

ORDER NO. 21-476

ENTERED Dec 20 2021

**BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON**

UM 1893

In the Matter of

PUBLIC UTILITY COMMISSION OF
OREGON,

Request for Approval of Energy Efficiency
Avoided Cost Data to Be Used by Energy
Trust.

ORDER

DISPOSITION: STAFF'S RECOMMENDATION ADOPTED

At its public meeting on December 14, 2021 the Public Utility Commission of Oregon adopted Staff's recommendation in this matter. The Staff Report with the recommendation is attached as Appendix A.



BY THE COMMISSION:

A handwritten signature in blue ink, appearing to read "Nolan Moser".

Nolan Moser
Chief Administrative Law Judge

A party may request rehearing or reconsideration of this order under ORS 756.561. A request for rehearing or reconsideration must be filed with the Commission within 60 days of the date of service of this order. The request must comply with the requirements in OAR 860-001-0720. A copy of the request must also be served on each party to the proceedings as provided in OAR 860-001-0180(2). A party may appeal this order by filing a petition for review with the Circuit Court for Marion County in compliance with ORS 183.484.

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

REGULAR CONSENT 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.

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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.

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In the request for comments, Staff also described the current status of carbon compliance costs in energy efficiency avoided costs. Staff described the intent to modify natural gas costs this year, and discuss electric costs next year, and requested comments on these plans. Last year, energy efficiency avoided costs already included some assumptions on the future cost of compliance.

Natural gas utilities submitted a forecast of future compliance costs derived for utilities' most recent IRPs that predicts an annual cost per ton emitted. These assumptions can easily be adjusted as new forecasts of compliance costs are developed. Staff proposed directing Energy Trust to apply the social cost of carbon at a 2.5 percent discount rate as the future cost of compliance.

Electric utilities did not provide explicit assumptions about compliance costs associated with carbon of GHGs. Instead, they use forecasts that have built-in assumptions about future carbon compliance costs across the overall electric market. These assumptions are embedded in the forward energy prices, and it is unclear to what extent these forecasts incorporate the cost of carbon associated with changes in state law. It may take some time to assess any issues of double-counting and to implement changes.

As of the writing of this memo, Staff has not received any comments specifically in response to this request. Staff will continue to accept comments leading up to the discussions that will resume in 2022.

This year's data submissions were due October 15, 2021. All five utilities submitted the requested data for Staff review using the template approved by the Commission. Four utilities submitted data by the October 15 filing date, and PGE submitted their filing one business day late. Please see the next section for request for a waiver to submit late information.

After data was submitted, Staff held a stakeholder workshop on November 4, 2021, for Energy Trust to provide an initial look at the resulting avoided costs using the submitted data. In addition to Staff and Energy Trust staff, there were 18 attendees, representing all six utilities. There were also representatives from Citizens' Utility Board, Northwest Energy Coalition, and Washington Utilities and Trade Commission Staff.

In the workshop, Staff requested that stakeholders consider these questions when reviewing the numbers:

- Are any of these numbers inconsistent with what you had submitted?
- Does anything stand out that you think Staff should investigate?
- Are there alternate numbers that Staff should give particular consideration to?

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In reviewing these data, stakeholders had questions about some of the information provided. Some utilities identified a few items for Energy Trust to follow up on later. The data submitted here reflect these additional clarifications.

Stakeholders also suggested having more time to review the data submissions. Some utilities suggested submitting data sooner so that there is more time for review. In 2022, Staff will discuss a possible timeline for voluntarily submitting data earlier than is required by rules.

Section II. Waiver Request

PGE was unable to file data by the October 15, 2021, deadline and submitted data on the next business day, October 17, 2021. PGE submits a one-time waiver from the filing deadline. In email, and on a call to Staff on October 15, PGE indicated that the data required management review before submission and that the required manager was unavailable that day. Staff considers this good cause for an occasional event and recommends that the Commission approve this waiver. Staff recommends that PGE implement processes to prevent future instances of a late filing.

Please see Attachment 1 for PGE's waiver request.

Section III. Data Recommendations

Staff reviewed the submitted utility data. For the most part, data came from the utilities' Integrated Resource Plans. In situations where alternate sets of data were provided, Staff checked to see if the alternate data had been reviewed previously by Staff in this docket or in other dockets. In cases where data had been reviewed and found reasonable, Staff recommends using the more recent alternate data.

In some cases, Staff also recommends applying certain data decisions specified in the past, rather than what has been submitted by the utilities. An example of this is the assumption that the deficiency start year is immediate, which is a placeholder until new direction is provided through UM 2011. These recommendations do not reflect inaccurate filings on the part of the utilities, but generally reflect past practices. These recommendations are separated by fuel type, starting with general decisions and then utility-specific recommendations.

Please note that there are some changes to outputs from year to year because of the shift in timeframe. All final recommended values are attached as Attachment 2.

Electric Utility Data

In 2019, as an outcome of UM 1893, Energy Trust began applying the seasonal contribution of energy savings measures for generating capacity, transmission capacity,

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and distribution capacity. Generation, transmission, and distribution capacity values may experience different seasonal patterns for a given utility. Seasonal contributions to peak are simplified based on utility estimates to one of: 100 percent winter contribution, 100 percent summer contribution, or a 50/50 split between winter and summer.

PacifiCorp

PacifiCorp submitted values from its acknowledged 2019 IRP as the main submission. PacifiCorp also submitted alternate values used in its 2021 IRP.

Staff recommends accepting the main submission values with the exception of alternate forward market energy prices to use the most up-to-date market numbers, and the seasonal split of capacity values (100 percent summer for generation and 50/50 split for transmission and distribution), and to the generating capacity deficiency year based on the decisions described above. Energy Trust has previously been directed to use a generation capacity deficiency start year as the first year values will be used (2023) based on the action plan to acquire wind resources for that year. Staff recommends continuing with this practice at this time, to be revisited when new direction is provided through the Generic Capacity Docket No. UM 2011. These recommendations result in minimal change to most numbers that were used last year in PacifiCorp's 2019 IRP.

Portland General Electric

Based on the review of electric utility data, PGE submitted values from its acknowledged 2019 IRP and 2019 IRP Update as the main submission. PGE submitted no alternate values.

Staff recommends accepting the main submission values with the exceptions described above to the seasonal split of capacity values (50/50 split for generation, transmission, and distribution). These recommendations result in minimal changes to values from last year.

Natural Gas Utility Data

IRP modeling for natural gas utilities has undergone changes in recent years as new practices are being adopted over time. There are some cases where a utility has not calculated certain values in past IRPs. In these cases, Staff has directed Energy Trust to represent these values as a weighted average of values provided by other utilities. Staff points out where there are or were missing values and recommends using this practice unless otherwise noted.

Starting in 2019, this docket began to include distribution peak hour values. Utilities have provided estimates that were created through different methods. Here is a summary of the two methods and how they were applied:

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Cascade's estimate of distribution capacity value was developed by applying a Cascade specific system-wide peak hour factor to their estimated annual distribution capacity [deferral] value. Energy Trust shaped that hourly value using the ratio of Cascade's system wide peak hour factor to the corresponding end-use peak hour factors utilized throughout the avoided cost calculations.

Northwest Natural's estimate of distribution capacity value was represented as the cost of serving an additional dekatherm on a peak hour. Energy Trust then annualized that value and applied end-use specific peak hour factors to determine each end-use profile's coincidence on that peak hour.¹

Once Energy Trust applied these numbers, they came out with significant differences. Since the last submission, Staff studied both approaches at length as part of the utilities' respective IRP reviews and Staff reaffirms that both approaches are reasonable, using the best data available to the utilities. Staff concludes that at this time, these data should be used as submitted. Staff anticipates these values will be updated as new information is made available, and as Energy Trust's processes evolve to better model peak loads.

Regarding carbon compliance costs, as discussed in Section I, Staff proposed updating all natural gas carbon compliance costs to be consistent with DEQ's costs, which reflect the social cost of carbon at a 2.5 percent discount rate. While all gas utilities submitted carbon compliance values consistently, Staff has directed Energy Trust to use the DEQ values for carbon compliance costs applied to the utilities' carbon intensities.

Avista

Avista submitted values from its acknowledged 2021 IRP as the main submission. Avista included alternate values for carbon compliance costs based off of DEQ's proposed Climate Protection Program.

Staff recommends accepting the main submission with exceptions for carbon compliance costs, as described above, and distribution capacity. Staff proposes to continue applying a weighted average of Northwest Natural and Cascade's distribution capacity costs to represent Avista. These recommendations result in various changes in values from last year and this year.

¹ Order No. 19-430 Appendix A p. 35.

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Cascade

Cascade submitted values from its acknowledged 2020 IRP as the main submission. Cascade also submitted alternate values with updated commodity prices and carbon compliance values.

Staff recommends accepting the main submission values with the exception of carbon compliance costs as described above. These recommendations result in various changes in values from last year and this year.

Northwest Natural

Northwest Natural submitted values from its acknowledged 2018 IRP Update as the main submission. Northwest Natural did not submitted alternate values. Please note that commodity prices come from Northwest Natural's recently acknowledged IRP Update from August and not their Purchased Gas Adjustment (PGA). The UM 1893 process can use information from a PGA based on timing of the PGA process with respect to IRPs.

Staff recommends accepting the main submission values with the exception of carbon compliance costs as described above. These recommendations result in various changes in values from last year and this year.

Section IV: 2022 Filing Results for 2023 Planning

To facilitate the review of data and provide a draft preview of the impacts of changes to energy efficiency avoided cost data, Energy Trust used the data recommended in this memo to produce generalized high-level estimates on impacts for 2023 planning.

Electric costs have changed only slightly by decreasing about one percent overall from the costs in use for 2021. This resulted in projected single-digit changes to different end uses. Residential air conditioning changed the most by increasing eight percent.

Natural gas costs have overall increased significantly by roughly thirty-two percent. This is due primarily to the changes to carbon compliance costs primarily and across all measures. Distribution capacity values increased while supply capacity values decreased. Other values have gone up and down slightly.

Please see Attachment 3 and Attachment 4 for more details.

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Conclusion

Based on this analysis, Staff believes the attached data are ready for Commission approval and for use by Energy Trust in planning for 2023 activities and for the preparation for the 2023 budget.

PROPOSED COMMISSION MOTION:

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

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

November 1, 2021

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 Amended Compliance Energy Efficiency Avoided Cost Submission

On October 18, 2021, PGE filed in Docket No. UM 1893 PGE’s Energy Efficiency Avoided Cost compliance filing. Pursuant to Oregon Administrative Rule (OAR) 860-030-0011(1), “*The EE avoided cost report must be submitted on or before October 15 of each year for use in the next energy efficiency program budget cycle*”. On Friday, October 15, 2021, PGE reached out to Staff requesting a one business day extension. PGE expressed appreciation to Staff’s understanding of the circumstances of the compliance filing being late. PGE submitted the compliance filing on Monday, October 18, 2021.

At the request of Staff, PGE is submitting an amended compliance filing requesting a waiver of OAR 860-001-0150 Filing Date, from October 15, 2021 to October 18, 2021. This letter serves only to request a waiver of the filing date and does not supplement or make any corrections to the content or attachments as previously filed on October 18, 2021.

Please direct any questions or comments regarding this filing to Santiago Beltran 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

cc: Anna Kim, OPUC

Data References

Original submissions and source documentation can be found in the following docket

Utility	Report Docket	Submission set (main or alternate) unless otherwise specified
PacifiCorp	RE 181	Main submission, alternate forward market prices, and T&D 12x24
PGE	RE 182	Main submission
Avista	RG 85	Main submission
Cascade	RG 86	Main submission
Northwest Natural	RG 87	Main submission

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Global Assumptions Electric		PacifiCorp		PGE	
Avoided Cost Element	Units	Value	Dollar Year	Value	Dollar Year
Inflation Rate	Percent	2.28%	N/A	2.05%	N/A
Real Discount Rate	Percent	4.54%	N/A	4.41%	N/A
Regional Act Credit	Percent	10.00%	N/A	10.00%	N/A
Transmission Loss Factor	Percent	3.50%	N/A	1.90%	N/A
Distribution Loss Factor, Commercial	Percent	3.69%	N/A	4.15%	N/A
Distribution Loss Factor, Industrial	Percent	3.20%	N/A	1.45%	N/A
Distribution Loss Factor, Residential	Percent	4.46%	N/A	4.74%	N/A
Risk Reduction Value	\$/MWh	\$3.88	2018	\$3.00	2020
Transmission Deferral Credit	\$/kW-yr	\$4.16	2018	\$9.38	2019
Seasonal Capacity Split - Summer	Percent	50%*	N/A	50.00%	N/A
Seasonal Capacity Split - Winter	Percent	50%*	N/A	50.00%	N/A
Summer Peak Period Definition	Month/Day/Hour	Trans. 12x24 profile	N/A	N/A	N/A
Winter Peak Period Definition	Month/Day/Hour	Trans. 12x24 profile	N/A	N/A	N/A
Deficiency start year	Year	2018	N/A	2022	N/A
Distribution Deferral Credit	\$/kW-yr	\$9.20	2018	\$24.39	2019
Seasonal Capacity Split - Summer	Percent	50%*	N/A	50.00%	N/A
Seasonal Capacity Split - Winter	Percent	50%*	N/A	50.00%	N/A
Summer Peak Period Definition	Month/Day/Hour	Dist. 12x24 profile	N/A	N/A	N/A
Winter Peak Period Definition	Month/Day/Hour	Dist. 12x24 profile	N/A	N/A	N/A
Deficiency start year	Year	2018	N/A	2022	N/A
Generation Capacity Credit	\$/kW-yr	\$83.76	2018	\$109.74	2020
Seasonal Capacity Split - Summer	Percent	100%*	N/A	50.00%	N/A
Seasonal Capacity Split - Winter	Percent	0%*	N/A	50.00%	N/A
Deficiency start year	Year	2022*	N/A	2022	N/A

* Denotes numbers specified by Staff

Forward Market Prices Electric

Note: Annual will be shaped to existing monthly shapes

Date	PacifiCorp HLH Total (\$/MWh)	PacifiCorp LLH Total (\$/MWh)	Year	PGE HLH Total (\$/MWh)	PGE LLH Total (\$/MWh)
1/1/2021	24.12	23.67	2021	\$22.24	\$20.35
2/1/2021	66.94	57.44	2022	\$27.58	\$25.56
3/1/2021	25.14	25.52	2023	\$29.33	\$27.13
4/1/2021	23.21	16.48	2024	\$30.06	\$28.00
5/1/2021	21.37	14.27	2025	\$34.63	\$32.45
6/1/2021	25.73	21.14	2026	\$38.44	\$36.49
7/1/2021	36.72	23.71	2027	\$41.18	\$39.60
8/1/2021	40.11	26.74	2028	\$43.64	\$41.43
9/1/2021	32.03	24.27	2029	\$48.73	\$46.54
10/1/2021	34.22	29.02	2030	\$53.38	\$51.00
11/1/2021	34.91	28.83	2031	\$57.12	\$54.42
12/1/2021	37.97	31.53	2032	\$58.55	\$56.39
1/1/2022	38.79	31.14	2033	\$61.36	\$59.23
2/1/2022	36.82	31.07	2034	\$62.48	\$60.59
3/1/2022	28.10	24.03	2035	\$65.15	\$63.67
4/1/2022	20.43	16.53	2036	\$66.73	\$63.87
5/1/2022	16.87	12.52	2037	\$70.04	\$67.73
6/1/2022	24.10	18.94	2038	\$72.49	\$70.19
7/1/2022	41.64	24.15	2039	\$77.49	\$74.83
8/1/2022	43.79	25.08	2040	\$81.03	\$78.28
9/1/2022	29.57	28.45	2041	\$83.42	\$81.54
10/1/2022	29.90	25.66	2042	\$84.53	\$82.37
11/1/2022	30.46	27.21	2043	\$87.13	\$84.74
12/1/2022	36.55	30.15	2044	\$87.80	\$84.90
1/1/2023	37.11	29.26	2045	\$90.67	\$88.32
2/1/2023	34.29	29.39	2046	\$91.83	\$89.46
3/1/2023	28.52	22.23	2047	\$94.69	\$91.31
4/1/2023	21.18	23.19	2048	\$94.66	\$92.90
5/1/2023	15.35	14.36	2049	\$98.44	\$96.36
6/1/2023	22.80	15.52	2050	\$99.90	\$96.54
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			

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Loss of Load Probability Heat Map Input Electric

PeaksCap

WEEKDAYS & WEEKENDS

Hi 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	0.00	0.01	0.01	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.01	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	0.01	0.00	0.00	0.00	0.00	0.00
19	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.17	0.00	0.00	0.00	0.01
20	0.01	0.00	0.00	0.00	0.01	0.00	0.17	0.00	0.00	0.00	0.00	0.01
21	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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.

PeaksCap

WEEKDAYS ONLY

Hi 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	0.00	0.00	0.01	0.01	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	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	0.08	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.

PeaksCap

WEEKENDS ONLY

Hi 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	0.00	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	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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.

PeaksCap

WEEKDAYS & WEEKENDS

Hi 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	0.51300	0.54841	0.600313	0	0	0	0	0	0	0.00320	0.54437	0	
8	1.97129	0.5181	0.002008	0	0	0	0	0	0	0.00124	1.20713	0	
9	2.16620	0.001004	0	0	0	0	0	0	0	0.00843	1.65189	0	
10	1.20491	0.18354	0	0	0	0	0	0	0	0.04071	0.93857	0	
11	0.97961	0.04664	0	0	0	0	0.00104	0	0	0.00271	0.60691	0	
12	0.54313	0.03129	0	0	0	0.00104	0.01164	0.00029	0	0.00294	0.06821	0	
13	0.2791	0.01447	0	0	0	0.00034	0.00321	0.00116	0.00036	0	0.00121	0.30764	
14	0.18410	0.00884	0	0	0	0.00026	0.00203	0.01394	0.02294	0	0.01149	0.21311	
15	0.11701	0.02081	0	0	0	0.00146	0.00849	0.00099	0.00041	0	0.01897	0.02961	
16	0.30704	0.02816	0	0	0	0.00034	0.01877	0.12931	0.47137	0.11561	0.00250	0.37054	
17	1.40317	0.00973	0	0	0	0.00034	0.00216	0.26384	0.79061	1.26319	0	0.1752	1.99811
18	1.80241	0.0224	0.00304	0	0	0.00034	0.00292	0.26366	1.21701	0.30056	0	0.30764	1.86641
19	1.31914	0.0716	0.00209	0	0	0.00034	0.00797	0.52017	1.99003	0.50787	0	0.33811	2.69161
20	1.90741	0.07961	0.00213	0	0	0.00029	0.00361	0.71736	1.60913	0.33163	0	0.45121	2.23059
21	1.86244	0.04844	0	0	0	0.00034	0.00354	0.44409	1.46444	0.1187	0	0.26176	1.91067</

ORDER NO. 21-476

Supplemental T&D information provided by PacifiCorp

Distribution 12x24 Weighting Dist. 12x24 profile
Hour

Season	Monthly Weight	Hour																								
		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%	1%	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%	2%	8%	###	###	7%	0%	0%	0%	0%	0%	0%
Summer	15%	8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	4%	4%	3%	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%	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	Hour																								
		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%	6%	2%	0%	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%	2%	7%	###	###	4%	0%	0%	0%	0%	0%	0%	0%
Summer	11%	8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	5%	4%	1%	0%	0%	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%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Winter	15%	12	0%	0%	0%	0%	0%	0%	3%	4%	1%	0%	0%	0%	0%	0%	0%	2%	3%	2%	0%	0%	0%	0%	0%	0%

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

Global Assumptions Natural Gas

		Avista	Cascade	Northwest Natural
Avoided Cost Element	Units	Value	Value	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

ORDER NO. 21-476

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

Year	Avista	Cascade		Northwest Natural			
	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.

ORDER NO. 21-476

End Use Load Profiles Natural Gas

Avista

Monthly Share of Normal Weather Annual Load													Avg. monthly EE	Peak to Annual Normal	Peak Hour
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												
End Use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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

Peak to Annual Normal	Peak Hour
0.0097	0.0005

* Alternate submission

ORDER NO. 21-476

Northwest Natural

Monthly Share of Normal Weather Annual Load												
End Use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
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
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
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
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
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

Peak to Annual Normal Weather	
Peak Day	Peak Hour
0.0176	0.0010
0.0176	0.0005
0.0157	0.0012
0.0033	0.0003
0.0036	0.0007
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

Avoided Cost Element		Pacific Power				Portland General Electric			
		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

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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%

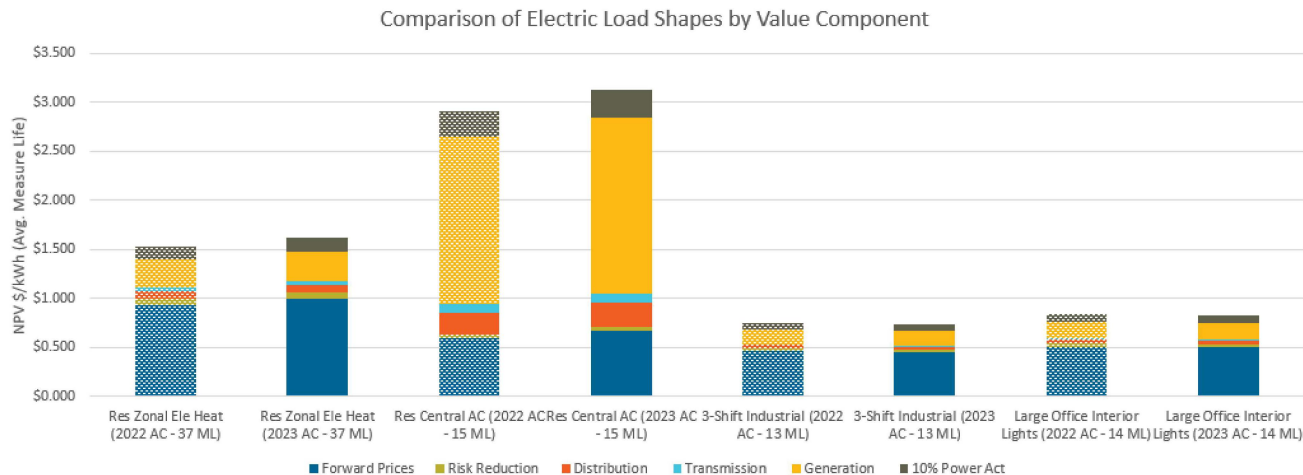
Final Results Summary

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.

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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.

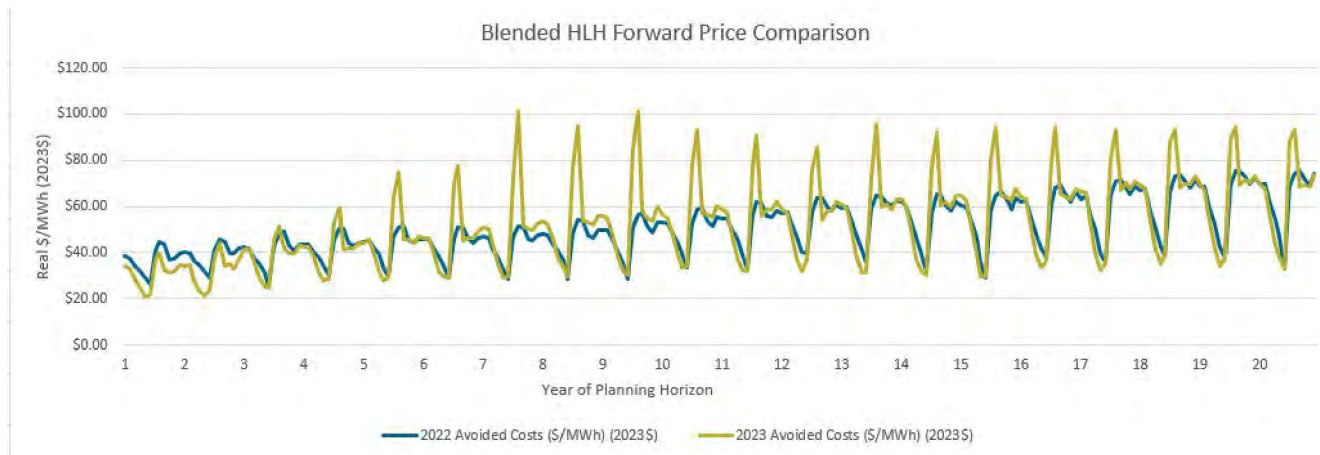
Final 2023 Electric Avoided Cost Component Changes and Impacts

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.

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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.

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Figure 3. Residential Avoided Cost Comparison of Representative Measures

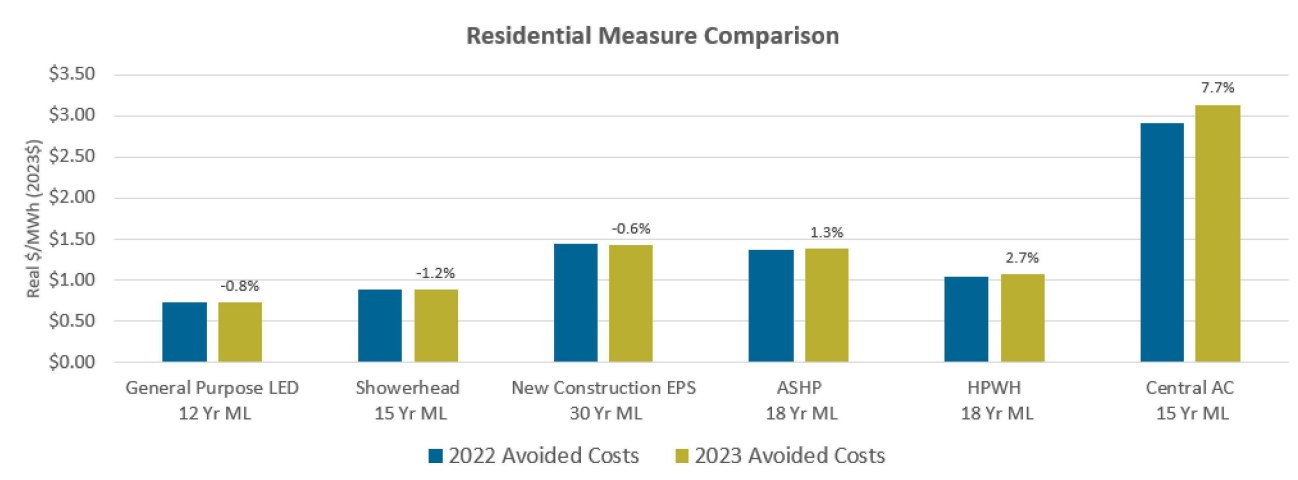


Figure 4. Commercial Avoided Cost Comparison of Representative Measures

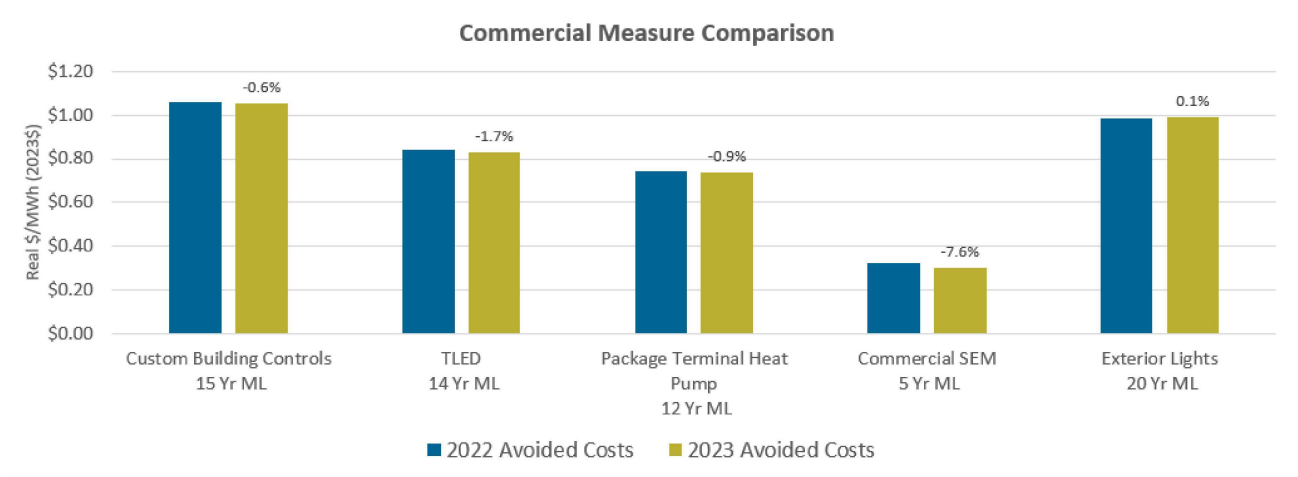
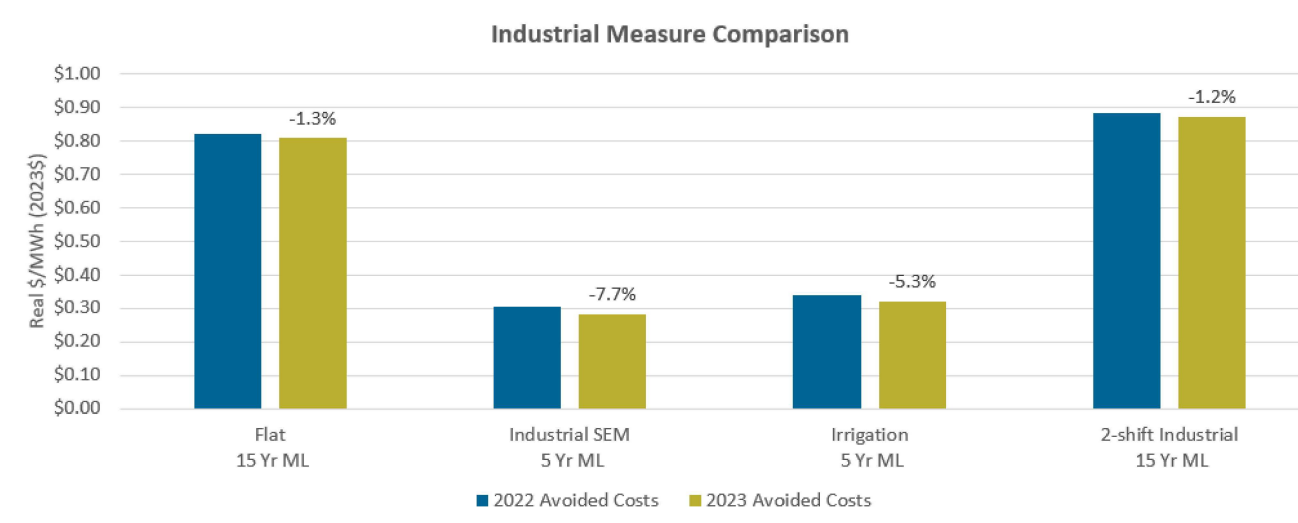


Figure 5. Industrial Avoided Cost Comparison of Representative Measures





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.

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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

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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

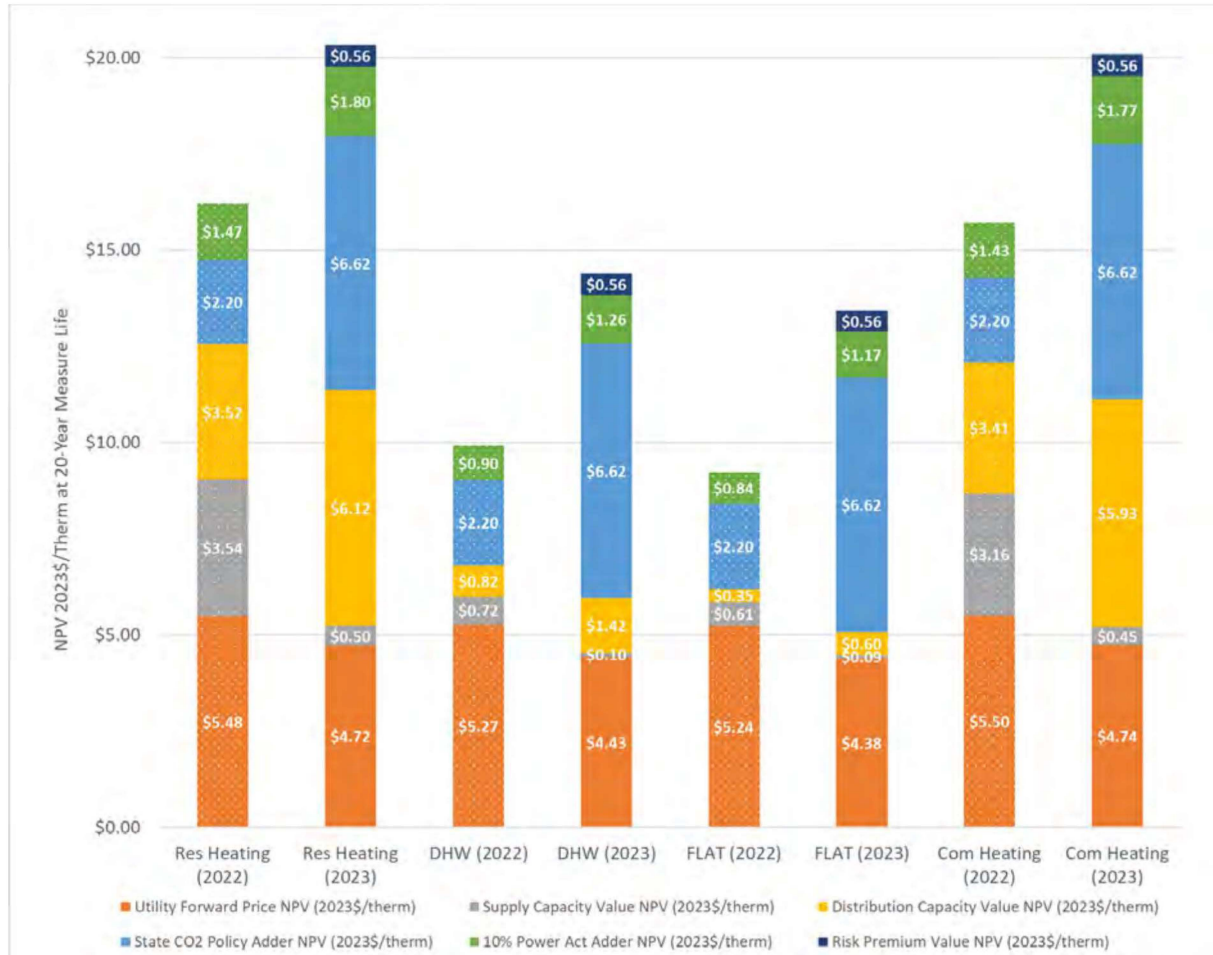
Inflation rate	2.16%	2.40%	11%
Real Discount rate	4.50%	4.50%	0%
Regional Act Credit	10%	10%	0%
Commodity and Transport Prices -2023\$/Therm	\$0.41	34%	-18%
Distribution Capacity - 2023\$/Therm/Year	\$216.48	\$367.66	70%
Supply Capacity - 2023\$/Therm/Year	\$15.85	\$2.20	-86%
CO2 Compliance - 2023\$/Therm	\$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



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Natural Gas Avoided Cost Component Changes and Impacts

Forward Market Prices

Figure 2 compares blended commodity and transport 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

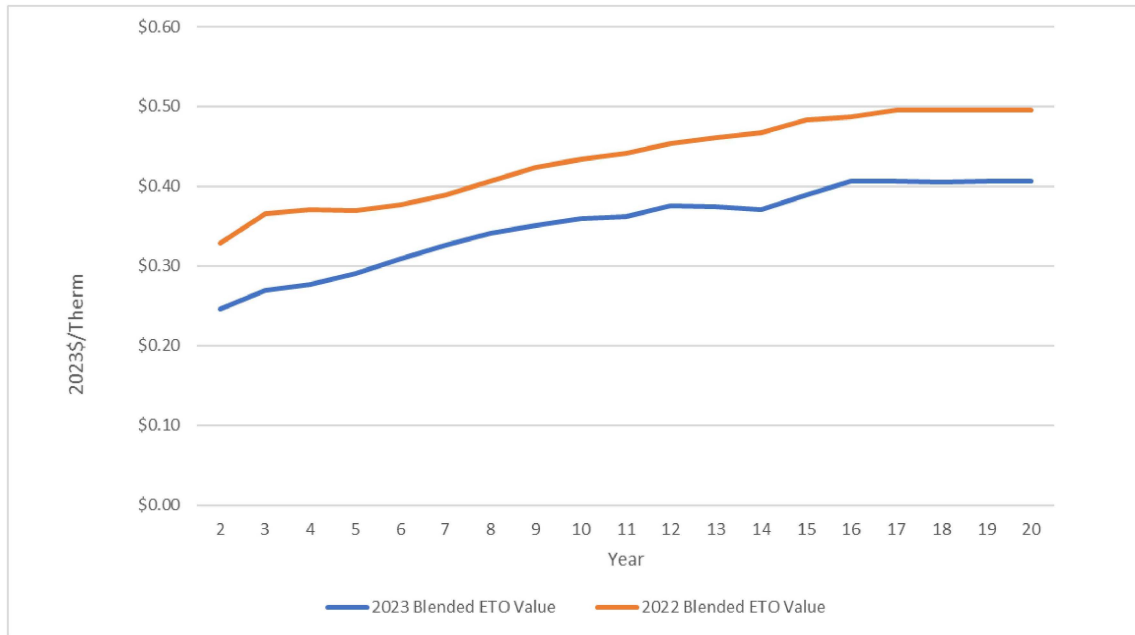
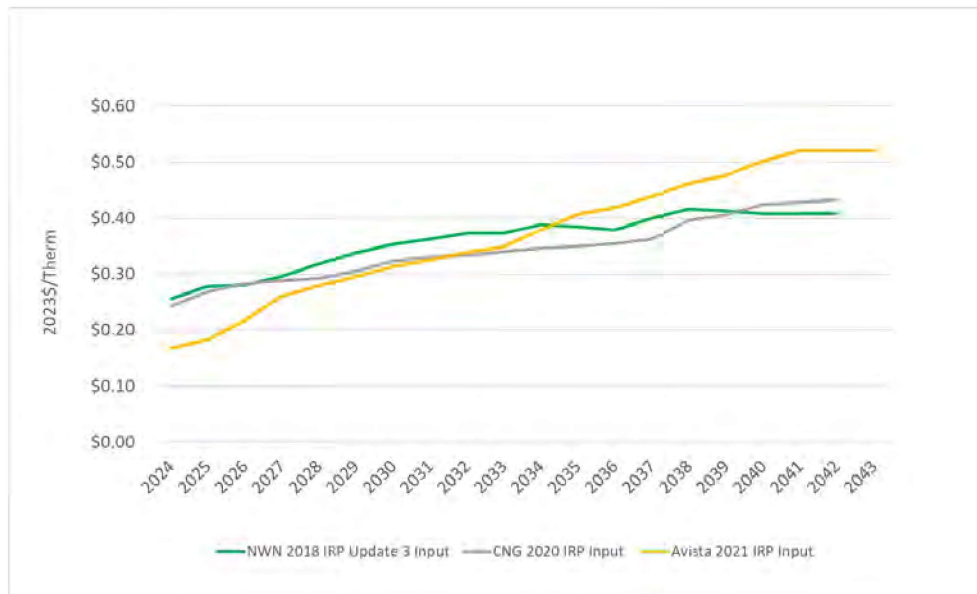


Figure 3. Comparison of Utility Specific Commodity and Transport Price for 2023 Avoided Costs



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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 utilizes 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 separately 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 calculating 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 avoided cost calculation are illustrated in 4.

Figure 4. Utility Supply Capacity Values for 2023 Avoided Costs

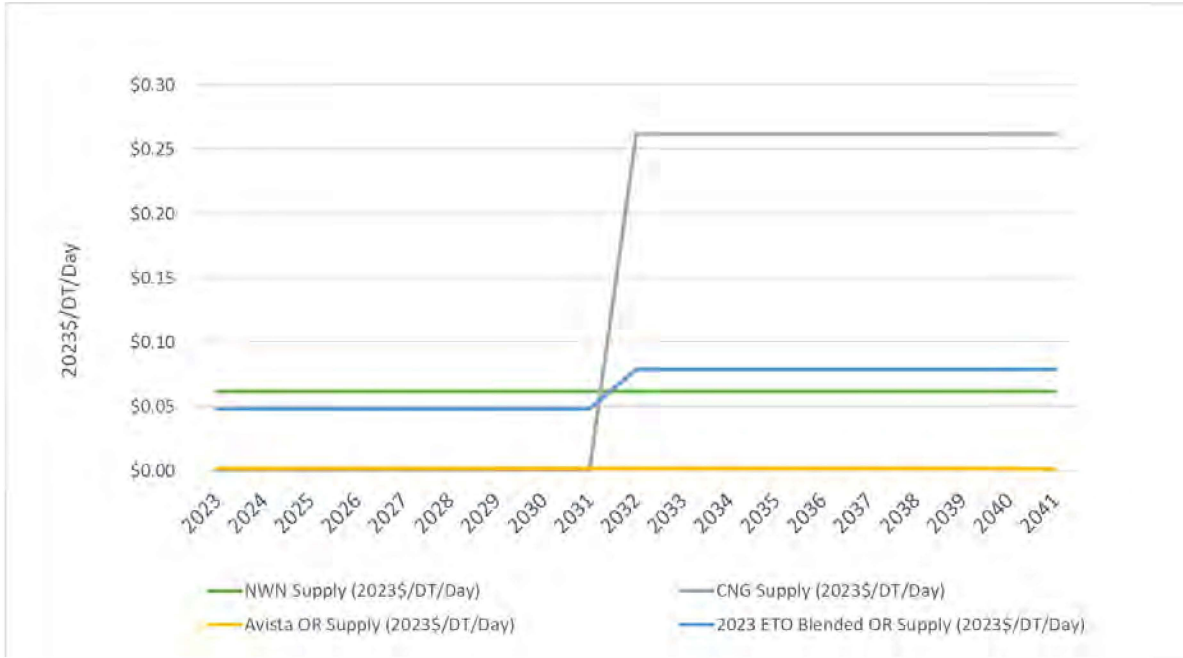
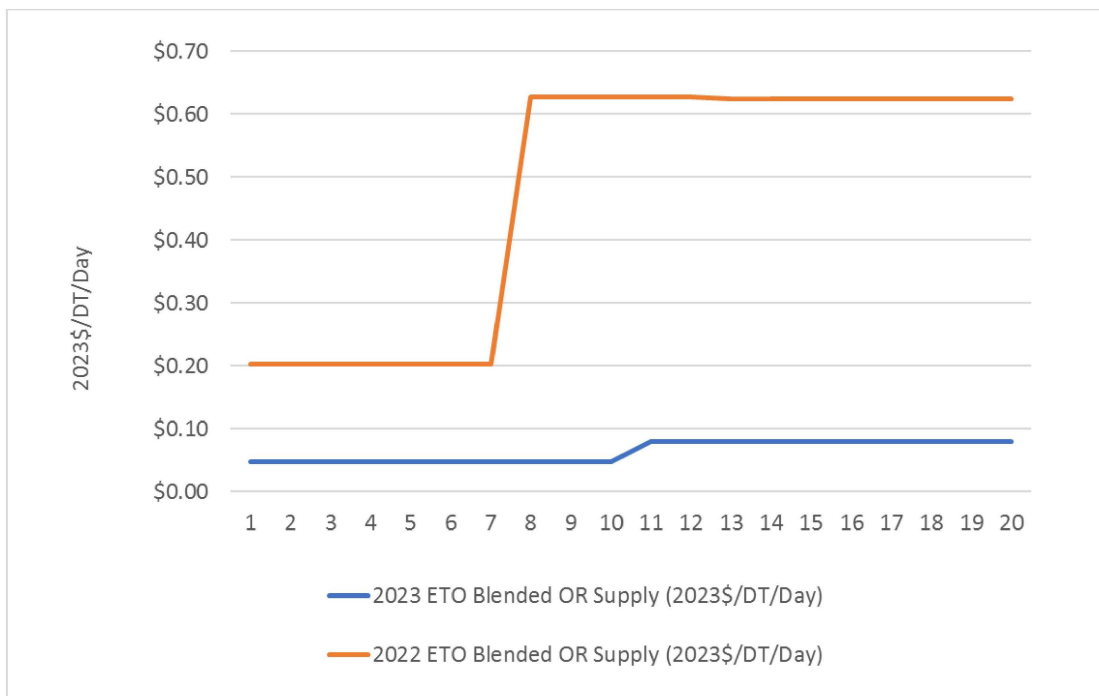


Figure 5 Blended Supply Capacity Values for 2023 and 2022 Avoided Costs



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 (MTCO_{2e}/Dth) and has provided either a primary or alternative submission that closely mirrors 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.

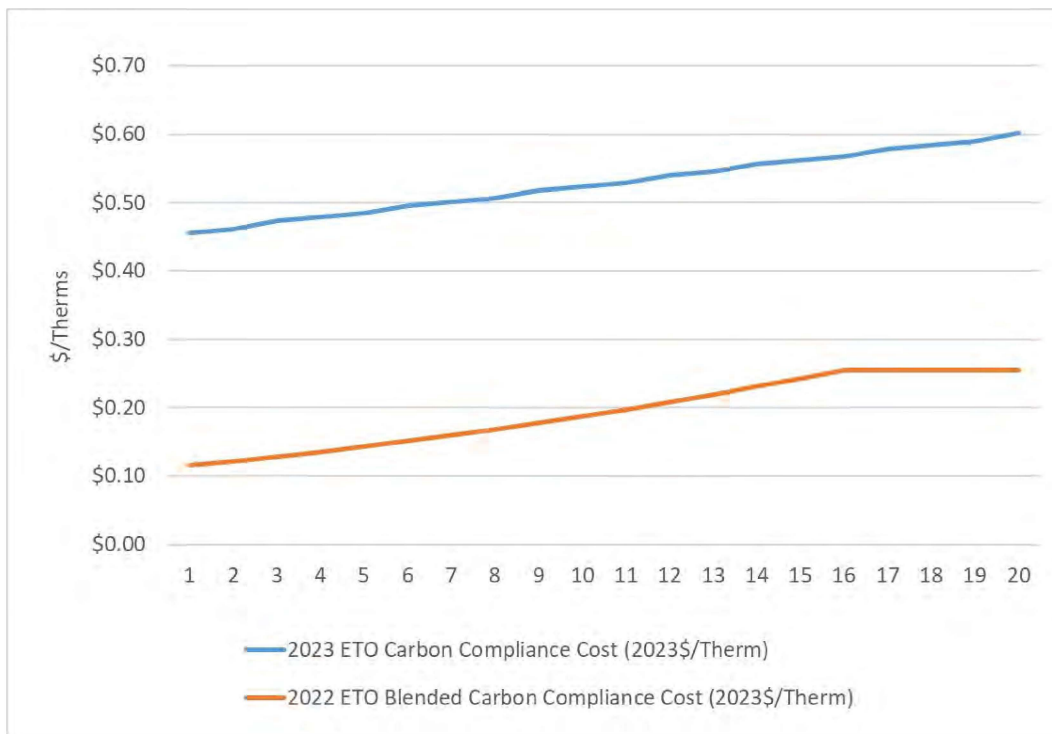
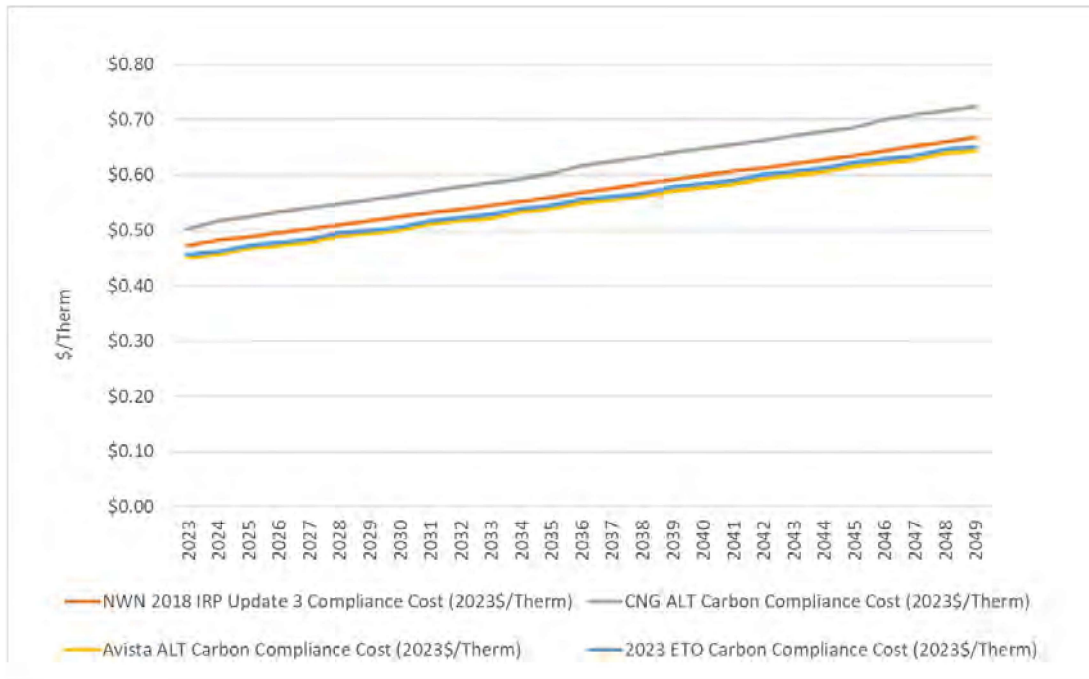
Table 7. Utility-Specific Carbon Intensity Values

	Carbon Intensity (MTCO _{2e} /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.

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Figure 6 Utility Carbon Compliance Values for 2023 Avoided Cost



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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

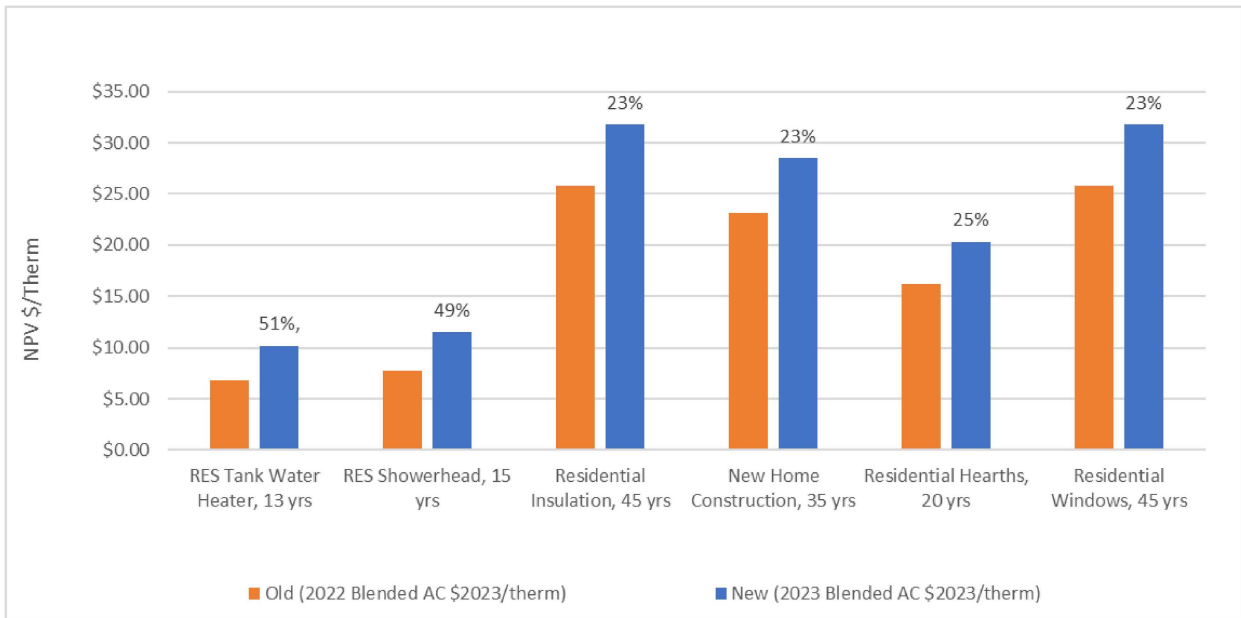


Figure 9. Commercial Avoided Cost Comparison of Representative Measures

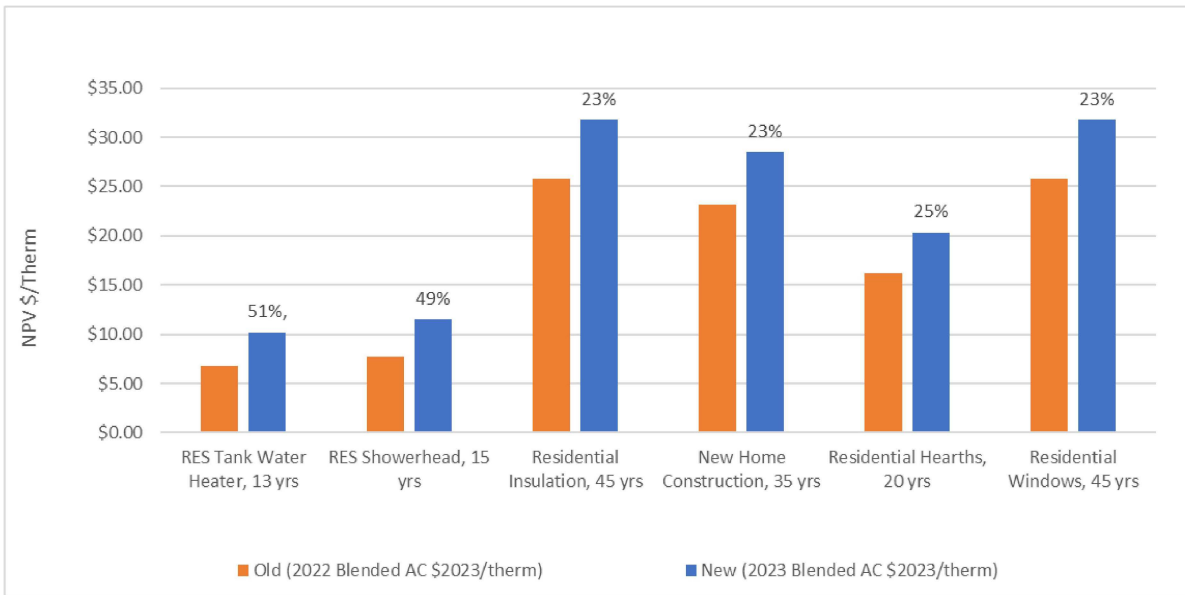


Figure 10. Industrial Avoided Cost Comparison of Representative Measures

