



**Portland General Electric**

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May 26, 2022

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

**RE: UM 1728 Supplemental 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 supplemental 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. PGE initially filed the Schedule 201, QF Avoided Cost Power Purchase Information on May 2, 2022. PGE is submitting this Supplemental filing to update the natural gas price forecast, which results in updated nonrenewable avoided cost prices. After discussions at the May 18, 2022, workshop and upon further review, PGE realized that it had inadvertently not used a more recent updated natural gas price forecast. PGE is now correcting this oversight in this supplemental filing using natural gas forward curves dated March 31, 2022, consistent with the date of the forward electricity curves also used in this update. All the other inputs that were used in the Company's initial filing and the renewable avoided cost prices remain unchanged.

OAR 860-029-0085(4)(c) requires updated avoided cost prices to be effective within 60 days of the May 1 update filing. However, since PGE is submitting this Supplemental Application to update Schedule 201 Qualifying Facility Information, PGE respectfully requests an effective date consistent with Staff's request of July 13, 2022, to allow OPUC Staff and Stakeholders enough time to review PGE's application.

Consistent with previous years' Avoided Cost filings PGE uses forward-looking natural gas and electricity curves created within the previous 90 days. In 2020 PGE used forward-looking natural gas and electricity curves created on January 31 and in 2021 PGE used forward-looking natural gas and electricity curves created on February 26.

There are multiple inputs into PGE's natural gas price forecast. Consistent with previous Avoided Cost filings PGE has used these inputs:

- 2022-2026 PGE Trading Curve (as of March 31, 2022)
- 2027 PGE/Wood Mackenzie Blend
- 2028-2050 Wood Mackenzie 2021 Update (released in January 2022)
- 2051+ Grow at rate of inflation

Near-term natural gas prices are based on PGE's forward AECO price curves, produced on a monthly basis for 2022 through 2026. The 2027 natural gas prices are based on a linear interpolation from PGE's curves to the long-term forecast. PGE utilizes the AECO Natural Gas Price Delivered Hub from Wood Mackenzie for its long-term natural gas forecast. Wood Mackenzie is a subscription service and provides PGE with long-term natural gas forecasts twice a year, typically in January and June.

For 2028 through 2050 prices align with the AECO prices from the 2021 H1 Wood Mackenzie forecast which was released in January 2022. Prices after 2051 are escalated with the rate of inflation.

The updated natural gas price forecast resulted in a change to the nonrenewable avoided cost prices. This change resulted in the 2023 nonrenewable avoided cost prices increasing slightly from what was filed on May 2, 2022: the Baseload price increased by 3%, Wind increased by 4%, and Solar increased by 4%. Renewable avoided cost prices did not change and remain as originally filed on May 2, 2022.

The following table, updated with the natural gas price forecast as discussed above, summarizes the impact on nonrenewable prices of updating the QF-forecast and solar-generation-profile components of the effective load carrying capability (ELCC) as compared to the traditional May 1 update without any ELCC changes and to PGE's current avoided cost prices:

Table Current and Proposed Levelized Avoided Costs (2023-2037) with flat 15-year PPA forecast

Nonrenewable \$MWh	Baseload	Wind	Solar
Current	\$ 32.42	\$ 27.83	\$ 24.33
Updated Standard May 1 updated (as filed May 26)	\$ 40.09	\$ 34.94	\$ 31.52
Updated May 1 update w/updated ELCC (as filed May 26)	\$ 40.10	\$ 35.49	\$ 30.27

Based on the updated natural gas price forecast changes discussed above PGE is submitting the following updated avoided cost filing documents. All other filing documents submitted on May 2, 2022, did not change and remain as originally filed.

- Updated Schedule 201 avoided cost prices.
- Updated avoided cost workpapers provided in excel files and password protected.
- Attachment A provides an updated description of standard avoided costs. The confidential Attachment A is subject to Protective Order No. 17-321.

The confidential Attachment A and excel files will be sent separately to the Filing Center and password protected.

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](mailto: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](http://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 27.00%. 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
2022	0.00	0.00	0.00	0.00	41.43	50.86	101.57	172.92	110.74	70.99	69.97	92.39
2023	92.39	81.18	53.66	36.84	33.27	39.90	110.36	152.06	107.28	61.73	62.53	76.46
2024	73.79	66.95	48.06	35.24	31.01	39.99	94.75	130.38	92.12	55.75	56.46	68.96
2025	53.89	53.19	51.42	49.18	49.12	49.57	50.03	50.22	50.13	50.58	51.94	53.96
2026	55.69	55.00	53.54	50.98	50.98	51.41	51.81	51.92	51.92	52.28	53.58	55.52
2027	52.27	52.39	52.49	50.95	51.05	51.16	51.27	51.38	51.49	51.88	52.86	52.97
2028	51.85	51.96	51.27	49.76	49.86	49.96	50.05	50.16	50.26	50.41	51.57	51.67
2029	52.86	52.97	51.92	50.35	50.44	50.54	50.64	50.74	50.84	50.99	52.16	52.26
2030	54.22	54.35	53.05	51.67	51.77	51.88	51.99	52.08	52.19	52.30	53.58	53.69
2031	54.13	54.24	54.33	52.86	52.96	53.07	53.17	53.28	53.39	53.50	54.78	54.89
2032	55.97	56.09	56.14	54.63	54.74	54.85	54.96	55.08	55.20	55.31	56.65	56.77
2033	59.41	59.54	57.79	56.34	56.47	56.59	56.71	56.81	56.93	57.04	58.49	58.63
2034	60.21	60.34	59.40	57.91	58.03	58.18	58.28	58.42	58.54	58.64	60.20	60.31
2035	63.65	63.85	61.13	59.70	59.83	59.97	60.09	60.22	60.29	60.42	62.27	62.42
2036	64.59	65.25	62.87	61.52	61.21	61.41	61.80	61.67	61.24	61.38	60.79	60.99
2037	62.37	63.02	64.06	63.49	63.17	63.75	63.89	63.61	63.67	63.36	61.14	61.34
2038	63.67	64.34	66.50	65.60	65.75	65.97	66.58	66.27	65.83	66.45	64.58	64.79
2039	66.15	66.85	68.26	67.92	67.60	68.31	68.46	68.62	67.66	68.28	66.51	66.70
2040	69.34	70.02	70.95	70.98	71.15	70.91	71.08	71.73	70.75	70.91	65.86	66.08
2041	68.65	70.38	74.97	74.25	74.43	75.21	75.40	75.09	74.57	75.30	72.62	72.88
2042	75.65	76.45	78.55	78.04	78.23	78.00	78.79	78.99	78.36	78.05	75.72	76.50
2043	77.08	78.98	79.42	78.61	78.44	79.11	78.84	79.09	79.02	79.21	77.16	76.92
2044	78.78	82.41	80.49	79.94	80.13	80.44	80.18	80.40	79.84	80.56	78.96	79.25
2045	82.71	83.76	83.64	82.87	83.48	83.81	83.52	84.24	83.06	83.41	81.44	82.28
2046	84.94	85.76	85.59	85.14	85.35	85.69	85.42	85.70	84.90	85.82	84.12	83.88
2047	88.53	89.78	88.82	87.46	87.68	88.04	88.67	88.91	88.15	88.13	90.09	90.88

## 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
2022	0.00	0.00	0.00	0.00	32.25	34.29	51.37	75.07	73.03	61.81	60.79	77.10
2023	76.59	67.42	42.96	29.70	23.08	27.92	51.42	71.23	66.61	53.09	54.41	64.94
2024	70.38	61.08	45.12	31.51	22.62	24.59	57.08	79.14	74.00	50.61	51.88	61.86
2025	27.57	26.87	25.11	22.87	22.81	23.26	23.72	23.90	23.82	24.27	25.63	27.64
2026	28.83	28.15	26.69	24.12	24.12	24.55	24.96	25.07	25.07	25.43	26.73	28.67
2027	24.87	24.99	25.09	23.55	23.65	23.76	23.87	23.98	24.09	24.48	25.46	25.57
2028	23.89	24.00	23.30	21.80	21.89	21.99	22.09	22.19	22.29	22.44	23.60	23.71
2029	24.32	24.43	23.39	21.81	21.91	22.01	22.10	22.20	22.30	22.46	23.62	23.73
2030	25.10	25.23	23.93	22.54	22.64	22.76	22.87	22.96	23.07	23.18	24.46	24.57
2031	24.42	24.53	24.61	23.14	23.25	23.35	23.46	23.56	23.67	23.78	25.07	25.18
2032	25.84	25.95	26.01	24.50	24.61	24.72	24.83	24.95	25.06	25.18	26.52	26.64
2033	28.46	28.59	26.84	25.39	25.52	25.65	25.76	25.86	25.98	26.10	27.54	27.68
2034	28.53	28.66	27.72	26.23	26.35	26.49	26.60	26.74	26.86	26.96	28.52	28.63
2035	31.42	31.62	28.90	27.48	27.60	27.74	27.86	27.99	28.06	28.19	30.05	30.19
2036	31.81	32.47	30.08	28.74	28.43	28.62	29.02	28.89	28.46	28.59	28.00	28.21
2037	28.80	29.45	30.49	29.92	29.61	30.19	30.32	30.04	30.11	29.80	27.58	27.78
2038	29.42	30.09	32.25	31.35	31.50	31.72	32.33	32.02	31.58	32.19	30.33	30.54
2039	31.20	31.89	33.31	32.97	32.64	33.35	33.51	33.66	32.70	33.33	31.56	31.75
2040	33.67	34.35	35.28	35.32	35.48	35.25	35.41	36.06	35.08	35.25	30.19	30.41
2041	32.25	33.98	38.57	37.85	38.03	38.81	39.00	38.70	38.17	38.90	36.22	36.48
2042	38.51	39.30	41.40	40.89	41.08	40.86	41.65	41.85	41.22	40.91	38.58	39.36
2043	39.17	41.07	41.52	40.70	40.54	41.20	40.93	41.18	41.11	41.31	39.25	39.02
2044	40.22	43.85	41.93	41.38	41.57	41.88	41.62	41.84	41.28	42.00	40.40	40.69
2045	43.10	44.16	44.04	43.27	43.88	44.21	43.92	44.64	43.46	43.81	41.84	42.68
2046	44.66	45.48	45.31	44.85	45.07	45.40	45.14	45.42	44.62	45.54	43.84	43.60
2047	47.42	48.68	47.71	46.35	46.58	46.93	47.56	47.80	47.04	47.03	48.98	49.77

**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
2022	0.00	0.00	0.00	0.00	41.09	50.52	101.23	172.59	110.40	70.65	69.63	92.06
2023	92.05	80.84	53.31	36.49	32.93	39.55	110.01	151.71	106.93	61.39	62.18	76.12
2024	73.44	66.60	47.71	34.89	30.66	39.64	94.40	130.03	91.77	55.40	56.11	68.61
2025	43.92	43.22	41.46	39.22	39.16	39.61	40.06	40.25	40.17	40.62	41.98	43.99
2026	45.52	44.84	43.38	40.81	40.81	41.24	41.64	41.76	41.76	42.11	43.41	45.36
2027	41.90	42.01	42.11	40.57	40.67	40.78	40.89	41.00	41.12	41.50	42.48	42.60
2028	41.26	41.37	40.68	39.17	39.27	39.37	39.47	39.57	39.67	39.82	40.98	41.08
2029	42.05	42.16	41.12	39.54	39.64	39.74	39.83	39.93	40.03	40.19	41.35	41.46
2030	43.20	43.32	42.02	40.64	40.74	40.85	40.96	41.06	41.17	41.27	42.55	42.66
2031	42.88	42.99	43.08	41.61	41.71	41.82	41.92	42.03	42.14	42.24	43.53	43.64
2032	44.56	44.67	44.73	43.22	43.33	43.44	43.55	43.67	43.78	43.90	45.24	45.36
2033	47.69	47.82	46.07	44.62	44.75	44.87	44.99	45.09	45.21	45.33	46.77	46.91
2034	48.21	48.35	47.41	45.92	46.04	46.18	46.28	46.42	46.54	46.65	48.20	48.31
2035	51.45	51.64	48.93	47.50	47.62	47.76	47.89	48.02	48.08	48.21	50.07	50.21
2036	52.18	52.83	50.45	49.11	48.79	48.99	49.38	49.26	48.82	48.96	48.37	48.58
2037	49.66	50.31	51.35	50.78	50.46	51.04	51.18	50.90	50.96	50.65	48.43	48.64
2038	50.70	51.38	53.53	52.63	52.78	53.00	53.61	53.30	52.86	53.48	51.61	51.82
2039	52.92	53.61	55.02	54.68	54.36	55.07	55.22	55.38	54.42	55.05	53.28	53.47
2040	55.84	56.51	57.44	57.48	57.64	57.41	57.57	58.23	57.24	57.41	52.35	52.57
2041	54.87	56.60	61.18	60.47	60.65	61.43	61.61	61.31	60.79	61.51	58.84	59.10
2042	61.59	62.38	64.48	63.97	64.16	63.94	64.72	64.93	64.29	63.99	61.66	62.44
2043	62.72	64.62	65.07	64.26	64.09	64.75	64.48	64.73	64.66	64.86	62.80	62.57
2044	64.18	67.81	65.89	65.34	65.53	65.84	65.58	65.79	65.23	65.95	64.36	64.65
2045	67.71	68.76	68.65	67.87	68.49	68.82	68.53	69.25	68.07	68.41	66.45	67.29
2046	69.69	70.51	70.34	69.88	70.10	70.43	70.17	70.45	69.65	70.57	68.86	68.63
2047	72.96	74.22	73.25	71.89	72.12	72.47	73.10	73.34	72.58	72.57	74.52	75.32

## 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
2022	0.00	0.00	0.00	0.00	31.91	33.95	51.03	74.73	72.69	61.47	60.46	76.77
2023	76.25	67.07	42.61	29.36	22.73	27.57	51.07	70.89	66.27	52.74	54.07	64.60
2024	70.03	60.73	44.77	31.16	22.27	24.24	56.72	78.79	73.64	50.26	51.52	61.50
2025	27.21	26.51	24.75	22.51	22.45	22.90	23.36	23.54	23.46	23.91	25.27	27.28
2026	28.47	27.79	26.33	23.76	23.76	24.19	24.59	24.70	24.70	25.06	26.36	28.30
2027	24.50	24.61	24.71	23.17	23.27	23.38	23.49	23.60	23.72	24.10	25.08	25.20
2028	23.50	23.61	22.92	21.41	21.51	21.61	21.71	21.81	21.91	22.06	23.22	23.33
2029	23.93	24.04	23.00	21.42	21.52	21.61	21.71	21.81	21.91	22.07	23.23	23.34
2030	24.70	24.83	23.53	22.15	22.25	22.36	22.47	22.56	22.67	22.78	24.06	24.17
2031	24.01	24.12	24.21	22.74	22.84	22.95	23.05	23.16	23.27	23.37	24.66	24.77
2032	25.42	25.54	25.59	24.08	24.19	24.30	24.42	24.53	24.65	24.76	26.11	26.22
2033	28.04	28.17	26.42	24.97	25.10	25.22	25.34	25.44	25.55	25.67	27.12	27.25
2034	28.10	28.23	27.29	25.80	25.92	26.06	26.16	26.31	26.42	26.53	28.09	28.19
2035	30.98	31.18	28.46	27.03	27.16	27.30	27.42	27.55	27.62	27.75	29.61	29.75
2036	31.36	32.02	29.63	28.29	27.98	28.17	28.57	28.44	28.01	28.14	27.55	27.76
2037	28.34	29.00	30.04	29.46	29.15	29.73	29.86	29.58	29.65	29.34	27.12	27.32
2038	28.95	29.63	31.78	30.88	31.03	31.25	31.86	31.55	31.11	31.73	29.86	30.07
2039	30.72	31.42	32.83	32.49	32.17	32.88	33.03	33.19	32.23	32.85	31.08	31.27
2040	33.19	33.86	34.80	34.83	34.99	34.76	34.92	35.58	34.59	34.76	29.70	29.92
2041	31.76	33.48	38.07	37.36	37.54	38.31	38.50	38.20	37.68	38.40	35.73	35.99
2042	38.00	38.79	40.89	40.38	40.58	40.35	41.14	41.34	40.71	40.40	38.07	38.85
2043	38.65	40.55	41.00	40.19	40.02	40.68	40.41	40.66	40.59	40.79	38.73	38.50
2044	39.69	43.33	41.40	40.85	41.04	41.36	41.09	41.31	40.75	41.47	39.87	40.17
2045	42.56	43.62	43.50	42.73	43.34	43.67	43.38	44.10	42.92	43.26	41.30	42.14
2046	44.11	44.93	44.76	44.30	44.52	44.85	44.59	44.87	44.07	44.99	43.28	43.05
2047	46.86	48.11	47.15	45.79	46.01	46.37	47.00	47.24	46.48	46.46	48.42	49.21

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

<b>TABLE 3a</b>												
<b>Avoided Costs</b>												
<b>Fixed Price Option for Solar QF</b>												
<b>On-Peak Forecast (\$/MWH)</b>												
<b>Year</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
2022	0.00	0.00	0.00	0.00	40.01	49.44	100.16	171.51	109.33	69.58	68.56	90.98
2023	90.95	79.74	52.22	35.40	31.83	38.46	108.92	150.62	105.84	60.29	61.09	75.02
2024	72.32	65.48	46.59	33.77	29.54	38.52	93.28	128.91	90.65	54.28	54.99	67.49
2025	29.90	29.20	27.44	25.20	25.13	25.59	26.04	26.23	26.14	26.59	27.95	29.97
2026	31.21	30.53	29.07	26.50	26.50	26.93	27.33	27.44	27.44	27.80	29.10	31.04
2027	27.29	27.41	27.51	25.97	26.07	26.18	26.29	26.40	26.51	26.90	27.88	27.99
2028	26.36	26.47	25.77	24.27	24.36	24.47	24.56	24.66	24.77	24.92	26.08	26.18
2029	26.84	26.95	25.91	24.33	24.43	24.53	24.62	24.73	24.83	24.98	26.15	26.25
2030	27.68	27.80	26.50	25.12	25.22	25.33	25.44	25.54	25.65	25.75	27.03	27.14
2031	27.04	27.15	27.24	25.77	25.87	25.98	26.08	26.19	26.30	26.41	27.69	27.80
2032	28.49	28.61	28.66	27.15	27.26	27.37	27.48	27.60	27.71	27.83	29.17	29.29
2033	31.20	31.33	29.58	28.13	28.26	28.38	28.49	28.60	28.71	28.83	30.27	30.41
2034	31.33	31.47	30.53	29.04	29.16	29.30	29.40	29.54	29.66	29.77	31.32	31.43
2035	34.27	34.47	31.75	30.32	30.45	30.59	30.71	30.84	30.91	31.04	32.89	33.04
2036	34.70	35.36	32.97	31.63	31.32	31.51	31.91	31.78	31.35	31.48	30.89	31.10
2037	31.77	32.42	33.46	32.89	32.57	33.15	33.29	33.01	33.07	32.76	30.55	30.75
2038	32.44	33.12	35.28	34.38	34.52	34.74	35.35	35.04	34.60	35.22	33.36	33.57
2039	34.29	34.98	36.39	36.05	35.73	36.44	36.60	36.75	35.79	36.42	34.65	34.84
2040	36.83	37.50	38.44	38.47	38.63	38.40	38.56	39.22	38.23	38.40	33.34	33.56
2041	35.47	37.20	41.79	41.07	41.25	42.03	42.22	41.91	41.39	42.11	39.44	39.70
2042	41.79	42.58	44.69	44.17	44.37	44.14	44.93	45.13	44.50	44.19	41.86	42.64
2043	42.52	44.42	44.87	44.05	43.89	44.55	44.28	44.53	44.46	44.66	42.60	42.37
2044	43.62	47.25	45.33	44.78	44.97	45.29	45.02	45.24	44.68	45.40	43.80	44.10
2045	46.61	47.66	47.55	46.77	47.39	47.72	47.43	48.15	46.97	47.31	45.35	46.19
2046	48.22	49.04	48.87	48.41	48.63	48.96	48.70	48.98	48.18	49.10	47.40	47.16
2047	51.05	52.31	51.35	49.99	50.21	50.56	51.19	51.43	50.67	50.66	52.61	53.41

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

<b>TABLE 3b</b>												
<b>Avoided Costs</b>												
<b>Fixed Price Option for Solar QF</b>												
<b>Off-Peak Forecast (\$/MWH)</b>												
<b>Year</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
2022	0.00	0.00	0.00	0.00	30.84	32.88	49.95	73.65	71.62	60.40	59.38	75.69
2023	75.15	65.98	41.51	28.26	21.64	26.48	49.98	69.79	65.17	51.65	52.97	63.50
2024	68.91	59.61	43.65	30.04	21.15	23.12	55.61	77.67	72.53	49.14	50.41	60.39
2025	26.07	25.37	23.61	21.37	21.31	21.76	22.22	22.40	22.32	22.77	24.13	26.14
2026	27.30	26.62	25.16	22.59	22.59	23.02	23.42	23.54	23.54	23.90	25.20	27.14
2027	23.31	23.42	23.53	21.99	22.08	22.19	22.30	22.42	22.53	22.92	23.90	24.01
2028	22.29	22.40	21.71	20.20	20.30	20.40	20.50	20.60	20.70	20.85	22.01	22.11
2029	22.69	22.80	21.76	20.19	20.28	20.38	20.48	20.58	20.68	20.83	22.00	22.10
2030	23.44	23.57	22.27	20.88	20.98	21.10	21.21	21.30	21.41	21.52	22.80	22.91
2031	22.72	22.83	22.92	21.45	21.55	21.66	21.76	21.87	21.98	22.09	23.37	23.48
2032	24.11	24.23	24.28	22.77	22.88	22.99	23.10	23.22	23.33	23.45	24.79	24.91
2033	26.70	26.83	25.08	23.63	23.76	23.88	24.00	24.10	24.21	24.33	25.78	25.91
2034	26.73	26.86	25.92	24.43	24.55	24.69	24.79	24.94	25.06	25.16	26.72	26.83
2035	29.58	29.78	27.06	25.64	25.76	25.90	26.03	26.16	26.22	26.35	28.21	28.35
2036	29.93	30.59	28.21	26.86	26.55	26.75	27.14	27.01	26.58	26.72	26.13	26.33
2037	26.89	27.54	28.58	28.01	27.69	28.27	28.41	28.13	28.19	27.88	25.67	25.87
2038	27.47	28.14	30.30	29.40	29.54	29.77	30.37	30.07	29.62	30.24	28.38	28.59
2039	29.21	29.90	31.31	30.97	30.65	31.36	31.52	31.67	30.71	31.34	29.57	29.76
2040	31.64	32.32	33.25	33.28	33.45	33.21	33.38	34.03	33.04	33.21	28.15	28.38
2041	30.18	31.91	36.49	35.78	35.96	36.74	36.92	36.62	36.10	36.82	34.15	34.41
2042	36.39	37.18	39.29	38.77	38.97	38.74	39.53	39.73	39.10	38.79	36.46	37.24
2043	37.01	38.91	39.36	38.54	38.38	39.04	38.77	39.02	38.95	39.15	37.09	36.86
2044	38.02	41.65	39.73	39.17	39.37	39.68	39.42	39.63	39.07	39.79	38.20	38.49
2045	40.85	41.91	41.79	41.02	41.63	41.96	41.67	42.39	41.21	41.55	39.59	40.43
2046	42.36	43.19	43.01	42.56	42.77	43.11	42.85	43.12	42.32	43.24	41.54	41.31
2047	45.08	46.33	45.37	44.01	44.23	44.59	45.22	45.45	44.70	44.68	46.64	47.43

**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 27.00%. The capacity contribution for Solar QF resources (Tables 6a and 6b) is assumed to be 6.00%. 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
2022	0.00	0.00	0.00	0.00	41.43	50.86	101.57	172.92	110.74	70.99	69.97	92.39
2023	92.39	81.18	53.66	36.84	33.27	39.90	110.36	152.06	107.28	61.73	62.53	76.46
2024	73.79	66.95	48.06	35.24	31.01	39.99	94.75	130.38	92.12	55.75	56.46	68.96
2025	76.02	71.42	58.69	50.05	47.20	53.25	90.14	114.14	88.37	63.87	64.35	72.77
2026	77.58	72.88	59.89	51.08	48.17	54.34	91.99	116.48	90.18	65.18	65.67	74.26
2027	79.17	74.37	61.12	52.12	49.16	55.46	93.87	118.87	92.03	66.51	67.01	75.78
2028	80.65	75.77	62.28	53.12	50.10	56.52	95.61	121.05	93.73	67.77	68.28	77.20
2029	82.45	77.45	63.65	54.28	51.19	57.75	97.76	123.79	95.84	69.27	69.79	78.92
2030	84.14	79.04	64.96	55.39	52.24	58.94	99.76	126.32	97.80	70.69	71.22	80.53
2031	85.86	80.66	66.29	56.53	53.31	60.14	101.81	128.91	99.81	72.13	72.68	82.18
2032	87.27	81.97	67.35	57.42	54.14	61.10	103.50	131.08	101.46	73.30	73.85	83.53
2033	89.41	84.00	69.03	58.87	55.52	62.63	106.02	134.25	103.94	75.12	75.68	85.59
2034	91.35	85.82	70.54	60.18	56.76	64.02	108.29	137.10	106.17	76.76	77.34	87.44
2035	93.12	87.47	71.89	61.31	57.82	65.23	110.41	139.81	108.24	78.23	78.82	89.13
2036	94.75	89.01	73.14	62.38	58.82	66.36	112.35	142.26	110.14	79.60	80.20	90.69
2037	96.97	91.09	74.86	63.84	60.21	67.93	114.98	145.59	112.72	81.47	82.08	92.82
2038	98.96	92.96	76.40	65.15	61.44	69.32	117.33	148.57	115.03	83.14	83.76	94.72
2039	100.98	94.86	77.96	66.49	62.70	70.74	119.74	151.62	117.38	84.84	85.48	96.66
2040	102.87	96.64	79.44	67.76	63.91	72.09	121.95	154.40	119.56	86.44	87.09	98.47
2041	105.16	98.79	81.19	69.24	65.30	73.66	124.69	157.89	122.24	88.35	89.02	100.66
2042	107.32	100.81	82.85	70.66	66.63	75.17	127.25	161.13	124.75	90.16	90.84	102.72
2043	109.52	102.88	84.55	72.10	68.00	76.71	129.86	164.43	127.30	92.01	92.70	104.83
2044	111.44	104.68	86.03	73.36	69.18	78.05	132.14	167.32	129.54	93.62	94.32	106.67
2045	114.18	107.26	88.18	75.22	70.94	80.02	135.36	171.36	132.70	95.94	96.66	109.29
2046	116.39	109.33	89.85	76.63	72.26	81.53	138.00	174.74	135.29	97.78	98.52	111.40
2047	118.77	111.57	91.69	78.20	73.74	83.20	140.83	178.32	138.06	99.78	100.53	113.69



**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
2022	0.00	0.00	0.00	0.00	32.25	34.29	51.37	75.07	73.03	61.81	60.79	77.10
2023	76.59	67.42	42.96	29.70	23.08	27.92	51.42	71.23	66.61	53.09	54.41	64.94
2024	70.38	61.08	45.12	31.51	22.62	24.59	57.08	79.14	74.00	50.61	51.88	61.86
2025	47.41	41.15	30.39	21.23	15.24	16.56	38.45	53.32	49.85	34.10	34.95	41.67
2026	48.38	41.99	31.02	21.66	15.55	16.90	39.24	54.41	50.87	34.79	35.66	42.52
2027	49.37	42.85	31.65	22.11	15.87	17.25	40.04	55.52	51.91	35.51	36.39	43.39
2028	50.25	43.61	32.21	22.50	16.15	17.55	40.75	56.51	52.83	36.14	37.04	44.16
2029	51.42	44.63	32.96	23.02	16.53	17.96	41.70	57.82	54.06	36.98	37.90	45.19
2030	52.47	45.54	33.64	23.49	16.86	18.33	42.55	59.01	55.17	37.73	38.68	46.12
2031	53.55	46.47	34.33	23.97	17.21	18.71	43.42	60.22	56.30	38.51	39.47	47.06
2032	54.49	47.29	34.93	24.40	17.51	19.04	44.19	61.28	57.29	39.19	40.17	47.89
2033	55.76	48.40	35.75	24.97	17.92	19.48	45.22	62.71	58.63	40.10	41.10	49.01
2034	56.90	49.39	36.48	25.48	18.29	19.88	46.15	63.99	59.83	40.92	41.94	50.01
2035	58.07	50.40	37.23	26.00	18.66	20.29	47.09	65.30	61.06	41.76	42.80	51.04
2036	59.10	51.29	37.89	26.46	18.99	20.65	47.93	66.46	62.14	42.50	43.56	51.94
2037	60.47	52.49	38.77	27.08	19.44	21.13	49.04	68.01	63.58	43.49	44.58	53.15
2038	61.71	53.56	39.56	27.63	19.84	21.56	50.05	69.40	64.89	44.38	45.49	54.24
2039	62.98	54.66	40.37	28.20	20.24	22.00	51.07	70.82	66.21	45.29	46.42	55.35
2040	64.09	55.63	41.09	28.69	20.60	22.39	51.98	72.07	67.39	46.09	47.24	56.33
2041	65.58	56.92	42.04	29.36	21.08	22.91	53.19	73.75	68.96	47.16	48.34	57.64
2042	66.93	58.09	42.91	29.96	21.51	23.38	54.28	75.26	70.37	48.13	49.33	58.82
2043	68.30	59.28	43.78	30.58	21.95	23.86	55.39	76.81	71.81	49.12	50.34	60.03
2044	69.51	60.33	44.56	31.12	22.34	24.28	56.37	78.16	73.08	49.99	51.23	61.09
2045	71.13	61.73	45.60	31.84	22.86	24.85	57.68	79.98	74.78	51.15	52.43	62.51
2046	72.58	62.99	46.53	32.50	23.33	25.36	58.86	81.62	76.31	52.20	53.50	63.79
2047	74.07	64.28	47.48	33.16	23.81	25.88	60.07	83.30	77.88	53.27	54.60	65.10

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

<b>TABLE 5a</b>												
<b>Renewable Avoided Costs</b>												
<b>Renewable Fixed Price Option for Wind QF</b>												
<b>On-Peak Forecast (\$/MWH)</b>												
<b>Year</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
2022	0.00	0.00	0.00	0.00	41.09	50.52	101.23	172.59	110.40	70.65	69.63	92.06
2023	92.05	80.84	53.31	36.49	32.93	39.55	110.01	151.71	106.93	61.39	62.18	76.12
2024	73.44	66.60	47.71	34.89	30.66	39.64	94.40	130.03	91.77	55.40	56.11	68.61
2025	66.06	61.45	48.73	40.09	37.24	43.29	80.18	104.18	78.41	53.91	54.39	62.81
2026	67.41	62.71	49.73	40.91	38.00	44.18	81.82	106.31	80.01	55.01	55.50	64.09
2027	68.79	64.00	50.74	41.75	38.78	45.08	83.50	108.49	81.65	56.14	56.64	65.40
2028	70.06	65.18	51.69	42.53	39.51	45.93	85.02	110.46	83.15	57.18	57.69	66.61
2029	71.64	66.64	52.85	43.48	40.39	46.95	86.95	112.98	85.03	58.46	58.98	68.11
2030	73.11	68.01	53.93	44.37	41.21	47.91	88.74	115.30	86.77	59.66	60.19	69.51
2031	74.61	69.40	55.03	45.28	42.06	48.89	90.55	117.66	88.55	60.88	61.42	70.93
2032	75.86	70.56	55.94	46.01	42.73	49.68	92.08	119.67	90.05	61.89	62.44	72.12
2033	77.70	72.28	57.31	47.15	43.80	50.91	94.30	122.53	92.22	63.40	63.97	73.87
2034	79.35	73.82	58.55	48.18	44.76	52.02	96.30	125.10	94.17	64.76	65.34	75.45
2035	80.91	75.27	59.68	49.10	45.61	53.02	98.20	127.60	96.03	66.02	66.61	76.93
2036	82.33	76.59	60.73	49.96	46.41	53.95	99.93	129.85	97.72	67.18	67.78	78.28
2037	84.26	78.38	62.15	51.13	47.50	55.22	102.27	132.88	100.01	68.76	69.37	80.11
2038	85.99	79.99	63.43	52.18	48.47	56.35	104.36	135.60	102.06	70.17	70.79	81.75
2039	87.75	81.63	64.73	53.25	49.47	57.50	106.50	138.38	104.15	71.60	72.24	83.43
2040	89.36	83.13	65.93	54.25	50.40	58.58	108.45	140.89	106.05	72.93	73.58	84.96
2041	91.38	85.01	67.40	55.45	51.51	59.88	110.91	144.11	108.46	74.57	75.23	86.88
2042	93.25	86.75	68.79	56.59	52.57	61.11	113.18	147.06	110.68	76.09	76.77	88.66
2043	95.16	88.53	70.20	57.75	53.65	62.36	115.50	150.08	112.95	77.65	78.35	90.47
2044	96.84	90.08	71.42	58.76	54.58	63.45	117.53	152.72	114.94	79.02	79.72	92.06
2045	99.18	92.27	73.18	60.22	55.95	65.02	120.36	156.37	117.71	80.95	81.67	94.30
2046	101.13	94.08	74.60	61.37	57.01	66.27	122.75	159.49	120.04	82.52	83.26	96.15
2047	103.20	96.01	76.13	62.63	58.18	67.63	125.26	162.76	122.49	84.22	84.97	98.12

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

<b>TABLE 5b</b>												
<b>Renewable Avoided Costs</b>												
<b>Renewable Fixed Price Option for Wind QF</b>												
<b>Off-Peak Forecast (\$/MWH)</b>												
<b>Year</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
2022	0.00	0.00	0.00	0.00	31.91	33.95	51.03	74.73	72.69	61.47	60.46	76.77
2023	76.25	67.07	42.61	29.36	22.73	27.57	51.07	70.89	66.27	52.74	54.07	64.60
2024	70.03	60.73	44.77	31.16	22.27	24.24	56.72	78.79	73.64	50.26	51.52	61.50
2025	47.05	40.79	30.03	20.87	14.88	16.20	38.09	52.96	49.49	33.74	34.59	41.31
2026	48.01	41.62	30.65	21.29	15.18	16.54	38.87	54.04	50.50	34.43	35.30	42.16
2027	49.00	42.48	31.28	21.73	15.49	16.87	39.67	55.15	51.54	35.13	36.02	43.02
2028	49.86	43.23	31.83	22.11	15.77	17.17	40.37	56.12	52.45	35.75	36.66	43.78
2029	51.03	44.23	32.57	22.63	16.14	17.57	41.31	57.43	53.67	36.59	37.51	44.80
2030	52.07	45.14	33.24	23.09	16.47	17.93	42.15	58.61	54.77	37.34	38.28	45.72
2031	53.14	46.07	33.92	23.57	16.80	18.30	43.02	59.81	55.89	38.10	39.06	46.66
2032	54.08	46.88	34.52	23.98	17.10	18.62	43.78	60.87	56.88	38.77	39.75	47.48
2033	55.34	47.97	35.32	24.54	17.50	19.06	44.80	62.28	58.21	39.68	40.68	48.59
2034	56.47	48.96	36.05	25.04	17.86	19.45	45.72	63.56	59.40	40.49	41.51	49.58
2035	57.63	49.96	36.79	25.56	18.22	19.85	46.65	64.86	60.61	41.32	42.36	50.60
2036	58.65	50.84	37.44	26.01	18.54	20.20	47.48	66.01	61.69	42.05	43.11	51.49
2037	60.01	52.03	38.31	26.62	18.98	20.67	48.58	67.55	63.12	43.03	44.12	52.69
2038	61.24	53.09	39.09	27.16	19.37	21.09	49.58	68.93	64.42	43.91	45.02	53.77
2039	62.50	54.18	39.89	27.72	19.76	21.52	50.59	70.34	65.74	44.81	45.94	54.87
2040	63.60	55.14	40.60	28.21	20.11	21.90	51.49	71.59	66.90	45.60	46.75	55.84
2041	65.09	56.42	41.55	28.86	20.58	22.41	52.69	73.25	68.46	46.67	47.84	57.14
2042	66.42	57.58	42.40	29.46	21.00	22.87	53.77	74.76	69.86	47.62	48.82	58.31
2043	67.78	58.76	43.27	30.06	21.43	23.34	54.87	76.29	71.29	48.60	49.82	59.51
2044	68.98	59.80	44.03	30.59	21.81	23.75	55.84	77.64	72.55	49.46	50.71	60.56
2045	70.59	61.19	45.06	31.30	22.32	24.31	57.14	79.44	74.24	50.61	51.89	61.97
2046	72.03	62.44	45.98	31.95	22.78	24.81	58.31	81.07	75.76	51.65	52.95	63.24
2047	73.51	63.72	46.92	32.60	23.24	25.32	59.51	82.73	77.32	52.70	54.03	64.54

**SCHEDULE 201 (Continued)**

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

<b>TABLE 6a</b>												
<b>Renewable Avoided Costs</b>												
<b>Renewable Fixed Price Option for Solar QF</b>												
<b>On-Peak Forecast (\$/MWH)</b>												
<b>Year</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
2022	0.00	0.00	0.00	0.00	40.01	49.44	100.16	171.51	109.33	69.58	68.56	90.98
2023	90.95	79.74	52.22	35.40	31.83	38.46	108.92	150.62	105.84	60.29	61.09	75.02
2024	72.32	65.48	46.59	33.77	29.54	38.52	93.28	128.91	90.65	54.28	54.99	67.49
2025	52.04	47.43	34.70	26.07	23.22	29.27	66.16	90.16	64.38	39.88	40.36	48.78
2026	53.10	48.40	35.42	26.60	23.69	29.87	67.51	92.00	65.70	40.70	41.19	49.78
2027	54.19	49.39	36.14	27.14	24.18	30.48	68.89	93.89	67.05	41.53	42.03	50.80
2028	55.16	50.27	36.79	27.63	24.61	31.02	70.12	95.56	68.24	42.27	42.78	51.71
2029	56.43	51.44	37.64	28.27	25.18	31.74	71.75	97.77	69.82	43.25	43.77	52.90
2030	57.59	52.49	38.41	28.85	25.69	32.39	73.22	99.78	71.25	44.14	44.67	53.99
2031	58.77	53.57	39.19	29.44	26.22	33.05	74.72	101.82	72.71	45.04	45.59	55.09
2032	59.79	54.49	39.87	29.94	26.66	33.62	76.02	103.60	73.98	45.82	46.37	56.05
2033	61.20	55.78	40.82	30.66	27.30	34.42	77.81	106.04	75.72	46.91	47.47	57.37
2034	62.47	56.94	41.67	31.30	27.88	35.14	79.42	108.22	77.29	47.88	48.46	58.56
2035	63.74	58.09	42.51	31.93	28.44	35.85	81.03	110.42	78.86	48.85	49.44	59.75
2036	64.86	59.11	43.25	32.48	28.93	36.47	82.46	112.37	80.25	49.71	50.30	60.80
2037	66.37	60.50	44.27	33.25	29.61	37.33	84.38	115.00	82.12	50.87	51.48	62.22
2038	67.73	61.74	45.17	33.93	30.22	38.09	86.11	117.35	83.81	51.91	52.54	63.50
2039	69.12	63.00	46.10	34.62	30.84	38.87	87.88	119.76	85.52	52.98	53.61	64.80
2040	70.35	64.12	46.92	35.24	31.39	39.57	89.44	121.88	87.04	53.92	54.57	65.95
2041	71.98	65.61	48.01	36.06	32.11	40.48	91.51	124.71	89.06	55.17	55.83	67.48
2042	73.46	66.95	48.99	36.80	32.77	41.31	93.39	127.27	90.89	56.30	56.98	68.86
2043	74.96	68.32	49.99	37.55	33.44	42.16	95.30	129.87	92.75	57.45	58.14	70.27
2044	76.28	69.52	50.87	38.20	34.03	42.90	96.98	132.16	94.38	58.46	59.17	71.51
2045	78.08	71.17	52.08	39.12	34.85	43.92	99.26	135.27	96.61	59.85	60.57	73.20
2046	79.66	72.61	53.13	39.90	35.54	44.80	101.28	138.02	98.57	61.06	61.79	74.68
2047	81.30	74.10	54.22	40.72	36.27	45.72	103.35	140.85	100.59	62.31	63.06	76.21

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

<b>TABLE 6b</b>												
<b>Renewable Avoided Costs</b>												
<b>Renewable Fixed Price Option for Solar QF</b>												
<b>Off-Peak Forecast (\$/MWH)</b>												
<b>Year</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
2022	0.00	0.00	0.00	0.00	30.84	32.88	49.95	73.65	71.62	60.40	59.38	75.69
2023	75.15	65.98	41.51	28.26	21.64	26.48	49.98	69.79	65.17	51.65	52.97	63.50
2024	68.91	59.61	43.65	30.04	21.15	23.12	55.61	77.67	72.53	49.14	50.41	60.39
2025	45.91	39.65	28.89	19.73	13.74	15.06	36.95	51.82	48.35	32.60	33.45	40.17
2026	46.85	40.46	29.49	20.13	14.02	15.37	37.71	52.88	49.34	33.26	34.13	40.99
2027	47.81	41.29	30.09	20.54	14.31	15.69	38.48	53.96	50.35	33.94	34.83	41.83
2028	48.65	42.02	30.62	20.90	14.56	15.96	39.16	54.91	51.24	34.54	35.44	42.57
2029	49.79	43.00	31.34	21.39	14.90	16.34	40.07	56.19	52.43	35.35	36.27	43.56
2030	50.81	43.88	31.98	21.83	15.20	16.67	40.89	57.35	53.51	36.07	37.02	44.46
2031	51.85	44.78	32.63	22.28	15.52	17.01	41.73	58.52	54.60	36.81	37.77	45.37
2032	52.76	45.57	33.21	22.67	15.79	17.31	42.46	59.55	55.57	37.46	38.44	46.17
2033	54.00	46.63	33.98	23.20	16.16	17.72	43.46	60.94	56.86	38.34	39.34	47.25
2034	55.10	47.59	34.68	23.68	16.49	18.08	44.35	62.19	58.03	39.12	40.14	48.21
2035	56.23	48.56	35.39	24.16	16.83	18.45	45.26	63.47	59.22	39.92	40.97	49.20
2036	57.22	49.42	36.01	24.58	17.12	18.77	46.05	64.58	60.26	40.63	41.69	50.07
2037	58.56	50.57	36.86	25.16	17.52	19.21	47.13	66.09	61.67	41.58	42.66	51.24
2038	59.76	51.61	37.61	25.68	17.88	19.61	48.10	67.45	62.93	42.43	43.54	52.29
2039	60.98	52.67	38.38	26.20	18.25	20.01	49.08	68.83	64.22	43.30	44.43	53.36
2040	62.06	53.59	39.05	26.66	18.57	20.36	49.94	70.04	65.35	44.06	45.21	54.30
2041	63.51	54.85	39.97	27.29	19.00	20.84	51.11	71.68	66.88	45.09	46.27	55.57
2042	64.81	55.97	40.79	27.85	19.39	21.26	52.16	73.15	68.25	46.01	47.22	56.71
2043	66.14	57.12	41.62	28.42	19.79	21.70	53.23	74.64	69.65	46.96	48.18	57.87
2044	67.30	58.12	42.35	28.91	20.14	22.08	54.16	75.96	70.88	47.78	49.03	58.89
2045	68.87	59.48	43.35	29.59	20.61	22.60	55.43	77.73	72.53	48.90	50.18	60.26
2046	70.29	60.70	44.23	30.20	21.03	23.06	56.57	79.33	74.02	49.90	51.20	61.50
2047	71.73	61.94	45.14	30.82	21.46	23.53	57.73	80.95	75.53	50.92	52.25	62.76

## SCHEDULE 201 (Continued)

## WIND INTEGRATION

TABLE 7		
Integration Costs		
Year	Wind	Solar
2022	0.34	1.41
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

**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 \(bilateral\)](https://www.theice.com/products/OTC/Physical-Energy/Electricity) 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 (CO<sub>2</sub>), methane (CH<sub>4</sub>), 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

Supplemental Application to Update Schedule 201  
Avoided Cost Power Purchase Information

Attachment A  
Description of Standard Avoided Costs

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

PORTLAND GENERAL ELECTRIC COMPANY  
SUPPLEMENTAL 2022 ANNUAL UPDATE  
STANDARD AVOIDED COST STUDY

Introduction

Consistent with Commission Order No. 14-058,<sup>1</sup> 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.

While only the first two factors listed above apply in this 2022 Standard Avoided Cost update, PGE is also seeking a waiver to update the Effective Load Carrying Capability (ELCC) based on updated Qualifying Facilities (QF) Forecast and Solar Generation Profiles.

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, 2022 for May 2022 through December 2026. For 2027-2050, prices are based on the same methodology as the acknowledged 2019 IRP Update with the most recent long-term forecast from Wood Mackenzie (2021 H1). The 2027 prices are based on a linear interpolation from PGE's curves to the long-term forecast. For 2028 through 2050, prices align with the AECO prices from the 2021 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 \$3.58/MMBtu in 2023 to \$5.85/MMBtu in 2046.

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 \$0.10/MMBtu in 2023 to \$0.16/MMBtu in 2046.

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

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<sup>1</sup> *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).

forward trading curves adjusted for delivery are used to price avoided costs during the resource sufficiency period. For May 2022 through December 2024, the market prices are based on PGE's forward Mid-Columbia trading curve from March 31, 2022.

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

#### Additional Updates

- **Updated QF Forecast.** PGE's current avoided cost prices assume that all QFs that have executed contracts will come online. In this filing, PGE updated its portfolio based on the assumption that 100% of the QFs under Schedule 202 that have executed contracts but have not yet achieved commercial operation will come online, and that 50% of the QFs under Schedule 201 that have executed contracts but have not yet achieved commercial operation will come online.

PGE's approach is fair and reasonable for the following reasons:

1. PGE has executed just eight (8) Schedule 202 contracts, of which one is operational, four are currently under contract but have not yet achieved commercial operation, two were converted to a bilateral contract, and one was terminated by the Seller. Given the limited history for QFs of this size, the sophistication of the developers of these projects, and the significant size of these projects (in aggregate all eight projects are 419MWs), it is reasonable for PGE to assume that the four Schedule 202 QFs currently under contract will achieve commercial operation.
2. The 50% assumed success rate for Schedule 201 projects is based on actual experience for all of PGE's executed Schedule 201 QF contracts to date, consistent with the data PGE presented at the IRP Roundtable.
3. PGE did not include any assumed renewal rate at this time given its limited historical experience, because PGE does not expect a meaningful amount of renewals to occur prior to 2030 (just 6MW currently under contract with PGE are up for renewal between now and 2030).

The new forecast assumption described above resulted in a reduction of approximately 44MW from the QF portfolio, of which 37MW was attributable to the solar portfolio.

- **Updated Solar Generation Profiles.** PGE's current avoided cost prices are based on only one solar generation profile for a proxy resource located in Christmas Valley. Based on feedback received during PGE's 2021 avoided cost update, PGE updated its solar generation profiles used to calculate ELCC values to use three proxy resources, which includes two east-side resources (Christmas Valley and Wasco) and one west-side resource (McMinnville). PGE presented

detailed information related to these proxy resources at its March 14, 2022 IRP Roundtable.

To incorporate three proxy resources for the purpose of determining a single solar capacity contribution (ELCC), PGE determined it was most reasonable to calculate a weighted average capacity contribution on an hour-by-hour basis based on the location of PGE’s solar QF resources currently online, plus the solar QF resources that have executed contracts but are not online (in proportions consistent with the new forecast assumption above). This resulted in an approximate weighting of 76.6% to the two east-side resources (split 50/50 between the two locations), and 23.4% to the west-side resource. As an example, for a single hour, the actual capacity factor used in that hour would be calculated as follows:

	<b>Christmas Valley</b>	<b>McMinnville</b>	<b>Wasco</b>
	<b>East Side</b>	<b>West Side</b>	<b>East Side</b>
Weighting	38.3%	23.4%	38.3% <b>A</b>
Capacity Factor	0.27	0.26	0.3 <b>B</b>
Weighted Capacity Factor	10.3%	6.1%	11.5% <b>C = A*B</b>
			Total Capacity Factor:
			27.9% <b>Sum of C</b>

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 from 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 3b<sup>2</sup> are estimates of monthly on- and off-peak avoided costs for energy and capacity over 20 years beginning in May 2022. The pricing is comprised of the energy plus the capacity costs (discussed below).<sup>3</sup>

<sup>4</sup> Table 1: Base Load QF; Table 2: Wind QF; Table 3: Solar QF.

<sup>3</sup> Avoided Cost Components section.



The sufficiency period prices (expressed in \$/MWh or mills/kWh) for the years 2022 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.<sup>4</sup> Table 4 provides integration costs avoided. Tables 4 and 5 show the projected on- and off-peak resource sufficiency period forward market prices.

#### 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.

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<sup>4</sup> Schedule 201, Sheet 201-3.

## **Standard Energy Tables**

PGE's Supplemental 2022 Standard AVOIDED COST ANNUAL UPDATE  
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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
2022	0.00	0.00	0.00	0.00	41.43	50.86	101.57	172.92	110.74	70.99	69.97	92.39	
2023	92.39	81.18	53.66	36.84	33.27	39.90	110.36	152.06	107.28	61.73	62.53	76.46	75.77
2024	73.79	66.95	48.06	35.24	31.01	39.99	94.75	130.38	92.12	55.75	56.46	68.96	66.30
2025	27.57	26.87	25.11	22.87	22.81	23.26	23.72	23.90	23.82	24.27	25.63	27.64	24.78
2026	28.83	28.15	26.69	24.12	24.12	24.55	24.96	25.07	25.07	25.43	26.73	28.67	26.03
2027	24.87	24.99	25.09	23.55	23.65	23.76	23.87	23.98	24.09	24.48	25.46	25.57	24.45
2028	23.89	24.00	23.30	21.80	21.89	21.99	22.09	22.19	22.29	22.44	23.60	23.71	22.76
2029	24.32	24.43	23.39	21.81	21.91	22.01	22.10	22.20	22.30	22.46	23.62	23.73	22.85
2030	25.10	25.23	23.93	22.54	22.64	22.76	22.87	22.96	23.07	23.18	24.46	24.57	23.60
2031	24.42	24.53	24.61	23.14	23.25	23.35	23.46	23.56	23.67	23.78	25.07	25.18	24.00
2032	25.84	25.95	26.01	24.50	24.61	24.72	24.83	24.95	25.06	25.18	26.52	26.64	25.40
2033	28.46	28.59	26.84	25.39	25.52	25.65	25.76	25.86	25.98	26.10	27.54	27.68	26.60
2034	28.53	28.66	27.72	26.23	26.35	26.49	26.60	26.74	26.86	26.96	28.52	28.63	27.35
2035	31.42	31.62	28.90	27.48	27.60	27.74	27.86	27.99	28.06	28.19	30.05	30.19	28.90
2036	31.81	32.47	30.08	28.74	28.43	28.62	29.02	28.89	28.46	28.59	28.00	28.21	29.27
2037	28.80	29.45	30.49	29.92	29.61	30.19	30.32	30.04	30.11	29.80	27.58	27.78	29.51
2038	29.42	30.09	32.25	31.35	31.50	31.72	32.33	32.02	31.58	32.19	30.33	30.54	31.29
2039	31.20	31.89	33.31	32.97	32.64	33.35	33.51	33.66	32.70	33.33	31.56	31.75	32.66
2040	33.67	34.35	35.28	35.32	35.48	35.25	35.41	36.06	35.08	35.25	30.19	30.41	34.32
2041	32.25	33.98	38.57	37.85	38.03	38.81	39.00	38.70	38.17	38.90	36.22	36.48	37.26
2042	38.51	39.30	41.40	40.89	41.08	40.86	41.65	41.85	41.22	40.91	38.58	39.36	40.48
2043	39.17	41.07	41.52	40.70	40.54	41.20	40.93	41.18	41.11	41.31	39.25	39.02	40.58
2044	40.22	43.85	41.93	41.38	41.57	41.88	41.62	41.84	41.28	42.00	40.40	40.69	41.55
2045	43.10	44.16	44.04	43.27	43.88	44.21	43.92	44.64	43.46	43.81	41.84	42.68	43.59
2046	44.66	45.48	45.31	44.85	45.07	45.40	45.14	45.42	44.62	45.54	43.84	43.60	44.91
2047	47.42	48.68	47.71	46.35	46.58	46.93	47.56	47.80	47.04	47.03	48.98	49.77	47.65

  

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
2022	0.00	0.00	0.00	0.00	32.25	34.29	51.37	75.07	73.03	61.81	60.79	77.10	
2023	76.59	67.42	42.96	29.70	23.08	27.92	51.42	71.23	66.61	53.09	54.41	64.94	52.48
2024	70.38	61.08	45.12	31.51	22.62	24.59	57.08	79.14	74.00	50.61	51.88	61.86	52.49
2025	27.57	26.87	25.11	22.87	22.81	23.26	23.72	23.90	23.82	24.27	25.63	27.64	24.78
2026	28.83	28.15	26.69	24.12	24.12	24.55	24.96	25.07	25.07	25.43	26.73	28.67	26.03
2027	24.87	24.99	25.09	23.55	23.65	23.76	23.87	23.98	24.09	24.48	25.46	25.57	24.45
2028	23.89	24.00	23.30	21.80	21.89	21.99	22.09	22.19	22.29	22.44	23.60	23.71	22.76
2029	24.32	24.43	23.39	21.81	21.91	22.01	22.10	22.20	22.30	22.46	23.62	23.73	22.85
2030	25.10	25.23	23.93	22.54	22.64	22.76	22.87	22.96	23.07	23.18	24.46	24.57	23.60
2031	24.42	24.53	24.61	23.14	23.25	23.35	23.46	23.56	23.67	23.78	25.07	25.18	24.00
2032	25.84	25.95	26.01	24.50	24.61	24.72	24.83	24.95	25.06	25.18	26.52	26.64	25.40
2033	28.46	28.59	26.84	25.39	25.52	25.65	25.76	25.86	25.98	26.10	27.54	27.68	26.60
2034	28.53	28.66	27.72	26.23	26.35	26.49	26.60	26.74	26.86	26.96	28.52	28.63	27.35
2035	31.42	31.62	28.90	27.48	27.60	27.74	27.86	27.99	28.06	28.19	30.05	30.19	28.90
2036	31.81	32.47	30.08	28.74	28.43	28.62	29.02	28.89	28.46	28.59	28.00	28.21	29.27
2037	28.80	29.45	30.49	29.92	29.61	30.19	30.32	30.04	30.11	29.80	27.58	27.78	29.51
2038	29.42	30.09	32.25	31.35	31.50	31.72	32.33	32.02	31.58	32.19	30.33	30.54	31.29
2039	31.20	31.89	33.31	32.97	32.64	33.35	33.51	33.66	32.70	33.33	31.56	31.75	32.66
2040	33.67	34.35	35.28	35.32	35.48	35.25	35.41	36.06	35.08	35.25	30.19	30.41	34.32
2041	32.25	33.98	38.57	37.85	38.03	38.81	39.00	38.70	38.17	38.90	36.22	36.48	37.26
2042	38.51	39.30	41.40	40.89	41.08	40.86	41.65	41.85	41.22	40.91	38.58	39.36	40.48
2043	39.17	41.07	41.52	40.70	40.54	41.20	40.93	41.18	41.11	41.31	39.25	39.02	40.58
2044	40.22	43.85	41.93	41.38	41.57	41.88	41.62	41.84	41.28	42.00	40.40	40.69	41.55
2045	43.10	44.16	44.04	43.27	43.88	44.21	43.92	44.64	43.46	43.81	41.84	42.68	43.58
2046	44.66	45.48	45.31	44.85	45.07	45.40	45.14	45.42	44.62	45.54	43.84	43.60	44.90
2047	47.42	48.68	47.71	46.35	46.58	46.93	47.56	47.80	47.04	47.03	48.98	49.77	47.65

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Portland General Electric													
Avoided Cost Study													
On-Peak Energy, Wind													
Table S.2a												Nominal \$/MWh	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2022	0.00	0.00	0.00	0.00	41.09	50.52	101.23	172.59	110.40	70.65	69.63	92.06	
2023	92.05	80.84	53.31	36.49	32.93	39.55	110.01	151.71	106.93	61.39	62.18	76.12	75.42
2024	73.44	66.60	47.71	34.89	30.66	39.64	94.40	130.03	91.77	55.40	56.11	68.61	65.94
2025	27.21	26.51	24.75	22.51	22.45	22.90	23.36	23.54	23.46	23.91	25.27	27.28	24.42
2026	28.47	27.79	26.33	23.76	23.76	24.19	24.59	24.70	24.70	25.06	26.36	28.30	25.66
2027	24.50	24.61	24.71	23.17	23.27	23.38	23.49	23.60	23.72	24.10	25.08	25.20	24.07
2028	23.50	23.61	22.92	21.41	21.51	21.61	21.71	21.81	21.91	22.06	23.22	23.33	22.38
2029	23.93	24.04	23.00	21.42	21.52	21.61	21.71	21.81	21.91	22.07	23.23	23.34	22.46
2030	24.70	24.83	23.53	22.15	22.25	22.36	22.47	22.56	22.67	22.78	24.06	24.17	23.20
2031	24.01	24.12	24.21	22.74	22.84	22.95	23.05	23.16	23.27	23.37	24.66	24.77	23.59
2032	25.42	25.54	25.59	24.08	24.19	24.30	24.42	24.53	24.65	24.76	26.11	26.22	24.99
2033	28.04	28.17	26.42	24.97	25.10	25.22	25.34	25.44	25.55	25.67	27.12	27.25	26.18
2034	28.10	28.23	27.29	25.80	25.92	26.06	26.16	26.31	26.42	26.53	28.09	28.19	26.92
2035	30.98	31.18	28.46	27.03	27.16	27.30	27.42	27.55	27.62	27.75	29.61	29.75	28.47
2036	31.36	32.02	29.63	28.29	27.98	28.17	28.57	28.44	28.01	28.14	27.55	27.76	28.82
2037	28.34	29.00	30.04	29.46	29.15	29.73	29.86	29.58	29.65	29.34	27.12	27.32	29.05
2038	28.95	29.63	31.78	30.88	31.03	31.25	31.86	31.55	31.11	31.73	29.86	30.07	30.82
2039	30.72	31.42	32.83	32.49	32.17	32.88	33.03	33.19	32.23	32.85	31.08	31.27	32.19
2040	33.19	33.86	34.80	34.83	34.99	34.76	34.92	35.58	34.59	34.76	29.70	29.92	33.83
2041	31.76	33.48	38.07	37.36	37.54	38.31	38.50	38.20	37.68	38.40	35.73	35.99	36.77
2042	38.00	38.79	40.89	40.38	40.58	40.35	41.14	41.34	40.71	40.40	38.07	38.85	39.97
2043	38.65	40.55	41.00	40.19	40.02	40.68	40.41	40.66	40.59	40.79	38.73	38.50	40.06
2044	39.69	43.33	41.40	40.85	41.04	41.36	41.09	41.31	40.75	41.47	39.87	40.17	41.02
2045	42.56	43.62	43.50	42.73	43.34	43.67	43.38	44.10	42.92	43.26	41.30	42.14	43.05
2046	44.11	44.93	44.76	44.30	44.52	44.85	44.59	44.87	44.07	44.99	43.28	43.05	44.36
2047	46.86	48.11	47.15	45.79	46.01	46.37	47.00	47.24	46.48	46.46	48.42	49.21	47.08

Portland General Electric													
Avoided Cost Study													
Off-Peak Energy, Wind													
Table S.2b												Nominal \$/MWh	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2022	0.00	0.00	0.00	0.00	31.91	33.95	51.03	74.73	72.69	61.47	60.46	76.77	
2023	76.25	67.07	42.61	29.36	22.73	27.57	51.07	70.89	66.27	52.74	54.07	64.60	52.13
2024	70.03	60.73	44.77	31.16	22.27	24.24	56.72	78.79	73.64	50.26	51.52	61.50	52.14
2025	27.21	26.51	24.75	22.51	22.45	22.90	23.36	23.54	23.46	23.91	25.27	27.28	24.42
2026	28.47	27.79	26.33	23.76	23.76	24.19	24.59	24.70	24.70	25.06	26.36	28.30	25.66
2027	24.50	24.61	24.71	23.17	23.27	23.38	23.49	23.60	23.72	24.10	25.08	25.20	24.07
2028	23.50	23.61	22.92	21.41	21.51	21.61	21.71	21.81	21.91	22.06	23.22	23.33	22.38
2029	23.93	24.04	23.00	21.42	21.52	21.61	21.71	21.81	21.91	22.07	23.23	23.34	22.46
2030	24.70	24.83	23.53	22.15	22.25	22.36	22.47	22.56	22.67	22.78	24.06	24.17	23.20
2031	24.01	24.12	24.21	22.74	22.84	22.95	23.05	23.16	23.27	23.37	24.66	24.77	23.60
2032	25.42	25.54	25.59	24.08	24.19	24.30	24.42	24.53	24.65	24.76	26.11	26.22	24.98
2033	28.04	28.17	26.42	24.97	25.10	25.22	25.34	25.44	25.55	25.67	27.12	27.25	26.18
2034	28.10	28.23	27.29	25.80	25.92	26.06	26.16	26.31	26.42	26.53	28.09	28.19	26.92
2035	30.98	31.18	28.46	27.03	27.16	27.30	27.42	27.55	27.62	27.75	29.61	29.75	28.46
2036	31.36	32.02	29.63	28.29	27.98	28.17	28.57	28.44	28.01	28.14	27.55	27.76	28.81
2037	28.34	29.00	30.04	29.46	29.15	29.73	29.86	29.58	29.65	29.34	27.12	27.32	29.05
2038	28.95	29.63	31.78	30.88	31.03	31.25	31.86	31.55	31.11	31.73	29.86	30.07	30.81
2039	30.72	31.42	32.83	32.49	32.17	32.88	33.03	33.19	32.23	32.85	31.08	31.27	32.18
2040	33.19	33.86	34.80	34.83	34.99	34.76	34.92	35.58	34.59	34.76	29.70	29.92	33.82
2041	31.76	33.48	38.07	37.36	37.54	38.31	38.50	38.20	37.68	38.40	35.73	35.99	36.78
2042	38.00	38.79	40.89	40.38	40.58	40.35	41.14	41.34	40.71	40.40	38.07	38.85	39.97
2043	38.65	40.55	41.00	40.19	40.02	40.68	40.41	40.66	40.59	40.79	38.73	38.50	40.06
2044	39.69	43.33	41.40	40.85	41.04	41.36	41.09	41.31	40.75	41.47	39.87	40.17	41.02
2045	42.56	43.62	43.50	42.73	43.34	43.67	43.38	44.10	42.92	43.26	41.30	42.14	43.04
2046	44.11	44.93	44.76	44.30	44.52	44.85	44.59	44.87	44.07	44.99	43.28	43.05	44.35
2047	46.86	48.11	47.15	45.79	46.01	46.37	47.00	47.24	46.48	46.46	48.42	49.21	47.09

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Portland General Electric Avoided Cost Study On-Peak Energy, Solar													Nominal \$/MWh	
Table S.3a	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2022	0.00	0.00	0.00	0.00	40.01	49.44	100.16	171.51	109.33	69.58	68.56	90.98		
2023	90.95	79.74	52.22	35.40	31.83	38.46	108.92	150.62	105.84	60.29	61.09	75.02		74.33
2024	72.32	65.48	46.59	33.77	29.54	38.52	93.28	128.91	90.65	54.28	54.99	67.49		64.83
2025	26.07	25.37	23.61	21.37	21.31	21.76	22.22	22.40	22.32	22.77	24.13	26.14		23.28
2026	27.30	26.62	25.16	22.59	22.59	23.02	23.42	23.54	23.54	23.90	25.20	27.14		24.50
2027	23.31	23.42	23.53	21.99	22.08	22.19	22.30	22.42	22.53	22.92	23.90	24.01		22.88
2028	22.29	22.40	21.71	20.20	20.30	20.40	20.50	20.60	20.70	20.85	22.01	22.11		21.17
2029	22.69	22.80	21.76	20.19	20.28	20.38	20.48	20.58	20.68	20.83	22.00	22.10		21.22
2030	23.44	23.57	22.27	20.88	20.98	21.10	21.21	21.30	21.41	21.52	22.80	22.91		21.94
2031	22.72	22.83	22.92	21.45	21.55	21.66	21.76	21.87	21.98	22.09	23.37	23.48		22.30
2032	24.11	24.23	24.28	22.77	22.88	22.99	23.10	23.22	23.33	23.45	24.79	24.91		23.67
2033	26.70	26.83	25.08	23.63	23.76	23.88	24.00	24.10	24.21	24.33	25.78	25.91		24.84
2034	26.73	26.86	25.92	24.43	24.55	24.69	24.79	24.94	25.06	25.16	26.72	26.83		25.55
2035	29.58	29.78	27.06	25.64	25.76	25.90	26.03	26.16	26.22	26.35	28.21	28.35		27.08
2036	29.93	30.59	28.21	26.86	26.55	26.75	27.14	27.01	26.58	26.72	26.13	26.33		27.40
2037	26.89	27.54	28.58	28.01	27.69	28.27	28.41	28.13	28.19	27.88	25.67	25.87		27.60
2038	27.47	28.14	30.30	29.40	29.54	29.77	30.37	30.07	29.62	30.24	28.38	28.59		29.33
2039	29.21	29.90	31.31	30.97	30.65	31.36	31.52	31.67	30.71	31.34	29.57	29.76		30.67
2040	31.64	32.32	33.25	33.28	33.45	33.21	33.38	34.03	33.04	33.21	28.15	28.38		32.29
2041	30.18	31.91	36.49	35.78	35.96	36.74	36.92	36.62	36.10	36.82	34.15	34.41		35.19
2042	36.39	37.18	39.29	38.77	38.97	38.74	39.53	39.73	39.10	38.79	36.46	37.24		38.36
2043	37.01	38.91	39.36	38.54	38.38	39.04	38.77	39.02	38.95	39.15	37.09	36.86		38.42
2044	38.02	41.65	39.73	39.17	39.37	39.68	39.42	39.63	39.07	39.79	38.20	38.49		39.34
2045	40.85	41.91	41.79	41.02	41.63	41.96	41.67	42.39	41.21	41.55	39.59	40.43		41.34
2046	42.36	43.19	43.01	42.56	42.77	43.11	42.85	43.12	42.32	43.24	41.54	41.31		42.62
2047	45.08	46.33	45.37	44.01	44.23	44.59	45.22	45.45	44.70	44.68	46.64	47.43		45.30

  

Portland General Electric Avoided Cost Study Off-Peak Energy, Solar													Nominal \$/MWh	
Table S.3b	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2022	0.00	0.00	0.00	0.00	30.84	32.88	49.95	73.65	71.62	60.40	59.38	75.69		
2023	75.15	65.98	41.51	28.26	21.64	26.48	49.98	69.79	65.17	51.65	52.97	63.50		51.04
2024	68.91	59.61	43.65	30.04	21.15	23.12	55.61	77.67	72.53	49.14	50.41	60.39		51.02
2025	26.07	25.37	23.61	21.37	21.31	21.76	22.22	22.40	22.32	22.77	24.13	26.14		23.28
2026	27.30	26.62	25.16	22.59	22.59	23.02	23.42	23.54	23.54	23.90	25.20	27.14		24.49
2027	23.31	23.42	23.53	21.99	22.08	22.19	22.30	22.42	22.53	22.92	23.90	24.01		22.88
2028	22.29	22.40	21.71	20.20	20.30	20.40	20.50	20.60	20.70	20.85	22.01	22.11		21.17
2029	22.69	22.80	21.76	20.19	20.28	20.38	20.48	20.58	20.68	20.83	22.00	22.10		21.22
2030	23.44	23.57	22.27	20.88	20.98	21.10	21.21	21.30	21.41	21.52	22.80	22.91		21.94
2031	22.72	22.83	22.92	21.45	21.55	21.66	21.76	21.87	21.98	22.09	23.37	23.48		22.31
2032	24.11	24.23	24.28	22.77	22.88	22.99	23.10	23.22	23.33	23.45	24.79	24.91		23.66
2033	26.70	26.83	25.08	23.63	23.76	23.88	24.00	24.10	24.21	24.33	25.78	25.91		24.84
2034	26.73	26.86	25.92	24.43	24.55	24.69	24.79	24.94	25.06	25.16	26.72	26.83		25.55
2035	29.58	29.78	27.06	25.64	25.76	25.90	26.03	26.16	26.22	26.35	28.21	28.35		27.08
2036	29.93	30.59	28.21	26.86	26.55	26.75	27.14	27.01	26.58	26.72	26.13	26.33		27.39
2037	26.89	27.54	28.58	28.01	27.69	28.27	28.41	28.13	28.19	27.88	25.67	25.87		27.59
2038	27.47	28.14	30.30	29.40	29.54	29.77	30.37	30.07	29.62	30.24	28.38	28.59		29.33
2039	29.21	29.90	31.31	30.97	30.65	31.36	31.52	31.67	30.71	31.34	29.57	29.76		30.67
2040	31.64	32.32	33.25	33.28	33.45	33.21	33.38	34.03	33.04	33.21	28.15	28.38		32.28
2041	30.18	31.91	36.49	35.78	35.96	36.74	36.92	36.62	36.10	36.82	34.15	34.41		35.20
2042	36.39	37.18	39.29	38.77	38.97	38.74	39.53	39.73	39.10	38.79	36.46	37.24		38.36
2043	37.01	38.91	39.36	38.54	38.38	39.04	38.77	39.02	38.95	39.15	37.09	36.86		38.42
2044	38.02	41.65	39.73	39.17	39.37	39.68	39.42	39.63	39.07	39.79	38.20	38.49		39.34
2045	40.85	41.91	41.79	41.02	41.63	41.96	41.67	42.39	41.21	41.55	39.59	40.43		41.33
2046	42.36	43.19	43.01	42.56	42.77	43.11	42.85	43.12	42.32	43.24	41.54	41.31		42.61
2047	45.08	46.33	45.37	44.01	44.23	44.59	45.22	45.45	44.70	44.68	46.64	47.43		45.31









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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
2022	-	-	-	-	-	-	-	-	-	-	-	-	-
2023	-	-	-	-	-	-	-	-	-	-	-	-	-
2024	-	-	-	-	-	-	-	-	-	-	-	-	-
2025													3.12
2026													3.30
2027													3.04
2028													2.77
2029													2.76
2030													2.86
2031													2.91
2032													3.11
2033													3.28
2034													3.38
2035													3.60
2036													3.64
2037													3.65
2038													3.91
2039													4.10
2040													4.34
2041													4.77
2042													5.25
2043	5.25												
2044	5.38												
2045	5.67												
2046	5.85												
2047	6.25												

## **Standard Capacity Tables**







## 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 26<sup>th</sup> day of May, 2022.

*/s/ Robert Macfarlane*

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