	51.45	51.97	53.52	53.99
2037	55.72	55.98	54.72	53.19	53.47	53.09	53.30	53.52	53.77	54.35	55.97	56.48
2038	58.24	58.52	57.19	55.57	55.88	55.49	55.70	55.94	56.21	56.81	58.52	59.04
2039	60.91	61.18	59.80	58.11	58.42	58.01	58.24	58.48	58.77	59.40	61.18	61.74
2040	63.68	63.97	62.52	60.73	61.07	60.63	60.88	61.12	61.43	62.09	63.97	64.55
2041	66.63	66.94	65.40	63.52	63.86	63.41	63.66	63.93	64.25	64.95	66.92	67.54
2042	69.70	70.02	68.40	66.43	66.80	66.33	66.57	66.86	67.20	67.93	70.02	70.66

					7	TABLE 2a						
					Ave	oided Co	sts					
							ion for W					
					On-Peak	Forecast	(\$/MWH)					
Year	Jan	Feb	Mar	Anr	Mov	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	Jan	reb	IVIAI	Apr	May	Jun	Jui	<b>Aug</b> 33.96	28.61	26.06	26.57	32.68
2017	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.14	33.59	30.19	26.03	28.05	33.46
2019	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2020	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.21
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.25
2022	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.11
2023	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.21
2024	41.62	41.74	41.83	41.12	41.09	41.01	41.11	41.20	41.32	41.42	42.16	42.27
2026	43.20	43.32	43.37	42.65	42.66	42.72	42.82	42.92	43.06	43.19	44.06	44.18
2027	44.72	44.84	44.75	44.02	44.15	43.90	44.00	44.11	44.23	44.98	43.63	43.76
2028	44.62	44.70	44.58	43.91	44.05	44.16	44.27	44.38	44.51	44.65	45.83	45.96
2029	47.09	47.22	47.33	46.64	46.82	47.94	48.05	48.18	48.34	48.45	49.80	49.94
2030	52.32	53.31	53.45	52.77	52.97	53.13	53.28	53.44	53.61	54.49	55.16	55.34
2031	56.67	56.86	56.48	55.37	55.52	55.41	55.56	55.72	55.89	56.06	57.23	57.40
2032	58.66	58.75	58.45	57.22	57.43	57.62	57.77	57.95	58.13	58.38	59.95	60.15
2033	61.73	61.93	61.68	60.52	60.75	60.95	61.12	61.30	61.51	61.92	63.34	63.55
2034	65.13	65.35	64.19	62.85	63.10	63.31	63.49	63.68	63.91	64.15	65.90	66.13
2035	67.65	67.89	66.75	65.37	65.62	65.29	65.48	65.68	65.91	66.42	67.89	68.34
2036	70.22	70.47	69.26	67.80	68.08	67.72	67.92	68.14	68.38	68.91	70.45	70.93
2037	73.05	73.32	72.06	70.53	70.80	70.43	70.64	70.86	71.11	71.69	73.30	73.81
2038	75.92	76.20	74.87	73.25	73.56	73.17	73.38	73.62	73.89	74.49	76.20	76.72
2039	78.95	79.22	77.84	76.15	76.46	76.04	76.27	76.52	76.81	77.44	79.22	79.78
2040	82.07	82.36	80.91	79.13	79.46	79.02	79.27	79.52	79.83	80.49	82.36	82.95
2041	85.39	85.70	84.16	82.28	82.62	82.17	82.43	82.70	83.01	83.71	85.69	86.30
2042	88.84	89.16	87.55	85.58	85.94	85.47	85.72	86.01	86.34	87.07	89.16	89.80

						FADI E OL						
						FABLE 2b						
				Standa		oided Co: Price Opt		ind OE				
						Forecast						
				<u> </u>	OII-F Cak	i Oi ecasi	( \$7 1414 A 1 1)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	26.96	27.08	27.17	26.46	26.43	26.35	26.45	26.53	26.65	26.75	27.49	27.60
2026	28.24	28.37	28.41	27.69	27.70	27.77	27.87	27.97	28.10	28.23	29.10	29.22
2027	29.46	29.59	29.50	28.76	28.90	28.65	28.75	28.85	28.97	29.72	28.37	28.50
2028	29.05	29.13	29.02	28.35	28.49	28.60	28.71	28.82	28.95	29.09	30.27	30.39
2029	31.21	31.34	31.46	30.77	30.94	32.06	32.18	32.31	32.46	32.58	33.93	34.07
2030	36.13	37.12	37.26	36.58	36.78	36.94	37.09	37.25	37.42	38.30	38.97	39.15
2031	40.16	40.34	39.96	38.86	39.01	38.90	39.04	39.20	39.37	39.55	40.71	40.88
2032	41.92	42.01	41.71	40.48	40.70	40.88	41.03	41.21	41.40	41.65	43.21	43.41
2033	44.55	44.75	44.50	43.34	43.57	43.77	43.94	44.11	44.33	44.74	46.16	46.37
2034	47.55	47.77	46.61	45.27	45.52	45.72	45.91	46.10	46.32	46.57	48.32	48.55
2035	49.78	50.02	48.88	47.49	47.75	47.41	47.60	47.80	48.04	48.54	50.02	50.47
2036	52.05	52.29	51.09	49.62	49.91	49.54	49.74	49.96	50.21	50.73	52.28	52.75
2037	54.46	54.72	53.46	51.93	52.21	51.83	52.04	52.26	52.51	53.09	54.71	55.22
2038	56.95	57.23	55.90	54.28	54.59	54.20	54.41	54.65	54.92	55.52	57.23	57.75
2039	59.60	59.87	58.49	56.80	57.11	56.70	56.93	57.17	57.46	58.09	59.87	60.43
2040	62.34	62.63	61.18	59.39	59.73	59.29	59.54	59.78	60.09	60.75	62.63	63.21
2041	65.26	65.57	64.03	62.15	62.49	62.04	62.29	62.56	62.88	63.58	65.55	66.17
2042	68.31	68.63	67.01	65.04	65.41	64.94	65.18	65.47	65.81	66.54	68.63	69.27

					-	TABLE 3a						
						oided Cos						
				Standar	d Fixed I	Price Opt	ion for So	olar QF				
					On-Peak	Forecast	(\$/MWH)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								33.96	28.61	26.06	26.57	32.68
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.46
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.21
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.25
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.11
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.21
2025	38.93	39.05	39.13	38.43	38.39	38.32	38.42	38.50	38.62	38.72	39.46	39.57
2026	40.45	40.57	40.62	39.90	39.91	39.97	40.07	40.17	40.31	40.44	41.31	41.43
2027	41.91	42.04	41.95	41.21	41.35	41.10	41.20	41.30	41.43	42.17	40.83	40.95
2028	41.75	41.84	41.72	41.05	41.19	41.30	41.41	41.52	41.65	41.79	42.97	43.10
2029	44.17	44.30	44.42	43.72	43.90	45.02	45.14	45.27	45.42	45.54	46.88	47.02
2030	49.34	50.33	50.48	49.79	49.99	50.15	50.31	50.46	50.63	51.51	52.18	52.36
2031	53.64	53.82	53.44	52.34	52.49	52.37	52.52	52.68	52.85	53.02	54.19	54.36
2032	55.58	55.67	55.37	54.14	54.36	54.54	54.69	54.87	55.06	55.31	56.87	57.07
2033	58.57	58.78	58.52	57.36	57.59	57.79	57.96	58.14	58.35	58.76	60.18	60.40
2034	61.90	62.12	60.96	59.62	59.87	60.07	60.26	60.45	60.67	60.92	62.66	62.90
2035	64.37	64.61	63.46	62.08	62.34	62.00	62.19	62.39	62.63	63.13	64.61	65.06
2036	66.88	67.12	65.92	64.46	64.74	64.38	64.58	64.80	65.04	65.57	67.11	67.58
2037	69.64	69.90	68.64	67.11	67.38	67.01	67.22	67.44	67.69	68.27	69.88	70.40
2038	72.43	72.71	71.39	69.77	70.08	69.68	69.89	70.13	70.40	71.01	72.71	73.23
2039	75.39	75.66	74.28	72.59	72.90	72.49	72.72	72.96	73.25	73.88	75.66	76.22
2040	78.44	78.74	77.28	75.50	75.83	75.39	75.64	75.89	76.20	76.86	78.74	79.32
2041	81.69	82.00	80.46	78.58	78.92	78.47	78.72	78.99	79.31	80.01	81.98	82.60
2042	85.07	85.39	83.77	81.80	82.17	81.70	81.94	82.23	82.57	83.30	85.39	86.03

						TABLE 3b						
						oided Cos						
				Standar		Price Opt		olar QF				
						Forecast		<u> </u>				
							(4,,					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	26.96	27.08	27.17	26.46	26.43	26.35	26.45	26.53	26.65	26.75	27.49	27.60
2026	28.24	28.37	28.41	27.69	27.70	27.77	27.87	27.97	28.10	28.23	29.10	29.22
2027	29.46	29.59	29.50	28.76	28.90	28.65	28.75	28.85	28.97	29.72	28.37	28.50
2028	29.05	29.13	29.02	28.35	28.49	28.60	28.71	28.82	28.95	29.09	30.27	30.39
2029	31.21	31.34	31.46	30.77	30.94	32.06	32.18	32.31	32.46	32.58	33.93	34.07
2030	36.13	37.12	37.26	36.58	36.78	36.94	37.09	37.25	37.42	38.30	38.97	39.15
2031	40.16	40.34	39.96	38.86	39.01	38.90	39.04	39.20	39.37	39.55	40.71	40.88
2032	41.92	42.01	41.71	40.48	40.70	40.88	41.03	41.21	41.40	41.65	43.21	43.41
2033	44.55	44.75	44.50	43.34	43.57	43.77	43.94	44.11	44.33	44.74	46.16	46.37
2034	47.55	47.77	46.61	45.27	45.52	45.72	45.91	46.10	46.32	46.57	48.32	48.55
2035	49.78	50.02	48.88	47.49	47.75	47.41	47.60	47.80	48.04	48.54	50.02	50.47
2036	52.05	52.29	51.09	49.62	49.91	49.54	49.74	49.96	50.21	50.73	52.28	52.75
2037	54.46	54.72	53.46	51.93	52.21	51.83	52.04	52.26	52.51	53.09	54.71	55.22
2038	56.95	57.23	55.90	54.28	54.59	54.20	54.41	54.65	54.92	55.52	57.23	57.75
2039	59.60	59.87	58.49	56.80	57.11	56.70	56.93	57.17	57.46	58.09	59.87	60.43
2040	62.34	62.63	61.18	59.39	59.73	59.29	59.54	59.78	60.09	60.75	62.63	63.21
2041	65.26	65.57	64.03	62.15	62.49	62.04	62.29	62.56	62.88	63.58	65.55	66.17
2042	68.31	68.63	67.01	65.04	65.41	64.94	65.18	65.47	65.81	66.54	68.63	69.27

PRICING OPTIONS FOR STANDARD PPA (Continued)

#### 2) Renewable Fixed Price Option

The Renewable Fixed Price Option is based on Renewable Avoided Costs. It is available only to Renewable QFs that generate electricity from a renewable energy source that may be used by the Company to comply with the Oregon Renewable Portfolio Standard as set forth in ORS 469A.005 to 469A.210.

This option is available for a maximum term of 15 years. Prices will be as established at the time the Standard PPA is executed and will be equal to the Renewable Avoided Costs in Tables 4a and 4b, 5a and 5b, or 6a and 6b, depending on the type of QF, effective at execution. QFs using any resource type other than wind and solar are assumed to be Base Load QFs.

Sellers will retain all Environmental Attributes generated by the facility during the Renewable Resource Sufficiency Period. A Renewable QF choosing the Renewable Fixed Price Option must cede all RPS Attributes generated by the facility to the Company from the start of the Renewable Resource Deficiency Period through the remainder of the PPA term.

Prices paid to the Seller under the Renewable Fixed Price Option include adjustments for the capacity contribution of the QF resource type relative to that of the avoided proxy resource. Both Wind QF resources (Tables 5a and 5b) and the avoided proxy resource, the basis used to determine Renewable Avoided Costs for the Renewable Fixed Price Option, are assumed to have a capacity contribution to peak of \$\frac{518.59}{18.59}\%. The capacity contribution for Solar QF resources (Tables 6a and 6b) is assumed to be \$\frac{515.33}{18.59}\%. The capacity contribution for Base Load QF resources (Tables 4a and 4b) is assumed to be 100%.

The Renewable Avoided Costs during the Renewable Resource Deficiency Period reflect an increase for avoided wind integration costs, shown in Table 7.

Prices paid to the Seller under the Renewable Fixed Price Option for Wind and solar QFs (Tables 5a, and 5b, 6a, and 6b) include a reduction for the wind integration costs in Table 7, which cancels out wind integration costs included in the Renewable Avoided Costs during the Renewable Resource Deficiency Period. However, if the Wind or Solar QF is outside of PGE's Balancing Authority Area as contemplated in the Commission's Order No. 14-058, the Seller is paid the wind integration charges in Table 7, in addition to the prices listed in Tables 5a and 5b or 6a and 6b.

Sellers with PPAs exceeding 15 years will receive pricing equal to the Mid-C Index Price for all years up to five in excess of the initial 15.

# PRICING OPTIONS FOR STANDARD PPA (Continued)

Renewable Fixed Price Option (Continued)

					-	ΓABLE 4a						
							ed Costs					
			R	enewable	Fixed Pr	ice Optic	n for Bas	se Load C	(F			
					On-Peak	Forecast	(\$/MWH)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								34.81	29.46	26.91	27.42	33.53
2018	32.01	29.46	25.38	21.14	20.62	21.14	30.01	33.42	31.06	25.63	27.67	32.27
2019	31.18	29.49	23.89	19.25	18.62	19.53	30.14	34.47	31.43	26.91	28.93	34.34
2020	32.84	31.06	25.15	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16
2021	34.60	32.72	26.46	21.28	20.58	21.61	33.44	38.27	34.87	29.82	32.09	38.13
2022	36.47	34.48	27.88	22.42	21.68	22.76	35.25	40.34	36.75	31.44	33.81	40.19
2023	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07
2024	36.16	34.47	31.84	26.04	23.28	16.27	29.02	32.72	35.73	35.93	36.83	39.19
2025	36.28	36.45	32.07	27.15	25.16	20.76	31.18	33.59	36.96	36.50	36.17	38.88
2026	38.02	38.42	34.69	28.61	23.72	19.90	33.16	36.49	39.07	39.98	39.93	41.34
2027	40.65	40.65	35.03	29.55	25.62	19.81	33.68	38.68	40.37	41.18	39.95	42.49
2028	41.59	39.62	35.61	29.31	24.13	18.69	35.04	39.47	41.56	42.04	42.77	45.50
2029	130.46	122.16	114.93	99.44	91.28	66.74	111.72	123.40	130.72	125.77	127.43	137.59
2030	131.08	128.53	117.83	98.71	84.69	62.99	114.81	124.72	133.57	132.78	130.81	140.19
2031	131.64	130.86	120.44	98.71	91.59	75.33	113.41	127.20	134.67	132.63	129.43	138.99
2032	134.62	132.28	119.05	100.89	89.34	66.65	119.99	136.17	137.32	134.74	138.45	144.33
2033	137.25	136.91	119.61	101.75	86.72	86.02	122.63	133.68	138.82	137.65	139.72	144.28
2034	142.85	142.41	123.71	103.53	88.59	73.28	127.14	137.57	142.77	143.43	144.85	150.81
2035	148.82	142.53	126.90	103.23	91.63	67.83	123.14	139.46	145.86	143.75	142.41	153.08
2036	149.95	144.47	128.97	105.99	82.91	55.60	131.13	142.04	150.30	148.99	147.58	158.25
2037	150.31	149.85	132.81	104.38	91.13	77.19	129.68	144.87	152.33	149.48	149.48	159.99
2038	153.59	155.69	131.34	104.62	84.94	70.00	139.81	155.20	158.10	155.40	156.18	165.33
2039	155.36	153.84	130.69	105.47	94.56	80.72	140.16	151.56	157.69	151.05	155.29	162.46
2040	157.59	155.79	132.79	114.89	87.55	75.00	145.49	156.16	163.50	158.77	161.06	169.93
2041	161.95	158.31	139.08	119.78	109.77	63.50	144.74	159.21	165.49	156.15	156.63	168.47
2042	164.72	162.40	143.32	120.89	93.22	64.66	149.09	163.83	169.34	163.16	161.00	175.92

_		_		_		TABLE 4b			_		_	
			D	enewable				o Load C	NE .			
			IX				(\$/MWH)		(1			
					On I cak	1 OI CCGSt	(ψ/1010011)	<u>'</u>				
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								24.51	24.72	23.85	24.11	27.42
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.4
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	33.70	32.17	29.76	25.01	21.99	19.00	26.39	30.90	33.57	33.77	33.61	34.83
2026	35.44	35.59	31.64	27.21	22.20	15.26	28.97	33.61	36.07	35.46	35.51	37.70
2027	36.66	35.71	32.22	27.60	23.64	18.12	29.40	34.72	37.35	37.55	36.31	38.40
2028	38.09	37.21	33.20	27.82	23.65	17.34	31.56	36.38	38.22	38.77	39.08	40.92
2029	87.39	83.14	79.75	60.89	56.60	30.37	68.86	84.70	91.46	89.10	90.05	95.00
2030	90.66	87.81	81.88	62.46	52.25	31.31	75.55	87.01	93.96	93.87	94.23	96.33
2031	94.53	91.33	79.90	66.32	59.86	41.01	74.22	87.92	95.40	93.03	92.05	96.31
2032	95.12	90.63	85.26	64.49	46.09	33.03	81.76	88.62	98.19	95.17	97.79	103.88
2033	96.72	93.73	84.37	65.02	55.14	44.09	81.80	90.25	98.91	96.03	97.55	104.35
2034	100.64	96.93	84.22	63.90	50.21	33.88	82.22	94.26	101.29	101.38	105.38	107.75
2035	103.38	100.59	93.20	71.90	61.31	46.52	81.06	99.14	104.45	99.35	103.56	106.09
2036	111.16	105.72	94.24	72.48	61.23	31.45	82.90	100.58	110.79	104.85	108.44	114.13
2037	110.15	107.49	96.32	79.57	59.61	38.00	86.10	101.85	110.09	103.94	105.91	113.12
2038	113.74	110.37	97.67	79.06	51.82	34.44	88.62	103.26	110.27	107.20	111.44	117.93
2039	110.16	108.78	96.61	84.94	62.94	60.33	93.55	103.97	110.69	110.48	115.32	122.80
2040	116.99	108.93	94.17	91.82	59.51	40.97	95.01	110.61	112.45	116.09	118.19	121.07
2041	116.50	110.73	111.72	97.32	66.46	37.99	97.97	109.98	123.17	113.27	119.57	123.40
2042	126.11	116.45	107.55	85.50	62.50	40.12	105.67	116.39	125.76	123.46	122.21	128.97

						TABLE 5a						
						Price Op		Wind OF				
						Forecast						
					on roun	. 0. 00001	(ψ/ /	<u>/</u>				
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017				-				33.96	28.61	26.06	26.57	32.68
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.46
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.21
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.2
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.11
2024	35.18	33.49	30.86	25.06	22.30	15.29	28.04	31.74	34.75	34.95	35.85	38.2
2025	35.28	35.45	31.07	26.15	24.16	19.76	30.18	32.59	35.96	35.50	35.17	37.88
2026	37.00	37.40	33.67	27.59	22.70	18.88	32.14	35.47	38.05	38.96	38.91	40.32
2027	39.61	39.61	33.99	28.51	24.58	18.77	32.64	37.64	39.33	40.14	38.91	41.45
2028	40.53	38.56	34.55	28.25	23.07	17.63	33.98	38.41	40.50	40.98	41.71	44.44
2029	113.52	105.21	97.99	82.50	74.34	49.80	94.77	106.45	113.77	108.83	110.48	120.64
2030	113.80	111.24	100.54	81.43	67.41	45.70	97.52	107.44	116.29	115.50	113.53	122.91
2031	114.02	113.23	102.81	81.08	73.97	57.71	95.79	109.57	117.04	115.01	111.80	121.36
2032	116.76	114.41	101.18	83.02	71.47	48.78	102.12	118.30	119.45	116.88	120.58	126.46
2033	118.91	118.57	101.27	83.40	68.38	67.68	104.29	115.34	120.47	119.31	121.38	125.94
2034	124.09	123.65	104.95	84.77	69.82	54.52	108.37	118.81	124.01	124.67	126.09	132.0
2035	129.75	123.46	107.82	84.16	72.56	48.75	104.07	120.39	126.78	124.67	123.33	134.0
2036	130.55	125.06	109.57	86.58	63.51	36.20	111.72	122.63	130.90	129.59	128.17	138.84
2037	130.46	130.00	112.97	84.54	71.28	57.35	109.83	125.02	132.49	129.63	129.63	140.14
2038	133.34	135.44	111.09	84.37	64.69	49.75	119.56	134.95	137.85	135.16	135.93	145.08
2039	134.72	133.19	110.04	84.82	73.91	60.08	119.52	130.91	137.04	130.40	134.64	141.8°
2040	136.52	134.72	111.73	93.82	66.49	53.93	124.43	135.10	142.44	137.70	140.00	148.87
2041	140.47	136.82	117.59	98.30	88.28	42.01	123.25	137.72	144.00	134.66	135.14	146.98
2042	142.81	140.48	121.41	98.97	71.31	42.74	127.18	141.92	147.43	141.25	139.09	154.01

						TABLE 5k	ed Costs					
							tion for \					
							(\$/MWH)					
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.57
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.54
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.50
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.82
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.05
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.38
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.81
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.82
2025	32.70	31.17	28.76	24.01	20.99	18.00	25.39	29.90	32.57	32.77	32.61	33.83
2026	34.42	34.57	30.62	26.19	21.18	14.24	27.95	32.59	35.05	34.44	34.49	36.68
2027	35.62	34.67	31.18	26.56	22.60	17.08	28.36	33.68	36.31	36.51	35.27	37.36
2028	37.03	36.15	32.14	26.76	22.59	16.28	30.50	35.32	37.16	37.71	38.02	39.86
2029	86.31	82.06	78.67	59.81	55.52	29.29	67.78	83.62	90.38	88.02	88.97	93.92
2030	89.56	86.71	80.78	61.36	51.15	30.21	74.45	85.91	92.86	92.77	93.13	95.23
2031	93.41	90.21	78.78	65.20	58.74	39.89	73.10	86.80	94.28	91.91	90.93	95.19
2032	93.98	89.49	84.12	63.35	44.95	31.89	80.62	87.48	97.05	94.03	96.65	102.74
2033	95.55	92.56	83.20	63.85	53.97	42.92	80.63	89.08	97.74	94.86	96.38	103.18
2034	99.45	95.74	83.03	62.71	49.02	32.69	81.03	93.07	100.10	100.19	104.19	106.56
2035	102.17	99.38	91.99	70.69	60.10	45.31	79.85	97.93	103.24	98.14	102.35	104.88
2036	109.92	104.48	93.00	71.24	59.99	30.21	81.66	99.34	109.55	103.61	107.20	112.89
2037	108.89	106.23	95.06	78.31	58.35	36.74	84.84	100.59	108.83	102.68	104.65	111.86
2038	112.45	109.08	96.38	77.77	50.53	33.15	87.33	101.97	108.98	105.91	110.15	116.64
2039	108.85	107.47	95.30	83.63	61.63	59.02	92.24	102.66	109.38	109.17	114.01	121.49
2040	115.65	107.59	92.83	90.48	58.17	39.63	93.67	109.27	111.11	114.75	116.85	119.73
2041	115.13	109.36	110.35	95.95	65.09	36.62	96.60	108.61	121.80	111.90	118.20	122.03
2042	124.72	115.06	106.16	84.11	61.11	38.73	104.28	115.00	124.37	122.07	120.82	127.58

					-	ΓABLE 6a	,								
					Renewak										
				Renewa	ble Fixed	Price Op	tion for S	Solar QF							
					On-Peak	Forecast	(\$/MWH)								
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
2017								33.96	28.61	26.06	26.57	32.68			
2018	31.14	28.59	24.51	20.27	19.75	20.27	29.14	32.55	30.19	24.76	26.80	31.40			
2019	30.30	28.61	23.01	18.37	17.74	18.65	29.26	33.59	30.55	26.03	28.05	33.46			
2020	31.94	30.16	24.25	19.36	18.69	19.66	30.84	35.40	32.19	27.43	29.56	35.26			
2021	33.68	31.80	25.54	20.36	19.66	20.69	32.52	37.35	33.95	28.90	31.17	37.21			
2022	35.53	33.54	26.94	21.48	20.74	21.82	34.31	39.40	35.81	30.50	32.87	39.25			
2023	31.59	31.52	27.55	24.15	22.18	20.89	27.33	30.07	32.42	32.91	33.05	35.11			
2024	<b>2024</b> 35.18 33.49 30.86 25.06 22.30 15.29 28.04 31.74 34.75 34.95 35.85 3														
2025															
2026	37.00	37.40	33.67	27.59	22.70	18.88	32.14	35.47	38.05	38.96	38.91	40.32			
2027	39.61	39.61	33.99	28.51	24.58	18.77	32.64	37.64	39.33	40.14	38.91	41.45			
2028	40.53	38.56	34.55	28.25	23.07	17.63	33.98	38.41	40.50	40.98	41.71	44.44			
2029	110.60	102.29	95.07	79.58	71.42	46.88	91.85	103.54	110.85	105.91	107.56	117.72			
2030	110.82	108.27	97.57	78.45	64.43	42.73	94.55	104.46	113.31	112.52	110.55	119.93			
2031	110.98	110.19	99.78	78.05	70.93	54.67	92.75	106.54	114.01	111.97	108.77	118.33			
2032	113.68	111.33	98.10	79.95	68.40	45.70	99.05	115.22	116.37	113.80	117.51	123.38			
2033	115.75	115.41	98.11	80.25	65.22	64.52	101.13	112.18	117.32	116.15	118.22	122.78			
2034	120.86	120.42	101.71	81.54	66.59	51.28	105.14	115.58	120.78	121.43	122.86	128.82			
2035	126.46	120.17	104.54	80.87	69.27	45.47	100.78	117.10	123.50	121.38	120.05	130.72			
2036	127.20	121.72	106.23	83.24	60.16	32.86	108.38	119.29	127.56	126.25	124.83	135.50			
2037	127.04	126.58	109.55	81.12	67.86	53.93	106.42	121.60	129.07	126.21	126.21	136.72			
2038	129.86	131.95	107.60	80.88	61.20	46.26	116.08	131.46	134.36	131.67	132.45	141.59			
2039	131.16	129.64	106.49	81.27	70.35	56.52	115.96	127.36	133.49	126.84	131.09	138.25			
2040	132.90	131.10	108.10	90.19	62.86	50.30	120.80	131.47	138.81	134.08	136.37	145.24			
2041	136.76	133.12	113.89	94.59	84.58	38.31	119.55	134.02	140.30	130.96	131.44	143.28			
2042	139.03	136.71	117.63	95.20	67.53	38.97	123.41	138.15	143.66	137.47	135.31	150.23			

						TABLE 6k	ed Costs					
							ea Costs tion for S					
							(\$/MWH)					
					OII-F Cak	i Oi ecasi	(\$/IVIVVII)	<u>'</u>				
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								23.66	23.87	23.00	23.26	26.5
2018	26.55	24.00	19.93	14.31	11.25	10.01	18.71	23.37	23.82	21.64	22.82	26.5
2019	23.54	23.73	18.41	12.58	9.54	9.19	18.27	24.18	24.65	22.45	23.99	28.5
2020	25.45	25.65	19.90	13.58	10.29	9.90	19.74	26.13	26.64	24.27	25.94	30.8
2021	27.26	27.48	21.28	14.47	10.93	10.52	21.11	28.00	28.55	25.98	27.79	33.0
2022	29.17	29.40	22.77	15.48	11.67	11.24	22.59	29.97	30.56	27.81	29.74	35.3
2023	29.49	28.50	26.17	21.82	20.26	18.32	24.28	27.26	29.95	30.17	30.59	31.8
2024	31.51	28.97	28.36	23.85	20.57	12.83	24.46	28.63	31.08	31.29	33.43	34.8
2025	32.70	31.17	28.76	24.01	20.99	18.00	25.39	29.90	32.57	32.77	32.61	33.8
2026	34.42	34.57	30.62	26.19	21.18	14.24	27.95	32.59	35.05	34.44	34.49	36.6
2027	35.62	34.67	31.18	26.56	22.60	17.08	28.36	33.68	36.31	36.51	35.27	37.3
2028	37.03	36.15	32.14	26.76	22.59	16.28	30.50	35.32	37.16	37.71	38.02	39.8
2029	86.31	82.06	78.67	59.81	55.52	29.29	67.78	83.62	90.38	88.02	88.97	93.9
2030	89.56	86.71	80.78	61.36	51.15	30.21	74.45	85.91	92.86	92.77	93.13	95.2
2031	93.41	90.21	78.78	65.20	58.74	39.89	73.10	86.80	94.28	91.91	90.93	95.1
2032	93.98	89.49	84.12	63.35	44.95	31.89	80.62	87.48	97.05	94.03	96.65	102.7
2033	95.55	92.56	83.20	63.85	53.97	42.92	80.63	89.08	97.74	94.86	96.38	103.1
2034	99.45	95.74	83.03	62.71	49.02	32.69	81.03	93.07	100.10	100.19	104.19	106.5
2035	102.17	99.38	91.99	70.69	60.10	45.31	79.85	97.93	103.24	98.14	102.35	104.8
2036	109.92	104.48	93.00	71.24	59.99	30.21	81.66	99.34	109.55	103.61	107.20	112.8
2037	108.89	106.23	95.06	78.31	58.35	36.74	84.84	100.59	108.83	102.68	104.65	111.8
2038	112.45	109.08	96.38	77.77	50.53	33.15	87.33	101.97	108.98	105.91	110.15	116.6
2039	108.85	107.47	95.30	83.63	61.63	59.02	92.24	102.66	109.38	109.17	114.01	121.4
2040	115.65	107.59	92.83	90.48	58.17	39.63	93.67	109.27	111.11	114.75	116.85	119.7
2041	115.13	109.36	110.35	95.95	65.09	36.62	96.60	108.61	121.80	111.90	118.20	122.0
2042	124.72	115.06	106.16	84.11	61.11	38.73	104.28	115.00	124.37	122.07	120.82	127.5

# WIND AND SOLAR INTEGRATION

TABLE 7											
Integration Costs Year Wind Solar											
Year	Wind	Solar									
2017	0.85	0.85									
2018	0.87	0.87									
2019	0.88	0.88									
2020	0.90	0.90									
2021	0.92	0.92									
2022	0.94	0.94									
2023	0.96	0.96									
2024	0.98	0.98									
2025	1.00	1.00									
2026	1.02	1.02									
2027	1.04	1.04									
2028	1.06	1.06									
2029	1.08	1.08									
2030	1.10	1.10									
2031	1.12	1.12									
2032	1.14	1.14									
2033	1.17	1.17									
2034	1.19	1.19									
2035	1.21	1.21									
2036	1.24	1.24									
2037	1.26	1.26									
2038	1.29	1.29									
2039	1.31	1.31									
2040	1.34	1.34									
2041	1.37	1.37									
2042	1.39	1.39									

#### MONTHLY SERVICE CHARGE

Each separately metered QF not associated with a retail Customer account will be charged \$10.00 per month.

#### **INSURANCE REQUIREMENTS**

The following insurance requirements are applicable to Sellers with a Standard PPA:

- 1) QFs with nameplate capacity ratings greater than 200 kW are required to secure and maintain a prudent amount of general liability insurance. The Seller must certify to the Company that it is maintaining general liability insurance coverage for each QF at prudent amounts. A prudent amount will be deemed to mean liability insurance coverage for both bodily injury and property damage liability in the amount of not less than \$1,000,000 each occurrence combined single limit, which limits may be required to be increased or decreased by the Company as the Company determines in its reasonable judgment, that economic conditions or claims experience may warrant.
- 2) Such insurance will include an endorsement naming the Company as an additional insured insofar as liability arising out of operations under this schedule and a provision that such liability policies will not be canceled or their limits reduced without 30 days' written notice to the Company. The Seller will furnish the Company with certificates of insurance together with the endorsements required herein. The Company will have the right to inspect the original policies of such insurance.
- 3) QFs with a design capacity of 200 kW or less are encouraged to pursue liability insurance on their own. The Oregon Public Utility Commission in Order No. 05-584 determined that it is inappropriate to require QFs that have a design capacity of 200 kW or less to obtain general liability insurance.

#### TRANSMISSION AGREEMENTS

If the QF is located outside the Company's service territory, the Seller is responsible for the transmission of power at its cost to the Company's service territory.

#### INTERCONNECTION REQUIREMENTS

Except as otherwise provided in a generation Interconnection Agreement between the Company and Seller, if the QF is located within the Company's service territory, switching equipment capable of isolating the QF from the Company's system will be accessible to the Company at all times. At the Company's option, the Company may operate the switching equipment described above if, in the sole opinion of the Company, continued operation of the QF in connection with the utility's system may create or contribute to a system emergency.

### INTERCONNECTION REQUIREMENTS (Continued)

The QF owner interconnecting with the Company's distribution system must comply with all requirements for interconnection as established pursuant to Commission rule, in the Company's Rules and Regulations (Rule C) or the Company's Interconnection Procedures contained in its FERC Open Access Transmission Tariff (OATT), as applicable. The Seller will bear full responsibility for the installation and safe operation of the interconnection facilities.

# DEFINITION OF A SMALL COGENERATION FACILITY OR SMALL POWER PRODUCTION FACILITY ELIGIBLE TO RECEIVE PRICING UNDER THE STANDARD PPA

A QF will be eligible to receive pricing under the Standard PPA if the nameplate capacity of the QF, together with any other electric generating facility using the same motive force, owned or controlled by the Same Person(s) or Affiliated Person(s), and located at the Same Site, does not exceed 10 MW. A Community-Based or Family-Owned QF is exempt from these restrictions.

#### **Definition of Community-Based**

- a. A community project (or a community sponsored project) must have a recognized and established organization located within the county of the project or within 50 miles of the project that has a genuine role in helping the project be developed and must have some not insignificant continuing role with or interest in the project after it is completed and placed in service.
- b. After excluding the passive investor whose ownership interests are primarily related to green tag values and tax benefits as the primary ownership benefit, the equity (ownership) interests in a community sponsored project must be owned in substantial percentage (80 percent or more) by the following persons (individuals and entities): (i) the sponsoring organization, or its controlled affiliates; (ii) members of the sponsoring organization (if it is a membership organization) or owners of the sponsorship organization (if it is privately owned); (iii) persons who live in the county in which the project is located or who live a county adjoining the county in which the project is located; or (iv) units of local government, charities, or other established nonprofit organizations active either in the county in which the project is located or active in a county adjoining the county in which the project is located.

#### **Definition of Family-Owned**

After excluding the ownership interest of the passive investor whose ownership interests are primarily related to green tag values and tax benefits as the primary ownership benefit, five or fewer individuals own 50 percent or more of the equity of the project entity, or fifteen or fewer individuals own 90 percent or more of the project entity. A "look through" rule applies to closely held entities that hold the project entity, so that equity held by LLCs, trusts, estates, corporations, partnerships or other similar entities is considered held by the equity owners of the look through entity. An individual is a natural person. In counting to five or fifteen, spouses or children of an equity owner of the project owner who also have an equity interest are aggregated and counted as a single individual.

DEFINITION OF A SMALL COGENERATION FACILITY OR SMALL POWER PRODUCTION FACILITY ELIGIBLE TO RECEIVE PRICING UNDER THE STANDARD PPA (Continued)

#### **Definition of Person(s) or Affiliated Person(s)**

As used above, the term "Same Person(s)" or "Affiliated Person(s)" means a natural person or persons or any legal entity or entities sharing common ownership, management or acting jointly or in concert with or exercising influence over the policies or actions of another person or entity. However, two facilities will not be held to be owned or controlled by the Same Person(s) or Affiliated Person(s) solely because they are developed by a single entity.

Furthermore, two facilities will not be held to be owned or controlled by the Same Person(s) or Affiliated Person(s) if such common person or persons is a "passive investor" whose ownership interest in the QF is primarily related to utilizing production tax credits, green tag values and MACRS depreciation as the primary ownership benefit and the facilities at issue are independent family-owned or community-based projects. A unit of Oregon local government may also be a "passive investor" in a community-based project if the local governmental unit demonstrates that it will not have an equity ownership interest in or exercise any control over the management of the QF and that its only interest is a share of the cash flow from the QF, which share will not exceed 20%. The 20% cash flow share limit may only be exceeded for good cause shown and only with the prior approval of the Commission.

#### **Definition of Same Site**

For purposes of the foregoing, generating facilities are considered to be located at the same site as the QF for which qualification for pricing under the Standard PPA is sought if they are located within a five-mile radius of any generating facilities or equipment providing fuel or motive force associated with the QF for which qualification for pricing under the Standard PPA is sought.

#### **Definition of Shared Interconnection and Infrastructure**

QFs otherwise meeting the above-described separate ownership test and thereby qualified for entitlement to pricing under the Standard PPA will not be disqualified by utilizing an interconnection or other infrastructure not providing motive force or fuel that is shared with other QFs qualifying for pricing under the Standard PPA so long as the use of the shared interconnection complies with the interconnecting utility's safety and reliability standards, interconnection agreement requirements and Prudent Electrical Practices as that term is defined in the interconnecting utility's approved Standard PPA.

#### OTHER DEFINITIONS

#### Mid-C Index Price

As used in this schedule, the daily Mid-C Index Price shall be the Day Ahead Intercontinental Exchange ("ICE") for the bilateral OTC market for energy at the Mid-C Physical for Average

### OTHER DEFINITIONS (Continued)

On-Peak Power and Average Off-Peak Power found on the following website: <a href="https://www.theice.com/products/OTC/Physical-Energy/Electricity">https://www.theice.com/products/OTC/Physical-Energy/Electricity</a>. In the event ICE no longer publishes this index, PGE and the Seller agree to select an alternative successor index representative of the Mid-C trading hub.

#### **Definition of RPS Attributes**

As used in this schedule, RPS Attributes means all attributes related to the Net Output generated by the Facility that are required in order to provide PGE with "qualifying electricity," as that term is defined in Oregon's Renewable Portfolio Standard Act, Ore. Rev. Stat. 469A.010, in effect at the time of execution of this Agreement. RPS Attributes do not include Environmental Attributes that are greenhouse gas offsets from methane capture not associated with the generation of electricity and not needed to ensure that there are zero net emissions associated with the generation of electricity.

#### **Definition of Environmental Attributes**

As used in this schedule, Environmental Attributes shall mean any and all claims, credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, resulting from the avoidance of the emission of any gas, chemical, or other substance to the air, soil or water. Environmental Attributes include but are not limited to: (1) any avoided emissions of pollutants to the air, soil, or water such as (subject to the foregoing) sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), and other pollutants; and (2) any avoided emissions of carbon dioxide (CO2), methane (CH4), and other greenhouse gases (GHGs) that have been determined by the United Nations Intergovernmental Panel on Climate Change to contribute to the actual or potential threat of altering the Earth's climate by trapping heat in the atmosphere.

#### **Definition of Resource Sufficiency Period**

This is the period from the current year through <del>2020</del>2024.

#### **Definition of Resource Deficiency Period**

This is the period from 2021 through 20345.

#### **Definition of Renewable Resource Sufficiency Period**

This is the period from the current year through 20192028.

#### **Definition of Renewable Resource Deficiency Period**

This is the period from 2020 through 20349.

#### SCHEDULE 201 (Concluded)

#### **DISPUTE RESOLUTION**

Upon request, the QF will provide the purchasing utility with documentation verifying the ownership, management and financial structure of the QF in reasonably sufficient detail to allow the utility to make an initial determination of whether or not the QF meets the above-described criteria for entitlement to pricing under the Standard PPA.

The QF may present disputes to the Commission for resolution using the following process:

The QF may file a complaint asking the Commission to adjudicate disputes regarding the formation of the standard contract. The QF may not file such a complaint during any 15-day period in which the utility has the obligation to respond, but must wait until the 15-day period has passed.

The utility may respond to the complaint within ten days of service.

The Commission will limit its review to the issues identified in the complaint and response, and utilize a process similar to the arbitration process adopted to facilitate the execution of interconnection agreements among telecommunications carriers. See OAR 860, Division 016. The administrative law judge will not act as an arbitrator.

#### **SPECIAL CONDITIONS**

- 1. Delivery of energy by Seller will be at a voltage, phase, frequency, and power factor as specified by the Company.
- If the Seller also receives retail Electricity Service from the Company at the same location, any payments under this schedule will be credited to the Seller's retail Electricity Service bill. At the option of the Customer, any net credit over \$10.00 will be paid by check to the Customer.
- 3. Unless required by state or federal law, if the 1978 Public Utility Regulatory Policies Act (PURPA) is repealed, PPAs entered into pursuant to this schedule will not terminate prior to the Standard or Negotiated PPA's termination date.

#### **TERM OF AGREEMENT**

Not less than one year and not to exceed 20 years.

# UM 1728 Application to Update Schedule 201 Qualifying Facility Information

# Attachment A Description of Standard Avoided Costs

# PORTLAND GENERAL ELECTRIC COMPANY STANDARD AVOIDED COST STUDY 2016 IRP UPDATE August 18, 2017

### <u>Introduction</u>

This avoided cost update is made consistent with PGE's 2016 Integrated Resource Plan (IRP). The Commission directs electric utilities to make an avoided cost filing within 30 days of IRP acknowledgement.

#### Integrated Resource Plan

The Commission partially acknowledged PGE's 2016 IRP on August 8, 2017. The 2016 IRP forms the basis of most of the inputs in this avoided cost study.

### Resource Timing

The resource deficiency period for nonrenewable resources starts in 2025, consistent with the Commission's August 8, 2017 acknowledgement decision.

#### **Avoided Cost Estimates**

Tables 1 and 2 (following) summarize the results for PGE's fixed price option. Tables 1 and 2 are estimates of monthly on- and off-peak avoided costs for energy and capacity for 20 years beginning in 2017. The resource sufficiency period prices (expressed in \$/MWh or mills/kWh) for the years 2017 through 2020, are based on forward electricity curves, and represent capacity and energy avoided costs.

On-peak prices beginning 2021 are represented by capacity and energy costs, while off-peak prices are represented by energy costs only. The on-peak price includes the following costs of a CCCT: fuel, variable O&M, capacity, and other fixed costs. The off-peak price includes: fuel, variable O&M, and other fixed costs. The "other fixed costs" represent the energy portion of the fixed costs of a CCCT. Other fixed costs are calculated by taking the fixed costs of a CCCT minus the real levelized capital carrying cost and fixed O&M of an SCCT. The result (other fixed costs) represents the energy portion of the fixed costs of a CCCT. On-peak periods are from 6 a.m. through 10 p.m. Mondays through Saturdays. The off-peak hours are from 10 p.m. until 6 a.m. Mondays through Saturdays and all twenty-four hours on Sunday. Table 3 provides flat monthly avoided costs, and Tables 4 and 5 show the on- and off-peak resource sufficiency rates.

### PGE's 2017 AVOIDED COST STUDY WORKPAPERS – Page 2

### Resource Sufficiency Period Pricing

Resource sufficiency period prices are based on forward Mid-Columbia electricity trading curves delivered to PGE's system. The forward trading curves are dated July 13, 2017.

### Gas Price Projections

The basis for the gas prices used in this study is described on Page 79 of PGE's 2016 IRP. The forecast is from June 2017.

In order to simplify market-based pricing, the estimate of gas transportation costs is fixed. The heat rate of a CCCT is then applied to the estimated transportation costs for both the AECO and Sumas trading hubs. This gas transportation estimate is added to the fixed costs and variable O&M costs to calculate Table 12.

### Renewable Capacity Contribution

To translate the renewable capacity contribution into prices for standard avoided costs consistent with Order No. 16-174, several inputs are necessary. First, the capacity contribution percentages of both wind and solar resources are necessary. The capacity contribution percentages are provided in PGE's 2016 IRP. The capacity contribution for wind is 18.59% and the capacity contribution for solar is 15.33%. Two additional inputs are necessary:

- (1) The on-peak capacity factor of the wind resource of 35.24% is calculated from the wind resource used to derive the capacity contribution for wind.
- (2) The on-peak capacity factor of the solar resource of 35.61% is calculated from the solar resource used to derive the capacity contribution for solar.

The translation of renewable capacity contribution into avoided cost prices is performed in two simple steps.

Step one: remove capacity value from all hours for the proxy gas resource.

Step two: add capacity in the on-peak hours for wind and solar QFs separately.

# CO2 (Carbon) Regulation

The Company, as directed in Order No. 08-339 is continues to evaluate expected regulatory compliance for CO2 in the context of resource planning. However, because no

# PGE's 2017 AVOIDED COST STUDY WORKPAPERS – Page 3

carbon regulation has yet been legislated, this filing includes no assumptions relative to cost effects of CO2 regulation. This practice is consistent with PGE's avoided costs since Commission Order No. 05-584.

### **Avoided Cost Components**

Tables 6 through 12 in the work papers show the capacity, fixed, variable, and gas forecast avoided cost components. The on- and off-peak SCCT-related capacity component costs are shown in Tables 6 and 7. Table 7 is blank since no capacity value is calculated for the off-peak period. The capacity values are applicable to on-peak hours. Table 8 contains the energy portion of a CCCT, calculated using fixed costs of a CCCT minus the real levelized capital carrying cost and fixed O&M of an SCCT. Table 9 shows the variable O&M associated with the CCCT and Table 10 shows the projected fuel costs. Tables 6, 8, 9 and 10 can be summed to equal the total on-peak avoided costs in Table 1. Tables 7, 8, 9 and 10 can be summed to equal the total off-peak avoided costs in Table 2.

#### Portland General Electric Avoided Cost Study Total Projected On-Peak Avoided Costs

Table 1 Nominal \$/MWh

Year	<u>Jan</u>	<u>Feb</u>	Mar	<u>Apr</u>	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec	Annual
2017	43.57	30.73	9.33	10.60	15.19	22.58	31.49	34.81	29.46	26.91	27.42	33.53	26.26
2018	32.01	29.46	25.38	21.14	20.62	21.14	30.01	33.42	31.06	25.63	27.67	32.27	27.48
2019	31.18	29.49	23.89	19.25	18.62	19.53	30.14	34.47	31.43	26.91	28.93	34.34	27.36
2020	32.84	31.06	25.15	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16	28.83
2021	34.60	32.72	26.46	21.28	20.58	21.61	33.44	38.27	34.87	29.82	32.09	38.13	30.33
2022	36.47	34.48	27.88	22.42	21.68	22.76	35.25	40.34	36.75	31.44	33.81	40.19	31.98
2023	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07	30.00
2024	36.16	34.47	31.84	26.04	23.28	16.27	29.02	32.72	35.73	35.93	36.83	39.19	31.48
2025	57.28	57.40	57.49	56.78	56.75	56.67	56.77	56.85	56.97	57.07	57.81	57.92	57.14
2026	59.17	59.29	59.34	58.62	58.63	58.69	58.79	58.89	59.03	59.16	60.03	60.15	59.15
2027	61.01	61.13	61.04	60.30	60.44	60.19	60.29	60.39	60.52	61.27	59.92	60.04	60.54
2028	61.23	61.31	61.19	60.52	60.66	60.78	60.88	61.00	61.12	61.26	62.44	62.57	61.25
2029	64.03	64.16	64.28	63.58	63.76	64.88	65.00	65.13	65.28	65.40	66.74	66.88	64.93
2030	69.60	70.59	70.73	70.05	70.25	70.41	70.56	70.72	70.89	71.77	72.44	72.62	70.88
2031	74.30	74.48	74.10	73.00	73.15	73.04	73.18	73.34	73.51	73.69	74.85	75.02	73.80
2032	76.53	76.62	76.32	75.09	75.30	75.49	75.64	75.81	76.00	76.25	77.82	78.02	76.24
2033	80.07	80.28	80.02	78.86	79.09	79.29	79.46	79.64	79.85	80.26	81.68	81.90	80.04
2034	83.89	84.11	82.95	81.61	81.86	82.07	82.25	82.45	82.67	82.91	84.66	84.89	83.02
2035	86.73	86.97	85.83	84.45	84.70	84.37	84.55	84.75	84.99	85.49	86.97	87.42	85.60
2036	89.63	89.87	88.67	87.20	87.49	87.12	87.32	87.54	87.78	88.31	89.86	90.33	88.43
2037	92.90	93.16	91.91	90.37	90.65	90.28	90.48	90.71	90.95	91.53	93.15	93.66	91.64
2038	96.17	96.45	95.12	93.50	93.81	93.42	93.63	93.87	94.14	94.74	96.45	96.97	94.85
2039	99.60	99.87	98.49	96.79	97.11	96.69	96.92	97.17	97.45	98.09	99.87	100.43	98.20
2040	103.14	103.43	101.98	100.19	100.53	100.09	100.34	100.59	100.89	101.55	103.43	104.02	101.68
2041	106.88	107.19	105.65	103.77	104.11	103.66	103.92	104.18	104.50	105.20	107.17	107.79	105.32
2042	110.75	111.07	109.46	107.49	107.86	107.38	107.63	107.92	108.25	108.98	111.07	111.71	109.12

#### Portland General Electric Avoided Cost Study Total Projected Off-Peak Avoided Costs

Table 2 Nominal \$/MWh

Year	<u>Jan</u>	<u>Feb</u>	Mar	<u>Apr</u>	May	<u>Jun</u>	<u>Jul</u>	Aug	<u>Sep</u>	<u>Oct</u>	Nov	Dec	Annual
2017	31.49	25.89	2.71	5.21	3.22	6.53	19.27	24.51	24.72	23.85	24.11	27.42	18.29
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.41	21.12
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38	20.80
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72	22.41
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97	23.95
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32	25.55
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77	27.53
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80	28.46
2025	27.96	28.08	28.17	27.46	27.43	27.35	27.45	27.53	27.65	27.75	28.49	28.60	27.83
2026	29.26	29.39	29.43	28.71	28.72	28.79	28.89	28.99	29.12	29.25	30.12	30.24	29.24
2027	30.50	30.63	30.54	29.80	29.94	29.69	29.79	29.89	30.01	30.76	29.41	29.54	30.04
2028	30.11	30.19	30.08	29.41	29.55	29.66	29.77	29.88	30.01	30.15	31.33	31.45	30.13
2029	32.29	32.42	32.54	31.85	32.02	33.14	33.26	33.39	33.54	33.66	35.01	35.15	33.20
2030	37.23	38.22	38.36	37.68	37.88	38.04	38.19	38.35	38.52	39.40	40.07	40.25	38.52
2031	41.28	41.46	41.08	39.98	40.13	40.02	40.16	40.32	40.49	40.67	41.83	42.00	40.78
2032	43.06	43.15	42.85	41.62	41.84	42.02	42.17	42.35	42.54	42.79	44.35	44.55	42.77
2033	45.72	45.92	45.67	44.51	44.74	44.94	45.11	45.28	45.50	45.91	47.33	47.54	45.67
2034	48.74	48.96	47.80	46.46	46.71	46.91	47.10	47.29	47.51	47.76	49.51	49.74	47.87
2035	50.99	51.23	50.09	48.70	48.96	48.62	48.81	49.01	49.25	49.75	51.23	51.68	49.85
2036	53.29	53.53	52.33	50.86	51.15	50.78	50.98	51.20	51.45	51.97	53.52	53.99	52.08
2037	55.72	55.98	54.72	53.19	53.47	53.09	53.30	53.52	53.77	54.35	55.97	56.48	54.46
2038	58.24	58.52	57.19	55.57	55.88	55.49	55.70	55.94	56.21	56.81	58.52	59.04	56.92
2039	60.91	61.18	59.80	58.11	58.42	58.01	58.24	58.48	58.77	59.40	61.18	61.74	59.51
2040	63.68	63.97	62.52	60.73	61.07	60.63	60.88	61.12	61.43	62.09	63.97	64.55	62.22
2041	66.63	66.94	65.40	63.52	63.86	63.41	63.66	63.93	64.25	64.95	66.92	67.54	65.08
2042	69.70	70.02	68.40	66.43	66.80	66.33	66.57	66.86	67.20	67.93	70.02	70.66	68.07

#### Portland General Electric Avoided Cost Study Total Projected Average Avoided Costs

Table 3 Nominal \$/MWh

Year	<u>Jan</u>	Feb	Mar	Apr	May	Jun	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec	Annual
2017	38.25	28.65	6.55	8.21	10.17	15.80	26.10	30.49	27.45	25.56	26.02	30.84	22.83
2018	30.08	27.49	23.46	18.50	17.06	16.81	25.41	29.57	28.23	24.32	25.99	30.13	24.76
2019	28.34	27.40	21.86	16.81	15.18	15.33	25.53	30.52	28.80	25.41	27.22	32.15	24.55
2020	30.12	29.14	23.23	17.82	15.89	16.44	27.09	32.22	30.75	27.00	28.85	34.30	26.08
2021	31.77	30.87	24.67	18.80	16.73	17.32	28.66	34.15	32.59	28.53	30.66	36.39	27.60
2022	33.67	32.71	26.13	19.88	17.69	18.29	30.08	36.38	34.53	30.25	32.49	38.56	29.23
2023	31.63	31.19	27.93	24.08	22.34	20.76	26.95	29.85	32.34	32.66	32.97	34.62	28.94
2024	34.62	32.55	30.74	25.53	22.56	15.18	27.52	31.42	34.10	34.40	35.81	37.70	30.19
2025	44.98	44.83	44.56	44.40	44.45	43.64	44.47	43.93	44.59	44.78	44.78	45.63	44.59
2026	46.63	46.48	46.15	45.99	45.44	46.07	46.25	45.71	46.40	46.62	46.74	47.61	46.34
2027	47.56	48.06	48.25	47.42	46.99	47.31	47.50	46.95	47.64	47.82	47.04	47.25	47.48
2028	47.51	48.08	48.15	46.69	47.61	47.64	47.16	47.95	47.99	47.55	49.30	48.85	47.87
2029	50.72	50.56	50.97	49.48	50.45	51.48	51.01	51.82	51.18	52.09	53.34	52.89	51.34
2030	56.03	56.71	56.46	56.38	56.68	56.02	56.99	57.15	56.50	58.19	58.77	58.35	57.02
2031	60.45	60.33	59.55	59.06	59.30	58.36	59.34	58.79	59.57	59.84	60.18	61.18	59.66
2032	62.49	62.38	62.28	60.96	60.55	61.36	61.61	61.06	61.87	61.50	63.69	63.98	61.98
2033	64.93	65.55	65.61	64.35	63.94	64.79	64.31	65.23	65.35	65.12	67.17	67.49	65.32
2034	68.39	69.05	68.21	65.99	67.12	67.23	66.75	67.70	67.82	67.42	69.82	69.39	67.90
2035	71.74	71.65	70.84	68.56	69.71	69.28	68.79	69.76	69.10	70.51	71.88	71.66	70.29
2036	74.39	74.42	72.64	71.86	72.25	70.97	72.09	71.52	72.44	73.07	73.71	75.09	72.87
2037	77.31	77.23	75.51	74.67	74.26	74.58	74.89	74.31	75.25	75.94	76.62	78.07	75.71
2038	79.44	80.19	79.22	77.49	77.09	77.40	77.72	77.15	78.12	78.02	80.43	81.06	78.60
2039	82.54	83.29	82.27	80.46	80.05	80.36	79.87	80.94	81.12	81.03	83.53	84.21	81.63
2040	85.74	86.65	85.43	82.65	83.98	83.43	82.94	84.04	83.36	85.00	86.77	86.62	84.71
2041	90.00	89.94	87.91	86.77	87.23	85.77	87.04	87.31	86.61	88.32	90.18	90.04	88.09
2042	93.54	93.48	91.36	90.16	90.64	89.14	90.41	89.82	90.92	91.77	92.83	94.50	91.54

#### Portland General Electric Avoided Cost Study Projected On Peak Resource Sufficiency Period Forward Market Prices

Table 4			Trojecteu	OII I CURT	resource e	difficiency	T CHOUT O	wara ma	KCC I TIOCS		Nominal \$	/MWh	
<u>Year</u>	<u>Jan</u>	Feb	Mar	<u>Apr</u>	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec	Annual
2017	43.57	30.73	9.33	10.60	15.19	22.58	31.49	34.81	29.46	26.91	27.42	33.53	26.26
2018	32.01	29.46	25.38	21.14	20.62	21.14	30.01	33.42	31.06	25.63	27.67	32.27	27.48
2019	31.18	29.49	23.89	19.25	18.62	19.53	30.14	34.47	31.43	26.91	28.93	34.34	27.36
2020	32.84	31.06	25.15	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16	28.83
2021	34.60	32.72	26.46	21.28	20.58	21.61	33.44	38.27	34.87	29.82	32.09	38.13	30.33
2022	36.47	34.48	27.88	22.42	21.68	22.76	35.25	40.34	36.75	31.44	33.81	40.19	31.98
2023	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07	30.00
2024	36.16	34.47	31.84	26.04	23.28	16.27	29.02	32.72	35.73	35.93	36.83	39.19	31.48
2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#### Portland General Electric Avoided Cost Study Projected Off Peak Resource Sufficiency Period Forward Market Prices

Table 5

Table 6

<u>Year</u>	<u>Jan</u>	<u>Feb</u>	Mar	<u>Apr</u>	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	<u>Oct</u>	Nov	Dec	Annual
2017	31.49	25.89	2.71	5.21	3.22	6.53	19.27	24.51	24.72	23.85	24.11	27.42	18.29
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.41	21.12
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38	20.80
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72	22.41
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97	23.95
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32	25.55
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77	27.53
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80	28.46
2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Nominal \$/MWh

Naminal \$/M/M/h

#### Portland General Electric Avoided Cost Study Total Projected On Peak Avoided Capacity Costs

Table 6										ľ	Nominal \$/N	ЛWh
<u>Year</u>	<u>Jan</u>	Feb	Mar	<u>Apr</u>	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2025	29.32	29.32	29.32	29.32	29.32	29.32	29.32	29.32	29.32	29.32	29.32	29.32
2026	29.91	29.91	29.91	29.91	29.91	29.91	29.91	29.91	29.91	29.91	29.91	29.91
2027	30.50	30.50	30.50	30.50	30.50	30.50	30.50	30.50	30.50	30.50	30.50	30.50
2028	31.11	31.11	31.11	31.11	31.11	31.11	31.11	31.11	31.11	31.11	31.11	31.11
2029	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74	31.74
2030	32.37	32.37	32.37	32.37	32.37	32.37	32.37	32.37	32.37	32.37	32.37	32.37
2031	33.02	33.02	33.02	33.02	33.02	33.02	33.02	33.02	33.02	33.02	33.02	33.02
2032	33.47	33.47	33.47	33.47	33.47	33.47	33.47	33.47	33.47	33.47	33.47	33.47
2033	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35	34.35
2034	35.15	35.15	35.15	35.15	35.15	35.15	35.15	35.15	35.15	35.15	35.15	35.15
2035	35.74	35.74	35.74	35.74	35.74	35.74	35.74	35.74	35.74	35.74	35.74	35.74
2036	36.34	36.34	36.34	36.34	36.34	36.34	36.34	36.34	36.34	36.34	36.34	36.34
2037	37.19	37.19	37.19	37.19	37.19	37.19	37.19	37.19	37.19	37.19	37.19	37.19
2038	37.93	37.93	37.93	37.93	37.93	37.93	37.93	37.93	37.93	37.93	37.93	37.93
2039	38.69	38.69	38.69	38.69	38.69	38.69	38.69	38.69	38.69	38.69	38.69	38.69
2040	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46
2041	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25
2042	41.06	41.06	41.06	41.06	41.06	41.06	41.06	41.06	41.06	41.06	41.06	41.06

#### Portland General Electric Avoided Cost Study Total Projected Off Peak Avoided Capacity Costs

Table 7 Nominal \$/MWh

<u>Year</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	Dec
2017	-	-	-	-	-	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-	-	-	-	-	-
2020	-	-	-	-	-	-	-	-	-	-	-	-
2021	-	-	-	-	-	-	-	-	-	-	-	-
2022	-	-	-	-	-	-	-	-	-	-	-	-
2023	-	-	-	-	-	-	-	-	-	-	-	-
2024	-	-	-	-	-	-	-	-	-	-	-	-
2025	-	-	-	-	-	-	-	-	-	-	-	-
2026	-	-	-	-	-	-	-	-	-	-	-	-
2027	-	-	-	-	-	-	-	-	-	-	-	-
2028	-	-	-	-	-	-	-	-	-	-	-	-
2029	-	-	-	-	-	-	-	-	-	-	-	-
2030	-	-	-	-	-	-	-	-	-	-	-	-
2031	-	-	-	-	-	-	-	-	-	-	-	-
2032	-	-	-	-	-	-	-	-	-	-	-	-
2033	-	-	-	-	-	-	-	-	-	-	-	-
2034	-	-	-	-	-	-	-	-	-	-	-	-
2035	-	-	-	-	-	-	-	-	-	-	-	-
2036	-	-	-	-	-	-	-	-	-	-	-	-
2037	-	-	-	-	-	-	-	-	-	-	-	-
2038	-	-	-	-	-	-	-	-	-	-	-	-
2039	-	-	-	-	-	-	-	-	-	-	-	-
2040	-	-	-	-	-	-	-	-	-	-	-	-
2041	-	-	-	-	-	-	-	-	-	-	-	-
2042	-	-	-	-	-	-	-	-	-	-	-	-

#### Portland General Electric Avoided Cost Study Total Projected Other Fixed Avoided Costs

Table 8 Nominal \$/MWh

<u>Year</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	Nov	Dec
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2025	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
2026	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67
2027	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
2028	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84
2029	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95
2030	5.05	5.05	5.05	5.05	5.05	5.05	5.05	5.05	5.05	5.05	5.05	5.05
2031	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15
2032	5.24	5.24	5.24	5.24	5.24	5.24	5.24	5.24	5.24	5.24	5.24	5.24
2033	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36
2034	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47
2035	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58
2036	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67
2037	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80
2038	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92	5.92
2039	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04
2040	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14
2041	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28
2042	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41

#### Portland General Electric Avoided Cost Study Total Projected Avoided Variable O&M Costs

Table 9 Nominal \$/MWh

<u>Year</u>	<u>Jan</u>	<u>Feb</u>	Mar	<u>Apr</u>	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2025	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29
2026	3.36	3.36	3.36	3.36	3.36	3.36	3.36	3.36	3.36	3.36	3.36	3.36
2027	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43
2028	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49
2029	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56	3.56
2030	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3.64
2031	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71
2032	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78
2033	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86
2034	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94
2035	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01
2036	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09
2037	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18
2038	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26
2039	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35
2040	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43
2041	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52	4.52
2042	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61

#### Portland General Electric Avoided Cost Study Total Projected Avoided Fuel Costs

Table 10 Nominal \$/MWh

V			N.4	Λ	Mari	l	L. I	Λ	Can	0-4	NIev	D
<u>Year</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	Oct	Nov	<u>Dec</u>
2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2025	20.09	20.21	20.30	19.59	19.56	19.48	19.58	19.66	19.78	19.88	20.62	20.73
2026	21.24	21.36	21.40	20.68	20.69	20.76	20.86	20.96	21.09	21.23	22.09	22.22
2027	22.31	22.44	22.35	21.61	21.75	21.50	21.60	21.70	21.83	22.57	21.23	21.35
2028	21.78	21.86	21.74	21.07	21.21	21.32	21.43	21.54	21.67	21.81	22.99	23.12
2029	23.78	23.90	24.02	23.33	23.50	24.62	24.74	24.87	25.02	25.14	26.49	26.63
2030	28.54	29.53	29.67	28.99	29.19	29.35	29.50	29.66	29.83	30.71	31.38	31.56
2031	32.42	32.60	32.22	31.12	31.26	31.15	31.30	31.46	31.63	31.80	32.97	33.14
2032	34.04	34.12	33.82	32.60	32.81	33.00	33.15	33.32	33.51	33.76	35.32	35.53
2033	36.50	36.70	36.45	35.28	35.51	35.72	35.88	36.06	36.28	36.69	38.11	38.32
2034	39.33	39.55	38.39	37.05	37.30	37.51	37.69	37.89	38.11	38.36	40.10	40.33
2035	41.39	41.63	40.49	39.11	39.36	39.03	39.22	39.42	39.66	40.16	41.63	42.08
2036	43.52	43.76	42.56	41.09	41.38	41.01	41.21	41.43	41.68	42.20	43.75	44.22
2037	45.74	46.00	44.74	43.21	43.48	43.11	43.32	43.54	43.79	44.37	45.98	46.50
2038	48.06	48.34	47.01	45.39	45.70	45.31	45.52	45.76	46.03	46.63	48.34	48.86
2039	50.52	50.80	49.42	47.72	48.04	47.62	47.85	48.10	48.38	49.01	50.80	51.36
2040	53.10	53.39	51.94	50.15	50.49	50.05	50.30	50.55	50.86	51.52	53.39	53.98
2041	55.82	56.14	54.60	52.71	53.06	52.61	52.86	53.13	53.44	54.15	56.12	56.73
2042	58.68	59.00	57.38	55.41	55.78	55.31	55.55	55.84	56.18	56.91	59.00	59.64

# UM 1728 Application to Update Schedule 201 Qualifying Facility Information

# Attachment B Description of Renewable Avoided Costs

# PORTLAND GENERAL ELECTRIC COMPANY RENEWABLE AVOIDED COST STUDY 2016 IRP UPDATE August 18, 2017

## <u>Introduction</u>

This renewable avoided cost update is made consistent with PGE's 2016 Integrated Resource Plan (IRP). The Commission directs electric utilities to make an avoided cost filing within 30 days of IRP acknowledgement.

## Integrated Resource Plan

The Commission partially acknowledged PGE's 2016 IRP on August 8, 2017. The 2016 IRP forms the basis of most of the inputs in this avoided cost study.

### Resource Timing

The renewable resource deficiency period starts in 2029, consistent with the Commission August 8, 2017 acknowledgement decision.

### **Avoided Cost Estimates**

Renewable avoided cost prices beginning January 2029 are represented by the fully allocated costs of a renewable wind resource. Tables 1 through 8 (following) summarize PGE avoided cost data consistent with Commission Order Nos. 05-584 and 11-505. Tables 1 and 2 are estimates of monthly on- and off-peak renewable avoided costs for twenty years beginning in 2017 prior to removing capacity and shaping energy. Tables 3 and 4 are energy prices prior to shaping.

The on- and off-peak prices in Tables 5 and 6 are developed using the on- and off-peak prices from PGE's AURORA model. On-peak periods are from 6 a.m. through 10 p.m. Mondays through Saturdays. The off-peak hours are from 10 p.m. until 6 a.m. Mondays through Saturdays and all twenty-four hours on Sunday. Tables 7 and 8 show the on- and off-peak resource sufficiency rates. The renewable resource sufficiency period prices (expressed in \$/MWh or mills/kWh) for the years 2017 through 2028, are based on forward electricity curves, and represent capacity and energy avoided costs.

# PGE's 2017 AVOIDED COST UPDATE WORKPAPERS – Page 2

### Resource Sufficiency Period Pricing

Renewable resource sufficiency period prices are based on forward Mid-Columbia electricity trading curves delivered to PGE's system. The forward trading curves are dated July 13, 2017.

### Renewable Capacity Contribution

To translate the renewable capacity contribution into prices for renewable avoided costs consistent with Order No. 16-174, several inputs are necessary. First, the capacity contribution percentages of both wind and solar resources are necessary. The capacity contribution percentages are provided in PGE's 2016 IRP. The capacity contribution for wind is 18.59% and the capacity contribution for solar is 15.33%. Three additional inputs are necessary:

- (1) The capacity factor of the proxy wind resource of 34.00% is an existing input already provided in the renewable avoided cost model.
- (2) The on-peak capacity factor of the wind resource of 35.24% is calculated from the wind resource used to derive the capacity contribution for wind.
- (3) The on-peak capacity factor of the solar resource of 35.61% is calculated from the solar resource used to derive the capacity contribution for solar.

The translation of renewable capacity contribution into avoided cost prices is performed in two simple steps.

Step one: remove capacity value from all hours for the proxy wind resource.

Step two: add capacity in the on-peak hours for wind and solar QFs separately.

The proxy wind resource used to calculate prices in the deficiency period includes both energy and capacity. In the first step, capacity is removed from all hours using this formula:

(SCCT \$/kW-year X wind capacity contribution percentage) / (number of annual hours X annual capacity factor of the proxy wind resource)\*

Step two is performed for wind and solar avoided QFs separately. For solar QFs, capacity is added into the on peak hours using this formula:

(SCCT \$/kW-year X solar capacity contribution percentage) / (number of on-peak hours X solar on-peak capacity factor)\*

<sup>\*</sup> Additional adjustments are included for inflation and line losses.

# PGE's 2017 AVOIDED COST UPDATE WORKPAPERS – Page 3

The above formula is used for wind QFs using the wind capacity contribution percentage and wind on-peak capacity factor.

# **Production Tax Credit**

The Consolidated Appropriations Act, 2016 (H.R. 2029, Sec. 301) extended the PTC. The Act also created a phase-down in the PTC; amount for wind facilities commencing construction in 2017, 2018, or 2019. The Act eliminates the PTC for wind facilities commencing construction in 2020 or later.

No PTC is assumed in this filing since construction on a facility to meet an online date of 2029 is unlikely to commence before 2020.

#### Portland General Electric Renewable Avoided Cost Study Total Projected On-Peak Avoided Costs

Table 1 Nominal \$/MWh

<u>Year</u>	<u>Jan</u>	<u>Feb</u>	Mar	<u>Apr</u>	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec
2017								34.81	29.46	26.91	27.42	33.53
2018	32.01	29.46	25.38	21.14	20.62	21.14	30.01	33.42	31.06	25.63	27.67	32.27
2019	31.18	29.49	23.89	19.25	18.62	19.53	30.14	34.47	31.43	26.91	28.93	34.34
2020	32.84	31.06	25.15	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16
2021	34.60	32.72	26.46	21.28	20.58	21.61	33.44	38.27	34.87	29.82	32.09	38.13
2022	36.47	34.48	27.88	22.42	21.68	22.76	35.25	40.34	36.75	31.44	33.81	40.19
2023	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07
2024	36.16	34.47	31.84	26.04	23.28	16.27	29.02	32.72	35.73	35.93	36.83	39.19
2025	36.28	36.45	32.07	27.15	25.16	20.76	31.18	33.59	36.96	36.50	36.17	38.88
2026	38.02	38.42	34.69	28.61	23.72	19.90	33.16	36.49	39.07	39.98	39.93	41.34
2027	40.65	40.65	35.03	29.55	25.62	19.81	33.68	38.68	40.37	41.18	39.95	42.49
2028	41.59	39.62	35.61	29.31	24.13	18.69	35.04	39.47	41.56	42.04	42.77	45.50
2029	89.85	89.85	89.85	89.85	89.85	89.85	89.85	89.85	89.85	89.85	89.85	89.85
2030	91.65	91.65	91.65	91.65	91.65	91.65	91.65	91.65	91.65	91.65	91.65	91.65
2031	93.48	93.48	93.48	93.48	93.48	93.48	93.48	93.48	93.48	93.48	93.48	93.48
2032	95.09	95.09	95.09	95.09	95.09	95.09	95.09	95.09	95.09	95.09	95.09	95.09
2033	97.26	97.26	97.26	97.26	97.26	97.26	97.26	97.26	97.26	97.26	97.26	97.26
2034	99.20	99.20	99.20	99.20	99.20	99.20	99.20	99.20	99.20	99.20	99.20	99.20
2035	101.18	101.18	101.18	101.18	101.18	101.18	101.18	101.18	101.18	101.18	101.18	101.18
2036	102.93	102.93	102.93	102.93	102.93	102.93	102.93	102.93	102.93	102.93	102.93	102.93
2037	105.27	105.27	105.27	105.27	105.27	105.27	105.27	105.27	105.27	105.27	105.27	105.27
2038	107.38	107.38	107.38	107.38	107.38	107.38	107.38	107.38	107.38	107.38	107.38	107.38
2039	109.52	109.52	109.52	109.52	109.52	109.52	109.52	109.52	109.52	109.52	109.52	109.52
2040	111.41	111.41	111.41	111.41	111.41	111.41	111.41	111.41	111.41	111.41	111.41	111.41
2041	113.95	113.95	113.95	113.95	113.95	113.95	113.95	113.95	113.95	113.95	113.95	113.95
2042	116.23	116.23	116.23	116.23	116.23	116.23	116.23	116.23	116.23	116.23	116.23	116.23
2043	118.55	118.55	118.55	118.55	118.55	118.55	118.55	118.55	118.55	118.55	118.55	118.55

#### Portland General Electric Renewable Avoided Cost Study Total Projected Off-Peak Avoided Costs

Table 2 . Nominal \$/MWh

Year	<u>Jan</u>	Feb	Mar	<u>Apr</u>	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec
2017								24.51	24.72	23.85	24.11	27.42
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.41
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	33.70	32.17	29.76	25.01	21.99	19.00	26.39	30.90	33.57	33.77	33.61	34.83
2026	35.44	35.59	31.64	27.21	22.20	15.26	28.97	33.61	36.07	35.46	35.51	37.70
2027	36.66	35.71	32.22	27.60	23.64	18.12	29.40	34.72	37.35	37.55	36.31	38.40
2028	38.09	37.21	33.20	27.82	23.65	17.34	31.56	36.38	38.22	38.77	39.08	40.92
2029	89.85	89.85	89.85	89.85	89.85	89.85	89.85	89.85	89.85	89.85	89.85	89.85
2030	91.65	91.65	91.65	91.65	91.65	91.65	91.65	91.65	91.65	91.65	91.65	91.65
2031	93.48	93.48	93.48	93.48	93.48	93.48	93.48	93.48	93.48	93.48	93.48	93.48
2032	95.09	95.09	95.09	95.09	95.09	95.09	95.09	95.09	95.09	95.09	95.09	95.09
2033	97.26	97.26	97.26	97.26	97.26	97.26	97.26	97.26	97.26	97.26	97.26	97.26
2034	99.20	99.20	99.20	99.20	99.20	99.20	99.20	99.20	99.20	99.20	99.20	99.20
2035	101.18	101.18	101.18	101.18	101.18	101.18	101.18	101.18	101.18	101.18	101.18	101.18
2036	102.93	102.93	102.93	102.93	102.93	102.93	102.93	102.93	102.93	102.93	102.93	102.93
2037	105.27	105.27	105.27	105.27	105.27	105.27	105.27	105.27	105.27	105.27	105.27	105.27
2038	107.38	107.38	107.38	107.38	107.38	107.38	107.38	107.38	107.38	107.38	107.38	107.38
2039	109.52	109.52	109.52	109.52	109.52	109.52	109.52	109.52	109.52	109.52	109.52	109.52
2040	111.41	111.41	111.41	111.41	111.41	111.41	111.41	111.41	111.41	111.41	111.41	111.41
2041	113.95	113.95	113.95	113.95	113.95	113.95	113.95	113.95	113.95	113.95	113.95	113.95
2042	116.23	116.23	116.23	116.23	116.23	116.23	116.23	116.23	116.23	116.23	116.23	116.23
2043	118.55	118.55	118.55	118.55	118.55	118.55	118.55	118.55	118.55	118.55	118.55	118.55

#### Portland General Electric Renewable Avoided Cost Study Total Projected On-Peak Avoided Costs: Capacity Removed, Energy Only

Table 3 Nominal \$/MWh Year <u>Jan</u> Feb Mar <u>Apr</u> May <u>Jun</u> <u>Jul</u> Aug Sep Oct 0 Nov <u>Dec</u> 2017 33.53 34.81 29.46 26.91 27.42 2018 32.01 29.46 25.38 21.14 20.62 21.14 30.01 33.42 31.06 25.63 27.67 32.27 2019 31.18 29.49 23.89 19.25 18.62 19.53 30.14 34.47 31.43 26.91 28.93 34.34 2020 32.84 31.06 25.15 20.26 19.59 20.56 31.74 36.30 33.09 28.33 30.46 36.16 2021 34.60 32.72 26.46 21.28 20.58 21.61 33.44 38.27 34.87 29.82 32.09 38.13 2022 36.47 27.88 22.42 21.68 22.76 35.25 40.34 36.75 31.44 40.19 34.48 33.81 32.48 25.11 28.29 31.03 36.07 2023 32.55 28.51 23.14 21.85 33.38 33.87 34.01 2024 36.16 34.47 31.84 26.04 23.28 16.27 29.02 32.72 35.73 35.93 36.83 39.19 36.96 2025 36.28 36.45 32.07 27.15 31.18 36.50 38.88 25.16 20.76 33.59 36.17 2026 38.02 38.42 34.69 28.61 23.72 19.90 33.16 36.49 39.07 39.98 39.93 41.34 2027 40.65 40.65 35.03 29.55 25.62 19.81 33.68 38.68 40.37 41.18 39.95 42.49 2028 41.59 39.62 35.61 29.31 24.13 18.69 35.04 39.47 41.56 42.04 42.77 45.50 80.44 2029 80.44 80.44 80.44 80.44 80.44 80.44 80.44 80.44 80.44 80.44 80.44 2030 82.05 82.05 82.05 82.05 82.05 82.05 82.05 82.05 82.05 82.05 82.05 82.05 2031 83.69 83.69 83.69 83.69 83.69 83.69 83.69 83.69 83.69 83.69 83.69 83.69 2032 85.13 85.13 85.13 85.13 85.13 85.13 85.13 85.13 85.13 85.13 85.13 85.13 2033 87.07 87 07 87.07 87.07 87 07 87.07 87 07 87.07 87 07 87.07 87.07 87 07 2034 88.82 88.82 88.82 88.82 88.82 88.82 88.82 88.82 88.82 88.82 88.82 88.82 2035 90.59 90.59 90.59 90.59 90.59 90.59 90.59 90.59 90.59 90.59 90.59 90.59 2036 92.15 92.15 92.15 92.15 92.15 92.15 92.15 92.15 92.15 92.15 92.15 92.15 2037 94.25 94.25 94.25 94.25 94.25 94.25 94.25 94.25 94.25 94.25 94.25 94.25 2038 96.14 96.14 96.14 96.14 96.14 96.14 96.14 96.14 96.14 96.14 96.14 96.14 98.06 98.06 98.06 98.06 98.06 98.06 98.06 98.06 98.06 98.06 98.06 98.06 2039 2040 99.75 99.75 99.75 99.75 99.75 99.75 99.75 99.75 99.75 99.75 99.75 99.75 2041 102.02 102.02 102.02 102.02 102.02 102.02 102.02 102.02 102.02 102.02 102.02 102.02 2042 104.06 104.06 104.06 104.06 104.06 104.06 104.06 104.06 104.06 104.06 104.06 104.06 2043 106.14 106.14 106.14 106.14 106.14 106.14 106.14 106.14 106.14 106.14 106.14 106.14

#### Portland General Electric Renewable Avoided Cost Study Total Projected Off-Peak Avoided Costs: Capacity Removed, Energy Only

Nominal \$/MWh

Table 4

Year <u>Jan</u> Feb Mar <u>Apr</u> May Jun <u>Jul</u> Aug Sep Oct 0 Nov <u>Dec</u> 2017 27.42 24.51 24.72 23.85 24.11 2018 27.42 24.87 20.80 15.18 12.12 10.88 19.58 22.51 27.41 24.24 24.69 23.69 2019 24.42 24.61 19.29 13.46 10.42 10.07 19.15 25.06 25.53 23.33 24.87 29.38 2020 26.35 26.55 20.80 14.48 11.19 10.80 20.64 27.03 27.54 25.17 26.84 31.72 2021 28.18 28.40 22.20 15.39 11.85 11.44 22.03 28.92 29.47 26.90 28.71 33.97 2022 30.11 30.34 23.71 16.42 12.61 12.18 23.53 30.91 31.50 28.75 30.68 36.32 30.45 29.46 27.13 22.78 21.22 19.28 25.24 28.22 30.91 31.55 32.77 2023 31.13 2024 32.49 29.95 29.34 24.83 21.55 13.81 25.44 29.61 32.06 32.27 34.41 35.80 2025 33.70 32.17 29.76 25.01 21.99 19.00 26.39 30.90 33.57 33.77 33.61 34.83 36.07 2026 35.44 35.59 27.21 22.20 28.97 33.61 35.46 35.51 37.70 31.64 15.26 2027 36.66 35.71 32.22 27.60 23.64 18.12 29.40 34.72 37.35 37.55 36.31 38.40 2028 38.09 37.21 33.20 27.82 23.65 17.34 31.56 36.38 38.22 38.77 39.08 40.92 80.44 80.44 80.44 2029 80.44 80.44 80.44 80.44 80.44 80.44 80.44 80.44 80.44 2030 82.05 82.05 82.05 82.05 82.05 82.05 82.05 82.05 82.05 82.05 82.05 82.05 2031 83.69 83.69 83.69 83.69 83.69 83.69 83.69 83.69 83.69 83.69 83.69 83.69 2032 85.13 85.13 85.13 85.13 85.13 85.13 85.13 85.13 85.13 85.13 85.13 85.13 2033 87.07 87.07 87.07 87.07 87.07 87.07 87.07 87.07 87.07 87.07 87.07 87.07 2034 88.82 88.82 88.82 88.82 88.82 88.82 88.82 88.82 88.82 88.82 88.82 88.82 2035 90.59 90.59 90.59 90.59 90.59 90.59 90.59 90.59 90.59 90.59 90.59 90.59 92.15 92.15 92.15 92.15 92.15 2036 92.15 92.15 92.15 92.15 92.15 92.15 92.15 94.25 94.25 2037 94.25 94.25 94.25 94.25 94.25 94.25 94.25 94.25 94.25 94.25 2038 96.14 96.14 96.14 96.14 96.14 96.14 96.14 96.14 96.14 96.14 96.14 96.14 98.06 98.06 2039 98.06 98.06 98.06 98.06 98.06 98.06 98.06 98.06 98.06 98.06 2040 99.75 99.75 99.75 99.75 99.75 99.75 99.75 99.75 99.75 99.75 99.75 99.75 2041 102.02 102.02 102.02 102.02 102.02 102.02 102.02 102.02 102.02 102.02 102.02 102.02 104.06 104.06 104.06 104.06 104.06 104.06 2042 104.06 104.06 104.06 104.06 104.06 104.06 2043 106.14 106.14 106.14 106.14 106.14 106.14 106.14 106.14 106.14 106.14 106.14 106.14

# Portland General Electric Renewable Avoided Cost Study Total Projected On-Peak Avoided Costs: Capacity Removed, Energy Only, Aurora Shaping

Table 5 Nominal \$/MWh Year <u>Jan</u> <u>Feb</u> Mar <u>Apr</u> May <u>Jun</u> <u>Jul</u> Aug Sep Oct Nov <u>Dec</u> 2017 34.81 29.46 26.91 27.42 33.53 2018 32.01 29.46 25.38 21.14 20.62 21.14 30.01 33.42 31.06 25.63 27.67 32.27 2019 31.18 29.49 23.89 19.25 18.62 19.53 30.14 34.47 31.43 26.91 28.93 34.34 2020 32.84 31.06 25.15 20.26 19.59 20.56 31.74 36.30 33.09 28.33 30.46 36.16 2021 34.60 32.72 26.46 21.28 20.58 21.61 33.44 38.27 34.87 29.82 32.09 38.13 2022 36.47 34.48 27.88 22.42 21.68 22.76 35.25 40.34 36.75 31.44 40.19 33.81 32.48 25.11 36.07 2023 32.55 28.51 23.14 21.85 28.29 31.03 33.38 33.87 34.01 2024 36.16 34.47 31.84 26.04 23.28 16.27 29.02 32.72 35.73 35.93 36.83 39.19 2025 36.28 36.45 32.07 27.15 25.16 20.76 31.18 33.59 36.96 36.50 38.88 36.17 2026 38.02 38.42 34.69 28.61 23.72 19.90 33.16 36.49 39.07 39.98 39.93 41.34 42.49 2027 40.65 40.65 35.03 29.55 25.62 19.81 33.68 38.68 40.37 41.18 39.95 2028 41.59 39.62 35.61 29.31 24.13 18.69 35.04 39.47 41.56 42.04 42.77 45.50 2029 98.73 90.42 83.19 67.70 59.55 35.00 79.98 91.66 98.98 94.04 95.69 105.85 2030 100.41 107.82 98.71 96.15 85.45 66.34 52.32 30.61 82.43 92.35 101.20 98.44 2031 98.62 97.84 65.69 80.40 99.62 105.97 87.42 58.57 42.31 94.18 101.65 96.41 2032 101.16 98.81 85.58 67.42 55.88 33.18 86.53 102.70 103.85 101.28 104.99 110.86 2033 102.89 102.55 85.26 67.39 52.36 51.67 88.28 99.33 104.46 103.29 105.37 109.93 68.38 107.62 115.66 2034 107.70 107.26 88.56 53.43 38.13 91.98 102.42 108.28 109.70 2035 113.08 106.79 91.16 67.49 55.89 32.09 87.40 103.72 110.12 108.00 106.67 117.34 2036 113.61 108.13 92.63 69.65 46.57 19.26 94.79 105.70 113.96 112.65 111.24 121.91 2037 113.12 112.66 95.63 67.20 53.95 40.01 92.50 107.68 115.15 112.29 112.29 122.80 2038 115.66 117.76 93.41 66.69 47.01 32.07 101.89 117.27 120.17 117.48 118.25 127.40 2039 116.68 115.16 92.00 42.04 101.48 112.36 123.77 66.79 55.87 112.88 119.00 116.60 2040 118.13 116.33 93.33 75.43 48.09 35.54 106.03 116.70 124.04 119.31 121.60 130.47 2041 121.70 118.06 98.83 79.53 69.52 23.25 104.49 118.96 125.24 115.90 116.38 128.22 108.04 2042 123.66 121.34 102.27 79.83 52.17 23.60 122.78 128.29 122.10 119.94 134.87 2043 122.16 123.35 99.46 72.94 58.09 47.87 111.16 125.04 130.94 122.06 123.56 138.81

# Portland General Electric Renewable Avoided Cost Study Total Projected Off-Peak Avoided Costs: Capacity Removed, Energy Only, Aurora Shaping

Table 6 Nominal \$/MWh

<u>Year</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
2017								24.51	24.72	23.85	24.11	27.42
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.41
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	33.70	32.17	29.76	25.01	21.99	19.00	26.39	30.90	33.57	33.77	33.61	34.83
2026	35.44	35.59	31.64	27.21	22.20	15.26	28.97	33.61	36.07	35.46	35.51	37.70
2027	36.66	35.71	32.22	27.60	23.64	18.12	29.40	34.72	37.35	37.55	36.31	38.40
2028	38.09	37.21	33.20	27.82	23.65	17.34	31.56	36.38	38.22	38.77	39.08	40.92
2029	87.39	83.14	79.75	60.89	56.60	30.37	68.86	84.70	91.46	89.10	90.05	95.00
2030	90.66	87.81	81.88	62.46	52.25	31.31	75.55	87.01	93.96	93.87	94.23	96.33
2031	94.53	91.33	79.90	66.32	59.86	41.01	74.22	87.92	95.40	93.03	92.05	96.31
2032	95.12	90.63	85.26	64.49	46.09	33.03	81.76	88.62	98.19	95.17	97.79	103.88
2033	96.72	93.73	84.37	65.02	55.14	44.09	81.80	90.25	98.91	96.03	97.55	104.35
2034	100.64	96.93	84.22	63.90	50.21	33.88	82.22	94.26	101.29	101.38	105.38	107.75
2035	103.38	100.59	93.20	71.90	61.31	46.52	81.06	99.14	104.45	99.35	103.56	106.09
2036	111.16	105.72	94.24	72.48	61.23	31.45	82.90	100.58	110.79	104.85	108.44	114.13
2037	110.15	107.49	96.32	79.57	59.61	38.00	86.10	101.85	110.09	103.94	105.91	113.12
2038	113.74	110.37	97.67	79.06	51.82	34.44	88.62	103.26	110.27	107.20	111.44	117.93
2039	110.16	108.78	96.61	84.94	62.94	60.33	93.55	103.97	110.69	110.48	115.32	122.80
2040	116.99	108.93	94.17	91.82	59.51	40.97	95.01	110.61	112.45	116.09	118.19	121.07
2041	116.50	110.73	111.72	97.32	66.46	37.99	97.97	109.98	123.17	113.27	119.57	123.40
2042	126.11	116.45	107.55	85.50	62.50	40.12	105.67	116.39	125.76	123.46	122.21	128.97
2043	120.84	117.22	106.74	92.45	75.66	55.17	95.95	115.68	123.02	118.73	119.21	130.15

# Renewable Avoided Cost Study Projected On Peak Resource Sufficiency Period Forward Market Prices

Table 7				on roun.		Junio.01.07	1 01104 1 0	. wara man			Nominal \$/	/MWh
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017								34.81	29.46	26.91	27.42	33.53
2018	32.01	29.46	25.38	21.14	20.62	21.14	30.01	33.42	31.06	25.63	27.67	32.27
2019	31.18	29.49	23.89	19.25	18.62	19.53	30.14	34.47	31.43	26.91	28.93	34.34
2020	32.84	31.06	25.15	20.26	19.59	20.56	31.74	36.30	33.09	28.33	30.46	36.16
2021	34.60	32.72	26.46	21.28	20.58	21.61	33.44	38.27	34.87	29.82	32.09	38.13
2022	36.47	34.48	27.88	22.42	21.68	22.76	35.25	40.34	36.75	31.44	33.81	40.19
2023	32.55	32.48	28.51	25.11	23.14	21.85	28.29	31.03	33.38	33.87	34.01	36.07
2024	36.16	34.47	31.84	26.04	23.28	16.27	29.02	32.72	35.73	35.93	36.83	39.19
2025	36.28	36.45	32.07	27.15	25.16	20.76	31.18	33.59	36.96	36.50	36.17	38.88
2026	38.02	38.42	34.69	28.61	23.72	19.90	33.16	36.49	39.07	39.98	39.93	41.34
2027	40.65	40.65	35.03	29.55	25.62	19.81	33.68	38.68	40.37	41.18	39.95	42.49
2028	41.59	39.62	35.61	29.31	24.13	18.69	35.04	39.47	41.56	42.04	42.77	45.50

#### Portland General Electric Renewable Avoided Cost Study Projected Off Peak Resource Sufficiency Period Forward Market Prices

Table 8											Nominal \$	/MWh
Year	<u>Jan</u>	<u>Feb</u>	Mar	<u>Apr</u>	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec
2017								24.51	24.72	23.85	24.11	27.42
2018	27.42	24.87	20.80	15.18	12.12	10.88	19.58	24.24	24.69	22.51	23.69	27.41
2019	24.42	24.61	19.29	13.46	10.42	10.07	19.15	25.06	25.53	23.33	24.87	29.38
2020	26.35	26.55	20.80	14.48	11.19	10.80	20.64	27.03	27.54	25.17	26.84	31.72
2021	28.18	28.40	22.20	15.39	11.85	11.44	22.03	28.92	29.47	26.90	28.71	33.97
2022	30.11	30.34	23.71	16.42	12.61	12.18	23.53	30.91	31.50	28.75	30.68	36.32
2023	30.45	29.46	27.13	22.78	21.22	19.28	25.24	28.22	30.91	31.13	31.55	32.77
2024	32.49	29.95	29.34	24.83	21.55	13.81	25.44	29.61	32.06	32.27	34.41	35.80
2025	33.70	32.17	29.76	25.01	21.99	19.00	26.39	30.90	33.57	33.77	33.61	34.83
2026	35.44	35.59	31.64	27.21	22.20	15.26	28.97	33.61	36.07	35.46	35.51	37.70
2027	36.66	35.71	32.22	27.60	23.64	18.12	29.40	34.72	37.35	37.55	36.31	38.40
2028	38.09	37.21	33.20	27.82	23.65	17.34	31.56	36.38	38.22	38.77	39.08	40.92

# UM 1728 Application to Update Schedule 201 Qualifying Facility Information

# Attachment C

List of Sources for Various Assumptions Used to Calculate Prices

#### Portland General Electric Sched 201 Workbooks Major Input Source Notes August 2017

Model	Worksheet	Item	Source	Source Detail
RAC	Capacity	Capacity Contribution	2016 IRP	Section 5.1.5
RAC	Capacity	On Peak Capacity Factor	2016 IRP	Section 5.1.5
RAC	CAPEX	Ongoing annual capital costs	2016 IRP	Appendix M
RAC	Plant Capital Cost Inputs	Overnight Capital Cost	2016 IRP	Chapter 7, p. 212, Table 7-4; Appendix M, Section 3.2.1
RAC	Plant Capital Cost Inputs	Capacity	2016 IRP	Chapter 7, p. 212, Table 7-4
RAC	Plant Capital Cost Inputs	Economic Life	2016 IRP	Chapter 7, p. 212, Table 7-4
RAC	Plant Operating Parameters	Fixed O&M	2016 IRP	Chapter 7, p. 212, Table 7-4; Appendix M, Sections 3.2.4 - 3.2.6
RAC	Plant Operating Parameters	Capacity Factor	2016 IRP	Appendix M, Section 3.1.2
RAC		Wind and Solar Integration Costs	2016 IRP	Section 7.2.1.2
RAC		Tax Rates, Inflation, Cost of Capital	2016 IRP	Section 10.2.1.3
10.00	Tinanolai a Tax i alamotoro	rax rates, milation, cost of capital	2010 110	0001011 10.2.1.0
RAC	Financial & Tax Parameters	In Service Year	2016 IRP	Staff Report, July 28, 2017; OPUC Public Meeting, August 8, 2017; PGE's June 23, 2017 Reply Comments page 45
RAC	Trading Curves	On/Off-Peak Prices	PGE Trading Curves 2016-2022, 2023+ from Aurora PNW prices based on 2016 IRP model with updated gas prices	Chapter 10
RAC	Transmission	BPA PTP + SCD	BPA Rates 2016-2019, 2016 IRP inflation assumption after 2019.	
SAC	Plant Cap Cost	Overnight Capital Cost	2016 IRP	Chapter 7, p. 212, Table 7-4; Appendix K
SAC	Plant Cap Cost	Capacity	2016 IRP	Chapter 7, p. 212, Table 7-4; Appendix K
SAC	Plant Cap Cost	Economic Life	2016 IRP	Chapter 7, p. 212, Table 7-4
SAC	Plant Oper	Heat Rate	2016 IRP	Chapter 7, p. 212, Table 7-4; Appendix K
SAC	Plant Oper	Fixed O&M	2016 IRP	Chapter 7, p. 212, Table 7-4; Appendix K
SAC	Gas Prices	AECO Delivered	2016 IRP framework, updated June 2017 Wood MacKenzie North America Natural Gas Long-Term Outlook	••
SAC	Aurora	CCCT generation, starts, start costs	2016 IRP	Aurora output
SAC	Plant Cap Cost	In Service Year	2016 IRP	Staff Report, July 28, 2017; OPUC Public Meeting, August 8, 2017; PGE's June 23, 2017 Reply Comments page 45

### **CERTIFICATE OF SERVICE**

I hereby certify that I served a true and correct copy of **Portland General Electric** Company's Application to Update Schedule 201 Qualifying Facility Information – Compliance Filing and Motion for Temporary Relief from Schedule 201 Prices on the parties listed below via electronic mail and/or US mail in compliance with OAR 860-001-0180.

Dated this 18th day of August, 2017.

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