



Portland General Electric
121 SW Salmon Street · Portland, Ore. 97204

April 28, 2023

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street, S.E.
P.O. Box 1088
Salem, OR 97308-1088

RE: UM 1728 Application to Update Schedule 201 Qualifying Facility Information

Pursuant to Oregon Administrative Rule (OAR) 860-029-0085 and Oregon Revised Statute (ORS) 758.525, Portland General Electric Company (PGE) submits this filing to revise its Schedule 201, Qualifying Facility Avoided Cost Power Purchase Information for Qualifying Facilities (QFs) 10 MW or Less, Sheet Nos. 201-1 through 201-25.

OAR 860-029-0085(4)(c) requires updated avoided cost prices to be effective within 60 days of the May 1 update filing. Accordingly, PGE respectfully requests an effective date of **June 28, 2023**.

This filing revises PGE's Schedule 201 consistent with Order Nos. 11-505 and 14-058. In Order No. 14-058, the Commission directed electric utilities to update their avoided cost prices on May 1 every year. Pursuant to OAR 860-029-0085(4)(a), the annual update is limited to four factors:

1. Updated natural gas prices;
2. On- and off-peak forward-looking electricity market prices;
3. Changes to the status of the Production Tax Credit (PTC); and
4. Any other action or change in an acknowledged Integrated Resource Plan (IRP) update relevant to the calculation of avoided costs.

The first three factors apply to PGE's 2023 update. PGE recently filed its 2023 IRP on March 31, 2023 which is still in the early stages of review by the Commission and has not been acknowledged; therefore factor four cannot be updated at this time.

A. The Inputs Included in this Filing Are Reasonable and Should be Approved as Part of PGE's Updated Avoided Cost Prices.

The following inputs to PGE's Schedule 201 avoided cost prices changed in this filing:

- **Natural Gas Prices.** For Non-Renewable Avoided Costs, forward natural gas prices are flat.
- **On- and off-peak forward-looking electricity market prices.** For both Non-Renewable and Renewable Avoided Costs, forward electricity prices have increased.

- **Changes to status of the PTC.** With the passing of the Inflation Reduction Act (IRA), which became effective August 16, 2022, the PTC received an extension for the full value of the PTC credit for facilities that start construction after January 1, 2022, and before January 1, 2025.

B. Conclusion

For the reasons discussed above, the inputs included in this avoided cost update are reasonable, and the resulting avoided cost prices should be approved.

Attachment A provides a description of non-renewable avoided costs. The confidential Attachment A is subject to Protective Order 17-321 and will be sent separately to the Filing Center password protected along with the excel files.

Attachment B provides a description of renewable avoided costs.

Attachment C provides a comparison of the inputs used in this filing to those used in PGE's current avoided costs.

Please direct any questions regarding this filing to Chris Pleasant at (503) 464-2555.

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

Sincerely,

\s\ Robert Macfarlane

Robert Macfarlane
Manager, Pricing & Tariffs

Enclosures

cc: Service List – UM 1728

**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 and memorialized in the PPA.

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

SCHEDULE 201 (Continued)

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 www.portlandgeneral.com. 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.

SCHEDULE 201 (Continued)**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 94.01% 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.

SCHEDULE 201 (Continued)**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.

ELIGIBILITY REQUIREMENTS TO RECEIVE THE STANDARD FIXED PRICE OPTION OR THE RENEWABLE FIXED PRICE 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. A QF will be eligible to receive either the Standard Fixed Price Option or the Renewable Fixed Price Option described below only if the nameplate capacity of the QF does not exceed 3 MW for solar QF projects or 10 MW for all other types of QF projects. A QF that does not meet these eligibility requirements must negotiate prices pursuant to the terms of Schedule 202. Solar QF projects with nameplate capacity that exceed 3 MW but do not exceed 10 MW are eligible for a Standard PPA containing negotiated prices under Schedule 202. Eligibility for the Standard Fixed Price Option or the Renewable Fixed Price Option may also be affected by the Definition of a Small Cogeneration Facility or Small Power Production Facility Eligible to Receive the Standard Fixed Price Option or the Renewable Fixed Price Option Under the Standard PPA stated below.

Except for As-Available Energy, 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 Net Output delivered in the On-Peak Period. Except for As-Available Energy, 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 Net Output delivered in the Off-Peak Period. The Company will pay the Seller the As-Available Rate for all As-Available Energy delivered during the PPA Term.

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 that meet the eligibility requirements identified above.

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 3b, 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.

SCHEDULE 201 (Continued)

PRICING OPTIONS FOR STANDARD PPA (Continued)

Standard Fixed Price Option (Continued)

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 25.00%. The capacity contribution for Solar QF resources (Tables 3a and 3b) is assumed to be 8.50%.

Prices paid to the Seller under the Standard Fixed Price Option for Wind QFs (Tables 2a and 2b) include a reduction for the wind integration costs in Table 7. However, if the Wind 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, for a net-zero effect.

Prices paid to the Seller under the Standard Fixed Price Option for Solar QFs (Tables 3a and 3b) include a reduction for the solar integration costs in Table 7. However, if the 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 solar integration charges in Table 7, in addition to the prices listed in Tables 3a and 3b, for a net-zero effect.

Sellers with terms exceeding 15 years from the commercial operation date will receive pricing equal to the Mid-C Index Price for all years up to five in excess of the initial 15 years after the commercial operation date selected by the Seller and memorialized in the PPA.

SCHEDULE 201 (Continued)

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

TABLE 1a												
Avoided Costs												
Fixed Price Option for Base Load QF												
On-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	70.99	73.54	153.56	252.44	204.53	82.20	97.49	135.21
2024	133.27	109.83	68.03	61.92	53.76	58.86	175.07	215.84	167.93	81.29	94.54	137.35
2025	54.42	54.33	52.97	49.94	49.79	50.77	51.56	51.79	51.60	52.08	54.46	56.85
2026	58.95	57.52	54.70	51.00	50.94	51.58	52.21	52.36	52.16	52.61	54.24	56.68
2027	58.60	57.35	54.52	51.34	51.21	51.60	52.13	52.35	52.24	52.90	55.16	57.94
2028	60.54	58.86	55.68	50.81	50.79	51.26	51.86	52.19	52.19	53.45	57.44	60.58
2029	52.57	51.69	50.52	49.11	49.19	49.28	49.36	49.46	49.55	50.07	51.72	51.82
2030	52.25	52.33	51.58	50.01	50.10	50.20	50.29	50.38	50.48	51.19	53.11	53.21
2031	53.17	53.27	52.09	50.81	50.91	50.95	51.05	51.14	51.24	52.03	54.29	54.39
2032	53.54	53.63	53.57	52.33	52.42	52.52	52.62	52.72	52.83	53.36	55.72	55.83
2033	56.43	56.17	54.85	53.79	53.84	53.92	54.06	54.13	54.24	54.70	57.17	57.33
2034	57.53	55.50	56.86	55.71	55.45	55.94	55.68	55.78	55.66	57.07	57.81	57.87
2035	59.24	56.46	58.17	56.94	56.68	57.18	57.23	57.01	57.36	58.39	59.44	59.55
2036	61.02	56.34	59.03	57.11	57.56	57.34	57.78	57.93	57.15	57.87	58.16	57.98
2037	59.44	57.25	60.60	58.86	58.97	59.12	59.23	59.78	59.37	59.64	59.95	60.14
2038	61.17	59.60	61.94	60.70	60.82	61.01	61.48	61.62	61.20	61.91	61.27	61.67
2039	62.49	61.66	64.84	63.09	63.59	63.74	63.52	63.65	63.12	63.68	63.64	63.69
2040	65.52	65.59	67.59	65.68	65.81	66.36	66.15	66.65	65.73	67.51	64.30	64.48
2041	66.11	66.61	70.62	68.87	68.87	69.03	69.18	69.71	68.82	69.89	69.35	69.59
2042	71.30	70.75	72.75	71.77	71.31	71.88	71.67	71.83	71.20	72.27	71.63	72.20
2043	73.73	72.32	74.51	73.46	73.57	73.44	73.13	73.78	72.70	74.56	73.35	73.63
2044	76.04	76.74	75.99	73.94	74.10	74.75	74.87	74.60	74.41	75.52	75.53	76.25
2045	78.50	77.06	79.39	77.84	78.01	78.31	78.48	79.08	78.35	79.06	78.72	79.03
2046	81.32	78.94	81.56	79.99	80.17	80.87	80.65	80.75	80.01	81.50	81.17	81.96
2047	84.54	83.60	84.85	83.73	83.55	84.26	84.46	84.28	83.50	84.50	85.61	86.51
2048	88.65	90.43	86.74	86.10	85.92	86.59	86.47	87.07	85.87	87.15	88.51	88.31

SCHEDULE 201 (Continued)

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

TABLE 1b												
Avoided Costs												
Fixed Price Option for Base Load QF												
Off-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	58.76	43.46	69.97	101.57	92.39	74.05	83.22	109.72
2024	108.81	90.46	59.88	55.80	43.57	43.57	79.25	111.36	84.34	60.90	75.17	109.83
2025	28.11	28.01	26.65	23.62	23.48	24.46	25.25	25.48	25.28	25.76	28.15	30.54
2026	32.09	30.67	27.85	24.15	24.08	24.73	25.36	25.51	25.31	25.76	27.39	29.82
2027	31.20	29.95	27.12	23.94	23.80	24.20	24.73	24.95	24.84	25.50	27.76	30.54
2028	32.58	30.90	27.71	22.85	22.82	23.29	23.90	24.22	24.23	25.49	29.47	32.62
2029	24.03	23.16	21.99	20.57	20.65	20.74	20.83	20.92	21.01	21.53	23.18	23.28
2030	23.12	23.21	22.46	20.89	20.98	21.08	21.17	21.26	21.36	22.07	23.98	24.09
2031	23.46	23.55	22.37	21.09	21.19	21.23	21.33	21.43	21.53	22.32	24.57	24.68
2032	23.41	23.49	23.44	22.19	22.29	22.38	22.48	22.59	22.70	23.22	25.59	25.70
2033	25.48	25.22	23.91	22.84	22.90	22.97	23.11	23.18	23.29	23.75	26.22	26.38
2034	25.84	23.82	25.17	24.02	23.77	24.26	24.00	24.10	23.97	25.39	26.13	26.19
2035	27.01	24.23	25.94	24.71	24.45	24.95	25.00	24.78	25.13	26.16	27.21	27.33
2036	28.24	23.55	26.24	24.32	24.78	24.55	24.99	25.14	24.36	25.09	25.38	25.19
2037	25.88	23.68	27.04	25.30	25.41	25.55	25.67	26.22	25.81	26.07	26.39	26.58
2038	26.92	25.35	27.69	26.45	26.56	26.76	27.23	27.37	26.95	27.66	27.02	27.42
2039	27.54	26.70	29.89	28.14	28.63	28.79	28.57	28.70	28.17	28.73	28.69	28.74
2040	29.86	29.92	31.92	30.01	30.14	30.69	30.48	30.98	30.06	31.84	28.63	28.81
2041	29.71	30.21	34.22	32.47	32.48	32.63	32.78	33.31	32.42	33.49	32.96	33.19
2042	34.16	33.60	35.61	34.63	34.17	34.74	34.53	34.69	34.06	35.12	34.48	35.05
2043	35.82	34.42	36.61	35.55	35.67	35.54	35.23	35.87	34.80	36.66	35.45	35.73
2044	37.48	38.18	37.44	35.38	35.54	36.19	36.31	36.05	35.85	36.96	36.97	37.69
2045	38.90	37.46	39.79	38.23	38.41	38.70	38.88	39.48	38.75	39.46	39.12	39.43
2046	41.04	38.66	41.27	39.70	39.89	40.59	40.36	40.47	39.72	41.22	40.88	41.67
2047	43.43	42.49	43.75	42.63	42.45	43.15	43.35	43.18	42.39	43.39	44.51	45.40
2048	46.84	48.62	44.92	44.28	44.10	44.78	44.65	45.25	44.06	45.33	46.69	46.50

SCHEDULE 201 (Continued)

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

TABLE 2a												
Avoided Costs												
Fixed Price Option for Wind QF												
On-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	70.64	73.19	153.21	252.09	204.18	81.86	97.15	134.86
2024	132.92	109.47	67.68	61.56	53.41	58.51	174.71	215.49	167.58	80.93	94.18	137.00
2025	43.22	43.13	41.76	38.74	38.59	39.57	40.36	40.59	40.40	40.88	43.26	45.65
2026	47.51	46.09	43.27	39.57	39.51	40.15	40.78	40.93	40.73	41.18	42.81	45.24
2027	46.93	45.69	42.85	39.68	39.54	39.94	40.46	40.68	40.57	41.23	43.50	46.28
2028	48.64	46.96	43.77	38.91	38.88	39.35	39.96	40.28	40.29	41.55	45.53	48.68
2029	40.42	39.55	38.38	36.96	37.04	37.13	37.21	37.31	37.40	37.92	39.57	39.67
2030	39.85	39.94	39.19	37.62	37.71	37.80	37.89	37.99	38.08	38.80	40.71	40.81
2031	40.52	40.62	39.44	38.16	38.25	38.30	38.40	38.49	38.59	39.38	41.64	41.74
2032	40.71	40.80	40.74	39.50	39.59	39.69	39.78	39.89	40.00	40.53	42.89	43.00
2033	43.25	42.99	41.68	40.61	40.67	40.75	40.88	40.95	41.07	41.53	44.00	44.16
2034	44.04	42.02	43.37	42.22	41.97	42.45	42.20	42.30	42.17	43.58	44.33	44.39
2035	45.52	42.74	44.45	43.22	42.96	43.46	43.51	43.29	43.64	44.67	45.72	45.83
2036	47.07	42.38	45.07	43.15	43.61	43.38	43.82	43.97	43.19	43.91	44.20	44.02
2037	45.15	42.96	46.32	44.57	44.68	44.83	44.94	45.49	45.09	45.35	45.67	45.85
2038	46.59	45.02	47.36	46.12	46.23	46.43	46.90	47.04	46.62	47.33	46.69	47.09
2039	47.61	46.78	49.96	48.21	48.71	48.86	48.64	48.77	48.24	48.80	48.76	48.81
2040	50.34	50.40	52.41	50.49	50.63	51.17	50.96	51.46	50.55	52.32	49.12	49.30
2041	50.61	51.11	55.13	53.38	53.38	53.53	53.68	54.21	53.33	54.40	53.86	54.09
2042	55.49	54.93	56.94	55.96	55.50	56.07	55.86	56.02	55.39	56.45	55.81	56.38
2043	57.59	56.18	58.38	57.32	57.44	57.31	57.00	57.64	56.56	58.43	57.21	57.49
2044	59.62	60.33	59.58	57.52	57.69	58.33	58.46	58.19	57.99	59.10	59.11	59.83
2045	61.64	60.20	62.53	60.98	61.16	61.45	61.62	62.22	61.50	62.20	61.87	62.18
2046	64.17	61.79	64.41	62.84	63.02	63.72	63.50	63.60	62.86	64.35	64.02	64.81
2047	67.04	66.10	67.35	66.23	66.05	66.76	66.96	66.78	66.00	67.00	68.11	69.01
2048	70.85	72.63	68.94	68.29	68.12	68.79	68.66	69.26	68.07	69.35	70.71	70.51

SCHEDULE 201 (Continued)

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

TABLE 2b												
Avoided Costs												
Fixed Price Option for Wind QF												
Off-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	58.41	43.12	69.62	101.22	92.05	73.70	82.87	109.38
2024	108.46	90.11	59.53	55.45	43.22	43.22	78.89	111.00	83.99	60.55	74.82	109.47
2025	27.75	27.65	26.29	23.26	23.12	24.10	24.89	25.12	24.92	25.40	27.79	30.18
2026	31.73	30.30	27.48	23.78	23.72	24.36	25.00	25.14	24.94	25.39	27.02	29.46
2027	30.82	29.58	26.74	23.57	23.43	23.82	24.35	24.57	24.46	25.12	27.39	30.17
2028	32.20	30.52	27.33	22.47	22.44	22.91	23.52	23.84	23.85	25.11	29.09	32.24
2029	23.64	22.77	21.60	20.18	20.26	20.35	20.44	20.53	20.62	21.14	22.79	22.89
2030	22.73	22.81	22.06	20.49	20.58	20.68	20.77	20.86	20.96	21.67	23.59	23.69
2031	23.05	23.14	21.97	20.69	20.78	20.83	20.92	21.02	21.12	21.91	24.16	24.27
2032	22.99	23.08	23.02	21.78	21.87	21.97	22.07	22.17	22.28	22.81	25.18	25.28
2033	25.05	24.80	23.48	22.41	22.47	22.55	22.69	22.76	22.87	23.33	25.80	25.96
2034	25.41	23.39	24.74	23.59	23.34	23.82	23.57	23.67	23.54	24.96	25.70	25.76
2035	26.57	23.79	25.50	24.27	24.01	24.51	24.56	24.34	24.69	25.72	26.77	26.88
2036	27.79	23.10	25.79	23.87	24.33	24.10	24.54	24.69	23.91	24.64	24.93	24.74
2037	25.42	23.22	26.58	24.84	24.95	25.10	25.21	25.76	25.35	25.61	25.93	26.12
2038	26.46	24.88	27.22	25.98	26.10	26.29	26.76	26.90	26.48	27.19	26.55	26.96
2039	27.06	26.23	29.41	27.66	28.16	28.31	28.09	28.22	27.69	28.25	28.21	28.26
2040	29.37	29.43	31.44	29.52	29.66	30.20	29.99	30.49	29.57	31.35	28.14	28.33
2041	29.21	29.71	33.72	31.97	31.98	32.13	32.28	32.81	31.93	32.99	32.46	32.69
2042	33.65	33.09	35.10	34.12	33.66	34.23	34.02	34.18	33.55	34.61	33.97	34.54
2043	35.30	33.90	36.09	35.03	35.15	35.02	34.71	35.35	34.28	36.14	34.93	35.21
2044	36.95	37.66	36.91	34.85	35.01	35.66	35.78	35.52	35.32	36.43	36.44	37.16
2045	38.36	36.92	39.25	37.69	37.87	38.16	38.34	38.94	38.21	38.92	38.58	38.89
2046	40.49	38.11	40.72	39.15	39.34	40.04	39.81	39.91	39.17	40.66	40.33	41.12
2047	42.87	41.93	43.18	42.06	41.88	42.59	42.79	42.61	41.83	42.83	43.94	44.84
2048	46.26	48.04	44.35	43.71	43.53	44.20	44.08	44.68	43.48	44.76	46.12	45.92

SCHEDULE 201 (Continued)

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

TABLE 3a												
Avoided Costs												
Fixed Price Option for Solar QF												
On-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	69.55	72.10	152.12	251.00	203.08	80.76	96.05	133.77
2024	131.80	108.36	66.56	60.45	52.29	57.39	173.60	214.37	166.46	79.82	93.07	135.88
2025	32.32	32.22	30.86	27.83	27.68	28.66	29.45	29.68	29.49	29.97	32.35	34.74
2026	36.38	34.96	32.14	28.44	28.37	29.02	29.65	29.79	29.60	30.05	31.68	34.11
2027	35.57	34.33	31.50	28.32	28.18	28.58	29.10	29.32	29.21	29.87	32.14	34.92
2028	37.05	35.37	32.18	27.32	27.29	27.76	28.37	28.69	28.70	29.96	33.94	37.09
2029	28.59	27.72	26.55	25.13	25.21	25.30	25.38	25.48	25.57	26.09	27.74	27.84
2030	27.78	27.86	27.11	25.54	25.63	25.73	25.82	25.91	26.01	26.72	28.64	28.74
2031	28.20	28.30	27.12	25.84	25.94	25.98	26.08	26.17	26.27	27.06	29.32	29.42
2032	28.21	28.30	28.24	26.99	27.09	27.19	27.28	27.39	27.50	28.03	30.39	30.50
2033	30.42	30.16	28.85	27.78	27.84	27.92	28.05	28.12	28.24	28.70	31.17	31.33
2034	30.91	28.89	30.24	29.09	28.84	29.32	29.07	29.17	29.04	30.45	31.20	31.26
2035	32.16	29.38	31.09	29.86	29.60	30.09	30.15	29.93	30.28	31.31	32.36	32.47
2036	33.47	28.78	31.47	29.55	30.01	29.78	30.23	30.37	29.59	30.32	30.61	30.42
2037	31.24	29.04	32.40	30.66	30.77	30.92	31.03	31.58	31.17	31.43	31.75	31.94
2038	32.40	30.82	33.16	31.92	32.04	32.23	32.70	32.84	32.42	33.13	32.49	32.89
2039	33.12	32.29	35.47	33.72	34.22	34.37	34.15	34.29	33.75	34.31	34.27	34.32
2040	35.55	35.61	37.62	35.71	35.84	36.39	36.18	36.68	35.76	37.54	34.33	34.51
2041	35.53	36.02	40.04	38.29	38.29	38.45	38.59	39.12	38.24	39.31	38.77	39.00
2042	40.09	39.54	41.54	40.56	40.10	40.67	40.46	40.62	39.99	41.06	40.42	40.99
2043	41.88	40.47	42.66	41.61	41.72	41.59	41.28	41.93	40.85	42.71	41.50	41.78
2044	43.63	44.34	43.59	41.53	41.70	42.34	42.47	42.20	42.00	43.11	43.12	43.84
2045	45.23	43.79	46.12	44.57	44.75	45.04	45.21	45.81	45.09	45.79	45.46	45.76
2046	47.47	45.09	47.71	46.14	46.32	47.02	46.80	46.90	46.16	47.65	47.32	48.11
2047	50.00	49.05	50.31	49.19	49.01	49.72	49.92	49.74	48.96	49.96	51.07	51.97
2048	53.51	55.29	51.60	50.95	50.78	51.45	51.32	51.92	50.73	52.01	53.36	53.17

SCHEDULE 201 (Continued)PRICING OPTIONS FOR STANDARD PPA (Continued)
Standard Fixed Price Option (Continued)

TABLE 3b												
Avoided Costs												
Fixed Price Option for Solar QF												
Off-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	57.32	42.02	68.53	100.13	90.95	72.61	81.78	108.28
2024	107.34	88.99	58.41	54.33	42.10	42.10	77.78	109.89	82.87	59.43	73.70	108.36
2025	26.61	26.51	25.15	22.12	21.98	22.96	23.75	23.98	23.78	24.26	26.65	29.04
2026	30.56	29.14	26.32	22.62	22.55	23.20	23.83	23.97	23.78	24.23	25.86	28.29
2027	29.63	28.39	25.56	22.38	22.24	22.64	23.16	23.38	23.27	23.93	26.20	28.98
2028	30.99	29.31	26.12	21.26	21.23	21.70	22.30	22.63	22.64	23.90	27.88	31.02
2029	22.41	21.53	20.36	18.94	19.03	19.11	19.20	19.30	19.38	19.90	21.56	21.65
2030	21.46	21.55	20.80	19.23	19.32	19.42	19.51	19.60	19.70	20.41	22.32	22.43
2031	21.76	21.86	20.68	19.40	19.49	19.54	19.64	19.73	19.83	20.62	22.88	22.98
2032	21.68	21.77	21.71	20.46	20.56	20.65	20.75	20.86	20.97	21.49	23.86	23.97
2033	23.71	23.46	22.14	21.07	21.13	21.21	21.35	21.42	21.53	21.99	24.46	24.62
2034	24.04	22.02	23.37	22.22	21.97	22.46	22.20	22.30	22.17	23.59	24.33	24.39
2035	25.18	22.39	24.10	22.87	22.61	23.11	23.17	22.95	23.29	24.33	25.37	25.49
2036	26.36	21.68	24.37	22.45	22.90	22.68	23.12	23.27	22.49	23.21	23.50	23.32
2037	23.97	21.77	25.13	23.38	23.49	23.64	23.76	24.31	23.90	24.16	24.48	24.66
2038	24.97	23.39	25.74	24.50	24.61	24.81	25.28	25.41	25.00	25.71	25.07	25.47
2039	25.54	24.71	27.90	26.14	26.64	26.80	26.58	26.71	26.18	26.73	26.70	26.75
2040	27.82	27.88	29.89	27.98	28.11	28.65	28.45	28.95	28.03	29.81	26.60	26.78
2041	27.64	28.13	32.15	30.40	30.40	30.56	30.71	31.24	30.35	31.42	30.88	31.11
2042	32.04	31.48	33.49	32.51	32.05	32.62	32.41	32.57	31.94	33.00	32.36	32.94
2043	33.66	32.25	34.45	33.39	33.51	33.38	33.07	33.71	32.63	34.50	33.28	33.56
2044	35.28	35.98	35.23	33.18	33.34	33.99	34.11	33.84	33.65	34.76	34.76	35.48
2045	36.65	35.21	37.54	35.98	36.16	36.45	36.63	37.23	36.50	37.21	36.87	37.18
2046	38.74	36.36	38.98	37.41	37.59	38.29	38.07	38.17	37.43	38.92	38.59	39.38
2047	41.09	40.14	41.40	40.28	40.10	40.81	41.01	40.83	40.05	41.05	42.16	43.06
2048	44.44	46.22	42.53	41.89	41.71	42.38	42.26	42.86	41.67	42.94	44.30	44.11

SCHEDULE 201 (Continued)

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 and that satisfy the eligibility requirements identified above.

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 25.00%. The capacity contribution for Solar QF resources (Tables 6a and 6b) is assumed to be 8.50%. 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 QFs (Tables 5a and 5b) 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 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.

Prices paid to the Seller under the Renewable Fixed Price Option for Solar QFs (Tables 6a and 6b) include a reduction for the Solar integration costs in Table 7. However, if the 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 solar integration charges in Table 7, in addition to the prices listed in Tables 6a and 6b.

SCHEDULE 201 (Continued)

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

Sellers with terms exceeding 15 years from the commercial operation date will receive pricing equal to the Mid-C Index Price for all years up to five in excess of the initial 15 years following the commercial operation date selected by the Seller and memorialized in the PPA.

TABLE 4a												
Renewable Avoided Costs												
Renewable Fixed Price Option for Base Load QF												
On-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	70.99	73.54	153.56	252.44	204.53	82.20	97.49	135.21
2024	133.27	109.83	68.03	61.92	53.76	58.86	175.07	215.84	167.93	81.29	94.54	137.35
2025	70.54	62.76	48.89	46.86	44.15	45.85	84.41	97.94	82.04	53.29	57.69	71.90
2026	71.99	64.05	49.89	47.82	45.06	46.79	86.14	99.95	83.72	54.38	58.87	73.37
2027	73.46	65.36	50.91	48.80	45.98	47.74	87.91	102.00	85.44	55.49	60.07	74.87
2028	74.84	66.59	51.89	49.74	46.87	48.67	89.54	103.88	87.03	56.55	61.21	76.27
2029	76.50	68.06	53.02	50.82	47.89	49.72	91.54	106.22	88.98	57.79	62.56	77.97
2030	78.07	69.46	54.11	51.86	48.87	50.74	93.42	108.40	90.80	58.98	63.84	79.57
2031	79.67	70.88	55.22	52.92	49.87	51.78	95.33	110.62	92.66	60.18	65.15	81.20
2032	80.97	72.03	56.08	53.75	50.64	52.59	96.91	112.46	94.19	61.14	66.19	82.53
2033	82.97	73.82	57.50	55.12	51.93	53.92	99.28	115.20	96.50	62.68	67.85	84.56
2034	84.77	75.43	58.78	56.35	53.10	55.13	101.42	117.66	98.57	64.06	69.34	86.39
2035	86.40	76.87	59.88	57.40	54.08	56.15	103.39	119.96	100.49	65.27	70.66	88.06
2036	87.92	78.22	60.93	58.40	55.02	57.13	105.20	122.07	102.25	66.41	71.89	89.60
2037	89.98	80.05	62.36	59.77	56.32	58.48	107.67	124.93	104.65	67.97	73.58	91.70
2038	91.82	81.69	63.64	61.00	57.47	59.68	109.88	127.49	106.79	69.36	75.09	93.58
2039	93.70	83.37	64.94	62.25	58.65	60.90	112.13	130.10	108.98	70.78	76.63	95.50
2040	95.46	84.94	66.19	63.45	59.79	62.07	114.21	132.50	111.01	72.13	78.08	97.29
2041	97.58	86.82	67.63	64.82	61.08	63.42	116.77	135.49	113.49	73.71	79.80	99.45
2042	99.58	88.60	69.02	66.15	62.33	64.72	119.16	138.26	115.82	75.22	81.43	101.49
2043	101.62	90.41	70.43	67.51	63.61	66.04	121.60	141.09	118.19	76.77	83.10	103.57
2044	103.40	91.99	71.66	68.68	64.72	67.20	123.74	143.57	120.26	78.11	84.55	105.38
2045	105.95	94.28	73.47	70.43	66.37	68.90	126.76	147.06	123.21	80.07	86.67	107.98
2046	107.99	96.08	74.85	71.74	67.60	70.19	129.23	149.94	125.60	81.58	88.31	110.07
2047	110.21	98.05	76.38	73.21	68.98	71.63	131.88	153.02	128.18	83.25	90.12	112.32
2048	112.14	99.77	77.71	74.49	70.18	72.87	134.19	155.71	130.43	84.71	91.70	114.29

SCHEDULE 201 (Continued)

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

TABLE 4b												
Renewable Avoided Costs												
Renewable Fixed Price Option for Base Load QF												
Off-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	58.76	43.46	69.97	101.57	92.39	74.05	83.22	109.72
2024	108.81	90.46	59.88	55.80	43.57	43.57	79.25	111.36	84.34	60.90	75.17	109.83
2025	36.11	30.02	19.87	18.52	14.46	14.46	26.30	36.96	27.99	20.21	24.95	36.45
2026	36.85	30.64	20.28	18.90	14.76	14.76	26.84	37.71	28.56	20.62	25.46	37.19
2027	37.60	31.26	20.69	19.29	15.06	15.06	27.39	38.49	29.15	21.05	25.98	37.96
2028	38.27	31.82	21.06	19.63	15.32	15.32	27.87	39.17	29.67	21.42	26.44	38.63
2029	39.16	32.56	21.55	20.08	15.68	15.68	28.52	40.08	30.36	21.92	27.05	39.53
2030	39.96	33.22	21.99	20.49	16.00	16.00	29.11	40.90	30.98	22.37	27.61	40.34
2031	40.78	33.91	22.44	20.91	16.33	16.33	29.70	41.74	31.61	22.83	28.17	41.16
2032	41.50	34.51	22.84	21.28	16.62	16.62	30.23	42.48	32.17	23.23	28.67	41.89
2033	42.47	35.31	23.37	21.78	17.01	17.01	30.93	43.47	32.92	23.77	29.34	42.87
2034	43.34	36.03	23.85	22.23	17.35	17.35	31.57	44.36	33.60	24.26	29.94	43.75
2035	44.23	36.77	24.34	22.68	17.71	17.71	32.21	45.26	34.28	24.75	30.55	44.64
2036	45.01	37.42	24.77	23.08	18.02	18.02	32.78	46.07	34.89	25.19	31.10	45.43
2037	46.06	38.29	25.35	23.62	18.44	18.44	33.55	47.14	35.70	25.78	31.82	46.49
2038	47.00	39.08	25.87	24.10	18.82	18.82	34.23	48.10	36.43	26.31	32.47	47.44
2039	47.97	39.88	26.40	24.60	19.21	19.21	34.93	49.09	37.18	26.85	33.14	48.41
2040	48.81	40.58	26.86	25.03	19.55	19.55	35.55	49.96	37.84	27.32	33.72	49.27
2041	49.95	41.53	27.49	25.62	20.00	20.00	36.38	51.12	38.72	27.96	34.51	50.42
2042	50.97	42.38	28.05	26.14	20.41	20.41	37.13	52.17	39.51	28.53	35.22	51.45
2043	52.02	43.25	28.63	26.68	20.83	20.83	37.89	53.24	40.32	29.11	35.94	52.51
2044	52.94	44.01	29.13	27.15	21.20	21.20	38.56	54.18	41.04	29.63	36.57	53.44
2045	54.17	45.04	29.81	27.78	21.69	21.69	39.45	55.44	41.99	30.32	37.42	54.68
2046	55.28	45.96	30.42	28.35	22.14	22.14	40.26	56.58	42.85	30.94	38.19	55.80
2047	56.41	46.90	31.05	28.93	22.59	22.59	41.09	57.74	43.73	31.57	38.97	56.94
2048	57.41	47.73	31.59	29.44	22.99	22.99	41.81	58.76	44.50	32.13	39.66	57.95

SCHEDULE 201 (Continued)

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

TABLE 5a												
Renewable Avoided Costs												
Renewable Fixed Price Option for Wind QF												
On-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	70.64	73.19	153.21	252.09	204.18	81.86	97.15	134.86
2024	132.92	109.47	67.68	61.56	53.41	58.51	174.71	215.49	167.58	80.93	94.18	137.00
2025	59.34	51.56	37.69	35.66	32.95	34.64	73.21	86.74	70.84	42.09	46.48	60.69
2026	60.56	52.62	38.46	36.39	33.63	35.35	74.71	88.52	72.29	42.95	47.44	61.94
2027	61.80	53.69	39.25	37.14	34.32	36.08	76.24	90.33	73.77	43.83	48.41	63.21
2028	62.93	54.69	39.99	37.84	34.97	36.76	77.63	91.98	75.12	44.65	49.31	64.37
2029	64.35	55.92	40.87	38.67	35.74	37.57	79.40	94.07	76.83	45.64	50.41	65.82
2030	65.67	57.06	41.71	39.46	36.47	38.34	81.02	96.00	78.40	46.58	51.45	67.17
2031	67.02	58.23	42.57	40.27	37.22	39.13	82.68	97.97	80.01	47.53	52.50	68.55
2032	68.14	59.20	43.25	40.92	37.81	39.75	84.08	99.63	81.36	48.31	53.36	69.69
2033	69.79	60.64	44.33	41.94	38.76	40.75	86.11	102.02	83.32	49.50	54.67	71.38
2034	71.28	61.94	45.30	42.86	39.61	41.64	87.93	104.17	85.09	50.57	55.85	72.91
2035	72.68	63.15	46.16	43.68	40.36	42.43	89.67	106.24	86.77	51.55	56.94	74.34
2036	73.96	64.26	46.97	44.44	41.07	43.17	91.25	108.11	88.29	52.45	57.93	75.64
2037	75.69	65.77	48.07	45.48	42.03	44.19	93.38	110.64	90.36	53.68	59.29	77.42
2038	77.24	67.11	49.06	46.42	42.89	45.10	95.29	112.91	92.21	54.78	60.51	79.00
2039	78.82	68.49	50.06	47.37	43.77	46.02	97.25	115.22	94.10	55.91	61.75	80.62
2040	80.27	69.76	51.01	48.26	44.60	46.89	99.02	117.32	95.82	56.95	62.90	82.10
2041	82.09	71.32	52.14	49.33	45.58	47.92	101.27	119.99	98.00	58.22	64.30	83.96
2042	83.77	72.78	53.20	50.34	46.52	48.91	103.35	122.45	100.00	59.41	65.62	85.68
2043	85.48	74.27	54.29	51.37	47.47	49.91	105.46	124.96	102.05	60.63	66.96	87.43
2044	86.98	75.58	55.24	52.27	48.30	50.78	107.32	127.16	103.85	61.69	68.14	88.97
2045	89.10	77.42	56.62	53.57	49.51	52.05	109.90	130.20	106.35	63.21	69.81	91.13
2046	90.85	78.93	57.70	54.59	50.45	53.04	112.08	132.80	108.45	64.43	71.16	92.92
2047	92.71	80.55	58.88	55.71	51.48	54.12	114.38	135.52	110.68	65.75	72.62	94.82
2048	94.33	81.96	59.91	56.68	52.38	55.07	116.39	137.90	112.62	66.90	73.90	96.49

SCHEDULE 201 (Continued)

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

TABLE 5b												
Renewable Avoided Costs												
Renewable Fixed Price Option for Wind QF												
Off-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	58.41	43.12	69.62	101.22	92.05	73.70	82.87	109.38
2024	108.46	90.11	59.53	55.45	43.22	43.22	78.89	111.00	83.99	60.55	74.82	109.47
2025	35.75	29.66	19.51	18.16	14.10	14.10	25.94	36.60	27.63	19.85	24.59	36.09
2026	36.48	30.27	19.91	18.53	14.39	14.39	26.47	37.35	28.20	20.26	25.09	36.83
2027	37.23	30.89	20.32	18.91	14.68	14.68	27.01	38.11	28.77	20.67	25.60	37.58
2028	37.89	31.43	20.68	19.24	14.94	14.94	27.49	38.78	29.28	21.04	26.06	38.25
2029	38.77	32.17	21.16	19.69	15.29	15.29	28.13	39.69	29.97	21.53	26.66	39.14
2030	39.57	32.83	21.59	20.10	15.60	15.60	28.71	40.50	30.58	21.97	27.21	39.94
2031	40.38	33.50	22.04	20.51	15.92	15.92	29.30	41.33	31.21	22.42	27.77	40.76
2032	41.09	34.09	22.43	20.87	16.20	16.20	29.81	42.06	31.76	22.81	28.26	41.48
2033	42.05	34.89	22.95	21.36	16.58	16.58	30.51	43.04	32.50	23.35	28.92	42.44
2034	42.91	35.60	23.42	21.79	16.92	16.92	31.13	43.92	33.16	23.82	29.51	43.31
2035	43.79	36.33	23.90	22.24	17.27	17.27	31.77	44.82	33.84	24.31	30.11	44.20
2036	44.56	36.97	24.32	22.63	17.57	17.57	32.33	45.62	34.44	24.74	30.65	44.98
2037	45.60	37.83	24.89	23.16	17.98	17.98	33.09	46.68	35.24	25.32	31.36	46.03
2038	46.53	38.61	25.40	23.64	18.35	18.35	33.76	47.63	35.97	25.84	32.00	46.97
2039	47.49	39.40	25.92	24.12	18.73	18.73	34.46	48.61	36.70	26.37	32.66	47.94
2040	48.33	40.09	26.38	24.55	19.06	19.06	35.06	49.47	37.35	26.83	33.23	48.78
2041	49.45	41.03	26.99	25.12	19.50	19.50	35.88	50.62	38.22	27.46	34.01	49.92
2042	50.47	41.87	27.54	25.63	19.90	19.90	36.62	51.66	39.00	28.02	34.71	50.94
2043	51.50	42.73	28.11	26.16	20.31	20.31	37.37	52.72	39.80	28.60	35.42	51.99
2044	52.41	43.48	28.60	26.62	20.67	20.67	38.03	53.65	40.51	29.10	36.04	52.91
2045	53.63	44.50	29.27	27.24	21.15	21.15	38.91	54.90	41.45	29.78	36.88	54.14
2046	54.73	45.41	29.87	27.80	21.58	21.58	39.71	56.03	42.30	30.39	37.64	55.25
2047	55.85	46.34	30.48	28.37	22.03	22.03	40.52	57.17	43.17	31.01	38.41	56.38
2048	56.84	47.16	31.02	28.87	22.42	22.42	41.24	58.18	43.93	31.56	39.09	57.38

SCHEDULE 201 (Continued)PRICING OPTIONS FOR STANDARD PPA (Continued)
Renewable Fixed Price Option (Continued)

TABLE 6a												
Renewable Avoided 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
2023	0.00	0.00	0.00	0.00	69.55	72.10	152.12	251.00	203.08	80.76	96.05	133.77
2024	131.80	108.36	66.56	60.45	52.29	57.39	173.60	214.37	166.46	79.82	93.07	135.88
2025	48.43	40.65	26.78	24.75	22.05	23.74	62.30	75.83	59.93	31.18	35.58	49.79
2026	49.42	41.48	27.33	25.26	22.50	24.22	63.58	77.39	61.16	31.82	36.31	50.81
2027	50.44	42.33	27.89	25.78	22.96	24.72	64.88	78.97	62.42	32.47	37.05	51.85
2028	51.34	43.10	28.40	26.24	23.38	25.17	66.04	80.38	63.53	33.06	37.72	52.78
2029	52.52	44.09	29.04	26.84	23.91	25.74	67.57	82.24	65.00	33.81	38.58	53.99
2030	53.60	44.99	29.64	27.39	24.40	26.27	68.95	83.93	66.33	34.51	39.37	55.10
2031	54.70	45.91	30.25	27.95	24.90	26.81	70.36	85.65	67.69	35.21	40.18	56.23
2032	55.64	46.70	30.75	28.42	25.31	27.25	71.58	87.13	68.86	35.81	40.86	57.19
2033	56.96	47.81	31.50	29.11	25.93	27.92	73.28	89.19	70.49	36.67	41.84	58.55
2034	58.15	48.81	32.17	29.73	26.48	28.51	74.80	91.04	71.96	37.44	42.72	59.78
2035	59.32	49.79	32.80	30.32	27.00	29.07	76.31	92.88	73.41	38.19	43.58	60.98
2036	60.36	50.66	33.37	30.84	27.47	29.58	77.65	94.52	74.70	38.86	44.34	62.05
2037	61.78	51.85	34.16	31.57	28.12	30.28	79.47	96.73	76.45	39.77	45.38	63.50
2038	63.04	52.91	34.86	32.22	28.70	30.90	81.10	98.71	78.01	40.58	46.31	64.80
2039	64.33	54.00	35.57	32.88	29.28	31.53	82.76	100.73	79.61	41.42	47.26	66.13
2040	65.49	54.97	36.22	33.48	29.82	32.10	84.24	102.53	81.04	42.16	48.11	67.32
2041	67.00	56.23	37.05	34.24	30.50	32.83	86.18	104.90	82.91	43.13	49.21	68.87
2042	68.37	57.39	37.81	34.94	31.12	33.51	87.95	107.05	84.61	44.01	50.22	70.28
2043	69.77	58.56	38.58	35.66	31.76	34.19	89.75	109.24	86.34	44.92	51.25	71.72
2044	70.99	59.59	39.25	36.28	32.31	34.79	91.33	111.17	87.86	45.70	52.15	72.98
2045	72.68	61.01	40.20	37.16	33.10	35.64	93.49	113.79	89.94	46.80	53.40	74.71
2046	74.15	62.23	41.00	37.89	33.75	36.34	95.38	116.10	91.75	47.73	54.47	76.22
2047	75.66	63.51	41.84	38.67	34.44	37.08	97.33	118.47	93.63	48.71	55.58	77.78
2048	76.99	64.62	42.57	39.34	35.04	37.73	99.05	120.56	95.28	49.56	56.55	79.14

SCHEDULE 201 (Continued)PRICING OPTIONS FOR STANDARD PPA (Continued)
Renewable Fixed Price Option (Continued)

TABLE 6b												
Renewable Avoided Costs												
Renewable Fixed Price Option for Solar QF												
Off-Peak Forecast (\$/MWH)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023	0.00	0.00	0.00	0.00	57.32	42.02	68.53	100.13	90.95	72.61	81.78	108.28
2024	107.34	88.99	58.41	54.33	42.10	42.10	77.78	109.89	82.87	59.43	73.70	108.36
2025	34.61	28.52	18.37	17.02	12.96	12.96	24.80	35.46	26.49	18.71	23.45	34.95
2026	35.32	29.10	18.75	17.37	13.22	13.22	25.31	36.18	27.03	19.09	23.93	35.66
2027	36.04	29.70	19.13	17.72	13.50	13.50	25.83	36.92	27.59	19.48	24.42	36.39
2028	36.68	30.22	19.47	18.03	13.73	13.73	26.28	37.57	28.07	19.83	24.84	37.03
2029	37.53	30.93	19.92	18.46	14.05	14.05	26.89	38.45	28.73	20.29	25.43	37.90
2030	38.30	31.56	20.33	18.83	14.34	14.34	27.45	39.24	29.32	20.71	25.95	38.68
2031	39.09	32.21	20.75	19.22	14.64	14.64	28.01	40.04	29.92	21.13	26.48	39.47
2032	39.78	32.78	21.11	19.56	14.89	14.89	28.50	40.75	30.44	21.50	26.94	40.16
2033	40.71	33.54	21.61	20.02	15.24	15.24	29.17	41.70	31.16	22.01	27.58	41.10
2034	41.54	34.23	22.05	20.43	15.55	15.55	29.77	42.56	31.80	22.46	28.14	41.95
2035	42.39	34.93	22.50	20.84	15.87	15.87	30.37	43.43	32.45	22.92	28.72	42.81
2036	43.14	35.55	22.90	21.21	16.15	16.15	30.91	44.19	33.02	23.32	29.22	43.56
2037	44.15	36.38	23.43	21.71	16.53	16.53	31.63	45.22	33.79	23.87	29.91	44.58
2038	45.05	37.12	23.91	22.15	16.87	16.87	32.28	46.15	34.48	24.35	30.52	45.49
2039	45.97	37.88	24.40	22.61	17.21	17.21	32.94	47.10	35.19	24.85	31.14	46.42
2040	46.78	38.55	24.83	23.00	17.51	17.51	33.52	47.92	35.81	25.29	31.69	47.24
2041	47.88	39.45	25.41	23.54	17.93	17.93	34.31	49.05	36.64	25.88	32.43	48.34
2042	48.86	40.26	25.93	24.02	18.29	18.29	35.01	50.05	37.40	26.41	33.10	49.33
2043	49.86	41.09	26.47	24.52	18.67	18.67	35.73	51.08	38.16	26.95	33.78	50.35
2044	50.73	41.81	26.93	24.94	18.99	18.99	36.35	51.97	38.83	27.42	34.37	51.23
2045	51.92	42.79	27.56	25.53	19.44	19.44	37.20	53.19	39.74	28.07	35.17	52.43
2046	52.99	43.66	28.13	26.05	19.84	19.84	37.97	54.28	40.56	28.64	35.89	53.50
2047	54.07	44.56	28.70	26.59	20.25	20.25	38.74	55.39	41.39	29.23	36.63	54.60
2048	55.02	45.34	29.20	27.05	20.60	20.60	39.42	56.37	42.11	29.74	37.27	55.56

SCHEDULE 201 (Continued)

WIND INTEGRATION

TABLE 7		
Integration Costs		
Year	Wind	Solar
2023	0.35	1.44
2024	0.35	1.47
2025	0.36	1.50
2026	0.37	1.53
2027	0.37	1.56
2028	0.38	1.59
2029	0.39	1.63
2030	0.40	1.66
2031	0.41	1.69
2032	0.41	1.73
2033	0.42	1.76
2034	0.43	1.80
2035	0.44	1.84
2036	0.45	1.87
2037	0.46	1.91
2038	0.47	1.95
2039	0.48	1.99
2040	0.49	2.03
2041	0.50	2.07
2042	0.51	2.12
2043	0.52	2.16
2044	0.53	2.21
2045	0.54	2.25
2046	0.55	2.30
2047	0.56	2.34
2048	0.57	2.39

3. As-Available Rate

The As-Available Rate is based on the Avoided Energy Cost for surplus energy at the time of delivery. The As-Available Rate is equal to the Avoided Energy Cost. The Company will purchase As-Available Energy at the As-Available Rate.

SCHEDULE 201 (Continued)**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.

SCHEDULE 201 (Continued)**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 THE STANDARD FIXED PRICE OPTION OR THE RENEWABLE FIXED PRICE OPTION UNDER THE STANDARD PPA

A QF will be eligible to receive the Standard Fixed Price Option or the Renewable Fixed Price Option (as appropriate) 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 3 MW for solar QF projects or 10 MW for all other types of QF projects. Solar QF projects with nameplate capacity (as calculated in this paragraph) that exceed 3 MW but do not exceed 10 MW are eligible for a Standard PPA containing negotiated prices under Schedule 202. 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

SCHEDULE 201 (Continued)**DEFINITION OF A SMALL COGENERATION FACILITY OR SMALL POWER PRODUCTION FACILITY ELIGIBLE TO RECEIVE THE STANDARD FIXED PRICE OPTION OR THE RENEWABLE FIXED PRICE OPTION UNDER THE STANDARD PPA (Continued)**

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 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 standard pricing or negotiated 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 standard pricing or negotiated 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 standard pricing or negotiated 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 standard pricing or negotiated 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.

SCHEDULE 201 (Continued)

OTHER DEFINITIONS

As-Available Energy

As-Available Energy means 1) all Net Output delivered to PGE if Seller elected the As-Available Rate option within a Standard PPA, or 2) (a) all Net Output delivered prior to the Commercial Operation Date; (b) all Net Output deliveries greater than Maximum Net Output in any Contract Year as defined under the Standard PPA year; and (c) for deliveries above the nameplate capacity in any hour.

Deliveries pursuant to an Off-System PPA that are above the nameplate capacity in any hour solely for the purpose of accommodating hourly scheduling in whole megawatts by a third-party transmission provider will not be subject to the As-Available Rate.

Mid-C Index Price

As used in this schedule, the daily Mid-C Index Price shall be the applicable day-ahead Intercontinental Exchange ("ICE") Mid-C Physical Peak (bilateral) or Mid-C Physical Off-Peak (bilateral) indices representative of the OTC market for WSPP Schedule-C physical Firm Energy transactions at the Mid-C trading hub. Product details for the Mid-C Physical Peak (bilateral) or Mid-C Physical Off-Peak (bilateral) are found on the following website: <https://www.theice.com/products/OTC/Physical-Energy/Electricity>. 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.

Avoided Energy Cost:

The Avoided Energy Cost means eighty-two and four tenths percent (82.4%) of the monthly arithmetic average of each day's ICE Mid-C Physical Peak (bilateral) and Mid-C Physical Off-Peak (bilateral) average index prices. Each day's index prices will reflect the relative proportions of peak hours and off-peak hours in the month as follows:

$$.824 * \left(\sum_{x=1}^n \{(\text{ICE Mid-C Physical Peak (bilateral) Avg}_x * \text{applicable peak index hours for day}) + (\text{ICE Mid-C Physical Off-Peak (bilateral) Avg}_x * \text{applicable off-peak index hours for day})\} / (n*24) \right)$$

where n = number of days in the month

SCHEDULE 201 (Continued)

OTHER DEFINITIONS (Continued)

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 2024.

Definition of Renewable Resource Deficiency Period

This is the period from 2025.

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 standard pricing or negotiated pricing under the Standard PPA.

SCHEDULE 201 (Concluded)

DISPUTE RESOLUTION (Continued)

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.
2. 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 from the commercial operation date selected by the Seller and memorialized in the PPA.

UM 1728

Application to Update Schedule 201
Avoided Cost Power Purchase Information

Attachment A
Description of Non-Renewable Avoided Costs

Tables S.9a and S.9b are confidential and have been redacted

PORTLAND GENERAL ELECTRIC COMPANY
NON-RENEWABLE AVOIDED COST STUDY
2023 ANNUAL UPDATE

Introduction

Consistent with Commission Order No. 14-058¹, annual avoided cost updates allow modification of four factors:

1. Updated natural gas prices;
2. On- and off-peak forward-looking electricity market prices;
3. Changes to the status of the Production Tax Credit; and
4. Any other action or change in an acknowledged Integrated Resource Plan (IRP) update relevant to the calculation of avoided costs.

Only the first two factors listed above apply in this 2023 Non-Renewable Avoided Cost update.

Below is a summary of the changes:

Factor 1: Gas Price Projections

Natural gas prices are based on PGE's forward AECO price curves from March 31, 2023 for May 2023 through December 2027. For 2028-2050, prices are based on the same methodology as the acknowledged 2019 IRP Update with the most recent long-term forecast from Wood Mackenzie (2022 H1). The 2028 prices are based on a linear interpolation from PGE's curves to the long-term forecast. For 2029 through 2050, prices align with the AECO prices from the 2022 H1 Wood Mackenzie forecast. Prices after 2051 are escalated with inflation.

The nominal average annual northwest burnertip natural gas price is forecasted to trend from \$2.78/MMBtu in 2024 to \$3.06/MMBtu in 2047.

The variable gas transportation costs are based on 2022 AUT variable transportation costs and loss rates.

The nominal average variable gas transportation cost is forecasted to trend from \$0.11/MMBtu in 2024 to \$0.18/MMBtu in 2047.

Factor 2: Electricity Market Projections

The forward trading curves are based on market prices for electricity delivered to PGE's system and calculated according to the methodology approved by the OPUC. The forward trading curves adjusted for delivery are used to price avoided costs during the resource

¹ *In the Matter of Investigation Into Qualifying Facility Contracting and Pricing*, Docket No. UM 1610, Order No. 14-058 at 25-26 (Feb. 24, 2014).

PGE's 2023 NON-RENEWABLE AVOIDED COST ANNUAL UPDATE
WORKPAPERS – Page 2

sufficiency period. For May 2023 through December 2024, the market prices are based on PGE's forward Mid-Columbia trading curve from March 31, 2023.

As in the current Schedule 201 prices, wheeling costs remain based on 2020 BPA rates consistent with the 2019 IRP Update adjusted for inflation.

Deficiency/Sufficiency Periods

There is no change to the Deficiency/Sufficiency periods as a result of this May 1 Update. The current Deficiency/Sufficiency periods approved by the Commission in Order No. 20-171 are stated below for reference purposes:

- Resource Sufficiency Period is the period from the current year through 2024.
- Resource Deficiency Period is the period beginning in 2025.

Avoided Cost Pricing Estimates

Tables 1 through 3 (following) summarize the results for PGE's fixed price option. Tables 1a, 1b, 2a, 2b, 3a, and 3b² are estimates of monthly on- and off-peak avoided costs for energy and capacity over 20 years beginning in May 2023. The pricing is comprised of the energy plus the capacity costs (discussed below).³

The sufficiency period prices (expressed in \$/MWh or mills/kWh) for the years 2023 through 2024, are based on the forward electricity prices adjusted for delivery as discussed above.

The deficiency period prices begin in 2025. The on-peak prices represent both capacity and energy costs, while off-peak prices represent energy costs only. The on-peak price includes the following costs of a CCCT: fuel, variable operation and maintenance (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.⁴ Table 4 provides integration costs avoided. Tables 4 and 5 show the projected on- and off-peak resource sufficiency period forward market prices.

⁴ Table 1: Base Load QF; Table 2: Wind QF; Table 3: Solar QF.

³ Avoided Cost Components section.

⁴ Schedule 201, Sheet 201-3.

PGE's 2023 NON-RENEWABLE AVOIDED COST ANNUAL UPDATE
WORKPAPERS – Page 3

Avoided Cost Components

Energy:

Tables 6 through 13 in the work papers show the other fixed costs, variable O&M, fuel costs, gas forecast avoided cost components (with and without transportation), and capacity.

Table 6 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 7 shows the variable O&M associated with the CCCT and Table 8 shows the projected fuel costs.

Table 9a and 9b contains the forecasted gas prices in \$/MMBtu.

Tables 4, 6, 7 and 8 can be summed to equal the total on-peak avoided costs in Table 1a. Tables 5, 6, 7 and 8 can be summed to equal the total off-peak avoided costs in Table 1b.

Capacity:

The on- and off-peak SCCT-related capacity component costs are shown in Tables 10a and 10b, 11a and 11b, and 12a and 12b. Tables 10b, 11b, and 12b are blank since no capacity value is calculated for the off-peak period. The capacity values are applicable only to on-peak hours.

Non-Renewable Energy Tables

PGE's 2023 NON-RENEWABLE AVOIDED COST ANNUAL UPDATE
 WORKPAPERS – Page 5

Portland General Electric Avoided Cost Study On-Peak Energy, Base Load													
Table S.1a												Nominal \$/MWh	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	70.99	73.54	153.56	252.44	204.53	82.20	97.49	135.21	
2024	133.27	109.83	68.03	61.92	53.76	58.86	175.07	215.84	167.93	81.29	94.54	137.35	113.45
2025	28.11	28.01	26.65	23.62	23.48	24.46	25.25	25.48	25.28	25.76	28.15	30.54	26.23
2026	32.09	30.67	27.85	24.15	24.08	24.73	25.36	25.51	25.31	25.76	27.39	29.82	26.89
2027	31.20	29.95	27.12	23.94	23.80	24.20	24.73	24.95	24.84	25.50	27.76	30.54	26.53
2028	32.58	30.90	27.71	22.85	22.82	23.29	23.90	24.22	24.23	25.49	29.47	32.62	26.66
2029	24.03	23.16	21.99	20.57	20.65	20.74	20.83	20.92	21.01	21.53	23.18	23.28	21.82
2030	23.12	23.21	22.46	20.89	20.98	21.08	21.17	21.26	21.36	22.07	23.98	24.09	22.13
2031	23.46	23.55	22.37	21.09	21.19	21.23	21.33	21.43	21.53	22.32	24.57	24.68	22.39
2032	23.41	23.49	23.44	22.19	22.29	22.38	22.48	22.59	22.70	23.22	25.59	25.70	23.30
2033	25.48	25.22	23.91	22.84	22.90	22.97	23.11	23.18	23.29	23.75	26.22	26.38	24.10
2034	25.84	23.82	25.17	24.02	23.77	24.26	24.00	24.10	23.97	25.39	26.13	26.19	24.73
2035	27.01	24.23	25.94	24.71	24.45	24.95	25.00	24.78	25.13	26.16	27.21	27.33	25.59
2036	28.24	23.55	26.24	24.32	24.78	24.55	24.99	25.14	24.36	25.09	25.38	25.19	25.17
2037	25.88	23.68	27.04	25.30	25.41	25.55	25.67	26.22	25.81	26.07	26.39	26.58	25.82
2038	26.92	25.35	27.69	26.45	26.56	26.76	27.23	27.37	26.95	27.66	27.02	27.42	26.96
2039	27.54	26.70	29.89	28.14	28.63	28.79	28.57	28.70	28.17	28.73	28.69	28.74	28.46
2040	29.86	29.92	31.92	30.01	30.14	30.69	30.48	30.98	30.06	31.84	28.63	28.81	30.29
2041	29.71	30.21	34.22	32.47	32.48	32.63	32.78	33.31	32.42	33.49	32.96	33.19	32.50
2042	34.16	33.60	35.61	34.63	34.17	34.74	34.53	34.69	34.06	35.12	34.48	35.05	34.58
2043	35.82	34.42	36.61	35.55	35.67	35.54	35.23	35.87	34.80	36.66	35.45	35.73	35.62
2044	37.48	38.18	37.44	35.38	35.54	36.19	36.31	36.05	35.85	36.96	36.97	37.69	36.67
2045	38.90	37.46	39.79	38.23	38.41	38.70	38.88	39.48	38.75	39.46	39.12	39.43	38.90
2046	41.04	38.66	41.27	39.70	39.89	40.59	40.36	40.47	39.72	41.22	40.88	41.67	40.48
2047	43.43	42.49	43.75	42.63	42.45	43.15	43.35	43.18	42.39	43.39	44.51	45.40	43.35
2048	46.84	48.62	44.92	44.28	44.10	44.78	44.65	45.25	44.06	45.33	46.69	46.50	45.49

Portland General Electric Avoided Cost Study Off-Peak Energy, Base Load													
Table S.1b												Nominal \$/MWh	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	58.76	43.46	69.97	101.57	92.39	74.05	83.22	109.72	
2024	108.81	90.46	59.88	55.80	43.57	43.57	79.25	111.36	84.34	60.90	75.17	109.83	76.91
2025	28.11	28.01	26.65	23.62	23.48	24.46	25.25	25.48	25.28	25.76	28.15	30.54	26.23
2026	32.09	30.67	27.85	24.15	24.08	24.73	25.36	25.51	25.31	25.76	27.39	29.82	26.89
2027	31.20	29.95	27.12	23.94	23.80	24.20	24.73	24.95	24.84	25.50	27.76	30.54	26.53
2028	32.58	30.90	27.71	22.85	22.82	23.29	23.90	24.22	24.23	25.49	29.47	32.62	26.66
2029	24.03	23.16	21.99	20.57	20.65	20.74	20.83	20.92	21.01	21.53	23.18	23.28	21.82
2030	23.12	23.21	22.46	20.89	20.98	21.08	21.17	21.26	21.36	22.07	23.98	24.09	22.14
2031	23.46	23.55	22.37	21.09	21.19	21.23	21.33	21.43	21.53	22.32	24.57	24.68	22.39
2032	23.41	23.49	23.44	22.19	22.29	22.38	22.48	22.59	22.70	23.22	25.59	25.70	23.28
2033	25.48	25.22	23.91	22.84	22.90	22.97	23.11	23.18	23.29	23.75	26.22	26.38	24.09
2034	25.84	23.82	25.17	24.02	23.77	24.26	24.00	24.10	23.97	25.39	26.13	26.19	24.74
2035	27.01	24.23	25.94	24.71	24.45	24.95	25.00	24.78	25.13	26.16	27.21	27.33	25.58
2036	28.24	23.55	26.24	24.32	24.78	24.55	24.99	25.14	24.36	25.09	25.38	25.19	25.17
2037	25.88	23.68	27.04	25.30	25.41	25.55	25.67	26.22	25.81	26.07	26.39	26.58	25.82
2038	26.92	25.35	27.69	26.45	26.56	26.76	27.23	27.37	26.95	27.66	27.02	27.42	26.96
2039	27.54	26.70	29.89	28.14	28.63	28.79	28.57	28.70	28.17	28.73	28.69	28.74	28.46
2040	29.86	29.92	31.92	30.01	30.14	30.69	30.48	30.98	30.06	31.84	28.63	28.81	30.28
2041	29.71	30.21	34.22	32.47	32.48	32.63	32.78	33.31	32.42	33.49	32.96	33.19	32.51
2042	34.16	33.60	35.61	34.63	34.17	34.74	34.53	34.69	34.06	35.12	34.48	35.05	34.58
2043	35.82	34.42	36.61	35.55	35.67	35.54	35.23	35.87	34.80	36.66	35.45	35.73	35.63
2044	37.48	38.18	37.44	35.38	35.54	36.19	36.31	36.05	35.85	36.96	36.97	37.69	36.67
2045	38.90	37.46	39.79	38.23	38.41	38.70	38.88	39.48	38.75	39.46	39.12	39.43	38.90
2046	41.04	38.66	41.27	39.70	39.89	40.59	40.36	40.47	39.72	41.22	40.88	41.67	40.47
2047	43.43	42.49	43.75	42.63	42.45	43.15	43.35	43.18	42.39	43.39	44.51	45.40	43.35
2048	46.84	48.62	44.92	44.28	44.10	44.78	44.65	45.25	44.06	45.33	46.69	46.50	45.49

PGE's 2023 NON-RENEWABLE AVOIDED COST ANNUAL UPDATE
 WORKPAPERS – Page 6

Table S.2a
 Portland General Electric
 Avoided Cost Study
 On-Peak Energy, Wind
 Nominal \$/MWh

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	70.64	73.19	153.21	252.09	204.18	81.86	97.15	134.86	113.09
2024	132.92	109.47	67.68	61.56	53.41	58.51	174.71	215.49	167.58	80.93	94.18	137.00	25.87
2025	27.75	27.67	26.29	23.26	23.12	24.10	24.89	25.12	24.92	25.40	27.79	30.18	26.52
2026	31.73	30.30	27.48	23.78	23.72	24.36	25.00	25.14	24.94	25.39	27.02	29.46	26.16
2027	30.82	29.58	26.74	23.57	23.43	23.82	24.35	24.57	24.46	25.12	27.39	30.17	26.27
2028	32.20	30.52	27.33	22.47	22.91	23.52	23.84	23.85	25.11	29.09	32.24	32.24	21.43
2029	23.64	22.77	21.60	20.18	20.26	20.35	20.44	20.53	20.62	21.14	22.79	22.89	21.73
2030	22.73	22.81	22.06	20.49	20.58	20.68	20.77	20.86	20.96	21.67	23.59	23.69	21.98
2031	23.05	23.14	21.97	20.69	20.78	20.83	20.92	21.02	21.12	21.91	24.16	24.27	21.98
2032	22.99	23.08	23.02	21.78	21.97	22.07	22.17	22.28	22.81	22.81	25.18	25.28	22.88
2033	25.05	24.80	23.48	22.41	22.47	22.55	22.69	22.76	23.33	23.33	25.80	25.96	23.68
2034	25.41	23.39	24.74	23.59	23.34	23.82	23.57	23.67	23.54	24.96	25.70	25.76	24.29
2035	26.57	23.79	25.50	24.27	24.01	24.51	24.56	24.34	24.69	25.72	26.77	26.88	25.15
2036	27.79	23.10	25.79	23.87	24.33	24.10	24.54	24.69	23.91	24.64	24.93	24.74	24.72
2037	25.42	23.22	26.58	24.84	25.10	25.21	25.76	25.35	25.61	25.93	26.12	26.12	25.36
2038	26.46	24.88	27.22	25.98	26.10	26.29	26.76	26.90	26.48	27.19	26.55	26.96	26.50
2039	27.06	26.23	29.41	27.66	28.16	28.31	28.09	28.22	27.69	28.25	28.21	28.26	27.98
2040	29.37	29.43	31.44	29.52	29.66	30.20	29.99	30.49	29.57	31.35	28.14	28.33	29.81
2041	29.21	29.71	33.72	31.97	32.13	32.28	32.81	31.93	32.99	32.46	32.69	32.00	32.00
2042	33.65	33.09	35.10	34.12	33.66	34.23	34.18	33.55	34.61	33.97	34.54	34.07	34.07
2043	35.30	33.90	36.09	35.03	35.15	35.02	34.71	35.35	34.28	36.14	34.93	35.21	35.10
2044	36.95	37.66	36.91	34.85	35.01	35.66	35.78	35.52	36.43	36.44	37.16	36.14	36.14
2045	38.36	36.92	39.25	37.69	37.87	38.16	38.34	38.94	38.21	38.92	38.89	38.36	38.36
2046	40.49	38.11	40.72	39.15	39.34	40.04	39.81	39.91	39.17	40.66	40.33	41.12	39.93
2047	42.87	41.93	43.18	42.06	41.88	42.59	42.79	42.61	41.83	42.83	43.94	44.84	42.79
2048	46.26	48.04	44.35	43.71	43.53	44.20	44.08	44.68	43.48	44.76	46.12	45.92	44.91

Table S.2b
 Portland General Electric
 Avoided Cost Study
 Off-Peak Energy, Wind
 Nominal \$/MWh

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	58.41	43.12	69.62	101.22	92.05	73.70	82.87	109.38	76.56
2024	108.46	90.11	59.53	55.45	43.22	43.22	78.89	111.00	83.99	60.55	74.82	109.47	25.87
2025	27.75	27.67	26.29	23.26	23.12	24.10	24.89	25.12	24.92	25.40	27.79	30.18	25.87
2026	31.73	30.30	27.48	23.78	23.72	24.36	25.00	25.14	24.94	25.39	27.02	29.46	26.52
2027	30.82	29.58	26.74	23.57	23.43	23.82	24.35	24.57	24.46	25.12	27.39	30.17	26.16
2028	32.20	30.52	27.33	22.47	22.91	23.52	23.84	23.85	25.11	29.09	32.24	32.24	21.42
2029	23.64	22.77	21.60	20.18	20.26	20.35	20.44	20.53	20.62	21.14	22.79	22.89	21.74
2030	22.73	22.81	22.06	20.49	20.58	20.68	20.77	20.86	20.96	21.67	23.59	23.69	21.98
2031	23.05	23.14	21.97	20.69	20.78	20.83	20.92	21.02	21.12	21.91	24.16	24.27	21.98
2032	22.99	23.08	23.02	21.78	21.97	22.07	22.17	22.28	22.81	22.81	25.18	25.28	22.88
2033	25.05	24.80	23.48	22.41	22.47	22.55	22.69	22.76	23.33	23.33	25.80	25.96	23.67
2034	25.41	23.39	24.74	23.59	23.34	23.82	23.57	23.67	23.54	24.96	25.70	25.76	24.30
2035	26.57	23.79	25.50	24.27	24.01	24.51	24.56	24.34	24.69	25.72	26.77	26.88	24.72
2036	27.79	23.10	25.79	23.87	24.33	24.10	24.54	24.69	23.91	24.64	24.93	24.74	24.30
2037	25.42	23.22	26.58	24.84	25.10	25.21	25.76	25.35	25.61	25.93	26.12	26.12	24.30
2038	26.46	24.88	27.22	25.98	26.10	26.29	26.76	26.90	26.48	27.19	26.55	26.96	24.30
2039	27.06	26.23	29.41	27.66	28.16	28.31	28.09	28.22	27.69	28.25	28.21	28.26	24.30
2040	29.37	29.43	31.44	29.52	29.66	30.20	29.99	30.49	29.57	31.35	28.14	28.33	24.30
2041	29.21	29.71	33.72	31.97	32.13	32.28	32.81	31.93	32.99	32.46	32.69	32.00	24.30
2042	33.65	33.09	35.10	34.12	33.66	34.23	34.18	33.55	34.61	33.97	34.54	34.07	24.30
2043	35.30	33.90	36.09	35.03	35.15	35.02	34.71	35.35	34.28	36.14	34.93	35.21	24.30
2044	36.95	37.66	36.91	34.85	35.01	35.66	35.78	35.52	36.43	36.44	37.16	36.14	24.30
2045	38.36	36.92	39.25	37.69	37.87	38.16	38.34	38.94	38.21	38.92	38.89	38.36	24.30
2046	40.49	38.11	40.72	39.15	39.34	40.04	39.81	39.91	39.17	40.66	40.33	41.12	24.30
2047	42.87	41.93	43.18	42.06	41.88	42.59	42.79	42.61	41.83	42.83	43.94	44.84	24.30
2048	46.26	48.04	44.35	43.71	43.53	44.20	44.08	44.68	43.48	44.76	46.12	45.92	24.30

Table S.3a
 Portland General Electric
 Avoided Cost Study
 On-Peak Energy, Solar
 Nominal \$/MWh

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	69.55	72.10	152.12	251.00	203.08	80.76	96.05	133.77	111.98
2024	131.80	108.36	66.56	60.45	52.29	57.99	173.60	214.37	166.46	79.82	93.07	135.88	24.73
2025	26.61	26.51	25.15	22.12	21.98	22.96	23.75	23.98	23.78	24.26	26.65	29.04	25.35
2026	30.56	29.14	26.32	22.62	22.55	22.20	23.83	23.97	23.78	24.23	25.86	28.29	24.97
2027	29.63	28.39	25.56	22.38	22.24	22.64	23.16	23.38	23.27	23.93	26.20	28.98	24.97
2028	30.99	29.31	26.12	21.26	21.23	21.70	22.30	22.63	22.64	23.90	27.88	31.02	25.06
2029	22.41	21.53	20.36	18.94	19.03	19.11	19.20	19.30	19.38	19.90	21.56	21.65	20.20
2030	21.46	21.55	20.80	19.23	19.32	19.42	19.51	19.60	19.70	20.41	22.32	22.43	20.47
2031	21.76	21.86	20.68	19.40	19.49	19.54	19.64	19.73	19.83	20.62	22.88	22.98	20.69
2032	21.71	21.77	21.71	20.46	20.56	20.65	20.75	20.86	20.97	21.49	23.86	23.97	21.57
2033	23.71	23.46	22.14	21.07	21.21	21.35	21.42	21.53	21.99	24.46	24.62	24.39	22.34
2034	24.04	22.02	23.37	22.22	21.97	22.46	22.20	22.30	22.17	23.59	24.33	24.39	22.93
2035	25.18	22.39	24.10	22.87	22.61	23.11	23.17	22.95	23.29	24.33	25.37	25.49	23.75
2036	26.36	21.68	24.37	22.45	22.68	23.12	23.27	22.49	23.21	23.50	23.32	23.32	23.29
2037	23.97	21.77	25.13	23.38	23.64	23.78	24.31	23.90	24.16	24.48	24.66	24.66	23.00
2038	24.97	23.39	25.74	24.50	24.61	24.81	25.28	25.41	25.00	25.71	25.07	25.47	25.01
2039	25.54	24.71	27.90	26.14	26.64	26.80	26.58	26.71	26.18	26.73	26.70	26.75	26.47
2040	27.82	27.88	29.89	27.98	28.11	28.65	28.45	28.95	28.03	29.81	26.60	26.78	28.26
2041	27.64	28.13	32.15	30.40	30.56	32.62	32.41	32.57	31.94	33.00	32.36	31.11	30.43
2042	32.04	31.48	33.49	32.51	32.05	32.62	32.41	32.57	31.94	33.00	32.36	32.94	32.46
2043	33.66	32.25	34.45	33.39	33.51	33.88	33.07	33.71	32.63	34.50	33.28	33.56	33.46
2044	35.28	35.98	35.23	33.18	33.34	33.99	34.11	33.84	33.65	34.76	34.76	35.48	34.46
2045	36.55	35.21	37.54	35.98	36.16	36.45	36.63	37.23	36.50	37.21	36.87	37.18	36.65
2046	38.74	36.36	38.98	37.41	37.59	38.29	38.07	38.17	37.43	38.92	38.59	39.38	38.18
2047	41.09	40.14	41.40	40.28	40.10	40.81	41.01	40.83	40.05	41.05	42.16	43.06	41.00
2048	44.44	46.22	42.53	41.89	41.71	42.38	42.26	42.86	41.67	42.94	44.30	44.11	43.10

Table S.3b
 Portland General Electric
 Avoided Cost Study
 Off-Peak Energy, Solar
 Nominal \$/MWh

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	57.32	42.02	68.53	100.13	90.95	72.61	81.78	108.28	108.28
2024	107.34	88.99	58.41	54.33	42.10	42.10	77.78	109.89	82.87	59.43	73.70	108.36	75.44
2025	26.61	26.51	25.15	22.12	21.98	22.96	23.75	23.98	23.78	24.26	26.65	29.04	24.73
2026	30.56	29.14	26.32	22.62	22.55	22.20	23.83	23.97	23.78	24.23	25.86	28.29	25.35
2027	29.63	28.39	25.56	22.38	22.24	22.64	23.16	23.38	23.27	23.93	26.20	28.98	24.97
2028	30.99	29.31	26.12	21.26	21.23	21.70	22.30	22.63	22.64	23.90	27.88	31.02	25.06
2029	22.41	21.53	20.36	18.94	19.03	19.11	19.20	19.30	19.38	19.90	21.56	21.65	20.19
2030	21.46	21.55	20.80	19.23	19.32	19.42	19.51	19.60	19.70	20.41	22.32	22.43	20.48
2031	21.76	21.86	20.68	19.40	19.49	19.54	19.64	19.73	19.83	20.62	22.88	22.98	20.70
2032	21.71	21.77	21.71	20.46	20.56	20.65	20.75	20.86	20.97	21.49	23.86	23.97	21.55
2033	23.71	23.46	22.14	21.07	21.21	21.35	21.42	21.53	21.99	24.46	24.62	24.39	22.33
2034	24.04	22.02	23.37	22.22	21.97	22.46	22.20	22.30	22.17	23.59	24.33	24.39	22.94
2035	25.18	22.39	24.10	22.87	22.61	23.11	23.17	22.95	23.29	24.33	25.37	25.49	23.75
2036	26.36	21.68	24.37	22.45	22.68	23.12	23.27	22.49	23.21	23.50	23.32	23.32	23.29
2037	23.97	21.77	25.13	23.38	23.64	23.78	24.31	23.90	24.16	24.48	24.66	24.66	23.00
2038	24.97	23.39	25.74	24.50	24.61	24.81	25.28	25.41	25.00	25.71	25.07	25.47	25.01
2039	25.54	24.71	27.90	26.14	26.64	26.80	26.58	26.71	26.18	26.73	26.70	26.75	26.47
2040	27.82	27.88	29.89	27.98	28.11	28.65	28.45	28.95	28.03	29.81	26.60	26.78	28.26
2041	27.64	28.13	32.15	30.40	30.56	32.62	32.41	32.57	31.94	33.00	32.36	31.11	30.44
2042	32.04	31.48	33.49	32.51	32.05	32.62	32.41	32.57	31.94	33.00	32.36	32.94	32.46
2043	33.66	32.25	34.45	33.39	33.51	33.88	33.07	33.71	32.63	34.50	33.28	33.56	33.46
2044	35.28	35.98	35.23	33.18	33.34	33.99	34.11	33.84	33.65	34.76	34.76	35.48	34.46
2045	36.55	35.21	37.54	35.98	36.16	36.45	36.63	37.23	36.50	37.21	36.87	37.18	36.65
2046	38.74	36.36	38.98	37.41	37.59	38.29	38.07	38.17	37.43	38.92	38.59	39.38	38.17
2047	41.09	40.14	41.40	40.28	40.10	40.81	41.01	40.83	40.05	41.05	42.16	43.06	41.01
2048	44.44	46.22	42.53	41.89	41.71	42.38	42.26	42.86	41.67	42.94	44.30	44.11	43.10

PGE's 2023 NON-RENEWABLE AVOIDED COST ANNUAL UPDATE
 WORKPAPERS – Page 11

Portland General Electric													
Avoided Cost Study													
Forecasted Gas Price - GPf (\$/MMBtu - including transportation)													
Table S.9b												Nominal \$/MMBtu	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	-	-	-	-	-	-	-	-	-	-	-	-	-
2024	-	-	-	-	-	-	-	-	-	-	-	-	-
2025													3.34
2026													3.43
2027													3.36
2028													3.37
2029													2.08
2030													2.06
2031													2.04
2032													2.09
2033													2.12
2034													2.14
2035													2.17
2036													2.07
2037													2.08
2038													2.14
2039													2.24
2040													2.36
2041													2.51
2042													2.64
2043													2.67
2044													2.70
2045													2.82
2046													2.89
2047													3.06
2048													3.16

Standard Capacity Tables

UM 1728

Application to Update Schedule 201
Avoided Cost Power Purchase Information

Attachment B
Description of Renewable Avoided Costs

PORTLAND GENERAL ELECTRIC COMPANY RENEWABLE AVOIDED COST STUDY 2023 ANNUAL UPDATE

Introduction

Consistent with Commission Order No. 14-058¹, annual renewable avoided cost updates allow modifications of four factors:

1. Updated natural gas prices;
2. On- and off-peak forward-looking electricity market prices;
3. Changes to the status of the Production Tax Credit; and
4. Any other action or change in an acknowledged Integrated Resource Plan (IRP) update relevant to the calculation of avoided costs.

The first three factors listed above apply in this 2023 Renewable Avoided Cost update.

Below is a summary of the changes:

Factor 2: Electricity Market Projections

The forward trading curves are based on market prices for electricity delivered to PGE's system and calculated according to the methodology approved by the OPUC. The forward trading curves adjusted for delivery are used to price avoided costs during a resource sufficiency period. For May 2023 through December 2024, the market prices are based on PGE's forward trading curve from March 31, 2023.

Wheeling costs, as included in PGE's Schedule 201 prices, remain based on current BPA rates adjusted for inflation.

Factor 3: Production Tax Credits

With the passing of the Inflation Reduction Act (IRA), which became effective August 16, 2022, the PTC received an extension for the full value of the PTC credit for facilities that start construction after January 1, 2022, and before January 1, 2025. PGE has updated the PTC application value from 60% to 100% and updated the Inflation Adjustment Factors for the PTC.

Deficiency/Sufficiency Periods

There is no change to the Deficiency/Sufficiency periods as a result of this May 1 Update. The current Deficiency/Sufficiency periods approved by the Commission in Order No. 20-171 are stated below for reference purposes:

- Renewable Resource Sufficiency Period is the period from the current year

¹ *In the Matter of Investigation Into Qualifying Facility Contracting and Pricing*, Docket No, UM 1610, Order No. 14-058 at 25-26 (Feb. 24, 2014).

PGE's 2023 Renewable AVOIDED COST ANNUAL UPDATE
WORKPAPERS – Page 2

through 2024.

- Renewable Resource Deficiency Period is the period from 2025.

Summary of Avoided Cost Estimates

Tables R.1 through R.3 (following) summarize PGE avoided cost prices. Tables R.1a, R.1b, R.2a, R.2b, R.3a, R.3b² are estimates of monthly on- and off-peak renewable avoided costs for over twenty years beginning in May 2023. The renewable resource sufficiency period prices (expressed in \$/MWh or mills/kWh) for the years 2023 through 2024 are based on the forward electricity curves adjusted for delivery as discussed above.

Renewable avoided cost prices beginning January 2025 are represented by the fully allocated costs of a renewable wind resource based on PGE's acknowledged 2019 IRP Update³ with applicable adjustments for capacity value. The energy portion of the on- and off-peak prices are shaped using the on- and off-peak monthly shape factors based on the 2024 market prices. On-peak periods are from 6 a.m. through 10 p.m. Mondays through Saturdays.⁴ The off-peak hours are from 10 p.m. until 6 a.m. Mondays through Saturdays and all twenty-four hours on Sunday.⁵ Table R.4 provides the wind integration costs. Tables R.5 and R.6 show the on- and off-peak resource sufficiency rates.

Avoided Cost Components

Energy:

Tables R.7, R.8 and R.9 are the basis for energy during the deficiency period. Table R.8 shows the full value of a wind resource (as flat \$/MWh). Table 7 isolates the value of wind capacity. Tables R.9 shows the full value of a wind resource less wind capacity value (Table 8 less Table 7 equates to Table 9).

To arrive at final renewable energy pricing, the full value of a wind resource less the capacity value of wind is shaped via monthly shape factors as described above.

Capacity:

Table R10a and b, R.1a and b, and R.12a and b isolate the capacity portion of avoided cost prices for Base Load, Wind, and Solar QFs (both on- and off-peak).

² R1: Base Load QF; R2: Wind QF; R3: Solar QF.

³ Acknowledged at the OPUC April 20, 2021 Public Meeting.

⁴ Schedule 201, Sheet 201-3.

⁵ *Id.*

Renewable Energy Tables

PGE's 2023 Renewable AVOIDED COST ANNUAL UPDATE
 WORKPAPERS – Page 4

Portland General Electric Renewable Avoided Cost Study On-Peak Energy, Base Load													
Table R.1a													Nominal \$/MWh
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	70.99	73.54	153.56	252.44	204.53	82.20	97.49	135.21	
2024	133.27	109.83	68.03	61.92	53.76	58.86	175.07	215.84	167.93	81.29	94.54	137.35	113.45
2025	44.23	36.45	22.58	20.55	17.84	19.53	58.10	71.63	55.73	26.98	31.37	45.58	37.65
2026	45.14	37.19	23.04	20.97	18.21	19.93	59.29	73.10	56.87	27.53	32.02	46.52	38.42
2027	46.06	37.96	23.51	21.40	18.58	20.34	60.50	74.60	58.04	28.09	32.67	47.47	39.15
2028	46.88	38.63	23.93	21.78	18.91	20.70	61.57	75.92	59.07	28.59	33.25	48.31	39.85
2029	47.97	39.53	24.49	22.28	19.35	21.18	63.01	77.68	60.44	29.26	34.02	49.43	40.71
2030	48.95	40.34	24.99	22.74	19.75	21.62	64.30	79.28	61.68	29.85	34.72	50.45	41.67
2031	49.95	41.16	25.50	23.21	20.15	22.06	65.62	80.90	62.94	30.47	35.43	51.48	42.52
2032	50.84	41.89	25.95	23.62	20.51	22.45	66.78	82.33	64.06	31.01	36.06	52.39	43.23
2033	52.02	42.87	26.56	24.17	20.98	22.97	68.33	84.25	65.55	31.73	36.90	53.61	44.27
2034	53.09	43.75	27.10	24.66	21.41	23.44	69.73	85.97	66.89	32.38	37.66	54.71	45.14
2035	54.17	44.64	27.65	25.17	21.85	23.93	71.16	87.74	68.26	33.04	38.43	55.83	45.98
2036	55.13	45.43	28.14	25.61	22.24	24.35	72.42	89.29	69.47	33.63	39.11	56.82	46.92
2037	56.42	46.49	28.80	26.21	22.76	24.92	74.11	91.37	71.09	34.41	40.02	58.14	48.03
2038	57.57	47.44	29.39	26.75	23.22	25.43	75.62	93.24	72.54	35.11	40.84	59.33	48.94
2039	58.75	48.41	29.99	27.29	23.70	25.95	77.17	95.15	74.03	35.83	41.67	60.55	50.00
2040	59.79	49.27	30.52	27.78	24.12	26.41	78.54	96.83	75.34	36.47	42.41	61.62	50.71
2041	61.18	50.42	31.23	28.42	24.68	27.02	80.37	99.09	77.09	37.32	43.40	63.05	52.09
2042	62.44	51.45	31.87	29.01	25.19	27.57	82.02	101.12	78.67	38.08	44.29	64.35	53.15
2043	63.71	52.51	32.53	29.60	25.70	28.14	83.70	103.19	80.28	38.86	45.20	65.66	54.24
2044	64.84	53.44	33.10	30.13	26.16	28.64	85.18	105.01	81.70	39.55	46.00	66.83	55.18
2045	66.35	54.68	33.87	30.83	26.77	29.30	87.16	107.46	83.61	40.47	47.07	68.38	56.42
2046	67.71	55.80	34.57	31.46	27.31	29.90	88.95	109.66	85.32	41.30	48.03	69.78	57.47
2047	69.10	56.94	35.27	32.10	27.87	30.52	90.77	111.91	87.07	42.14	49.01	71.21	58.83
2048	70.32	57.95	35.90	32.67	28.37	31.06	92.37	113.89	88.61	42.89	49.88	72.47	59.86
Capacity Removed, Aurora Shaping													
Portland General Electric Renewable Avoided Cost Study Off-Peak Energy, Base Load													
Table R.1b													Nominal \$/MWh
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	58.76	43.46	69.97	101.57	92.39	74.05	83.22	109.72	
2024	108.81	90.46	59.88	55.80	43.57	43.57	79.25	111.36	84.34	60.90	75.17	109.83	76.91
2025	36.11	30.02	19.87	18.52	14.46	14.46	26.30	36.96	27.99	20.21	24.95	36.45	25.50
2026	36.85	30.64	20.28	18.90	14.76	14.76	26.84	37.71	28.56	20.62	25.46	37.19	26.03
2027	37.60	31.26	20.69	19.29	15.06	15.06	27.39	38.49	29.15	21.05	25.98	37.96	26.61
2028	38.27	31.82	21.06	19.63	15.32	15.32	27.87	39.17	29.67	21.42	26.44	38.63	27.11
2029	39.16	32.56	21.55	20.08	15.68	15.68	28.52	40.08	30.36	21.92	27.05	39.53	27.72
2030	39.96	33.22	21.99	20.49	16.00	16.00	29.11	40.90	30.98	22.37	27.61	40.34	28.24
2031	40.78	33.91	22.44	20.91	16.33	16.33	29.70	41.74	31.61	22.83	28.17	41.16	28.80
2032	41.50	34.51	22.84	21.28	16.62	16.62	30.23	42.48	32.17	23.23	28.67	41.89	29.33
2033	42.47	35.31	23.37	21.78	17.01	17.01	30.93	43.47	32.92	23.77	29.34	42.87	30.00
2034	43.34	36.03	23.85	22.23	17.35	17.35	31.57	44.36	33.60	24.26	29.94	43.75	30.69
2035	44.23	36.77	24.34	22.68	17.71	17.71	32.21	45.26	34.28	24.75	30.55	44.64	31.31
2036	45.01	37.42	24.77	23.08	18.02	18.02	32.78	46.07	34.89	25.19	31.10	45.43	31.80
2037	46.06	38.29	25.35	23.62	18.44	18.44	33.55	47.14	35.70	25.78	31.82	46.49	32.53
2038	47.00	39.08	25.87	24.10	18.82	18.82	34.23	48.10	36.43	26.31	32.47	47.44	33.26
2039	47.97	39.88	26.40	24.60	19.21	19.21	34.93	49.09	37.18	26.85	33.14	48.41	33.88
2040	48.81	40.58	26.86	25.03	19.55	19.55	35.55	49.96	37.84	27.32	33.72	49.27	34.63
2041	49.95	41.53	27.49	25.62	20.00	20.00	36.38	51.12	38.72	27.96	34.51	50.42	35.30
2042	50.97	42.38	28.05	26.14	20.41	20.41	37.13	52.17	39.51	28.53	35.22	51.45	36.00
2043	52.02	43.25	28.63	26.68	20.83	20.83	37.89	53.24	40.32	29.11	35.94	52.51	36.74
2044	52.94	44.01	29.13	27.15	21.20	21.20	38.56	54.18	41.04	29.63	36.57	53.44	37.41
2045	54.17	45.04	29.81	27.78	21.69	21.69	39.45	55.44	41.99	30.32	37.42	54.68	38.36
2046	55.28	45.96	30.42	28.35	22.14	22.14	40.26	56.58	42.85	30.94	38.19	55.80	39.13
2047	56.41	46.90	31.05	28.93	22.59	22.59	41.09	57.74	43.73	31.57	38.97	56.94	39.86
2048	57.41	47.73	31.59	29.44	22.99	22.99	41.81	58.76	44.50	32.13	39.66	57.95	40.57
Capacity Removed, Aurora Shaping													

PGE's 2023 Renewable AVOIDED COST ANNUAL UPDATE
 WORKPAPERS – Page 5

Portland General Electric Renewable Avoided Cost Study On-Peak Energy, Wind													
Table R.2a													Nominal \$/MWh
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	70.64	73.19	153.21	252.09	204.18	81.86	97.15	134.86	
2024	132.92	109.47	67.68	61.56	53.41	58.51	174.71	215.49	167.58	80.93	94.18	137.00	113.09
2025	43.87	36.09	22.22	20.19	17.48	19.17	57.74	71.27	55.37	26.62	31.01	45.22	37.29
2026	44.77	36.83	22.67	20.60	17.84	19.57	58.92	72.73	56.51	27.16	31.65	46.15	38.06
2027	45.68	37.58	23.14	21.02	18.21	19.97	60.13	74.22	57.66	27.72	32.30	47.09	38.78
2028	46.49	38.25	23.55	21.40	18.53	20.32	61.19	75.53	58.68	28.21	32.87	47.93	39.47
2029	47.58	39.14	24.10	21.89	18.96	20.79	62.62	77.29	60.05	28.87	33.63	49.04	40.32
2030	48.55	39.94	24.59	22.34	19.35	21.22	63.90	78.88	61.28	29.46	34.32	50.05	41.27
2031	49.55	40.76	25.09	22.80	19.74	21.65	65.21	80.49	62.54	30.06	35.03	51.07	42.11
2032	50.42	41.48	25.54	23.20	20.09	22.04	66.36	81.92	63.64	30.59	35.65	51.98	42.82
2033	51.60	42.44	26.13	23.74	20.56	22.55	67.91	83.82	65.12	31.30	36.48	53.19	43.85
2034	52.65	43.31	26.67	24.23	20.98	23.01	69.30	85.54	66.46	31.95	37.22	54.28	44.71
2035	53.73	44.20	27.21	24.73	21.41	23.48	70.72	87.29	67.82	32.60	37.99	55.39	45.53
2036	54.68	44.98	27.69	25.16	21.79	23.90	71.97	88.84	69.02	33.18	38.66	56.37	46.47
2037	55.96	46.03	28.34	25.75	22.30	24.46	73.65	90.91	70.63	33.95	39.56	57.68	47.57
2038	57.10	46.97	28.92	26.28	22.76	24.96	75.16	92.77	72.07	34.64	40.37	58.86	48.47
2039	58.27	47.94	29.51	26.82	23.22	25.47	76.70	94.67	73.55	35.35	41.20	60.07	49.52
2040	59.30	48.78	30.03	27.29	23.63	25.92	78.05	96.34	74.85	35.98	41.92	61.13	50.22
2041	60.68	49.92	30.73	27.93	24.18	26.52	79.87	98.59	76.59	36.82	42.90	62.56	51.59
2042	61.93	50.94	31.36	28.50	24.68	27.07	81.51	100.61	78.16	37.57	43.78	63.84	52.64
2043	63.20	51.99	32.01	29.08	25.18	27.62	83.18	102.67	79.77	38.34	44.68	65.15	53.72
2044	64.31	52.91	32.57	29.60	25.63	28.11	84.65	104.49	81.18	39.02	45.47	66.30	54.65
2045	65.81	54.14	33.33	30.29	26.23	28.76	86.62	106.92	83.07	39.93	46.53	67.84	55.88
2046	67.16	55.25	34.01	30.91	26.76	29.35	88.39	109.11	84.77	40.75	47.48	69.23	56.91
2047	68.54	56.38	34.71	31.54	27.31	29.95	90.21	111.35	86.51	41.58	48.45	70.65	58.26
2048	69.75	57.38	35.32	32.10	27.79	30.48	91.80	113.31	88.03	42.32	49.31	71.90	59.29
Capacity Removed, Aurora Shaping, Integration Removed													
Portland General Electric Renewable Avoided Cost Study Off-Peak Energy, Wind													
Table R.2b													Nominal \$/MWh
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	58.41	43.12	69.62	101.22	92.05	73.70	82.87	109.38	
2024	108.46	90.11	59.53	55.45	43.22	43.22	78.89	111.00	83.99	60.55	74.82	109.47	76.56
2025	35.75	29.66	19.51	18.16	14.10	14.10	25.94	36.60	27.63	19.85	24.59	36.09	25.14
2026	36.48	30.27	19.91	18.53	14.39	14.39	26.47	37.35	28.20	20.26	25.09	36.83	25.66
2027	37.23	30.89	20.32	18.91	14.68	14.68	27.01	38.11	28.77	20.67	25.60	37.58	26.24
2028	37.89	31.43	20.68	19.24	14.94	14.94	27.49	38.78	29.28	21.04	26.06	38.25	26.73
2029	38.77	32.17	21.16	19.69	15.29	15.29	28.13	39.69	29.97	21.53	26.66	39.14	27.33
2030	39.57	32.83	21.59	20.10	15.60	15.60	28.71	40.50	30.58	21.97	27.21	39.94	27.84
2031	40.38	33.50	22.04	20.51	15.92	15.92	29.30	41.33	31.21	22.42	27.77	40.76	28.40
2032	41.09	34.09	22.43	20.87	16.20	16.20	29.81	42.06	31.76	22.81	28.26	41.48	28.92
2033	42.05	34.89	22.95	21.36	16.58	16.58	30.51	43.04	32.50	23.35	28.92	42.44	29.58
2034	42.91	35.60	23.42	21.79	16.92	16.92	31.13	43.92	33.16	23.82	29.51	43.31	30.26
2035	43.79	36.33	23.90	22.24	17.27	17.27	31.77	44.82	33.84	24.31	30.11	44.20	30.87
2036	44.56	36.97	24.32	22.63	17.57	17.57	32.33	45.62	34.44	24.74	30.65	44.98	31.35
2037	45.60	37.83	24.89	23.16	17.98	17.98	33.09	46.68	35.24	25.32	31.36	46.03	32.07
2038	46.53	38.61	25.40	23.64	18.35	18.35	33.76	47.63	35.97	25.84	32.00	46.97	32.79
2039	47.49	39.40	25.92	24.12	18.73	18.73	34.46	48.61	36.70	26.37	32.66	47.94	33.41
2040	48.33	40.09	26.38	24.55	19.06	19.06	35.06	49.47	37.35	26.83	33.23	48.78	34.14
2041	49.45	41.03	26.99	25.12	19.50	19.50	35.88	50.62	38.22	27.46	34.01	49.92	34.80
2042	50.47	41.87	27.54	25.63	19.90	19.90	36.62	51.66	39.00	28.02	34.71	50.94	35.50
2043	51.50	42.73	28.11	26.16	20.31	20.31	37.37	52.72	39.80	28.60	35.42	51.99	36.22
2044	52.41	43.48	28.60	26.62	20.67	20.67	38.03	53.65	40.51	29.10	36.04	52.91	36.88
2045	53.63	44.50	29.27	27.24	21.15	21.15	38.91	54.90	41.45	29.78	36.88	54.14	37.82
2046	54.73	45.41	29.87	27.80	21.58	21.58	39.71	56.03	42.30	30.39	37.64	55.25	38.58
2047	55.85	46.34	30.48	28.37	22.03	22.03	40.52	57.17	43.17	31.01	38.41	56.38	39.30
2048	56.84	47.16	31.02	28.87	22.42	22.42	41.24	58.18	43.93	31.56	39.09	57.38	39.99
Capacity Removed, Aurora Shaping, Integration Removed													

PGE's 2023 Renewable AVOIDED COST ANNUAL UPDATE
 WORKPAPERS – Page 6

Portland General Electric Renewable Avoided Cost Study On-Peak Energy, Solar													
Table R.3a													Nominal \$/MWh
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	69.55	72.10	152.12	251.00	203.08	80.76	96.05	133.77	
2024	131.80	108.36	66.56	60.45	52.29	57.39	173.60	214.37	166.46	79.82	93.07	135.88	111.98
2025	42.73	34.95	21.08	19.05	16.34	18.03	56.60	70.13	54.23	25.48	29.87	44.08	36.15
2026	43.60	35.66	21.51	19.44	16.68	18.40	57.76	71.57	55.34	26.00	30.49	44.99	36.89
2027	44.50	36.39	21.95	19.84	17.02	18.78	58.94	73.03	56.48	26.53	31.11	45.91	37.59
2028	45.28	37.03	22.33	20.18	17.32	19.11	59.98	74.32	57.47	27.00	31.66	46.72	38.26
2029	46.34	37.90	22.86	20.66	17.72	19.56	61.38	76.06	58.81	27.63	32.40	47.81	39.08
2030	47.29	38.68	23.33	21.08	18.09	19.96	62.64	77.62	60.02	28.19	33.06	48.79	40.01
2031	48.26	39.47	23.81	21.51	18.46	20.37	63.92	79.21	61.25	28.77	33.74	49.79	40.83
2032	49.11	40.16	24.22	21.89	18.78	20.72	65.05	80.60	62.33	29.28	34.33	50.66	41.51
2033	50.26	41.10	24.79	22.40	19.22	21.21	66.57	82.48	63.78	29.96	35.14	51.85	42.51
2034	51.28	41.95	25.30	22.86	19.61	21.64	67.93	84.17	65.09	30.58	35.86	52.91	43.34
2035	52.34	42.81	25.82	23.33	20.02	22.09	69.32	85.90	66.42	31.20	36.59	53.99	44.14
2036	53.26	43.56	26.27	23.74	20.37	22.47	70.55	87.41	67.59	31.75	37.23	54.94	45.05
2037	54.50	44.58	26.89	24.30	20.84	23.00	72.19	89.45	69.17	32.50	38.10	56.23	46.11
2038	55.62	45.49	27.44	24.79	21.27	23.47	73.67	91.29	70.59	33.16	38.89	57.38	46.99
2039	56.76	46.42	28.00	25.30	21.71	23.95	75.18	93.16	72.04	33.84	39.68	58.56	48.01
2040	57.76	47.24	28.49	25.74	22.09	24.37	76.51	94.80	73.31	34.43	40.38	59.59	48.68
2041	59.11	48.34	29.16	26.35	22.61	24.95	78.29	97.01	75.02	35.24	41.32	60.98	50.01
2042	60.32	49.33	29.75	26.89	23.07	25.46	79.90	99.00	76.55	35.96	42.17	62.23	51.03
2043	61.55	50.35	30.36	27.44	23.54	25.98	81.53	101.03	78.12	36.70	43.04	63.50	52.08
2044	62.64	51.23	30.90	27.92	23.95	26.43	82.97	102.81	79.50	37.34	43.79	64.62	52.97
2045	64.10	52.43	31.62	28.58	24.52	27.05	84.91	105.21	81.36	38.22	44.82	66.13	54.17
2046	65.41	53.50	32.27	29.16	25.02	27.61	86.65	107.37	83.02	39.00	45.73	67.49	55.17
2047	66.75	54.60	32.93	29.76	25.53	28.17	88.42	109.56	84.72	39.80	46.67	68.87	56.48
2048	67.93	55.56	33.51	30.28	25.98	28.67	89.98	111.50	86.22	40.50	47.49	70.08	57.47
<i>Capacity Removed, Aurora Shaping, Integration Removed</i>													
Portland General Electric Renewable Avoided Cost Study Off-Peak Energy, Solar													
Table R.3b													Nominal \$/MWh
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2023	0.00	0.00	0.00	0.00	57.32	42.02	68.53	100.13	90.95	72.61	81.78	108.28	
2024	107.34	88.99	58.41	54.33	42.10	42.10	77.78	109.89	82.87	59.43	73.70	108.36	75.44
2025	34.61	28.52	18.37	17.02	12.96	12.96	24.80	35.46	26.49	18.71	23.45	34.95	24.00
2026	35.32	29.10	18.75	17.37	13.22	13.22	25.31	36.18	27.03	19.09	23.93	35.66	24.50
2027	36.04	29.70	19.13	17.72	13.50	13.50	25.83	36.92	27.59	19.48	24.42	36.39	25.05
2028	36.68	30.22	19.47	18.03	13.73	13.73	26.28	37.57	28.07	19.83	24.84	37.03	25.52
2029	37.53	30.93	19.92	18.46	14.05	14.05	26.89	38.45	28.73	20.29	25.43	37.90	26.09
2030	38.30	31.56	20.33	18.83	14.34	14.34	27.45	39.24	29.32	20.71	25.95	38.68	26.58
2031	39.09	32.21	20.75	19.22	14.64	14.64	28.01	40.04	29.92	21.13	26.48	39.47	27.11
2032	39.78	32.78	21.11	19.56	14.89	14.89	28.50	40.75	30.44	21.50	26.94	40.16	27.60
2033	40.71	33.54	21.61	20.02	15.24	15.24	29.17	41.70	31.16	22.01	27.58	41.10	28.24
2034	41.54	34.23	22.05	20.43	15.55	15.55	29.77	42.56	31.80	22.46	28.14	41.95	28.89
2035	42.39	34.93	22.50	20.84	15.87	15.87	30.37	43.43	32.45	22.92	28.72	42.81	29.47
2036	43.14	35.55	22.90	21.21	16.15	16.15	30.91	44.19	33.02	23.32	29.22	43.56	29.93
2037	44.15	36.38	23.43	21.71	16.53	16.53	31.63	45.22	33.79	23.87	29.91	44.58	30.62
2038	45.05	37.12	23.91	22.15	16.87	16.87	32.28	46.15	34.48	24.35	30.52	45.49	31.31
2039	45.97	37.88	24.40	22.61	17.21	17.21	32.94	47.10	35.19	24.85	31.14	46.42	31.89
2040	46.78	38.55	24.83	23.00	17.51	17.51	33.52	47.92	35.81	25.29	31.69	47.24	32.59
2041	47.88	39.45	25.41	23.54	17.93	17.93	34.31	49.05	36.64	25.88	32.43	48.34	33.22
2042	48.86	40.26	25.93	24.02	18.29	18.29	35.01	50.05	37.40	26.41	33.10	49.33	33.89
2043	49.86	41.09	26.47	24.52	18.67	18.67	35.73	51.08	38.16	26.95	33.78	50.35	34.58
2044	50.73	41.81	26.93	24.94	18.99	18.99	36.35	51.97	38.83	27.42	34.37	51.23	35.21
2045	51.92	42.79	27.56	25.53	19.44	19.44	37.20	53.19	39.74	28.07	35.17	52.43	36.11
2046	52.99	43.66	28.13	26.05	19.84	19.84	37.97	54.28	40.56	28.64	35.89	53.50	36.83
2047	54.07	44.56	28.70	26.59	20.25	20.25	38.74	55.39	41.39	29.23	36.63	54.60	37.52
2048	55.02	45.34	29.20	27.05	20.60	20.60	39.42	56.37	42.11	29.74	37.27	55.56	38.17
<i>Capacity Removed, Aurora Shaping, Integration Removed</i>													

Renewable Capacity Tables

PGE's 2023 Renewable AVOIDED COST ANNUAL UPDATE
WORKPAPERS – Page 14

UM 1728

Application to Update Schedule 201
Avoided Cost Power Purchase Information

Attachment C
Filing Inputs

Worksheet Tab: Plant Capital Cost Inputs						
	4/28/23 Filing				7/12/22 Compliance Filing	
	Value	Units	\$ Year	Source	Value	\$ Year
Simple Cycle Combustion Thermal Plant Equipment (1x0 GE 7HA.02)						
Clean Capacity	356	MW	2019	IRP - Supply-Side Resource Study - Spring 2018	356	2018
Degraded Capacity	347	MW	2019	IRP - Supply-Side Resource Study - Spring 2018	347	2018
Overnight capital cost	181,044	(\$000s)	2018	2019 IRP LUCAS model	181,044	2018
CO2 offset	3,674	(\$000s)	2017	2019 IRP revenue requirement model	3,674	2017
Economic life	38	yrs.	2019	IRP - Supply-Side Resource Study - Spring 2018	38	2018
Tax life	15	yrs.		no change	15	2018
Decommissioning cost	1,533	(\$000s)	2018	2019 IRP LUCAS model	1,533	2018
In-service date	2025				2025	2018
Start construction date	2023				2023	2018
EPC period	20	months	2019	IRP - Supply-Side Resource Study - Spring 2018	20	2018
Capacity contribution	95.5%	%	2019	IRP Update	95.5%	2018
Interconnection Facilities	6,160	(\$000s)	2013	2019 IRP Update LUCAS model	6,160	2018
Interconnection Facilities	6,639	(\$000s)	2018	Calculation	6,639	2018
Network Upgrades	3,556	(\$000s)	2013	2019 IRP Update LUCAS model	3,556	2018
Network Upgrades	3,833	(\$000s)	2018	Calculation	3,833	2018
Interconnection and Network Upgrades	10,473	(\$000s)	2018	Calculation	10,473	2018
Combined Cycle Combustion Thermal Plant Equipment (1x1 GE 7HA.02)						
Clean Capacity	517	MW	2019	IRP - Supply-Side Resource Study - Spring 2018	517	2018
Degraded Capacity	503	MW	2019	IRP - Supply-Side Resource Study - Spring 2018	503	2018
Overnight capital cost	459,128	(\$000s)	2018	2019 IRP - Supply-Side Resource Study - Spring 2018	459,128	2018
CO2 offset	9,277	(\$000s)	2017	2019 IRP LUCAS model	9,277	2017
Economic life	38	yrs.	2019	IRP PGE Zone Model	38	2018
Tax life	20			no change	20	2018
Decommissioning cost	2,450	(\$000s)	2018	2019 IRP LUCAS model	2,450	2018
In-service date	2025				2025	2018
Start construction date	2022				2022	2018
EPC period	30	months	2019	IRP - Supply-Side Resource Study - Spring 2018	30	2018
Interconnection Facilities	8,313	(\$000s)	2013	2019 IRP Update LUCAS model	8,313	2018
Interconnection Facilities	8,961	(\$000s)	2018	Calculation	8,961	2018
Network Upgrades	3,556	(\$000s)	2013	2019 IRP Update LUCAS model	3,556	2018
Network Upgrades	3,833	(\$000s)	2018	Calculation	3,833	2018
Interconnection and Network Upgrades	12,794	(\$000s)	2018	Calculation	12,794	2018

Wind Equipment (Gorge wind):						
Capacity	245	MW	2019 IRP - Supply-Side Resource Study - Spring 2018		245	
Turbines	68	turbines	2019 IRP - Supply-Side Resource Study - Spring 2018		68	
Overnight capital cost	369,222	(\$000s)	2018 2019 IRP - Supply-Side Resource Study - Spring 2018		369,222	2018
Annual capital reinvestment		\$/MW				
PTC application	100%				60%	
Economic life	30		2019 IRP - Supply-Side Resource Study - Spring 2018		30	
Tax life	5		no change		5	
Decommissioning cost	8,428	(\$000s)	2018 2019 IRP Update LUCAS model		8,428	2018
In-service date	2025				2025	
Start construction date	2027				2027	
EPC period	27	months	2019 IRP - Supply-Side Resource Study - Spring 2018		27	
Plant retirement						
Capacity contribution	25.0%	%	2019 IRP Figure 6-3, 100 MW incremental addition		25.0%	
Interconnection Facilities	15,061	(\$000s)	2013 2019 IRP LUCAS model		15,061	
Interconnection Facilities	16,234	(\$000s)	2018 Calculation		16,234	
Network Upgrades	3,556	(\$000s)	2013 2019 IRP LUCAS model		3,556	
Network Upgrades	3,833	(\$000s)	2018 Calculation		3,833	
Interconnection and Network Upgrades	20,067	(\$000s)	2018		20,067	
Workbook Tab: Plant Operating Parameters						
			4/28/23 Filing		7/11/22 Compliance Filing	
	Value	Units	\$ Year	Source	Value	\$ Year
Simple Cycle Combustion Thermal Plant Equipment (1x0 GE 7HA.02)						
Heat Rate (Degraded)	9,298	Btu/kWh		2019 IRP - Supply-Side Resource Study - Spring 2018	9,298	
Fixed O&M	2.10	\$/kW-yr	2018	2019 IRP - Supply-Side Resource Study - Spring 2018	2.10	2018
Variable O&M	9.69	\$/MWh	2018	2019 IRP - Supply-Side Resource Study - Spring 2018	9.69	2018
Insurance	0.17	\$/100 project cost	2023		0.17	2023
Materials inventory	4.90	\$/kW degraded	2018		4.90	2018
Net Energy Value: revenues - variable cos	0.39	\$/kW-yr	2020	2019 IRP Update PGE Zone Model	0.39	2020
Flexibility value	4.82	\$/kW-yr	2020	2019 IRP table 6-5	4.82	2020
Contingency reserves (%)	-	%				
Spinning reserves	-	\$/MWh				
Supplemental reserves	-	\$/MWh				
Contingency reserves cost	-	\$/MWh				
Availability factor	-	%				
Ancillary services cost	-					
Combined Cycle Combustion Thermal Plant Equipment (1x1 GE 7HA.02)						
Heat Rate (Degraded)	6,362	Btu/kWh		2019 IRP - Supply-Side Resource Study - Spring 2018	6,362	
Fixed O&M	6.57	\$/kW-yr	2018	2019 IRP - Supply-Side Resource Study - Spring 2018	6.57	2018
Variable O&M	0.72	\$/MWh	2018	2019 IRP - Supply-Side Resource Study - Spring 2018	0.72	2018
Insurance	0.17	\$/100 project cost	2022		0.17	2022
Materials inventory	2.49	\$/kW degraded	2018		2.49	2018
Availability factor	94.01%	%		2019 IRP - Supply-Side Resource Study - Spring 2018	94.01%	
Contingency reserves (%)	-	%				
Spinning reserves	-	\$/MWh				
Supplemental reserves	-	\$/MWh				
Contingency reserves cost	-	\$/MWh				
Schedule outage rate	-	%				

Gorge Wind						
Fixed O&M	37.00	\$/kW-yr	2018	2019 IRP - Supply-Side Resource Study - Spring 2018	37.00	2018
Capacity factor (flat)	40.80%			2019 IRP - Supply-Side Resource Study - Spring 2018	40.80%	
Capacity factor (peak)	39.97%			2019 IRP - Supply-Side Resource Study - Spring 2018	39.97%	
Annual output	-	MWh			874,935	
Land royalties	1.70	\$/MWh	2018	2019 IRP - Supply-Side Resource Study - Spring 2018	1.70	2018
Insurance	0.08	\$/100 project cost	0		0.08	2022
Capacity contribution	25.00%				25.00%	
Spinning reserves	-	%				
Contingency reserves cost	-					
Solar						
Capacity factor (peak)	36.87%			2019 IRP	36.87%	
Capacity contribution	8.50%			2019 IRP	15.78%	
BPA line loss	1.90%			No change	1.90%	
Workbook Tab: Financial and Tax Parameters						
				4/28/23 Filing		7/11/22 Compliance Filing
	Value			Source		Value
Composite Income Tax Rate	27.35%			2019 IRP - Appendix I Table I-1		27.35%
Debt Portion of Capitalization	50.00%			2019 IRP - Appendix I Table I-1		50.00%
Common Stock Portion of Capitalization	50.00%			2019 IRP - Appendix I Table I-1		50.00%
Property Tax Rate	1.45%			2016 IRP Update, Section 7		1.45%
Inflation Rate	2.05%			2019 IRP - Appendix I Table I-1		2.05%
Common Return	9.50%			2019 IRP - Appendix I Table I-1		9.50%
Debt Return	4.94%			2019 IRP - Appendix I Table I-1		4.94%
Pre-Tax Nominal Cost of Capital	4.75%			calculation		7.22%
Equityportion	65.79%			calculation		65.79%
After-Tax Nominal Cost of Capital	6.54%			calculation		6.54%
After-Tax Real Cost of Capital	4.41%			calculation		4.41%

UM 1728 Service List

CERTIFICATE OF SERVICE

I hereby certify that I have this day caused the Documents in UM 1728 to be served by electronic mail to those parties whose e-mail addresses appear on the attached service list for OPUC Docket UM 1728.

Dated at Portland, Oregon, this 28th day of April, 2023.

/s/ Robert Macfarlane

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