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

October 19, 2020

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

RE: UM 1893 – PGE's Energy Efficiency Avoided Cost Submission

Portland General Electric Company (PGE) submits this compliance filing pursuant to OPUC Order No. 19-430 in compliance with Oregon Administrative Rule (OAR) 860-030-0011. Please see the attached pages for PGE's energy efficiency avoided cost submission. This filing updates for final PGE 2019 Integrated Resource Plan inputs. PGE also appreciates Staff's understanding the circumstances of this compliance filing being late.

Please direct any questions or comments regarding this filing to Santiago Laborde at (503) 464-7902.

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

Enclosure
cc: Anna Kim, OPUC

Energy Efficiency Avoided Cost Submission Template - Electric

Utility Name: PGE

Submission Date: 19-Oct-20

Instructions and Definitions

<> Please fill out this workbook completely and per the instructions and submit via electronic filing to docket UM 1893. Submissions are due October 15 of each year.
<> Inputs will be reviewed and approved by the OPUC before being sent to the Energy Trust of Oregon for use in Avoided Cost development
<> **Provide as much detail as possible when sourcing** data inputs, including the link to the source (if available), page number and table or graph number
This will increase the efficiency of this process and require less iteration during the OPUC review period
Required pages 1,2,3,4 refer to data presented in the most recently acknowledged IRP, IRP Update, or General Rate Case unless otherwise noted.

1) Global Inputs - IRP

<> Most components of the avoided costs are input into this tab including inflation/discount rates, line losses, risk reduction values, T&D deferral values, and generation deferral values
<> Identify the winter & summer peak periods for Transmission and Distribution. The Generation LOLP Map will be utilized for generation peak definitions.
<> If necessary, Energy Trust will work with each utility about sector definitions for T&D for which values to provide for Res, Com, and Ind
<> Ensure that the dollar years of the data inputs match the source - Energy Trust will inflate to the proper year
<> Please provide the values in the most recently acknowledged IRP

2) Forward Market Prices - IRP

<> Provide forward market price forecast by month for both high load hours and low load hours
<> Please provide the dollar amount of these prices that is associated with carbon costs (or %). If it is a dollar value, this is a subset of the total prices provided - The total forward market prices should be the FULL price, including carbon
<> Indicate if the forecast is in nominal or real dollars (and what dollar year if real)
<> Please provide the values in the most recently acknowledged IRP

3) LOLP - IRP

<> Input a 12x24 Loss of Load Probability heat map per the example in the worksheet
<> These will be potentially utilized in future iterations of avoided cost updates pending outcome of UM1893
<> Include heat maps for all days, weekdays only, and weekends only
<> Please provide the values in the most recently acknowledged IRP

4) RPS Compliance - IRP

<> Input RPS compliance costs by year
<> Please provide the values in the most recently acknowledged IRP

1a, 2a, 3a, 4a) Alternative Submissions

<> Use these worksheets to provide alternative values to the most recently acknowledged IRP values
<> Provide a rationale for submitting the alternative values in the box provided at the top of each alternative worksheet
<> If a second set of alternative values is submitted, simply copy the alt tabs necessary and rename to 1b, alt 2 in the tab name

Global Assumptions Inputs				SOURCING				
				Provide as much detail as possible with sourcing including a link. Ensure that dollar years listed here are the same as the source.				
Avoided Cost Element	**Units**	**Value**	**Dollar Year**	**Source**	**Source Page #**	**Table # (if applicable)**	**Source Link or File Name**	**Source Notes**
Inflation Rate	Percent	2.05%	N/A	2019 IRP	341	I-4	https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=en	Second Quarter 2018 Global Insight long-term forecast
Real Discount Rate	Percent	4.41%	N/A	2019 IRP	341	I-4	https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=en	After-Tax Real Cost of Capital, calculated from Nominal Weighted After-Tax Cost of Capital and Long-Term General Inflation.
Regional Act Credit	Percent	10.00%	N/A					
Transmission Loss Factor	Percent	1.90%	N/A	BPA Open Access Transmission Tariff, Effective Date: October 1, 2019	143		https://www.bpa.gov/transmission/Doing%20Business/Tariff/Documents/bpa-oatt-TC-20-settlement-tariff-100119.pdf	Real Power Loss factor for one segment of BPA transmission. This factor is for the losses external to PGE's system for avoided energy purchases, generation capacity, and risk value. This factor does not apply to the PGE Tranmission in the Transmission Deferral Credit.
Distribution Loss Factor, Commercial	Percent	4.15%	N/A	2015 GRC (UE 283) Line Loss Study (the most recent loss study)			Workpaper "LineLoss2015GRC_Dist_Commercial.xlsx"	Internal loss factor for Commercial loads based on weighted average of primary and secondary losses from the 2015 GRC Line Loss Study.
Distribution Loss Factor, Industrial	Percent	1.45%	N/A	2015 GRC (UE 283) Line Loss Study (the most recent loss study)	1		"2015 GRC losses.pdf"	Internal loss factor from study for loads with subtranmission delivery voltage.
Distribution Loss Factor, Residential	Percent	4.74%	N/A	2015 GRC (UE 283) Line Loss Study (the most recent loss study)	1		"2015 GRC losses.pdf"	Internal loss factor for loads with secondary delivery voltage.
Risk Reduction Value	$/MWh	$3.00	2020	2019 IRP			Workpaper "EE_RiskCalc_2019IRP.xlsx"	Risk reduction value calculated from 2019 IRP values.
Transmission Deferral Credit	$/kW-yr	$9.38	2019	2019 GRC (UE 335)			Workpaper "T&D 2019.xlsx"	2019 GRC, most recently approved GRC filing. TransmissionDeferralCredit = (TransmissionRevReq/TransmissionCOSPeak)
Seasonal Capacity Split - Summer	Percent	0.00%	N/A	Per previous assumption				
Seasonal Capacity Split - Winter	Percent	100.00%	N/A	Per previous assumption				
Summer Peak Period Definition	Month/Day/Hour	N/A	N/A					*Day is intended to be weekday or weekend*
Winter Peak Period Definition	Month/Day/Hour	N/A	N/A					*Day is intended to be weekday or weekend*
Deficiency start year	Year	2022	N/A	See Source Note				The year 2022 reflects PGE's understanding of the default value being the first year of Energy Trust's EE calculations. PGE may calculate an alternative transmission deficiency start year for future filings, but did not for this filing.
Distribution Deferral Credit	$/kW-yr	$24.39	2019	2019 GRC (UE 335)			Workpaper "T&D 2019.xlsx"	2019 GRC, most recently approved GRC filing. DistributionDeferralCredit = (SubtransmissionMarginalCostRevenues/SubtransmissionRateclassPeak) +(SubstationMarginalCostRevenues/SubstationRateclassPeak)
Seasonal Capacity Split - Summer	Percent	0.00%	N/A	Per previous assumption				
Seasonal Capacity Split - Winter	Percent	100.00%	N/A	Per previous assumption				
Summer Peak Period Definition	Month/Day/Hour	N/A	N/A					*Day is intended to be weekday or weekend*
Winter Peak Period Definition	Month/Day/Hour	N/A	N/A					*Day is intended to be weekday or weekend*
Deficiency start year	Year	2022	N/A	See Source Note				The year 2022 reflects PGE's understanding of the default value being the first year of Energy Trust's EE calculations. PGE may calculate an alternative distribution deficiency start year for future filings, but did not for this filing.
Generation Capacity Credit	$/kW-yr	$103.33	2020	2019 IRP	166			2019 IRP net cost of capacity.
Seasonal Capacity Split - Summer	Percent	50.00%	N/A	Per previous assumption.				This is the seasonal capacity split used by Staff in the December 2018 process. PGE may calculate an alternative seasonal capacity split for future filings, but did not for this filing.
Seasonal Capacity Split - Winter	Percent	50.00%	N/A	Per previous assumption.				This is the seasonal capacity split used by Staff in the December 2018 process. PGE may calculate an alternative seasonal capacity split for future filings, but did not for this filing.
Deficiency start year	Year	2022	N/A	2019 IRP	288	Table G-2		2019 IRP Reference Case and not before the first year of Energy Trust's calculations.
RPS Compliance Cost	$/MWh	$ -	2020	2019 IRP Errata Filing	5	Figure ES-3		In the 2019 IRP, there was no incremental cost of wind (SE Washington) net of capacity value and energy value. Figure ES-3 is a correction to Figure 6-8 (2019 IRP, pg 169).
Avoided RPS Compliance Obligation	%	0.00%	N/A					

Forward Price Inputs

Real or Nominal?	Nominal
Dollar Year:	n/a
Carbon Prices Additive?	Embedded in Market Prices
Carbon Value Units ($/MWh	2016$/metric ton
Source and Pg #:	Wholesale market energy prices: 2019 IRP, pg 80-81. Carbon prices: 2019 IRP, pg 75-76.
Source Link or File Name:	https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=en
Source Notes:	Reference Case wholesale market energy prices. Reference Case carbon prices based on revised 2017 IEPR GHG Price Projections published 1-16-18. Monthly wholesale electricity prices can be provided in a separate confidential file.

NOTES:
Please provide notes as to how this value relates to forward market prices. It can be expressed as a percentage of forward market prices, a set $/MWh, or $/ton. **Please identify the units in the box to the left**

		MONTHLY	MONTHLY	MONTHLY	MONTHLY		ANNUAL	ANNUAL	ANNUAL
Year	**Date**	**Wholesale Market Energy HLH Total ($/MWh)**	**Wholesale Market Energy LLH Total ($/MWh)**	HLH Carbon Cost ($/MWh) (OR % of HLH Price that accounts for Carbon?)	LLH Carbon Cost ($/MWh) (OR % of LLH Price that accounts for Carbon?)	**Year**	**Wholesale Market Energy HLH Total ($/MWh)**	**Wholesale Market Energy LLH Total ($/MWh)**	Carbon emissions price (2016$ per metric ton)
2021	1/1/2021	See annual values in column J.	See annual values in column K.	See annual values in column L.	See annual values in column L.	2021	$ 25.18	$ 23.32	$ 19.23
2021	2/1/2021					2022	$ 26.17	$ 24.19	$ 21.54
2021	3/1/2021					2023	$ 28.37	$ 26.16	$ 24.12
2021	4/1/2021					2024	$ 32.03	$ 29.87	$ 27.00
2021	5/1/2021					2025	$ 37.26	$ 34.85	$ 30.23
2021	6/1/2021					2026	$ 40.17	$ 37.96	$ 33.85
2021	7/1/2021					2027	$ 43.23	$ 41.57	$ 37.89
2021	8/1/2021					2028	$ 46.92	$ 44.46	$ 42.41
2021	9/1/2021					2029	$ 52.26	$ 49.90	$ 47.47
2021	10/1/2021					2030	$ 56.40	$ 53.88	$ 53.16
2021	11/1/2021					2031	$ 59.62	$ 56.83	$ 53.16
2021	12/1/2021					2032	$ 61.70	$ 59.26	$ 53.16
2022	1/1/2022					2033	$ 67.08	$ 64.61	$ 53.16
2022	2/1/2022					2034	$ 69.56	$ 67.30	$ 53.16
2022	3/1/2022					2035	$ 72.12	$ 70.08	$ 53.16
2022	4/1/2022					2036	$ 73.74	$ 70.34	$ 53.16
2022	5/1/2022					2037	$ 76.75	$ 74.18	$ 53.16
2022	6/1/2022					2038	$ 78.41	$ 75.58	$ 53.16
2022	7/1/2022					2039	$ 82.75	$ 79.63	$ 53.16
2022	8/1/2022					2040	$ 84.93	$ 81.90	$ 53.16
2022	9/1/2022					2041	$ 87.69	$ 85.35	$ 53.16
2022	10/1/2022					2042	$ 88.79	$ 86.36	$ 53.16
2022	11/1/2022					2043	$ 91.51	$ 88.70	$ 53.16
2022	12/1/2022					2044	$ 92.28	$ 89.03	$ 53.16
2023	1/1/2023					2045	$ 95.25	$ 92.61	$ 53.16
2023	2/1/2023					2046	$ 96.48	$ 93.83	$ 53.16
2023	3/1/2023					2047	$ 99.45	$ 95.71	$ 53.16
2023	4/1/2023					2048	$ 99.44	$ 97.38	$ 53.16
2023	5/1/2023					2049	$ 103.25	$ 101.08	$ 53.16
2023	6/1/2023					2050	$ 104.93	$ 101.18	$ 53.16

Loss of Load Probability Heat Map Input

NOTE: This is utilitized for generation defferals only.

Source and page #: 2019 IRP

Source Link or File Name: https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=en

Source Notes: Page 107

WEEKDAYS & WEEKENDS

Hr Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	1.01	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	1.18
8	3.08	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	2.52
9	3.94	0.95	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.11	3.66
10	2.91	0.62	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.07	2.76
11	2.27	0.39	0.00	0.00	0.00	0.00	0.01	0.08	0.01	0.00	0.04	2.25
12	1.54	0.26	0.00	0.00	0.00	0.00	0.03	0.21	0.03	0.00	0.03	1.94
13	1.19	0.17	0.00	0.00	0.00	0.00	0.11	0.59	0.07	0.00	0.02	1.46
14	1.01	0.10	0.00	0.00	0.00	0.01	0.29	1.21	0.15	0.00	0.02	1.14
15	0.95	0.12	0.00	0.00	0.00	0.02	0.62	2.79	0.29	0.00	0.02	0.91
16	1.01	0.14	0.00	0.00	0.00	0.02	0.78	1.50	0.67	0.00	0.04	1.30
17	2.91	0.35	0.00	0.00	0.00	0.03	0.98	1.74	0.38	0.00	0.16	4.25
18	3.23	0.67	0.00	0.00	0.00	0.03	0.90	2.20	0.60	0.00	0.17	2.88
19	4.88	1.26	0.00	0.00	0.00	0.03	1.19	2.81	0.89	0.00	0.33	4.45
20	4.75	1.60	0.00	0.00	0.00	0.05	1.31	2.33	0.65	0.00	0.33	3.86
21	3.44	1.17	0.00	0.00	0.00	0.04	0.97	3.93	0.47	0.00	0.22	2.74
22	2.07	0.77	0.00	0.00	0.00	0.02	0.35	1.89	0.45	0.00	0.12	1.62
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

WEEKDAYS Only

Hr Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	1.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	1.17
8	3.03	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	2.49
9	3.85	0.93	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.10	3.59
10	2.78	0.59	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.07	2.62
11	2.12	0.36	0.00	0.00	0.00	0.00	0.01	0.08	0.01	0.00	0.04	2.08
12	1.43	0.24	0.00	0.00	0.00	0.00	0.03	0.21	0.03	0.00	0.03	1.77
13	1.09	0.16	0.00	0.00	0.00	0.00	0.11	0.58	0.07	0.00	0.02	1.32
14	0.94	0.10	0.00	0.00	0.00	0.01	0.28	1.19	0.15	0.00	0.01	1.04
15	0.89	0.12	0.00	0.00	0.00	0.02	0.61	2.74	0.29	0.00	0.02	0.83
16	0.94	0.13	0.00	0.00	0.00	0.02	0.77	1.39	0.65	0.00	0.03	1.18
17	2.72	0.34	0.00	0.00	0.00	0.03	0.96	1.60	0.35	0.00	0.13	3.96
18	2.94	0.65	0.00	0.00	0.00	0.02	0.88	2.00	0.57	0.00	0.15	2.58
19	4.46	1.21	0.00	0.00	0.00	0.03	1.14	2.52	0.83	0.00	0.29	4.11
20	4.39	1.53	0.00	0.00	0.00	0.04	1.26	2.10	0.60	0.00	0.30	3.60
21	3.22	1.12	0.00	0.00	0.00	0.03	0.92	3.71	0.45	0.00	0.20	2.58
22	1.95	0.74	0.00	0.00	0.00	0.01	0.34	1.80	0.44	0.00	0.11	1.53
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

WEEKENDS Only

Hr Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
8	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
9	0.09	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
10	0.12	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
11	0.15	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
12	0.11	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
13	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
14	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.10
15	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.00	0.00	0.00	0.09
16	0.07	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.02	0.00	0.01	0.12
17	0.19	0.01	0.00	0.00	0.00	0.00	0.02	0.14	0.02	0.00	0.02	0.29
18	0.28	0.02	0.00	0.00	0.00	0.00	0.03	0.21	0.04	0.00	0.03	0.29
19	0.42	0.05	0.00	0.00	0.00	0.01	0.05	0.29	0.06	0.00	0.04	0.33
20	0.36	0.07	0.00	0.00	0.00	0.01	0.05	0.24	0.04	0.00	0.03	0.25
21	0.22	0.05	0.00	0.00	0.00	0.01	0.04	0.22	0.02	0.00	0.02	0.16
22	0.12	0.03	0.00	0.00	0.00	0.01	0.01	0.09	0.01	0.00	0.01	0.08
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

RPS Compliance Inputs IRP

Real or Nominal?	Real
Dollar Year:	2020
Source and Pg #:	2019 IRP Errata Filing, pg 5, Figure ES-3. This is a correction to Figure 6-8 in the 2019 IRP (pg 169).
Source Link or File Name:	https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=er
Source Notes:	In the 2019 IRP, there was no incremental cost of wind (SE Washington) net of capacity value and energy value.

	RPS Compliance Cost ($/MWh)	Avoided RPS Compliance Obligation (%)
2021	$ -	20.00%
2022	$ -	20.00%
2023	$ -	20.00%
2024	$ -	20.00%
2025	$ -	27.00%
2026	$ -	27.00%
2027	$ -	27.00%
2028	$ -	27.00%
2029	$ -	27.00%
2030	$ -	35.00%
2031	$ -	35.00%
2032	$ -	35.00%
2033	$ -	35.00%
2034	$ -	35.00%
2035	$ -	45.00%
2036	$ -	45.00%
2037	$ -	45.00%
2038	$ -	45.00%
2039	$ -	45.00%
2040	$ -	50.00%
2041	$ -	50.00%
2042	$ -	50.00%
2043	$ -	50.00%
2044	$ -	50.00%
2045	$ -	50.00%
2046	$ -	50.00%
2047	$ -	50.00%
2048	$ -	50.00%
2049	$ -	50.00%
2050	$ -	50.00%

Alternative Submissions	Rationale for alternative submission: The updated values are shaded in green. These values reflect a more current assessment of customer value.

Global Assumptions Inputs

				SOURCING *Provide as much detail as possible with sourcing including a link. Ensure that dollar years listed here are the same as the source.*					
Avoided Cost Element	**Units**	**Value**	**Dollar Year**	**Source**	**Source Page #**	**Table # (if applicable)**	**Source Link or File Name**	**Source Notes**	**Update Status**
Inflation Rate	Percent	2.05%	N/A	2019 IRP	341	I-4	https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=en	Second Quarter 2018 Global Insight long-term forecast	No change
Real Discount Rate	Percent	4.41%	N/A	2019 IRP	341	I-4	https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=en	After-Tax Real Cost of Capital, calculated from Nominal Weighted After-Tax Cost of Capital and Long-Term General Inflation.	No change
Regional Act Credit	Percent	10.00%	N/A						No change
Transmission Loss Factor	Percent	1.90%	N/A	BPA Open Access Transmission Tariff, Effective Date: October 1, 2019	143		https://www.bpa.gov/transmission/Doing%20Business/Tariff/Documents/bpa-oatt-TC-20-settlement-tariff-100119.pdf	Real Power Loss factor for one segment of BPA transmission. This factor is for the losses external to PGE's system for avoided energy purchases, generation capacity, and risk value. This factor does not apply to the PGE Tranmission in the Transmission Deferral Credit.	No change
Distribution Loss Factor, Commercial	Percent	4.15%	N/A	2015 GRC (UE 283) Line Loss Study (the most recent loss study)			Workpaper "LineLoss2015GRC_Dist_Commercial.xlsx"	Internal loss factor for Commercial loads based on weighted average of primary and secondary losses from the 2015 GRC Line Loss Study.	No change
Distribution Loss Factor, Industrial	Percent	1.45%	N/A	2015 GRC (UE 283) Line Loss Study (the most recent loss study)	1		"2015 GRC losses.pdf"	Internal loss factor from study for loads with subtranmission delivery voltage.	No change
Distribution Loss Factor, Residential	Percent	4.74%	N/A	2015 GRC (UE 283) Line Loss Study (the most recent loss study)	1		"2015 GRC losses.pdf"	Internal loss factor for loads with secondary delivery voltage.	No change
Risk Reduction Value	$/MWh	$3.00	2020	2019 IRP			Workpaper "EE_RiskCalc_2019IRP.xlsx"	Risk reduction value calculated from 2019 IRP values.	No change
Transmission Deferral Credit	$/kW-yr	$9.38	2019	2019 GRC (UE 335)			Workpaper "T&D 2019.xlsx"	2019 GRC, most recently approved GRC filing. TransmissionDeferralCredit = (TransmissionRevReq/TransmissionCOSPeak)	No change
Seasonal Capacity Split - Summer	Percent	50.00%	N/A					Capacity is more constrained in summer due to heat. 50/50 split is based on 2018 system load shape.	**Update**
Seasonal Capacity Split - Winter	Percent	50.00%	N/A						**Update**
Summer Peak Period Definition	Month/Day/Hour	N/A	N/A					*Day is intended to be weekday or weekend*	No change
Winter Peak Period Definition	Month/Day/Hour	N/A	N/A					*Day is intended to be weekday or weekend*	No change
Deficiency start year	Year	2022	N/A	See Source Note				The year 2021 reflects PGE's understanding of the default value being the first year of Energy Trust's EE calculations. PGE may calculate an alternative transmission deficiency start year for future filings, but did not for this filing.	No change
Distribution Deferral Credit	$/kW-yr	$24.39	2019	2019 GRC (UE 335)			Workpaper "T&D 2019.xlsx"	2019 GRC, most recently approved GRC filing. DistributionDeferralCredit = (SubtransmissionMarginalCostRevenues/SubtransmissionRateclassPeak)+(SubstationMarginalCostRevenues/SubstationRateclassPeak)	No change
Seasonal Capacity Split - Summer	Percent	50.00%	N/A					Capacity is more constrained in summer due to heat. 50/50 split is based on 2018 system load shape.	**Update**
Seasonal Capacity Split - Winter	Percent	50.00%	N/A						**Update**
Summer Peak Period Definition	Month/Day/Hour	N/A	N/A					*Day is intended to be weekday or weekend*	No change
Winter Peak Period Definition	Month/Day/Hour	N/A	N/A					*Day is intended to be weekday or weekend*	No change
Deficiency start year	Year	2022	N/A	See Source Note				The year 2021 reflects PGE's understanding of the default value being the first year of Energy Trust's EE calculations. PGE may calculate an alternative distribution deficiency start year for future filings, but did not for this filing.	No change
Generation Capacity Credit	$/kW-yr	$106.58	2020	2019 IRP w/ interconnection costs	166			2019 IRP net cost of capacity for 2022 COD. Interconnection cost update	**Update**
Seasonal Capacity Split - Summer	Percent	50.00%	N/A	Per previous assumption.				This is the seasonal capacity split used by Staff in the December 2018 process. PGE may calculate an alternative seasonal capacity split for future filings, but did not for this filing.	No change
Seasonal Capacity Split - Winter	Percent	50.00%	N/A	Per previous assumption.				This is the seasonal capacity split used by Staff in the December 2018 process. PGE may calculate an alternative seasonal capacity split for future filings, but did not for this filing.	No change
Deficiency start year	Year	2022	N/A	2019 IRP	288	Table G-2		2019 IRP Reference Case	No change
RPS Compliance Cost	$/MWh	$ -	2020	2019 IRP Errata Filing	5	Figure ES-3		In the 2019 IRP, there was no incremental cost of wind (SE Washington) net of capacity value and energy value. Figure ES-3 is a correction to Figure 6-8 (2019 IRP, pg 169).	No change
Avoided RPS Compliance Obligation	%	0.00%	N/A						No change

Alternative Submissions	Rationale for alternative submission: The wholesale market prices are based on a more current gas price forecast. No change to carbon prices.

Forward Price Inputs

Real or Nominal?	Nominal
Dollar Year:	n/a
Carbon Prices Additive?	Embedded in Market Prices
Carbon Value Units ($/MWh	2016$/metric ton
Source and Pg #:	Wholesale market energy prices: 2019 IRP, pg 80-81. Carbon prices: 2019 IRP, pg 75-76.
Source Link or File Name:	https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=en
Source Notes:	Reference Case wholesale market energy prices based on 2019 IRP WECC-Wide Aurora model with gas price update to 2019H2. Monthly prices can be provided in a separate confidential file. Reference Case carbon prices based on revised 2017 IEPR GHG Price Projections published 1-16-18.

NOTES:
Please provide notes as to how this value relates to forward market prices. It can be expressed as a percentage of forward market prices, a set $/MWh, or $/ton. **Please identify the units in the box to the left**

Year	Date	MONTHLY **Wholesale Market Energy HLH Total ($/MWh)**	MONTHLY **Wholesale Market Energy LLH Total ($/MWh)**	MONTHLY HLH Carbon Cost ($/MWh) (OR % of HLH Price that accounts for Carbon?)	MONTHLY LLH Carbon Cost ($/MWh) (OR % of LLH Price that accounts for Carbon?)
2022	1/1/2022	See annual values in column J.	See annual values in column K.	See annual values in column L.	See annual values in column L.
2022	2/1/2022				
2022	3/1/2022				
2022	4/1/2022				
2022	5/1/2022				
2022	6/1/2022				
2022	7/1/2022				
2022	8/1/2022				
2022	9/1/2022				
2022	10/1/2022				
2022	11/1/2022				
2022	12/1/2022				
2023	1/1/2023				
2023	2/1/2023				
2023	3/1/2023				
2023	4/1/2023				
2023	5/1/2023				
2023	6/1/2023				
2023	7/1/2023				
2023	8/1/2023				
2023	9/1/2023				
2023	10/1/2023				
2023	11/1/2023				
2023	12/1/2023				
2024	1/1/2024				
2024	2/1/2024				
2024	3/1/2024				
2024	4/1/2024				
2024	5/1/2024				
2024	6/1/2024				

Year	UPDATE ANNUAL **Wholesale Market Energy HLH Total ($/MWh)**	UPDATE ANNUAL **Wholesale Market Energy LLH Total ($/MWh)**	ANNUAL Carbon emissions price (2016$ per metric ton)
2022	$ 27.19	$ 25.16	$ 21.54
2023	$ 28.84	$ 26.69	$ 24.12
2024	$ 29.44	$ 27.39	$ 27.00
2025	$ 33.80	$ 31.63	$ 30.23
2026	$ 37.38	$ 35.46	$ 33.85
2027	$ 39.79	$ 38.32	$ 37.89
2028	$ 42.01	$ 39.97	$ 42.41
2029	$ 46.71	$ 44.66	$ 47.47
2030	$ 50.93	$ 48.67	$ 53.16
2031	$ 54.62	$ 52.09	$ 53.16
2032	$ 56.12	$ 54.08	$ 53.16
2033	$ 58.87	$ 56.82	$ 53.16
2034	$ 59.99	$ 58.14	$ 53.16
2035	$ 62.59	$ 61.15	$ 53.16
2036	$ 64.25	$ 61.50	$ 53.16
2037	$ 67.49	$ 65.30	$ 53.16
2038	$ 70.02	$ 67.75	$ 53.16
2039	$ 75.02	$ 72.36	$ 53.16
2040	$ 78.40	$ 75.81	$ 53.16
2041	$ 80.90	$ 79.03	$ 53.16
2042	$ 81.85	$ 79.83	$ 53.16
2043	$ 84.36	$ 82.03	$ 53.16
2044	$ 85.16	$ 82.22	$ 53.16
2045	$ 87.87	$ 85.72	$ 53.16
2046	$ 88.84	$ 86.75	$ 53.16
2047	$ 91.71	$ 88.52	$ 53.16
2048	$ 91.77	$ 90.02	$ 53.16
2049	$ 95.32	$ 93.47	$ 53.16
2050	$ 96.78	$ 93.62	$ 53.16

Alternative Submissions	Rationale for alternative submission: This aligns with the 2019 IRP. (No change.)

Loss of Load Probability Heat Map Input

NOTE: This is utilitized for generation defferals only.

Source and page #: 2019 IRP
Source Link or File Name: https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=en
Source Notes: Page 107

WEEKDAYS & WEEKENDS

Hr Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	1.01	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	1.18
8	3.08	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	2.52
9	3.94	0.95	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.11	3.66
10	2.91	0.62	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.07	2.76
11	2.27	0.39	0.00	0.00	0.00	0.00	0.01	0.08	0.01	0.00	0.04	2.25
12	1.54	0.26	0.00	0.00	0.00	0.00	0.03	0.21	0.03	0.00	0.03	1.94
13	1.19	0.17	0.00	0.00	0.00	0.00	0.11	0.59	0.07	0.00	0.02	1.46
14	1.01	0.10	0.00	0.00	0.00	0.01	0.29	1.21	0.15	0.00	0.02	1.14
15	0.95	0.12	0.00	0.00	0.00	0.02	0.62	2.79	0.29	0.00	0.02	0.91
16	1.01	0.14	0.00	0.00	0.00	0.02	0.78	1.50	0.67	0.00	0.04	1.30
17	2.91	0.35	0.00	0.00	0.00	0.03	0.98	1.74	0.38	0.00	0.16	4.25
18	3.23	0.67	0.00	0.00	0.00	0.03	0.90	2.20	0.60	0.00	0.17	2.88
19	4.88	1.26	0.00	0.00	0.00	0.03	1.19	2.81	0.89	0.00	0.33	4.45
20	4.75	1.60	0.00	0.00	0.00	0.05	1.31	2.33	0.65	0.00	0.33	3.86
21	3.44	1.17	0.00	0.00	0.00	0.04	0.97	3.93	0.47	0.00	0.22	2.74
22	2.07	0.77	0.00	0.00	0.00	0.02	0.35	1.89	0.45	0.00	0.12	1.62
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

WEEKDAYS Only

Hr Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	1.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	1.17
8	3.03	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	2.49
9	3.85	0.93	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.10	3.59
10	2.78	0.59	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.07	2.62
11	2.12	0.36	0.00	0.00	0.00	0.00	0.01	0.08	0.01	0.00	0.04	2.08
12	1.43	0.24	0.00	0.00	0.00	0.00	0.03	0.21	0.03	0.00	0.03	1.77
13	1.09	0.16	0.00	0.00	0.00	0.00	0.11	0.58	0.07	0.00	0.02	1.32
14	0.94	0.10	0.00	0.00	0.00	0.01	0.28	1.19	0.15	0.00	0.01	1.04
15	0.89	0.12	0.00	0.00	0.00	0.02	0.61	2.74	0.29	0.00	0.02	0.83
16	0.94	0.13	0.00	0.00	0.00	0.02	0.77	1.39	0.65	0.00	0.03	1.18
17	2.72	0.34	0.00	0.00	0.00	0.03	0.96	1.60	0.35	0.00	0.13	3.96
18	2.94	0.65	0.00	0.00	0.00	0.02	0.88	2.00	0.57	0.00	0.15	2.58
19	4.46	1.21	0.00	0.00	0.00	0.03	1.14	2.52	0.83	0.00	0.29	4.11
20	4.39	1.53	0.00	0.00	0.00	0.04	1.26	2.10	0.60	0.00	0.30	3.60
21	3.22	1.12	0.00	0.00	0.00	0.03	0.92	3.71	0.45	0.00	0.20	2.58
22	1.95	0.74	0.00	0.00	0.00	0.01	0.34	1.80	0.44	0.00	0.11	1.53
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

WEEKENDS Only

Hr Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
8	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
9	0.09	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
10	0.12	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
11	0.15	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
12	0.11	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
13	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
14	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.10
15	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.00	0.00	0.00	0.09
16	0.07	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.02	0.00	0.01	0.12
17	0.19	0.01	0.00	0.00	0.00	0.00	0.02	0.14	0.02	0.00	0.02	0.29
18	0.28	0.02	0.00	0.00	0.00	0.00	0.03	0.21	0.04	0.00	0.03	0.29
19	0.42	0.05	0.00	0.00	0.00	0.01	0.05	0.29	0.06	0.00	0.04	0.33
20	0.36	0.07	0.00	0.00	0.00	0.01	0.05	0.24	0.04	0.00	0.03	0.25
21	0.22	0.05	0.00	0.00	0.00	0.01	0.04	0.22	0.02	0.00	0.02	0.16
22	0.12	0.03	0.00	0.00	0.00	0.01	0.01	0.09	0.01	0.00	0.01	0.08
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Alternative Submissions	Rationale for alternative submission: This aligns with the 2019 IRP. (No change to the input value.)

RPS Compliance Inputs IRP

Real or Nominal?	Real
Dollar Year:	2020
Source and Pg #:	2019 IRP Errata Filing, pg 5, Figure ES-3. This is a correction to Figure 6-8 in the 2019 IRP (pg 169).
Source Link or File Name:	https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=er
Source Notes:	In the 2019 IRP, there was no incremental cost of wind (SE Washington) net of capacity value and energy value.

	RPS Compliance Cost ($/MWh)	Avoided RPS Compliance Obligation (%)
2022	$ -	20.00%
2023	$ -	20.00%
2024	$ -	20.00%
2025	$ -	27.00%
2026	$ -	27.00%
2027	$ -	27.00%
2028	$ -	27.00%
2029	$ -	27.00%
2030	$ -	35.00%
2031	$ -	35.00%
2032	$ -	35.00%
2033	$ -	35.00%
2034	$ -	35.00%
2035	$ -	45.00%
2036	$ -	45.00%
2037	$ -	45.00%
2038	$ -	45.00%
2039	$ -	45.00%
2040	$ -	50.00%
2041	$ -	50.00%
2042	$ -	50.00%
2043	$ -	50.00%
2044	$ -	50.00%
2045	$ -	50.00%
2046	$ -	50.00%
2047	$ -	50.00%
2048	$ -	50.00%
2049	$ -	50.00%
2050	$ -	50.00%