ITEM NO. CA8

PUBLIC UTILITY COMMISSION OF OREGON
STAFF REPORT
PUBLIC MEETING DATE: December 14, 2021

REGULAR ____ CONSENT X EFFECTIVE DATE N/A

DATE: December 6, 2021

TO: Public Utility Commission

FROM: Anna Kim

THROUGH: Bryan Conway, JP Batmale, and Sarah Hall **SIGNED**

SUBJECT: OREGON PUBLIC UTILITY COMMISSION STAFF:
(Docket No. UM 1893)
Request for approval of Energy Efficiency Avoided Cost data to be used by Energy Trust.

STAFF RECOMMENDATION:

The Public Utility Commission of Oregon (Commission) should approve the attached energy efficiency avoided cost data for use by Energy Trust of Oregon (Energy Trust) and approve Portland General Electric's (PGE) one-time waiver from the filing deadline.

DISCUSSION:

Issue

Whether to approve the attached energy efficiency avoided cost data for use by Energy Trust and approve Portland General Electric's one-time waiver from the filing deadline.

Applicable Law

OAR 860-030-0011(1) requires an energy utility to submit its data for calculation of energy efficiency avoided costs in the manner and method specified in a Commission-approved reporting form. The form must be submitted by October 15 of each year for use in the next energy efficiency program budget cycle. See OAR 860-030-0011(1).

Under OAR 860-030-0011(2), the Commission may approve, at its discretion, the use of data more recent than data used in the utility's last acknowledged Integrated Resource Plan (IRP) or general rate case in which the Commission has issued a final order.

Under OAR 860-030-0013, Energy Trust may not use utility-specific energy efficiency avoided cost data until it has been approved by the Commission. The Commission generally considers energy efficiency avoided cost data for approval within 60 days of submission.

Under OAR 860-030-0000(3), the Commission may waive the Division 030 rules when there is good cause.

Analysis

Staff's memo was initially submitted for the November 30, 2021, Public Meeting but was removed when Staff identified errors in the labeling of some natural gas data. Labels were updated for natural gas commodity transport, infrastructure, and risk (see Attachment 2). There were also updates to Energy Trust's draft previews of avoided cost impacts, with extensive updates to the natural gas preview in particular (see Attachments 3 and 4). Updates to Energy Trust's memos do not affect the data for which Staff is seeking approval.

Staff's analysis is divided into four sections. Section I presents a summary of activities since the last report. Section II describes PGE's request for a waiver to the submission deadline. Section III presents Staff's recommendations on data to approve for use by Energy Trust for energy efficiency avoided cost calculations. Section IV provides a brief description of results to energy efficiency avoided costs.

Section I: Summary of Activities

In 2021, no changes were made to the data collection workbook. Staff proposed potential changes to greenhouse gas compliance costs. Utilities submitted data, and Staff reviewed the submissions with stakeholder assistance.

On October 7, 2021, Staff posted a request for responses, outlining Staff's plans to change carbon compliance costs. Staff described the intent to lead a detailed discussion on enhancing the modeling of carbon compliance costs into energy efficiency avoided costs in 2022, consistent with the passage of HB 2021 and implementation of Department of Environmental Quality's (DEQ) Climate Protection Program. This avoided cost of carbon compliance should reflect the regulatory risk associated with non-compliance with state law. In preparation for this discussion, Staff requested suggestions on: a) what elements to explore in the forthcoming discussion, and b) what actions utilities could more immediately take to align energy efficiency investments to meet energy sector clean energy goals in the 2030s.

UM 1893, CA8 UM 1893 Attachment 2.xlsx, E Market
Electronic version available on request.

Forward Market Prices Electric

Date	PacifiCorp HLH Total ($/MWh)	PacifiCorp LLH Total ($/MWh)
1/1/2021	24.12	23.67
2/1/2021	66.94	57.44
3/1/2021	25.14	25.52
4/1/2021	23.21	16.48
5/1/2021	21.37	14.27
6/1/2021	25.73	21.14
7/1/2021	36.72	23.71
8/1/2021	40.11	26.74
9/1/2021	32.03	24.27
10/1/2021	34.22	29.02
11/1/2021	34.91	28.83
12/1/2021	37.97	31.53
1/1/2022	38.79	31.14
2/1/2022	36.82	31.07
3/1/2022	28.10	24.03
4/1/2022	20.43	16.53
5/1/2022	16.87	12.52
6/1/2022	24.10	18.94
7/1/2022	41.64	24.15
8/1/2022	43.79	25.08
9/1/2022	29.57	28.45
10/1/2022	29.90	25.66
11/1/2022	30.46	27.21
12/1/2022	36.55	30.15
1/1/2023	37.11	29.26
2/1/2023	34.29	29.39
3/1/2023	28.52	22.23
4/1/2023	21.18	23.19
5/1/2023	15.35	14.36
6/1/2023	22.80	15.52
7/1/2023	49.11	22.75
8/1/2023	53.40	25.96
9/1/2023	32.10	22.99
10/1/2023	30.80	26.31
11/1/2023	32.72	30.31
12/1/2023	36.76	30.58
…	…	…
…	…	…
11/1/2070	171.32	144.04
12/1/2070	187.60	167.96

Note: Annual will be shaped to existing monthly shapes

Year	PGE HLH Total ($/MWh)	PGE LLH Total ($/MWh)
2021	$22.24	$20.35
2022	$27.58	$25.56
2023	$29.33	$27.13
2024	$30.06	$28.00
2025	$34.63	$32.45
2026	$38.44	$36.49
2027	$41.18	$39.60
2028	$43.64	$41.43
2029	$48.73	$46.54
2030	$53.38	$51.00
2031	$57.12	$54.42
2032	$58.55	$56.39
2033	$61.36	$59.23
2034	$62.48	$60.59
2035	$65.15	$63.67
2036	$66.73	$63.87
2037	$70.04	$67.73
2038	$72.49	$70.19
2039	$77.49	$74.83
2040	$81.03	$78.28
2041	$83.42	$81.54
2042	$84.53	$82.37
2043	$87.13	$84.74
2044	$87.80	$84.90
2045	$90.67	$88.32
2046	$91.83	$89.46
2047	$94.69	$91.31
2048	$94.66	$92.90
2049	$98.44	$96.36
2050	$99.90	$96.54

CA8 - UM 1893
Attachment 2

Loss of Load Probability Heat Map Input Electric

PacifiCorp

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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.00	0.00	0.00
19	0.01	0.00	0.00	0.00	0.00	0.01	0.05	0.17	0.00	0.00	0.00	0.01
20	0.01	0.00	0.00	0.00	0.00	0.01	0.09	0.17	0.00	0.00	0.00	0.01
21	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.11	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
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

Note: This information is provided to Energy Trust to identify peak definitions.

PacifiCorp

WEEKDAYS ONLY

	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.00	0.00
19	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.16	0.00	0.00	0.01
20	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.15	0.00	0.00	0.01
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.11	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
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

Note: This information is provided to Energy Trust to identify peak definitions.

PacifiCorp

WEEKENDS ONLY

	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	-0.03	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	-0.01	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	-0.01	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.07	-0.07	0.00
19	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.12	-0.15	0.00	0.00	0.01
20	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.08	-0.15	0.00	0.00	0.01
21	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.05	-0.11	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.01	-0.01	0.00	0.00	0.00	0.00
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

Note: This information is provided to Energy Trust to identify peak definitions.

PGE

WEEKDAYS & WEEKENDS

Hr Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0.51309	0.15643	0.00313	0	0	0	0	0	0	0.03129	0.54437	
8	1.57159	0.5383	0.00209	0	0	0	0	0	0	0.08134	1.29731	
9	2.16601	0.46929	0.00104	0	0	0	0	0	0	0.08343	1.65189	
10	1.29419	0.18354	0	0	0	0	0	0	0	0.04171	0.93857	
11	0.87496	0.06466	0	0	0	0	0	0.00104	0	0.02711	0.66951	
12	0.54333	0.03129	0	0	0	0	0.00104	0.01564	0.00209	0	0.02294	0.46824
13	0.2774	0.01147	0	0	0	0.00104	0.00521	0.10116	0.00626	0	0.01251	0.30764
14	0.18459	0.00834	0	0	0	0.00626	0.02503	0.31494	0.02294	0	0.01147	0.23151
15	0.17103	0.02086	0	0	0	0.0146	0.0949	1.04599	0.05631	0	0.01877	0.20961
16	0.30764	0.02816	0	0	0.00104	0.01877	0.12931	0.47137	0.15851	0	0.02503	0.37856
17	1.42037	0.09073	0	0	0.00104	0.02816	0.26384	0.79361	0.12619	0	0.1752	1.99811
18	1.88236	0.32224	0.00104	0	0.00104	0.0292	0.28366	1.21701	0.30556	0	0.30764	1.86463
19	3.11919	0.6716	0.00209	0	0.00104	0.04797	0.5037	1.99603	0.50787	0	0.53811	2.69161
20	2.90749	0.67994	0.00313	0	0.00209	0.06361	0.77276	1.60913	0.33163	0	0.45156	2.22859
21	1.88236	0.48284	0	0	0.00104	0.03754	0.44009	2.46844	0.1387	0	0.26176	1.31087
22	0.93023	0.2555	0	0	0	0.00834	0.11367	0.82594	0.13349	0	0.10637	0.55897
23	0.00209	0.00104	0	0	0	0	0	0	0	0	0	0
24	0.00104	0	0	0	0	0	0	0	0	0	0	0

Note: This information is provided to Energy Trust to identify peak definitions.

PGE

WEEKDAYS ONLY

Hr Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0.50823	0.15549	0.00312	0	0	0	0	0	0	0	0.03114	0.54017
8	1.54312	0.51077	0.00207	0	0	0	0	0	0	0	0.08053	1.28077
9	2.11707	0.4591	0.00102	0	0	0	0	0	0	0	0.08153	1.61882
10	1.23894	0.17641	0	0	0	0	0	0	0	0	0.03984	0.89128
11	0.81818	0.06069	0	0	0	0	0	0.00104	0	0	0.02499	0.61869
12	0.50376	0.02908	0	0	0	0	0.00104	0.01558	0.00208	0	0.02025	0.42777
13	0.25587	0.01079	0	0	0	0.00102	0.00519	0.10048	0.00623	0	0.01058	0.27876
14	0.17124	0.00795	0	0	0	0.00603	0.02488	0.31152	0.02379	0	0.00928	0.2115
15	0.16048	0.0201	0	0	0	0.01383	0.09396	1.02683	0.0556	0	0.01513	0.18973
16	0.28676	0.02715	0	0	0.00103	0.01691	0.12692	0.43896	0.15487	0	0.02007	0.34353
17	1.32975	0.0874	0	0	0.00102	0.02459	0.25712	0.72943	0.11807	0	0.15082	1.86228
18	1.71683	0.31054	0.00089	0	0.001	0.02445	0.27511	1.10316	0.28589	0	0.26122	1.67377
19	2.85104	0.64554	0.00176	0	0.00099	0.03731	0.48369	1.79197	0.47603	0	0.47526	2.48967
20	2.68901	0.65038	0.00263	0	0.00194	0.04729	0.74046	1.44522	0.30887	0	0.40645	2.08251
21	1.76121	0.46185	0	0	0.00094	0.02865	0.42169	2.3294	0.13321	0	0.23478	1.23434
22	0.87813	0.24494	0	0	0	0.00546	0.10976	0.78717	0.13168	0	0.09453	0.52969
23	0.00206	0.00097	0	0	0	0	0	0	0	0	0	0
24	0.00103	0	0	0	0	0	0	0	0	0	0	0

Note: This information is provided to Energy Trust to identify peak definitions.

PGE

WEEKENDS ONLY

Hr Ending	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0.00485	0.00094	1.3E-05	0	0	0	0	0	0	0	0.00015	0.0042
8	0.02947	0.00753	1.6E-05	0	0	0	0	0	0	0	0.00081	0.01654
9	0.04894	0.01018	2.7E-05	0	0	0	0	0	0	0	0.0019	0.03307
10	0.05524	0.00714	0	0	0	0	0	0	0	0	0.00187	0.0473
11	0.05678	0.00397	0	0	0	0	0	4.9E-06	0	0	0.00212	0.05083
12	0.03957	0.00221	0	0	0	0	4.1E-06	6.4E-05	5.9E-06	0	0.0027	0.04047
13	0.02153	0.00068	0	0	0	2.2E-05	2.7E-05	0.00068	2.9E-05	0	0.00193	0.02889
14	0.01334	0.0004	0	0	0	0.00023	0.00015	0.00343	0.00015	0	0.00219	0.02001
15	0.01055	0.00076	0	0	0	0.00077	0.00094	0.01915	0.00072	0	0.00365	0.01988
16	0.02089	0.00101	0	0	1.8E-05	0.00187	0.0024	0.03241	0.00364	0	0.00496	0.03503
17	0.09062	0.00333	0	0	2.4E-05	0.00356	0.00673	0.06418	0.00812	0	0.02438	0.13583
18	0.16553	0.0117	0.00015	0	3.8E-05	0.00475	0.00854	0.11385	0.01967	0	0.04642	0.19085
19	0.26815	0.02606	0.00033	0	5E-05	0.01056	0.02001	0.20405	0.03184	0	0.06285	0.20195
20	0.21848	0.02957	0.0005	0	0.00014	0.01632	0.03229	0.16391	0.02275	0	0.04511	0.14608
21	0.12114	0.02099	0	0	0.0001	0.00889	0.0184	0.13905	0.00549	0	0.02698	0.07653
22	0.0521	0.01056	0	0	0	0.00288	0.00392	0.03877	0.00181	0	0.01184	0.02928
23	3E-05	7.7E-05	0	0	0	0	0	0	0	0	0	0
24	1.5E-05	0	0	0	0	0	0	0	0	0	0	0

Note: This information is provided to Energy Trust to identify peak definitions.

Supplemental T&D information provided by PacifiCorp

Distribution 12x24 Weighting Dist. 12x24 profile

		Hour																							
Season	Monthly Weight	Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Winter	21%	1	0%	0%	0%	0%	0%	0%	6%	###	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Winter	7%	2	0%	0%	0%	0%	0%	0%	2%	4%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Winter	0%	3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Summer	0%	4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Summer	0%	5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Summer	5%	6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%	0%	0%	0%	0%	0%
Summer	37%	7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	8%	###	###	7%	0%	0%	0%	0%	0%
Summer	15%	8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	4%	4%	3%	0%	0%	0%	0%	0%
Summer	0%	9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Summer	0%	10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Winter	3%	11	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Winter	13%	12	0%	0%	0%	0%	0%	0%	4%	7%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Transmission 12x24 Weighting Trans. 12x24 profile

		Hour																							
Season	Monthly Weight	Mon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Winter	25%	1	0%	0%	0%	0%	0%	0%	0%	9%	###	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Winter	8%	2	0%	0%	0%	0%	0%	0%	0%	6%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Winter	0%	3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Summer	0%	4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Summer	0%	5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Summer	1%	6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Summer	37%	7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	7%	###	###	4%	0%	0%	0%	0%	0%	0%
Summer	11%	8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	5%	4%	1%	0%	0%	0%	0%	0%	0%
Summer	0%	9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Summer	0%	10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Winter	3%	11	0%	0%	0%	0%	0%	0%	0%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Winter	15%	12	0%	0%	0%	0%	0%	0%	0%	3%	4%	1%	0%	0%	0%	0%	0%	0%	2%	3%	2%	0%	0%	0%	0%	0%

Note: This information is provided to Energy Trust to identify peak definitions.

Global Assumptions Natural Gas

Avoided Cost Element	Units	Avista Value	Cascade Value	Northwest Natural Value
Discount Rate (Company's Real after-tax weighted average cost of capital (WACC)	Percent	4.36%	7.33%	4.54%
Inflation Rate	Percent	2.00%	3.72%	2.25%
Regional Act Credit	Percent	10.00%	10.00%	10.00%
Forecast Period Calendar Start Year	Year	2020	2021	2021
Real Dollar Base Year	Year	2019	2019	2019
System Peak Definition	Calendar Month/Day/Hour	February 28th & December 20th	Day	Day for Gas Supply, Hour for Distribution System Planning
System Peak Coincident Day Factor (if needed)	Peak Day/Annual Load Ratio	0.0095	0.0513	
System Peak Coincident Hour Factor (if needed)	Peak Hour/Annual Load Ratio	0.0004	0.0005	

* Denotes numbers specified by Staff

Avista

Gas Commodity and Transportation/Storage Costs - ($/Dth)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2020	-$1.88	-$1.60	-$1.30	-$1.13	-$1.06	-$0.87	-$0.82	-$1.12	-$1.02	-$1.10	-$1.75	-$2.46
2021	-$2.51	-$2.42	-$2.11	-$1.79	-$1.51	-$1.55	-$1.67	-$1.66	-$1.54	-$1.60	-$1.90	-$2.18
2022	-$2.24	-$2.15	-$1.85	-$1.53	-$1.22	-$1.31	-$1.43	-$1.39	-$1.24	-$1.24	-$1.52	-$2.00
2023	-$2.04	-$1.91	-$1.64	-$1.52	-$1.17	-$1.32	-$1.37	-$1.37	-$1.14	-$1.22	-$1.71	-$2.00
2024	-$2.11	-$1.86	-$1.78	-$1.66	-$1.46	-$1.47	-$1.45	-$1.45	-$1.52	-$1.54	-$1.72	-$2.04
2025	-$2.16	-$2.08	-$1.93	-$2.03	-$1.85	-$1.79	-$1.80	-$1.79	-$1.87	-$1.93	-$2.14	-$2.41
2026	-$2.56	-$2.54	-$2.35	-$2.50	-$2.21	-$2.19	-$2.18	-$2.19	-$2.23	-$2.36	-$2.52	-$2.73
2027	-$2.75	-$2.69	-$2.50	-$2.72	-$2.39	-$2.35	-$2.34	-$2.35	-$2.40	-$2.47	-$2.70	-$2.95
2028	-$2.91	-$2.84	-$2.68	-$2.63	-$2.52	-$2.50	-$2.51	-$2.52	-$2.57	-$2.77	-$2.92	-$3.11
2029	-$3.08	-$2.99	-$2.80	-$3.00	-$2.67	-$2.67	-$2.65	-$2.65	-$2.70	-$2.86	-$3.03	-$3.28
2030	-$3.19	-$3.11	-$2.94	-$3.14	-$2.76	-$2.74	-$2.69	-$2.72	-$2.76	-$2.97	-$3.17	-$3.43
2031	-$3.32	-$3.27	-$3.06	-$3.31	-$2.90	-$2.88	-$2.84	-$2.84	-$2.92	-$3.05	-$3.29	-$3.54
2032	-$3.42	-$3.34	-$3.14	-$3.44	-$2.97	-$2.94	-$2.79	-$2.81	-$2.97	-$3.17	-$3.46	-$3.74
2033	-$3.64	-$3.63	-$3.42	-$3.69	-$3.25	-$3.26	-$3.15	-$3.17	-$3.28	-$3.43	-$3.74	-$3.97
2034	-$3.86	-$3.79	-$3.60	-$3.84	-$3.43	-$3.41	-$3.35	-$3.37	-$3.45	-$4.00	-$3.89	-$4.70
2035	-$4.02	-$3.94	-$3.68	-$3.97	-$3.55	-$3.50	-$3.39	-$3.43	-$3.53	-$4.06	-$4.02	-$4.94
2036	-$4.21	-$4.19	-$3.95	-$4.06	-$3.72	-$3.70	-$3.53	-$3.56	-$3.68	-$4.19	-$4.24	-$5.20
2037	-$4.41	-$4.28	-$4.06	-$4.12	-$3.91	-$3.89	-$3.79	-$3.87	-$3.95	-$4.43	-$4.54	-$5.50
2038	-$4.75	-$4.54	-$4.24	-$4.31	-$4.01	-$4.01	-$3.88	-$3.90	-$3.98	-$4.45	-$4.60	-$5.64
2039	-$4.86	-$4.70	-$4.52	-$4.56	-$4.27	-$4.20	-$4.09	-$4.09	-$4.24	-$4.69	-$4.89	-$5.99
2040	-$5.06	-$4.90	-$4.70	-$4.73	-$4.43	-$4.41	-$4.31	-$4.34	-$4.45	-$4.90		

* These values will be applied as positive values.

Cascade

Gas Commodity and Transportation/Storage Costs - (Real 2019$/Dth)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2021	$2.66	$2.47	$2.05	$1.71	$1.57	$1.57	$1.86	$1.90	$1.92	$1.91	$2.12	$2.41
2022	$2.53	$2.44	$2.05	$1.77	$1.66	$1.68	$1.93	$1.96	$1.97	$2.02	$2.21	$2.47
2023	$2.54	$2.48	$2.11	$1.86	$1.74	$1.71	$2.02	$2.06	$2.08	$2.13	$2.28	$2.50
2024	$2.57	$2.48	$2.17	$1.93	$1.79	$1.89	$2.10	$2.14	$2.13	$2.27	$2.43	$2.76
2025	$2.76	$2.68	$2.37	$2.17	$2.08	$2.12	$2.41	$2.49	$2.45	$2.41	$2.59	$2.95
2026	$2.92	$2.85	$2.51	$2.30	$2.19	$2.22	$2.52	$2.60	$2.58	$2.53	$2.69	$3.07
2027	$3.00	$2.92	$2.57	$2.36	$2.26	$2.28	$2.58	$2.67	$2.65	$2.58	$2.73	$3.09
2028	$3.01	$2.92	$2.62	$2.40	$2.29	$2.31	$2.61	$2.73	$2.69	$2.60	$2.77	$3.13
2029	$3.07	$3.00	$2.71	$2.46	$2.37	$2.41	$2.76	$2.88	$2.82	$2.75	$2.95	$3.28
2030	$3.28	$3.19	$2.89	$2.60	$2.50	$2.60	$2.90	$3.02	$2.96	$2.89	$3.13	$3.39
2031	$3.47	$3.31	$2.98	$2.70	$2.61	$2.68	$2.97	$3.08	$3.03	$2.95	$3.17	$3.42
2032	$3.50	$3.31	$2.99	$2.71	$2.62	$2.70	$3.00	$3.10	$3.05	$2.97	$3.21	$3.46
2033	$3.54	$3.38	$3.05	$2.75	$2.67	$2.76	$3.06	$3.16	$3.10	$3.03	$3.28	$3.55
2034	$3.61	$3.44	$3.09	$2.80	$2.71	$2.79	$3.11	$3.21	$3.15	$3.07	$3.34	$3.62
2035	$3.65	$3.48	$3.13	$2.84	$2.75	$2.84	$3.14	$3.25	$3.19	$3.11	$3.38	$3.65
2036	$3.70	$3.52	$3.15	$2.87	$2.78	$2.87	$3.18	$3.28	$3.23	$3.14	$3.43	$3.70
2037	$3.77	$3.59	$3.23	$2.95	$2.83	$2.91	$3.27	$3.36	$3.30	$3.26	$3.55	$3.84
2038	$4.18	$3.88	$3.44	$3.03	$3.03	$3.14	$3.68	$3.80	$3.70	$3.50	$3.87	$4.31
2039	$4.27	$3.96	$3.50	$3.15	$3.18	$3.24	$3.75	$3.86	$3.80	$3.59	$3.96	$4.35
2040	$4.34	$4.01	$3.55	$3.50	$3.26	$3.27	$3.95	$4.21	$4.44	$3.92	$3.89	$4.26
2041	$4.38	$4.05	$3.58	$3.53	$3.29	$3.30	$3.99	$4.25	$4.48	$3.96	$3.93	$4.31
2042	$4.42	$4.09	$3.62	$3.57	$3.33	$3.33	$4.03	$4.29	$4.53	$4.00	$3.97	$4.35
2043	$4.47	$4.13	$3.66	$3.60	$3.36	$3.37	$4.07	$4.34	$4.57	$4.04	$4.01	$4.39
2044	$4.51	$4.18	$3.69	$3.64	$3.39	$3.40	$4.11	$4.38	$4.62	$4.08	$4.05	$4.44
2045	$4.56	$4.22	$3.73	$3.68	$3.43	$3.43	$4.15	$4.42	$4.66	$4.12	$4.09	$4.48
2046	$4.60	$4.26	$3.77	$3.71	$3.46	$3.47	$4.19	$4.47	$4.71	$4.16	$4.13	$4.53
2047	$4.65	$4.30	$3.81	$3.75	$3.50	$3.50	$4.23	$4.51	$4.76	$4.20	$4.17	$4.57
2048	$4.70	$4.35	$3.84	$3.79	$3.53	$3.54	$4.27	$4.56	$4.80	$4.24	$4.21	$4.62
2049	$4.74	$4.39	$3.88	$3.83	$3.57	$3.57	$4.32	$4.60	$4.85	$4.29	$4.26	$4.66
2050	$4.79	$4.43	$3.92	$3.86	$3.60	$3.61	$4.36	$4.65	$4.90	$4.33	$4.30	$4.71
2051	$4.84	$4.48	$3.96	$3.90	$3.64	$3.64	$4.40	$4.69	$4.95	$4.37	$4.34	$4.76
2052	$4.89	$4.52	$4.00	$3.94	$3.68	$3.68	$4.45	$4.74	$5.00	$4.42	$4.38	$4.81
2053	$4.94	$4.57	$4.04	$3.98	$3.71	$3.72	$4.49	$4.79	$5.05	$4.46	$4.43	$4.85
2054	$4.98	$4.61	$4.08	$4.02	$3.75	$3.75	$4.54	$4.84	$5.10	$4.50	$4.47	$4.90
2055	$5.03	$4.66	$4.12	$4.06	$3.79	$3.79	$4.58	$4.89	$5.15	$4.55	$4.52	$4.95
2056	$5.08	$4.71	$4.16	$4.10	$3.82	$3.83	$4.63	$4.93	$5.20	$4.59	$4.56	$5.00
2057	$5.14	$4.75	$4.20	$4.14	$3.86	$3.87	$4.68	$4.98	$5.25	$4.64	$4.61	$5.05
2058	$5.19	$4.80	$4.25	$4.18	$3.90	$3.91	$4.72	$5.03	$5.31	$4.69	$4.65	$5.10
2059	$5.24	$4.85	$4.29	$4.23	$3.94	$3.95	$4.77	$5.08	$5.36	$4.73	$4.70	$5.15
2060	$5.29	$4.90	$4.33	$4.27	$3.98	$3.99	$4.82	$5.13	$5.41	$4.78	$4.75	$5.20
2061	$5.34	$4.95	$4.37	$4.31	$4.02	$4.03	$4.87	$5.19	$5.47	$4.83	$4.80	$5.26
2062	$5.40	$5.00	$4.42	$4.35	$4.06	$4.07	$4.91	$5.24	$5.52	$4.88	$4.84	$5.31
2063	$5.45	$5.05	$4.46	$4.40	$4.10	$4.11	$4.96	$5.29	$5.58	$4.93	$4.89	$5.36
2064	$5.51	$5.10	$4.51	$4.44	$4.14	$4.15	$5.01	$5.34	$5.63	$4.98	$4.94	$5.41
2065	$5.56	$5.15	$4.55	$4.49	$4.18	$4.19	$5.06	$5.40	$5.69	$5.03	$4.99	$5.47

Northwest Natural

Gas Commodity and Transportation/Storage Costs (Real 2019$/Dth)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2021	$1.74	$1.74	$1.52	$1.34	$1.18	$1.18	$1.18	$1.19	$1.19	$1.25	$1.94	$1.97
2022	$1.97	$1.99	$1.95	$1.79	$1.70	$1.71	$1.71	$1.72	$1.73	$1.76	$2.24	$2.26
2023	$2.27	$2.28	$2.22	$1.98	$1.86	$1.87	$1.88	$1.89	$1.89	$1.92	$2.43	$2.46
2024	$2.48	$2.47	$2.41	$2.20	$2.14	$2.15	$2.16	$2.16	$2.17	$2.22	$2.73	$2.77
2025	$2.78	$2.79	$2.76	$2.35	$2.34	$2.35	$2.36	$2.37	$2.38	$2.39	$2.81	$2.85
2026	$2.86	$2.87	$2.70	$2.41	$2.32	$2.33	$2.34	$2.35	$2.36	$2.43	$2.86	$2.98
2027	$2.99	$3.00	$2.83	$2.52	$2.47	$2.48	$2.49	$2.50	$2.51	$2.57	$3.02	$3.10
2028	$3.11	$3.13	$3.04	$2.76	$2.66	$2.67	$2.68	$2.69	$2.70	$2.75	$3.31	$3.44
2029	$3.45	$3.47	$3.30	$2.99	$2.81	$2.82	$2.83	$2.84	$2.85	$2.89	$3.34	$3.46
2030	$3.48	$3.49	$3.36	$3.07	$3.00	$3.02	$3.03	$3.04	$3.05	$3.09	$3.52	$3.57
2031	$3.59	$3.61	$3.53	$3.17	$3.05	$3.06	$3.07	$3.08	$3.09	$3.14	$3.70	$3.75
2032	$3.77	$3.78	$3.69	$3.33	$3.08	$3.09	$3.10	$3.12	$3.13	$3.19	$3.81	$3.84
2033	$3.86	$3.87	$3.54	$3.27	$3.05	$3.06	$3.07	$3.09	$3.10	$3.15	$3.86	$4.09
2034	$4.11	$4.12	$3.64	$3.34	$3.15	$3.17	$3.18	$3.19	$3.20	$3.25	$4.09	$4.20
2035	$4.21	$4.23	$3.79	$3.41	$3.07	$3.08	$3.10	$3.11	$3.12	$3.18	$3.92	$4.05
2036	$4.07	$4.08	$3.72	$3.38	$3.00	$3.01	$3.02	$3.03	$3.05	$3.11	$3.89	$4.18
2037	$4.20	$4.21	$3.84	$3.54	$3.25	$3.27	$3.28	$3.29	$3.31	$3.36	$4.08	$4.32
2038	$4.34	$4.36	$3.99	$3.66	$3.45	$3.46	$3.48	$3.49	$3.50	$3.55	$4.05	$4.36
2039	$4.38	$4.40	$3.99	$3.54	$3.37	$3.38	$3.40	$3.41	$3.42	$3.48	$4.12	$4.42
2040	$4.44	$4.45	$4.05	$3.71	$3.36	$3.38	$3.41	$3.43	$3.18	$3.28	$3.92	$4.22

Environmental Compliance Natural Gas - Carbon Intesity (MTCO2e/Dth)

Year	Avista	Cascade	Northwest Natural
2021	0.0529	0.0531	0.0531
2022	0.0529	0.0531	0.0531
2023	0.0529	0.0531	0.0531
2024	0.0529	0.0531	0.0531
2025	0.0529	0.0531	0.0531
2026	0.0529	0.0531	0.0531
2027	0.0529	0.0531	0.0531
2028	0.0529	0.0531	0.0531
2029	0.0529	0.0531	0.0531
2030	0.0529	0.0531	0.0531
2031	0.0529	0.0531	0.0531
2032	0.0529	0.0531	0.0531
2033	0.0529	0.0531	0.0531
2034	0.0529	0.0531	0.0531
2035	0.0529	0.0531	0.0531
2036	0.0529	0.0531	0.0531
2037	0.0529	0.0531	0.0531
2038	0.0529	0.0531	0.0531
2039	0.0529	0.0531	0.0531
2040	0.0529	0.0531	0.0531
2041	0.0529	0.0531	0.0531
2042	0.0529	0.0531	0.0531
2043	0.0529	0.0531	0.0531
2044	0.0529	0.0531	0.0531
2045	0.0529	0.0531	0.0531
2046	0.0529	0.0531	0.0531
2047	0.0529	0.0531	0.0531
2048	0.0529	0.0531	0.0531
2049	0.0529	0.0531	0.0531
2050	0.0529	0.0531	0.0531
2051		0.0531	
2052		0.0531	
2053		0.0531	
2054		0.0531	
2055		0.0531	
2056		0.0531	
2057		0.0531	
2058		0.0531	
2059		0.0531	
2060		0.0531	
2061		0.0531	
2062		0.0531	
2063		0.0531	
2064		0.0531	
2065		0.0531	

Infrastructure Costs Natural Gas

	Avista	Cascade			Northwest Natural		
Year	Supply (Nominal $/Dth/Day)*	Supply (Real 2019$/ Dth/Day)	Distribution Peak DAY (Real 2019$/ Dth/Day)	Distribution Peak HOUR (Real 2019$/ Dth/Hour)	Supply (Real 2019$/ Dth/Day)	Distribution Peak DAY (Real 2019$/ Dth/Day)	Distribution Peak HOUR (Real 2019$/ Dth/Hour)
2021	-$0.001	$0.000	$0.119	$0.006	$0.057	N/A	$0.442
2022	-$0.002	$0.000	$0.127	$0.007	$0.057	N/A	$0.442
2023	-$0.002	$0.000	$0.130	$0.007	$0.057	N/A	$0.442
2024	-$0.002	$0.000	$0.121	$0.006	$0.057	N/A	$0.442
2025	-$0.002	$0.000	$0.141	$0.007	$0.057	N/A	$0.442
2026	-$0.002	$0.000	$0.126	$0.006	$0.057	N/A	$0.442
2027	-$0.002	$0.000	$0.126	$0.006	$0.057	N/A	$0.442
2028	-$0.002	$0.000	$0.128	$0.007	$0.057	N/A	$0.442
2029	-$0.002	$0.000	$0.128	$0.007	$0.057	N/A	$0.442
2030	-$0.002	$0.000	$0.129	$0.007	$0.057	N/A	$0.442
2031	-$0.002	$0.000	$0.129	$0.007	$0.057	N/A	$0.442
2032	-$0.002	$0.000	$0.128	$0.007	$0.057	N/A	$0.442
2033	-$0.002	$0.226	$0.128	$0.007	$0.057	N/A	$0.442
2034	-$0.002	$0.226	$0.130	$0.007	$0.057	N/A	$0.442
2035	-$0.002	$0.226	$0.130	$0.007	$0.057	N/A	$0.442
2036	-$0.002	$0.226	$0.131	$0.007	$0.057	N/A	$0.442
2037	-$0.002	$0.226	$0.131	$0.007	$0.057	N/A	$0.442
2038	-$0.002	$0.226	$0.129	$0.007	$0.057	N/A	$0.442
2039	-$0.002	$0.226	$0.131	$0.007	$0.057	N/A	$0.442
2040	-$0.002	$0.226	$0.132	$0.007	$0.057	N/A	$0.442
2041		$0.226	$0.131	$0.007	$0.057	N/A	$0.442
2042		$0.226			$0.057	N/A	$0.442
2043		$0.226			$0.057	N/A	$0.442
2044		$0.226			$0.057	N/A	$0.442
2045		$0.226			$0.057	N/A	$0.442
2046		$0.226			$0.057	N/A	$0.442
2047		$0.226			$0.057	N/A	$0.442
2048		$0.226			$0.057	N/A	$0.442
2049		$0.226			$0.057	N/A	$0.442
2050		$0.226			$0.057	N/A	$0.442
2051		$0.226					
2052		$0.226					
2053		$0.226					
2054		$0.226					
2055		$0.226					
2056		$0.226					
2057		$0.226					
2058		$0.226					
2059		$0.226					
2060		$0.226					
2061		$0.226					

2062		$0.226					
2063		$0.226					
2064		$0.226					
2065		$0.226					

* These values will be applied as positive values.

** Alternate submissions

Note: Avista's distribution values will be calculated as a weighted average of the other utilities.

Risk Reduction Value Natural Gas

	Avista	Cascade	Northwest Natural
Year	Risk Reduction Value ($/Dth)	Risk Reduction Value (Real 2019$/Dth)	Risk Reduction Value (Real 2019$/Dth)
2021	$0.000	-$0.139	$0.510
2022	$0.000	-$0.108	$0.510
2023	$0.000	-$0.067	$0.510
2024	$0.000	-$0.104	$0.510
2025	$0.000	-$0.245	$0.510
2026	$0.000	-$0.301	$0.510
2027	$0.000	-$0.221	$0.510
2028	$0.000	-$0.109	$0.510
2029	$0.000	-$0.078	$0.510
2030	$0.000	-$0.105	$0.510
2031	$0.000	-$0.069	$0.510
2032	$0.000	$0.000	$0.510
2033	$0.000	-$0.001	$0.510
2034	$0.000	-$0.016	$0.510
2035	$0.000	-$0.030	$0.510
2036	$0.000	-$0.057	$0.510
2037	$0.000	-$0.141	$0.510
2038	$0.000	-$0.459	$0.510
2039	$0.000	-$0.304	$0.510
2040		$0.000	$0.510

* Alternate submission

Note: Negative values will be applied as zero.

End Use Load Profiles Natural Gas

Avista

Monthly Share of Normal Weather Annual Load													Avg. monthly EE	Peak to Annual Normal Weather	
End Use	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**		**Peak Day**	**Peak Hour**
Com-New Buildings	0.0021	0.0024	0.0031	0.0043	0.0074	0.0106	0.0109	0.0108	0.0102	0.0050	0.0028	0.0019	3080	0.0095851	0.000425
Com-Replacement	0.0062	0.0070	0.0088	0.0125	0.0215	0.0306	0.0315	0.0313	0.0295	0.0144	0.0082	0.0055	8927		
Com-SEM	0.0004	0.0004	0.0005	0.0007	0.0012	0.0018	0.0018	0.0018	0.0017	0.0008	0.0005	0.0003	516		
Com-Retrofit	0.0056	0.0064	0.0080	0.0113	0.0195	0.0277	0.0285	0.0283	0.0267	0.0130	0.0075	0.0050	8071		
Ind-Retrofit	0.0014	0.0016	0.0021	0.0029	0.0050	0.0071	0.0073	0.0073	0.0069	0.0033	0.0019	0.0013	2073		
Ind-Replacement	0.0002	0.0002	0.0003	0.0004	0.0007	0.0010	0.0010	0.0010	0.0009	0.0005	0.0003	0.0002	279		
Res-Manufactured New Homes	0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0003	0.0003	0.0003	0.0001	0.0001	0.0000	81		
Res-SF New Homes	0.0011	0.0013	0.0016	0.0023	0.0039	0.0055	0.0057	0.0056	0.0053	0.0026	0.0015	0.0010	1613		
Res-Market Transformation	0.0079	0.0089	0.0112	0.0158	0.0272	0.0387	0.0398	0.0395	0.0373	0.0182	0.0104	0.0069	11278		
Res-Showerheads & Aerators	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	18		
Res-Smart Thermostat	0.0025	0.0028	0.0035	0.0049	0.0085	0.0121	0.0124	0.0123	0.0116	0.0057	0.0033	0.0022	3524		
Res-Thermostat Optimization	0.0004	0.0005	0.0006	0.0009	0.0015	0.0021	0.0022	0.0021	0.0020	0.0010	0.0006	0.0004	610		
Res-WaterHeat	0.0002	0.0002	0.0003	0.0004	0.0007	0.0010	0.0010	0.0010	0.0010	0.0005	0.0003	0.0002	296		
Res-Insulation	0.0012	0.0013	0.0017	0.0024	0.0041	0.0058	0.0060	0.0059	0.0056	0.0027	0.0016	0.0010	1689		
Res-Heating & Windows	0.0006	0.0007	0.0009	0.0013	0.0022	0.0032	0.0033	0.0032	0.0031	0.0015	0.0009	0.0006	927		
MF-Retrofit	0.0002	0.0003	0.0003	0.0005	0.0008	0.0011	0.0012	0.0012	0.0011	0.0005	0.0003	0.0002	329		
MF-Replacement	0.0003	0.0004	0.0005	0.0007	0.0011	0.0016	0.0017	0.0016	0.0015	0.0008	0.0004	0.0003	469		
	#########	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######			
20 years (2017 - 2037) avg, by month, normal weather															

Average per month of 20 years of EE vs. normal weather annual load.

Peak day in for Oregon territories only for the upcoming winter season (2020-2021). Peak hour takes the peak day/24*1.065

Cascade

Monthly Share of Normal Weather Annual Load													Peak to Annual Normal	
End Use	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Peak Day**	**Peak Hour**
All	0.1541783	0.1264	0.1072	0.0724	0.0499	0.0356	0.0303	0.0312	0.0414	0.0708	0.1191	0.1616	0.0097	0.0005

* Alternate submission

Northwest Natural

	Monthly Share of Normal Weather Annual Load												Peak to Annual Normal Weather	
End Use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Peak Day	Peak Hour
Residential Space Heating	0.204	0.145	0.123	0.070	0.033	0.006	0.000	0.001	0.008	0.062	0.129	0.218	0.0176	0.0010
Residential Hearths and Fireplaces	0.204	0.145	0.123	0.070	0.033	0.006	0.000	0.001	0.008	0.062	0.129	0.218	0.0176	0.0005
Commercial Space Heating	0.204	0.145	0.123	0.070	0.033	0.006	0.000	0.001	0.008	0.062	0.129	0.218	0.0157	0.0012
Water Heating	0.101	0.096	0.092	0.088	0.083	0.079	0.073	0.068	0.069	0.073	0.081	0.095	0.0033	0.0003
Cooking	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.0036	0.0007
Process Load	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.0027	0.0001

Memo

To: Anna Kim, Oregon PUC

From: Ben Cartwright, Energy Trust of Oregon

Date: December 2, 2021

Re: Draft 2023 Electric Avoided Cost Update Summary

This memo provides a summary of the updates to Energy Trust's Final 2023 Electric Avoided Cost buildup, including an overview of the utility inputs provided, a discussion of the results, and a comparison of the final updated blended values to current 2022 Avoided Cost values.

Utility Provided Inputs and PUC Direction

Pursuant to AR 621, each funding utility provides Energy Trust with Avoided Cost inputs for use in the Energy Trust Final 2023 Blended Avoided Costs. Each utility provides the individual components in Table 1 below from the most recently acknowledged IRP (IRP Column) and an optional additional input for the OPUC to consider (Alternative Column). Table 1 shows the values currently utilized in 2022 Avoided Costs, the inputs provided by each electric utility from their most recently acknowledged IRPs, and alternative submissions for consideration in 2023 Avoided Costs. The last column for each utility identifies the direction from OPUC staff as to which of the various submittals Energy Trust should incorporate into the final 2023 Avoided Costs; these values are also highlighted in gold.

Table 1. Utility Inputs Pursuant to AR 621 for use in the Final Energy Trust 2023 Blended Avoided Costs

		Pacific Power				Portland General Electric			
Avoided Cost Element		PAC Current (2022 AC)	PAC 2019 IRP Submission	PAC Alternative Submission	Final Inputs for 2023 Avoided Cost	PGE Current (2022 AC)	PGE 2019 IRP Submission	PGE Alternative Submission	Final Inputs for 2023 Avoided Cost
Global Assumptions	Inflation Rate	2.28%	2.28%	2.16%	IRP	2.05%	2.05%	N/A	IRP
	Real Discount Rate	4.54%	4.54%	4.63%	IRP	4.41%	4.41%	N/A	IRP
	Regional Act Credit	10.00%	10.00%	10.00%	IRP	10.00%	10.00%	N/A	IRP
T&D Line Losses	Transmission Loss Factor	3.50%	3.50%	3.50%	IRP	1.90%	1.90%	N/A	IRP
	Distribution Loss Factor, Commercial	3.69%	3.69%	3.69%	IRP	4.15%	4.15%	N/A	IRP
	Distribution Loss Factor, Industrial	3.20%	3.20%	3.20%	IRP	1.45%	1.45%	N/A	IRP
	Distribution Loss Factor, Residential	4.46%	4.46%	4.46%	IRP	4.74%	4.74%	N/A	IRP
Transmission Capacity Value	Transmission Deferral Credit	$4.16	$4.16	$6.34	IRP	$9.38	$9.38	N/A	IRP
	Seasonal Capacity Split - Summer	50%	48%	39%	Current	50%	50%	N/A	IRP
	Seasonal Capacity Split - Winter	50%	52%	61%	Current	50%	50%	N/A	IRP
	Deficiency start year	2022	2018	2021	IRP	2022	2022	N/A	IRP
Distribution Capacity Value	Distribution Deferral Credit	$9.20	$9.20	$13.38	IRP	$24.39	$24.39	N/A	IRP
	Seasonal Capacity Split - Summer	50%	57%	90%	Current	50%	50%	N/A	IRP
	Seasonal Capacity Split - Winter	50%	43%	10%	Current	50%	50%	N/A	IRP
	Deficiency start year	2022	2018	2021	IRP	2022	2022	N/A	IRP
Generation Capacity Value	Generation Capacity Credit	$83.76	$83.76	$83.76	IRP	$103.33	$109.74	N/A	IRP
	Seasonal Capacity Split - Summer	100.0%	92%	83%	Current	50.0%	50%	N/A	IRP
	Seasonal Capacity Split - Winter	0.0%	8%	17%	Current	50.0%	50%	N/A	IRP
	Deficiency start year	2022	2026	2026	Current	2022	2022	N/A	IRP
Other Values	Risk Reduction Value	$4.02	$3.88	$3.05	IRP	$3.00	$3.00	N/A	IRP
	Forward Market Prices	$45.29	$46.64	$54.92	Update	$48.11	$43.73	N/A	IRP

Energy Trust took these inputs and blended them into electric Avoided Cost values that can be used throughout Energy Trust territory. The blended values are weighted averages where the weighting is based on forecasted 2023 electric utility expenditures from Energy Trust's 2022-2023 budget.

Some additional notes on Table 1:

1) The values provided in this table are in the dollar years provided by the utility. These values will be inflated to 2023$ for use in the 2023 Avoided Costs.
2) The PacifiCorp seasonal capacity split values for Transmission and Distribution are labeled as 'Current' because the OPUC directed Energy Trust to use a 50/50 split for 2023 Avoided Costs.
3) PGE did not provide alternative values for 2023 Avoided Costs.

Table 2 below provides a comparison of the blended 2022 Avoided Cost Component Values to the updated final 2023 Avoided Cost Component values and their percent change from 2022.

Table 2: Comparison of Component Values from 2022 Avoided Costs to the blended Final 2023 Avoided Costs Values

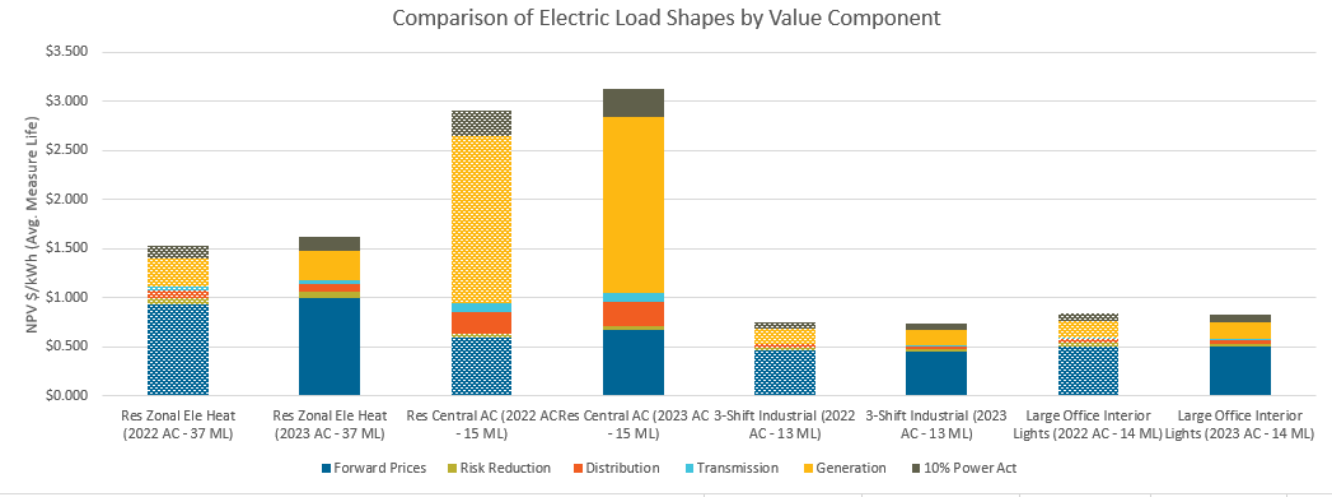
Avoided Cost Component	2023 AC (Updated) Blended Value	2022 Blended Value	Percent Change
Inflation Rate	2.14%	2.14%	0.0%
Real Discount Rate	4.50%	4.50%	0.0%
Northwest Power Act 10% Credit	10.00%	10.00%	0.0%
Risk Reduction Value ($/MWh) ($ 2023)	$3.65	$3.71	-1.6%
Transmission Loss Factor	2.54%	2.54%	0.0%
Transmission Loss Credit ($/kW-yr.) ($ 2023)	$7.97	$7.97	0.0%
Distribution Loss Factor, Commercial	3.96%	3.96%	0.0%
Distribution Loss Factor, Industrial	2.15%	2.15%	0.0%
Distribution Loss Factor, Residential	4.63%	4.63%	0.0%
Distribution Credit ($/kW-yr.) ($ 2023)	$20.00	$20.00	0.0%
Generation Deferral Credit ($/kW-yr.) ($ 2023)	$107.48	$103.40	3.9%
Forward Market Prices ($/MWh) ($ 2023)	$48.20	$46.98	2.6%

Final Results Summary

Once the updated values provided by Electric Utilities were blended, Energy Trust compared each of the 318 electric load shapes updated in the 2023 Avoided Costs to the current 2022 iteration of Avoided Costs and compared the overall impact of the changes based on end use load profiles from the Energy Trust measure mix from 2020 and 2021 YTD. **Overall, final 2023 electric Avoided Costs decreased slightly with overall decreases of ~0.7 percent or $0.006/kWh** compared to current 2022 Avoided Costs, when weighted by the 2020 and 2021 YTD savings achievements with overall weighted average Avoided Cost values going from $0.875/kWh in 2022 to $0.869/kWh in 2023**.** Decreases in forward prices are the largest driver of these decrease in Avoided Costs. However, the increase in generation capacity values that were used as inputs to avoided cost calculations offset a large portion of the impacts of decreased forward prices.

Figure 1 below shows the impact of the individual component parts for both the 2023 and 2022 Avoided Costs based on a sample of illustrative end use load profiles; these load profiles do not necessarily represent end uses that make up large portions of the savings in Energy Trust's portfolio.

Figure 1. Comparison of Load Shape Value by Component



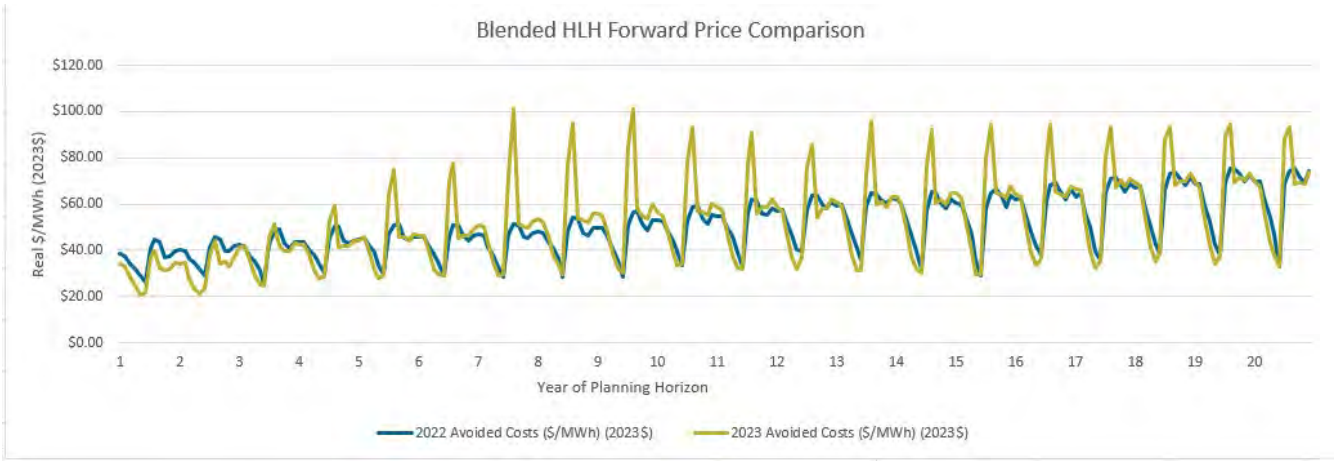
The next section of this memo details the changes to each component of the Avoided Costs update.

Final 2023 Electric Avoided Cost Component Changes and Impacts

Forward Market Prices

On average Heavy Load Hours price comparison went up in 2023 compared to 2022 as reflected in Figure 2 below. However, the overall impact of updated forward market prices is a decrease of about 2% compared to 2022 Avoided Cost inputs based on the Energy Trust measure mix from 2020 and 2021 YTD. As seen in Figure 2, there are spikes in forward prices in the summer months starting in year 5, however there are also decreases in winter pricing over the 20-year planning horizon which results in a net decrease in overall forward prices due to the 2020 and 2021 YTD measure mix consisting of a heavy composition of heating measures.

Figure 2. Blended Forward Price Comparison - Heavy Load Hours



Transmission, Distribution and Generation Values

For 2023 Avoided Costs, the blended transmission and distribution deferral credit values that were used as inputs to avoided cost calculations did not change. Generation deferral credit values that were used as inputs to avoided cost calculations did increase by nearly 4% compared to 2022 Avoided Costs. This 4% increase offsets much of the decrease in forward prices discussed above.

Consistent with updates in UM1893 proceedings for 2022 Avoided Costs, a seasonal 50% summer/50% winter split of the transmission and distribution values were again utilized in the updated 2023 Avoided Costs. Furthermore, generation capacity splits remained the same in 2023 with a seasonal 50% summer/50% winter split applied for PGE and a 100% summer split applied for PacifiCorp.

Risk Reduction & NW Power Act Credit

Risk Reduction values that were used as inputs to avoided cost calculations decreased about 1.6% in the 2023 Avoided Costs. The same NW Power Act Credit value was also utilized in the 2023 Avoided Costs as the 2022 Avoided Costs and therefore there was no change in this value. This credit is applied to each of the Avoided Cost components (except risk reduction) and therefore its impact is relative to the changes in other individual components of each load shape.

Measure Level Impacts

On a measure level, the overall impact of the input changes varies by measure and load profile due to changes in the submitted values. Currently the peak coincident factors for transmission and distribution are specific to each utility and then blended, with the value split 50% summer/50% winter for summer and winter peak hours.

The following figures show changes in NPV Avoided Costs per unit of savings for representative measures across each sector. The NPV is shown according to each measure's typical measure life. The measures shown in these graphs are meant to show differential impacts across end uses and do not necessarily represent measures that make up most of the savings within each sector.

Figure 3. Residential Avoided Cost Comparison of Representative Measures

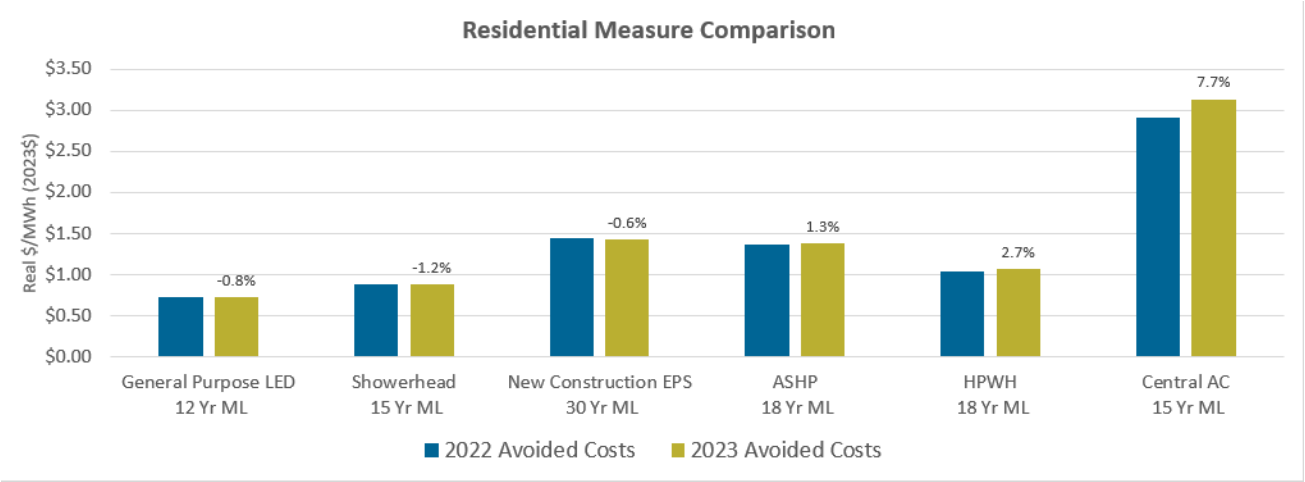


Figure 4. Commercial Avoided Cost Comparison of Representative Measures

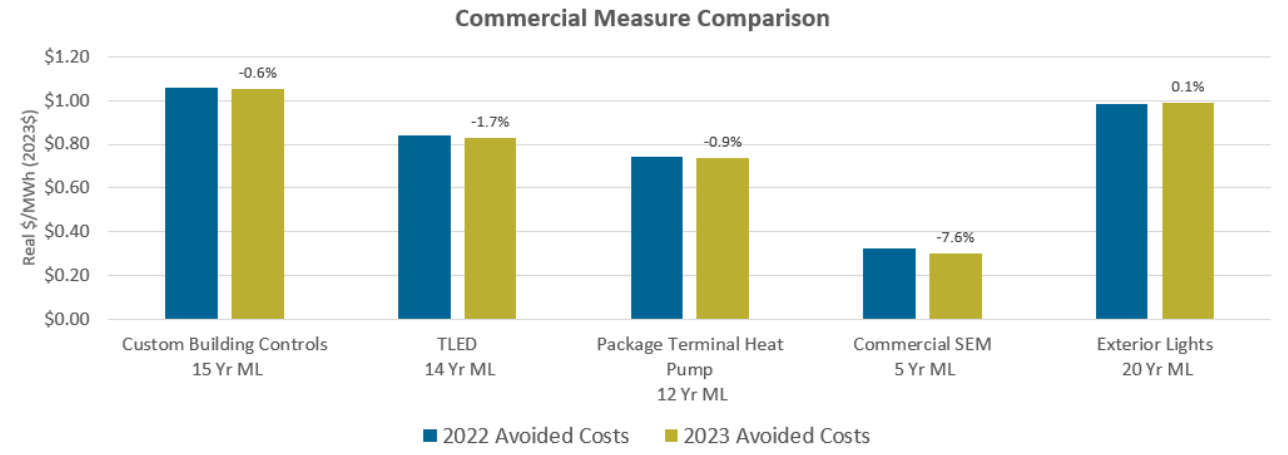
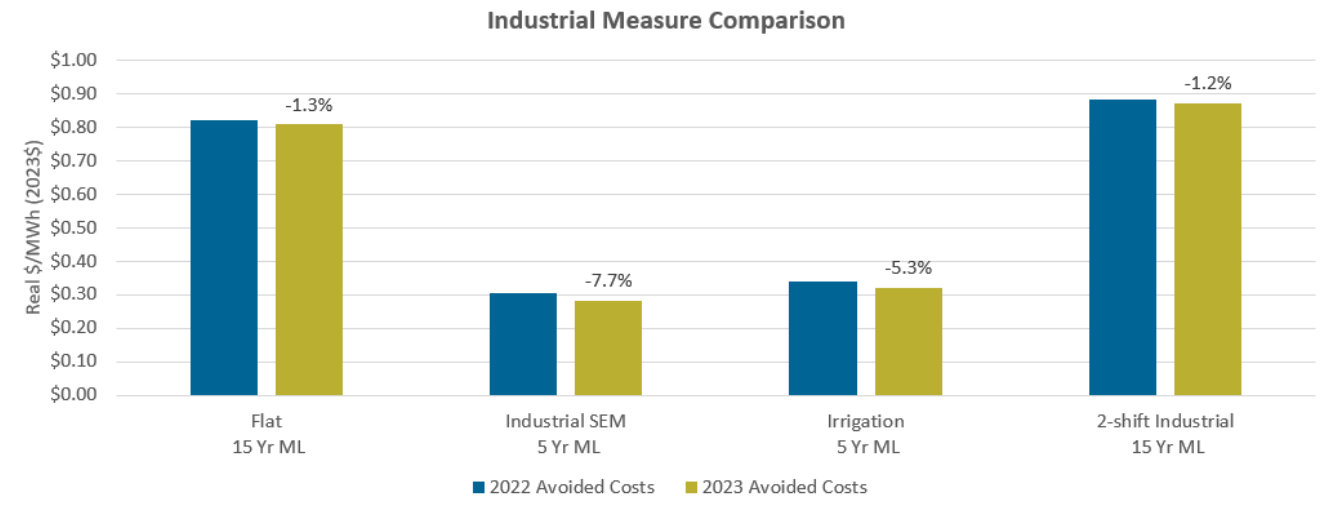


Figure 5. Industrial Avoided Cost Comparison of Representative Measures



Memo

To: Anna Kim, Oregon PUC

From: Gina Saraswati, Energy Trust of Oregon

Date: December 2, 2021

Re: Draft 2023 Natural Gas Avoided Cost Update Summary

This memo provides a summary of the updates to Energy Trust's 2023 Natural Gas Avoided Cost buildup, including an overview of the utility inputs provided, a discussion of the results, and a comparison of the updated blended values to current 2022 Avoided Cost values.

Utility Provided Inputs and PUC Direction

Pursuant to UM 1893, each funding utility provides Energy Trust with Avoided Cost inputs for use in 2023 Blended Avoided Costs. Each utility provides each component in the table below from the most recently acknowledged IRP and an optional additional input for the OPUC to consider. Table 1 below shows the values currently utilized in 2022 Avoided Costs, the inputs provided by each gas utility from their most recent IRPs and updated utility submissions for consideration in 2023 Avoided Costs. The table also shows the values that Energy Trust used in 2023 Avoided Cost calculations as directed by OPUC staff; these values are identified in their own rows as well as being highlighted in orange. Finally, Table 1 compares the blended values used to calculate Avoided Costs for the current 2022 vintage with the blended values used to calculate Avoided Costs for the 2023 vintage.

Table 1. Utility Inputs for use in Energy Trust 2023 Blended Avoided Costs

Input Vintage Description	Avoided Cost Element							
	Inflation Rate	Real Discount Rate	Regional Act Credit	Commodity and Transport	Distribution Capacity - Hourly	Supply Capacity	CO2 Compliance	Risk Reduction
	Percentage	Percentage	Percentage	$/Therm	$/Therm/Year	$/Therm/Year	$/Therm	$/Therm
Northwest Natural								
Selected Input for 2022 Avoided Cost (2023$)	1.96%	4.91%	10%	$0.40	$246.65	$12.69	$0.16	$0.00
Current Submission - 2018 IRP Update (2023$)	2.25%	4.54%	10%	$0.34	$423.23	$2.26	$0.52	$0.06
Selected Input for 2023 Avoided Cost (2023$)	**2.25%**	**4.54%**	**10%**	**$0.34**	**$423.23**	**$2.26**	**$0.51**	**$0.06**
2023 Avoided Cost Input Source	**2018 IRP Update**	**2018 IRP Update**	**2018 IRP Update**	**2018 IRP Update**	**2018 IRP Update**	**2018 IRP Update**	**DEQ**	**2018 IRP Update**
Cascade Natural Gas								
Selected Input for 2022 Avoided Cost (2023$)	3.68%	7.33%	10%	$0.41	$1.32	$48.05	$0.15	$0.00
Current Submission - 2020 IRP (2023$)	3.72%	7.33%	10%	$0.32	$1.43	$3.75	$0.34	$0.00
Current Submission - ALT(2023$)	N/A	N/A	N/A	$0.36	N/A	N/A	$0.56	N/A
Selected Input for 2023 Avoided Cost (2023$)	**3.72%**	**7.33%**	**10%**	**$0.32**	**$1.43**	**$3.75**	**$0.51**	**$0.00**
2023 Avoided Cost Input Source	**2020 IRP**	**2020 IRP**	**2020 IRP**	**2020 IRP**	**2020 IRP**	**2020 IRP**	**DEQ**	**2020 IRP**
Avista								
Selected Input for 2022 Avoided Cost (2023$)	2.00%	4.36%	10%	$0.55	$218.57	$0.07	$0.16	$0.00
Current Submission - 2021 IRP (2023$)	2.00%	4.36%	10%	$0.34	N/A	$0.06	$0.28	$0.00
Current Submission - ALT (2023$)	N/A	N/A	N/A	N/A	N/A	N/A	$0.50	N/A
Selected Input for 2023 Avoided Cost (2023$)	**2.00%**	**4.36%**	**10.00%**	**$0.34**	**$367.66**	**$0.06**	**$0.51**	**$0.00**
2023 Avoided Cost Input Source	**2021 IRP**	**2021 IRP**	**2021 IRP**	**2021 IRP**	**Blended NWN & CNG Value**	**2021 IRP**	**DEQ**	**2021 IRP**
Energy Trust								
Prior Blended Input for 2022 Avoided Cost (2023$)	**2.16%**	**4.50%**	**10%**	**$0.41**	**$216.48**	**$15.85**	**$0.17**	**$0.00**
Updated Blended Input for 2023 Avoided Cost (2023$)	**2.40%**	**4.50%**	**10%**	**$0.34**	**$367.66**	**$2.20**	**$0.51**	**$0.04**
Percent Difference	**11%**	**0%**	**0%**	**-18%**	**70%**	**-86%**	**194%**	**Positive increase**

Energy Trust took these inputs and blended them into gas Avoided Costs values that can be used throughout Energy Trust territory. The blended values are weighted averages where the weighting is based on forecasted 2023 gas utility expenditures from Energy Trusts 2022-2023 budget.

Some additional notes on Table 1.

1) The values provided by utilities were in dollar years specific to their source. These values were inflated to 2023$ for use in the 2023 Avoided Costs.
2) All values are sourced from each respective utility's IRP or alternate submission with the exception of Avista's hourly distribution value. These values rely on a weighted average of values from the other two respective utilities for input.
3) The carbon compliance value selected for each utility are the values published by DEQ as part of the proposed rulemaking in OAR 340-271-990
4) Risk reduction has historically been $0/Therm due to previous agreement that if utilities submit negative risk reduction values that a $0 value will be applied in the blended avoided cost calculation. This year, Northwest Natural has submitted a positive risk reduction value which has resulted in a positive increase in the risk reduction value in the blended avoided costs.

Table 2 below provides a comparison of the blended 2022 Avoided Cost Component Values to the updated 2023 Avoided Cost Component values and their percent change from 2022.

Table 2: Comparison of Component Values from 2022 Avoided Costs to 2023 Avoided Costs

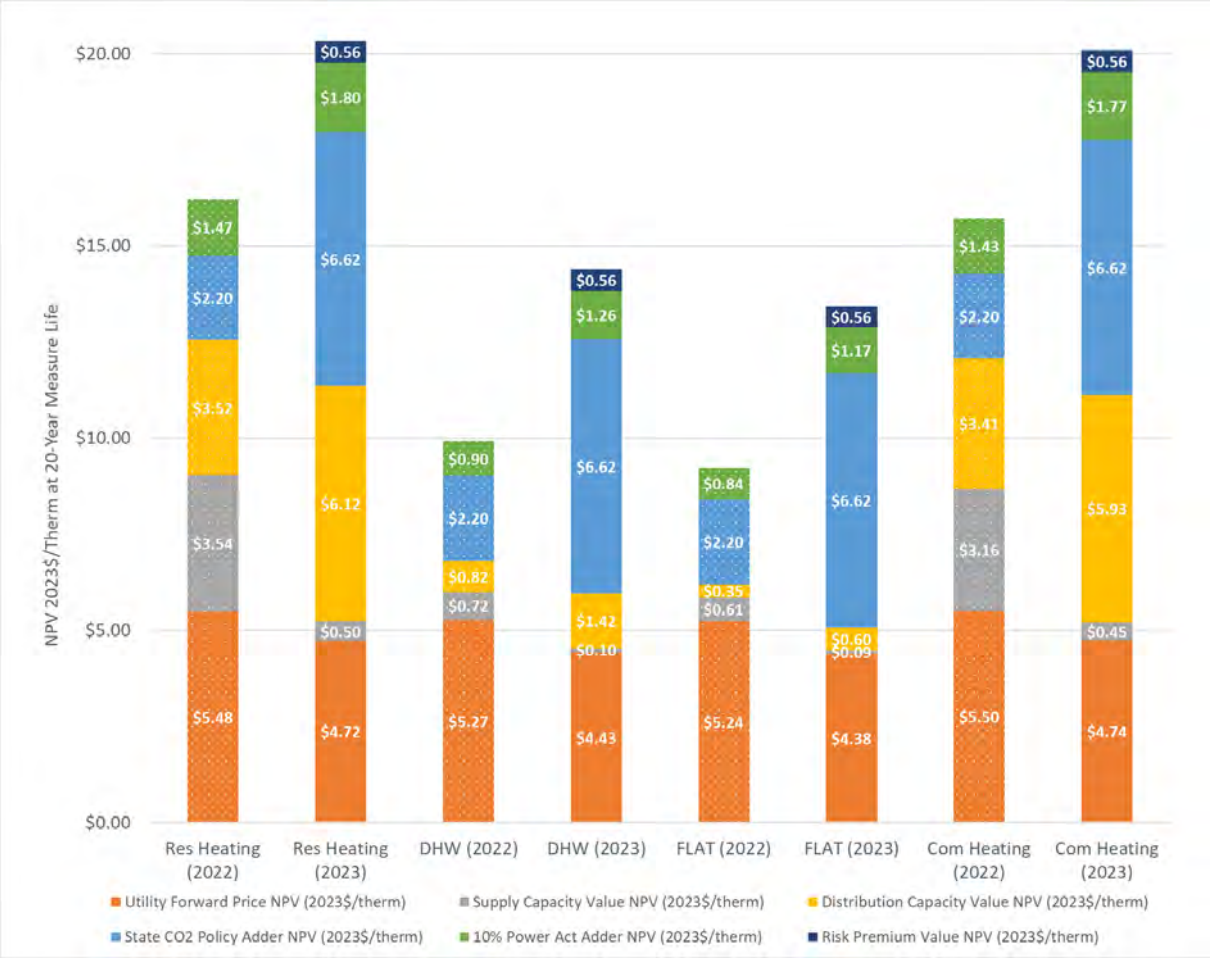
Inflation rate	2.16%	2.40%	11%
Real Discount rate	4.50%	4.50%	0%
Regional Act Credit	10%	10%	0%
Commodity and Transport Prices -2023$/Therm	$0.41	34%	-18%
Distribution Capacity - 2023$/Therm/Year	$216.48	$367.66	70%
Supply Capacity - 2023$/Therm/Year	$15.85	$2.20	-86%
CO2 Compliance - 2023$/Therm	$0.17	$0.51	194%
Risk Reduction - 2023$/Therm	$0.00	$0.04	Increase from zero

Results Summary

Once the updated values provided by Gas Utilities were blended, Energy Trust compared the respective value components of the Avoided Costs for updated 2023 Avoided Costs to the current 2022 iteration of Avoided Costs and compared the overall impact of the changes based on 2020 program savings achievements. **Overall, 2023 natural gas Avoided Costs increased by 32 percent** compared to current 2022 Avoided Costs, when weighted by the last full year of savings achieved in 2020**.**

On an end use basis represented per loadshape, the contribution of each individual Avoided Cost component is different dependent on how much that loadshape coincides with defined utility peak periods. Figure 1 below illustrates and compares the differential impact of the individual component parts of 2022 and 2023 Avoided Costs associated with specified end use load profiles. The contributions of the value components of the load profiles shown in this graph are based on an assumed 20 year measure life. This figure does not represent the proportional contribution of each loadshape to Energy Trust's overall portfolio.

Figure 1. Comparison of Load Shape Value by Component



Natural Gas Avoided Cost Component Changes and Impacts

Forward Market Prices

Figure 2 compares blended commodity and tranport prices from 2022 Avoided Cost inputs and 2023 Avoided Cost inputs. Overall blended commodity and transport prices went down by approximately 18%.

Figure 2. Blended Commodity and Transport Price Comparison

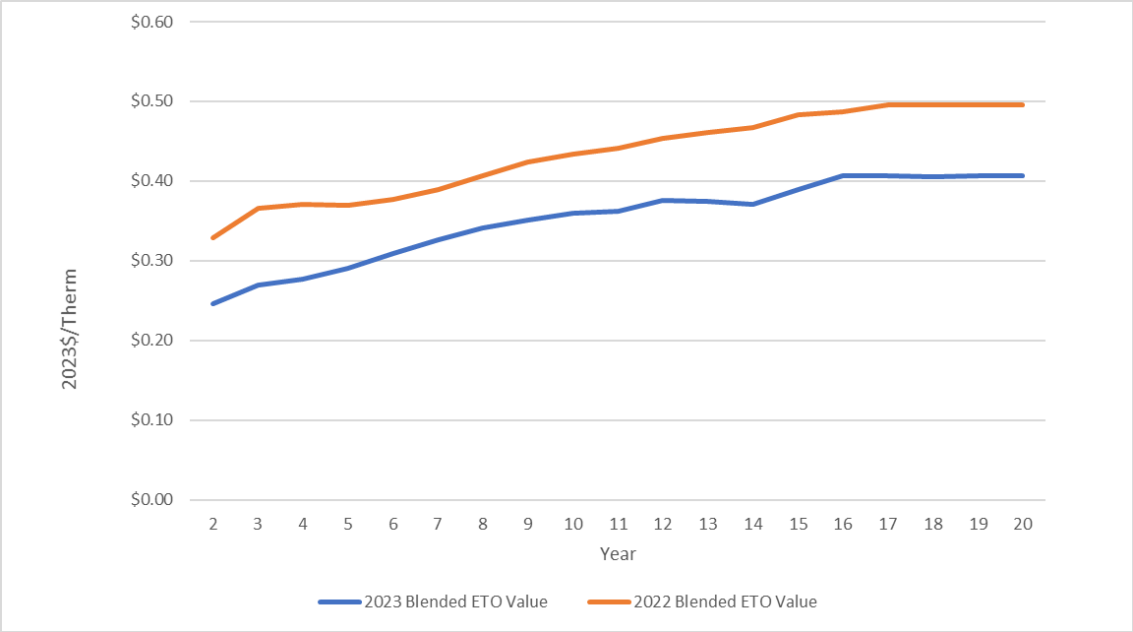
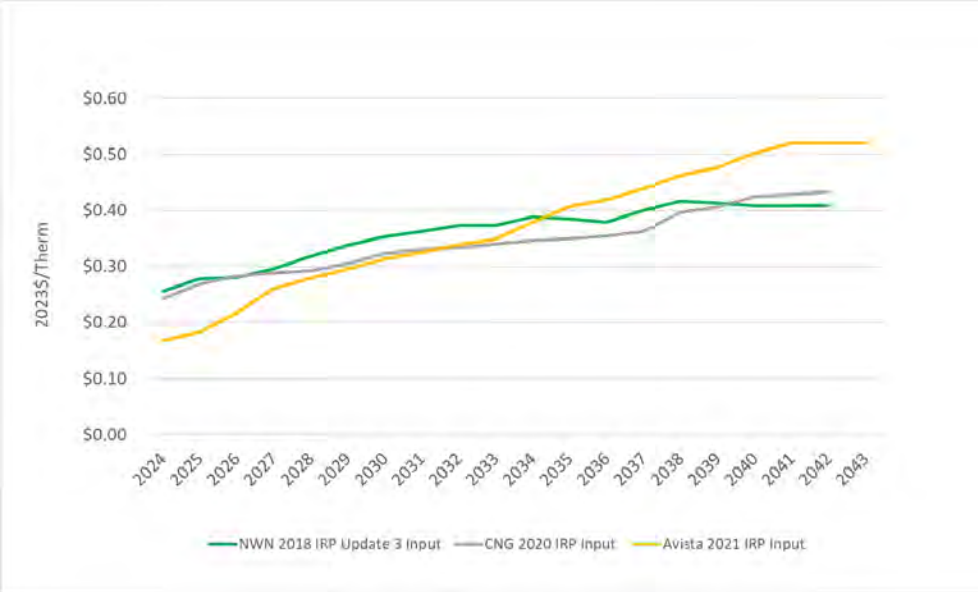


Figure 3. Comparison of Utility Specific Commodity and Transport Price for 2023 Avoided Costs



Peak Factors

Energy Trust uses peak factors to determine the proportion of end-use consumption that takes place on a peak day or a peak hour for natural gas utilities. Peak day and peak hour factors are defined for each of the end-use load profiles that Energy Trust utlizes in avoided cost calculations.

Supply capacity values are shaped using peak day factors, which represent the proportion of annual end-use consumption that falls on a peak day. A peak day is assumed to be the maximum daily coincidence of end-use consumption on a December or January weekday. Distribution capacity values are shaped using peak hour factors, which represent the proportion of end-use consumption that falls on a peak hour. For 2023 Avoided Costs, Energy Trust uses the same peak hour factors and peak day factors that were used for 2022 Avoided Costs.

In the 2021 Avoided Costs, Energy Trust relied on peak hour factors that were calculated seperately from peak day factors. This separate calculation resulted in some instances where the peak hour factor was less than 1/24th of a peak day factor. As a result, Energy Trust altered its method for calcuating peak hour factors for space heating end-uses. For space heating end-uses, a peak hour factor is calculated based on the proportion of consumption during the maximum hour on the peak day as characterized by peak day factors in Table 3. This method was applied for the 2022 Avoided Costs and is also applied to the 2023 Avoided Costs.

For non-space heating end-uses a peak hour is characterized as the maximum hourly coincidence of end-use consumption on a December or January weekday morning from 7-10 A.M. Peak day and peak hour factors are derived from a combination of electric analog end-use load profiles from the Northwest Power and Conservation Council and Northwest Natural regression modeling. Table 3 and Table 4 show each of the peak factors used in 2023 Avoided Costs and their respective sources.

Table 3 – Daily Peak Factors for 2023 and 2022 Avoided Costs

End-Use Load Shape	2023 Peak Day Factor	Peak Day Factor Source	2022 Peak Day Factor	Peak Day Factor Source
Residential Space Heating	**0.0176**	Northwest Natural 2018 IRP Update 3	**0.0176**	Northwest Natural 2018 IRP Update 3
Commercial Space Heating	**0.0157**	Northwest Natural 2018 IRP Update 3	**0.0157**	Northwest Natural 2018 IRP Update 3
Domestic Hot Water	**0.0036**	NWPCC	**0.0036**	NWPCC
Flat	**0.0030**	NWPCC	**0.0030**	NWPCC
Clotheswasher	**0.0020**	NWPCC	**0.0020**	NWPCC

Table 4 – Proportion of Hourly Consumption Used to Derive Space Heating Peak Hour Factors

End-Use Load Shape	% of hourly usage on a peak day	Source	Analog Profile
Residential Space Heating	**7.27%**	NWPCC GLS Shapes	R-All-HVAC-ER-All-All-E
Commercial Space Heating	**7.90%**	NWPCC GLS Shapes	C-All-HVAC-ER-All-All-E

Table 5 – Hourly Peak Factors for 2023 and 2022 Avoided Costs

End-Use Load Shape	2023 Peak Hour Factor	Peak Hour Factor Source	2022 Peak Hour Factor	Peak Hour Factor Source
Residential Space Heating	**0.00128**	NWPCC and Northwest Natural	**0.00128**	NWPCC and Northwest Natural
Commercial Space Heating	**0.00124**	NWPCC and Northwest Natural	**0.00124**	NWPCC and Northwest Natural
Domestic Hot Water	**0.00030**	NWPCC	**0.00030**	NWPCC
Flat	**0.00013**	NWPCC	**0.00013**	NWPCC
Clotheswasher	**0.00024**	NWPCC	**0.00024**	NWPCC

Supply Capacity

The blended supply capacity values that were used as inputs to avoided cost calculations decreased by 86% from the prior round of Avoided Costs submissions. Utility values used in the 2023 avoded cost calculation are illustrated in 4.

Figure 4. Utility Supply Capacity Values for 2023 Avoided Costs

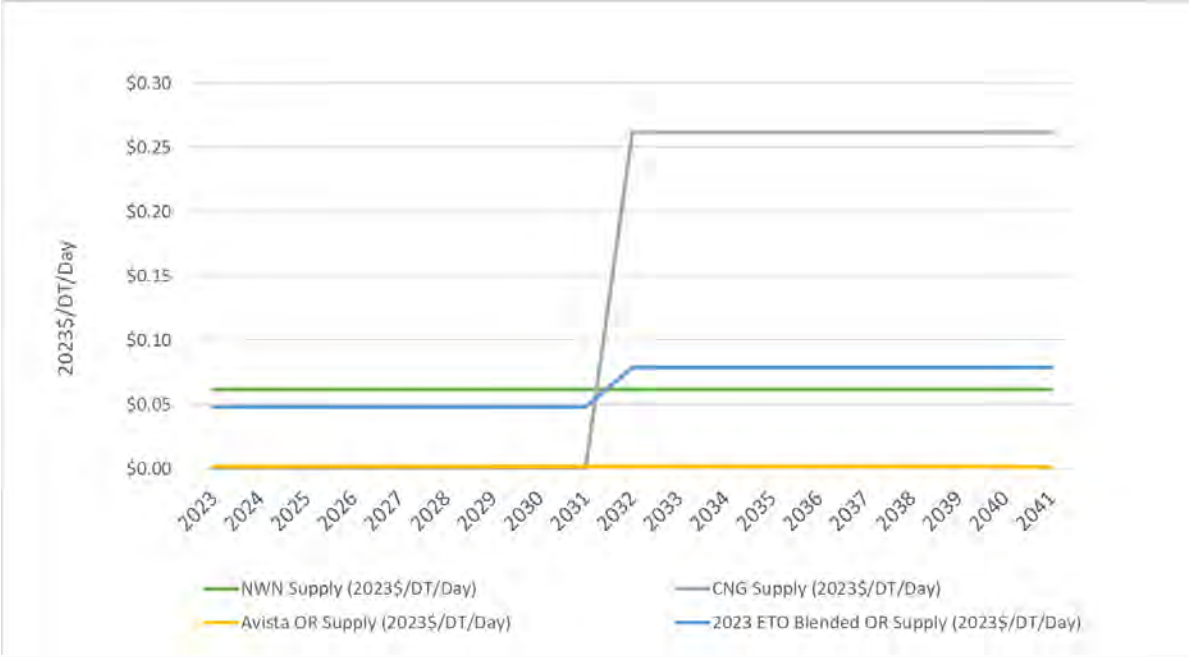
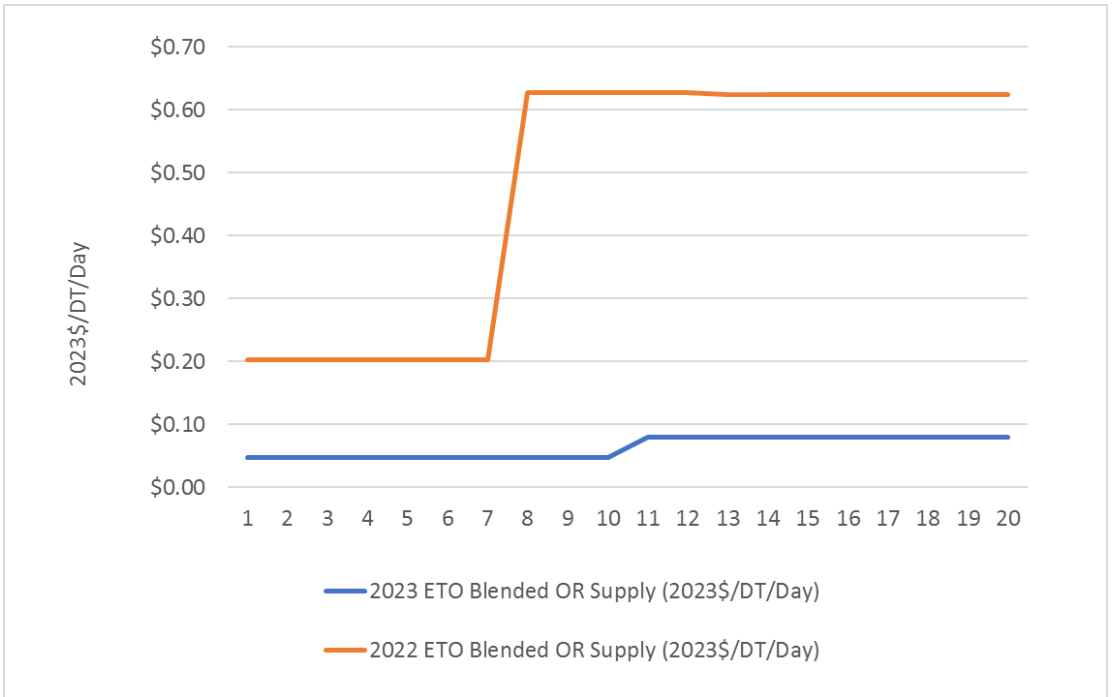


Figure 5 Blended Supply Capacity Values for 2023 and 2022 Avoided Costs



Distribution Capacity

The blended distribution capacity values that were used as inputs to avoided cost calculations increased by 70% from the prior round of Avoided Costs submissions.

Table 6 illustrates the change in distribution capacity costs for each end use load profile from 2022 blended Avoided Costs to the current 2023 blended avoided cost.

Table 6. 70 Year Average Blended Distribution Capacity Value by Loadshape

	DHW	FLAT	Res Heating	Com Heating	Clotheswasher
2022 Blended Avoided Costs	$0.68	$0.29	$2.94	$2.85	$0.54
2023 Blended Avoided Costs	$1.19	$0.50	$5.11	$4.95	$0.95

Carbon Policy Compliance Value

Carbon compliance values increased by 194% from the prior submission from a blended value of $0.17 per therm to $0.51 per therm. Each gas utility has a specific associated carbon intensity value (MTCO2e/Dth) and has provided either a primary or alternative submission that closely mirors the carbon values published by DEQ as part of the proposed rulemaking in OAR 340-271-990.

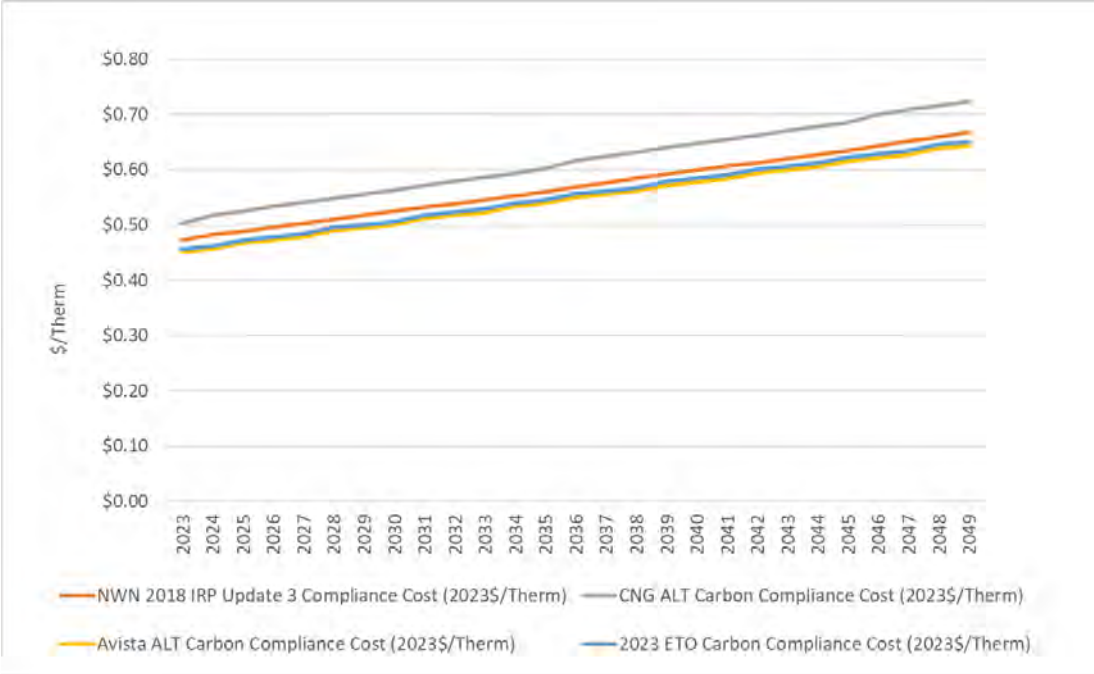
Energy Trust applies a blended carbon intensity value towards the published DEQ schedule in order to calculate the final blended values of carbon compliance for the 2023 Avoided Costs.

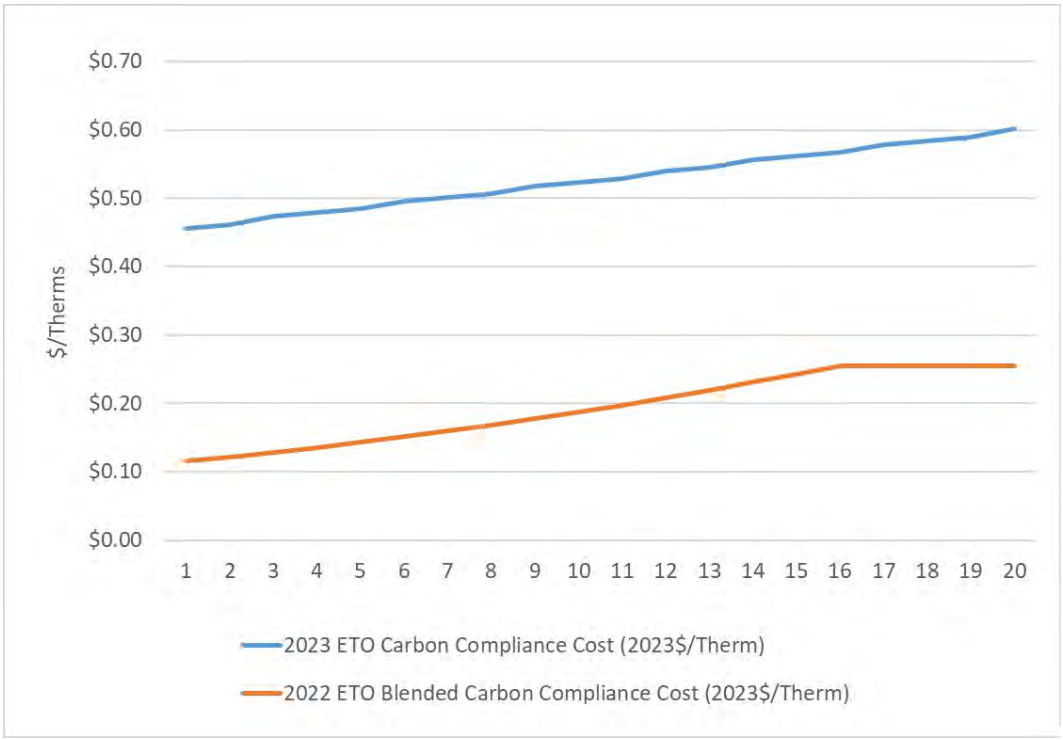
Table 7. Utility-Specific Carbon Intensity Values

	Carbon Intesity (MTCO2e/Dth)
Northwest Natural	0.05310
Cascade	0.05306
Avista	0.05287
Energy Trust Blended Value	0.05307

Figure 6 illustrates the respective values provided by each natural gas utility and the blended value for use in Energy Trust avoided cost.

Figure 6 Utility Carbon Compliance Values for 2023 Avoided Cost





Risk Reduction & NW Power Act Credit

Risk reduction values increased from the 2022 Avoided Costs with a value of $0 to a value of $0.04 for 2023 Avoided Costs; this is an outcome of a previous agreement that if utilities submit negative risk reduction values that a $0 value will be applied in the blended avoided cost calculation.

The NW Power Act Credit is applied to each of the avoided cost components and therefore it's impact is relative to the changes in other individual components of each loadshape. The NW Power Act Credit continued to be 10% of avoided cost value.

Measure Level Impacts

For some measures, particularly space heating measures, the change in Avoided Costs is greater due to the increase in distribution capacity values relative to other profiles. These end-uses have higher peak hour coincident factors than other profiles, and therefore their value increased more relative to other profiles.

The following figures show changes in NPV Avoided Costs per unit of savings for representative measures across each sector. The NPV is shown according to each measure's typical measure life. The measures shown in these graphs are meant to show differential impacts across enduses and do not necessarily represent measures that make up the majority of savings within each sector.

Figure 8. Residential Avoided Cost Comparison of Representative Measures

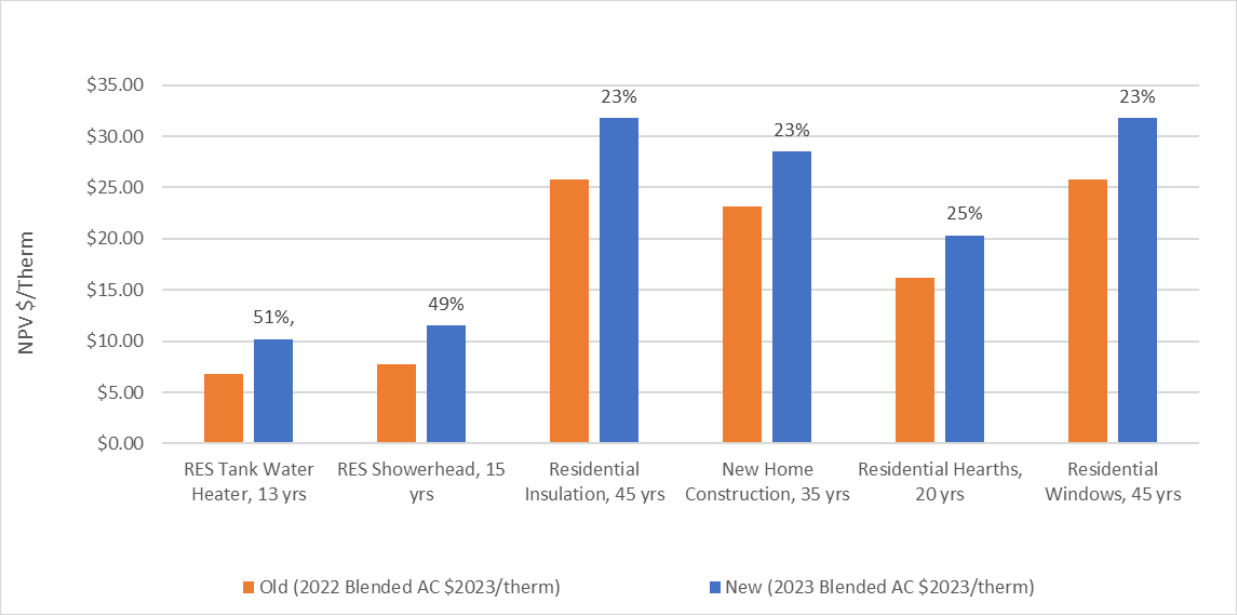


Figure 9. Commercial Avoided Cost Comparison of Representative Measures

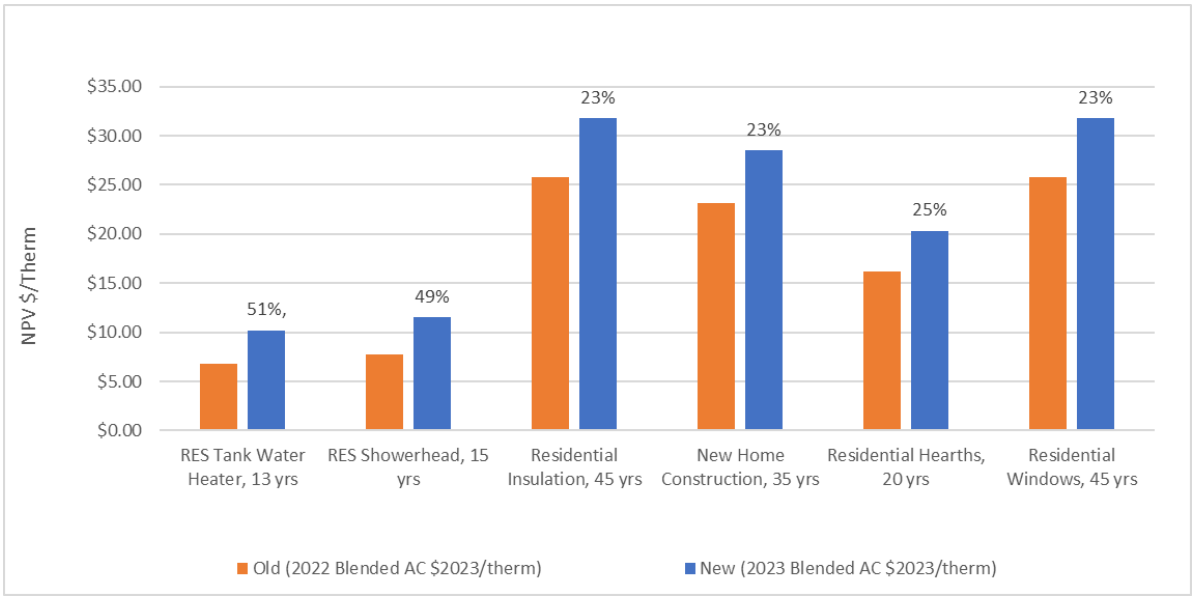
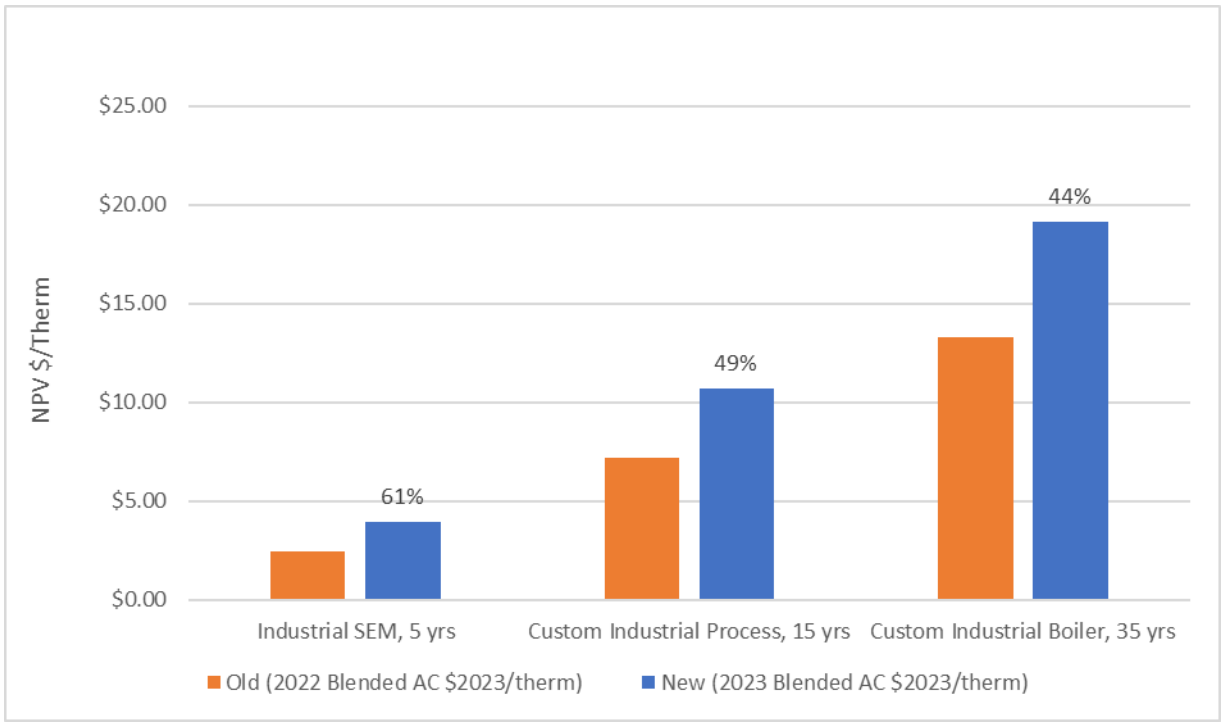



Figure 10. Industrial Avoided Cost Comparison of Representative Measures