ITEM NO. RA2

PUBLIC UTILITY COMMISSION OF OREGON
STAFF REPORT
PUBLIC MEETING DATE: December 3, 2019

REGULAR __X__ CONSENT ____ EFFECTIVE DATE ____December 4, 2019____

DATE: November 22, 2019

TO: Public Utility Commission

FROM: Anna Kim

THROUGH: Michael Dougherty and JP Batmale **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.

DISCUSSION:

Issue

Whether to approve the attached energy efficiency avoided cost data for use by Energy Trust.

Applicable Law

Effective May 22, 2019, the Commission adopted OAR 860-030-0011 and other associated changes, formalizing the process of collecting and reviewing energy efficiency avoided cost data from energy utilities before the data is used by The Energy Trust of Oregon (Energy Trust).[1] Relevant here, 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 15th of each year, and subsequent changes approved by

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[1] See *In the Matter of Rulemaking to Adopt Energy Efficiency Avoided Cost Reporting Rules,* Docket No. AR 621, Order No. 19-177 (May 22, 2019).

the Commission will take effect no less than 60 days following approval. See OAR 860-030-0011(3).

Analysis

Since the investigation into energy efficiency avoided costs was opened on October 12, 2017,[2] Staff has worked with stakeholders to increase transparency on energy efficiency avoided cost calculations, establish a standard process of review, and explore new ways to improve these calculations. While the mechanism for review has been formally established in rules, the process continues to be highly collaborative as new ideas are explored and the data collection forms evolve.

This is the first formal iteration of data review since the rules were put into effect. Staff is grateful for the ongoing interest and assistance from utilities, Northwest Energy Coalition, Northwest Energy Efficiency Alliance, Northwest Power and Conservation Council, Oregon Department of Energy, and others. Energy Trust continues to provide invaluable support to Staff on this matter. Staff will note that the previous voluntary review process proved very beneficial in allowing Staff to make improvements before the first formal review. Staff will continue to learn and make improvements based on experience and feedback.

This analysis is divided into three sections. In Section I, this memo presents a summary of activities since the last report. The Commission requested status updates twice a year on this docket.[3] This memo provides an update on activities in this docket since the last update in July 2019.[4] In Section II, this memo presents Staff's recommendations on data to approve for use by Energy Trust for energy efficiency avoided cost calculations. Section III provides a brief description of results to energy efficiency avoided costs.

Section I: Summary of Activities Since the Last Report

Staff will note that all five utilities submitted the requested data on time using the template approved by the Commission in accordance with OAR 860-030-0011(1). Staff

[2] See In the Matter of the Public Utility Commission of Oregon's Investigation into the Methodology and Process for Developing Avoided Costs Used in Energy Efficiency Cost-Effectiveness Tests, Docket No. UM 1893, Order No. 17-394.

[3] See In the Matter of the Public Utility Commission of Oregon's Investigation into the Methodology and Process for Developing Avoided Costs Used in Energy Efficiency Cost-Effectiveness Tests, Docket No. UM 1893, Order No. 18-077 (February 27, 2018) page 1.

[4] See In the Matter of the Public Utility Commission of Oregon's Investigation into the Methodology and Process for Developing Avoided Costs Used in Energy Efficiency Cost-Effectiveness Tests, Docket No. UM 1893, Order No. 19-252 (July 30, 2019).

appreciates the documentation and referencing that the utilities provided with these submissions, and the ongoing helpful engagement with Staff and Energy Trust to understand and properly use the data provided. These data will be used by Energy Trust for 2021.

After the data submission deadline on October 15th, Staff held a stakeholder workshop on November 4th, 2019, for Energy Trust to provide an initial look at the resulting avoided costs using the submitted data. This review helped Staff identify areas to focus Staff's final analysis of the submitted data by seeing if the data appeared to be reasonable and applied correctly.

One area identified for additional review involved the incorporation of natural gas distribution capacity costs for the peak hour. In the last UM 1893 report, Staff described the intent to explore the possibility of applying peak hour costs rather than peak day costs.[5] Two different utilities provided peak hour costs. These costs were calculated with very different methods, creating outputs that require different application. Staff worked with Energy Trust and the utilities to determine that Energy Trust can incorporate both value formats into the same avoided cost calculator for use in 2021 planning. Staff will revisit this issue in 2020 to propose clarifications in the data submission form and discuss the possibility of simplifying the process that currently requires Energy Trust to incorporate both formats.

In this workshop, Staff also discussed how to balance the need for certain data to remain confidential while allowing for stakeholder review of energy efficiency avoided cost data and for use by Energy Trust in energy efficiency avoided cost calculations. This discussion was launched in response to the submission of some confidential data to the docket. Based on the discussion, Staff felt the issue warranted further review with stakeholders in 2020. Staff plans to work with stakeholders in 2020 to propose an approach well before the next October 15th filing deadline.

Section II. Data Recommendations

Staff reviewed the submitted utility data. For the most part, data came from the utilities' Integrated Resource Plans (IRPs). In situations where alternate sets of data were provided, Staff reviewed the alternate data to determine if the 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.

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[5] See In the Matter of the Public Utility Commission of Oregon's Investigation into the Methodology and Process for Developing Avoided Costs Used in Energy Efficiency Cost-Effectiveness Tests, Docket No. UM 1893, Order No. 19-252 (July 30, 2019) Appendix A page 6.

Staff also recommends applying certain data decisions to data for Energy Trust's use rather than allowing Energy Trust to use what has been submitted by the utilities. These recommendations do not reflect inaccurate filings on the part of the utilities, but generally reflect past practices on how to interpret these data. These recommendations are separated by fuel type, starting with general decisions and then utility-specific recommendations. All final recommended values are attached as Attachment 1.

Electric Utility Data

Based on discussions in the UM 1893 docket with stakeholders, Staff had recommended a change to Energy Trust's cost-effectiveness calculations to reflect the value of peak savings in an improved way. Whereas in the past, Energy Trust had assumed a generating capacity winter peak for both electric utilities, they began applying generating capacity deferral value based on the seasonal contribution of energy savings measures.

Seasonal contributions to peak are simplified based on utility estimates to one of: 100% winter contribution, 100% summer contribution, or a 50/50 split between winter and summer. In further discussion with stakeholders in early 2019 as described in the July 22 Staff Report, this will also apply to transmission capacity and distribution capacity values. Generation, transmission, and distribution capacity values may experience different seasonal patterns for a given utility.

Of minor note: RPS compliance costs were collected but is not currently in use. This data may be used in future years.

Portland General Electric (PGE)

Based on the review of electric utility data, PGE submitted values from their acknowledged 2018 IRP Update to their 2016 IRP as the main submission. PGE also submitted alternate values from the 2019 IRP. The 2019 IRP was filed on July 19, 2019, and is currently under review and has not yet been acknowledged. Staff recommends accepting the alternate values with the exceptions described above to the seasonal split of capacity values (50/50 seasonal split for generation and 100% winter for transmission and distribution) and other exceptions related to the ongoing analysis of the PGE IRP.

As part of the review of PGE's 2019 IRP, Staff has studied most of the inputs submitted for use for calculating energy efficiency avoided costs. Staff recommends not using the alternate values for forward market prices as Staff continues to study these values as part of Staff's analysis of the 2019 IRP. Staff also recommends not using the alternate submission for risk reduction value as this is an outcome of the 2019 IRP and would be reviewed as the IRP is acknowledged or soon before acknowledgement.

PacifiCorp
Similarly, PacifiCorp submitted values from their acknowledged 2017 IRP as the main submission. PacifiCorp also submitted alternate values from the 2019 IRP. The 2019 IRP was filed on October 18, 2019, and is currently under review and has not yet been acknowledged. Staff has had less time to review these numbers in the context of the completed IRP. Staff recommends accepting the main submission values with the exceptions described above to the seasonal split of capacity values (100% summer for generation and 50/50 split for transmission and distribution), and to the generating capacity deficiency year.

Energy Trust has previously been directed to use a generation capacity deficiency start year of 2021 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 either there is a new outcome as a result of the next acknowledged IRP, or new direction is provided through the Generic Capacity Docket UM 2011.

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, it has been common practice to represent these values with a weighted average of values provided by other utilities. Staff points out where there are missing values and recommends using this practice unless otherwise noted.

As previously described in Section I, Staff agreed to begin transitioning to the use of natural gas distribution capacity costs calculated for the peak hour instead of the peak day. Two utilities filed numbers created through different methodologies that Energy Trust can incorporate using slightly different methods. Staff recommends approving these distribution capacity costs for the peak hour and will work with stakeholders in UM 1893 to improve clarity and transparency in the 2020 workbook.

Northwest Natural
Northwest Natural submitted values from their acknowledged 2018 IRP as the main submission. Staff recommends accepting the main submission values with the exception of risk reduction values. Northwest Natural accurately submitted negative values. Negative values have previously been interpreted as zero values for purposes of energy efficiency avoided costs and Staff recommends continuing this process.

Avista
Avista submitted values from their acknowledged 2018 IRP as the main submission. Staff recommends accepting the main submission values with two exceptions. During

the review process, Avista noticed an error in filing the discount rate and has sent Staff the correct number (4.36 percent). Avista represented commodity and transport costs at negative values as a cost. These will be input as positive values to be consistent with other utilities.

Additionally, as of the 2019 filing, Avista has not yet calculated distribution capacity cost values or risk reduction values. Avista intends to calculate these numbers for their next IRP. For this year, Staff proposes applying a weighted average of Northwest Natural and Cascade's distribution capacity costs to represent Avista. The other utilities provided zero or negative values for risk reduction values. As negative values are represented as a zero value, Staff recommends Avista's risk reduction value is set to zero as well.

Cascade

Cascade submitted values from their acknowledged 2018 IRP as the main submission. Cascade also submitted alternate values from the 2020 IRP. Cascade expects to file the 2020 IRP in July 2020. Staff has not conducted any significant review of numbers from Cascade's 2020 IRP. Staff recommends accepting the main submission values with two exceptions for environmental compliance and distribution capacity costs.

In preparation for the 2020 IRP, Cascade has calculated new distribution capacity cost values. Cascade did not provide these calculations for the 2018 IRP. Staff has reviewed the methodology and calculations for distribution capacity costs and believes that these are reasonable for use in energy efficiency avoided cost calculations. Staff recommends using these values.

Cascade submitted environmental compliance costs based on the 2018 IRP and updated costs based on the 2020 IRP. In the 2018 IRP, Staff had concerns about the application of these numbers and requested improvements in the 2020 IRP.[6] Cascade submitted new environmental compliance costs based on what will be used in the 2020 IRP. Staff reviewed these new values and determined that the numbers were not provided in a way that applied to the calculation of energy efficiency avoided costs. Based on this assessment, Staff proposes applying a weighted average of Northwest Natural's and Avista's environmental compliance costs to represent Cascade.

[6] See In the Matter of CASCADE NATURAL GAS CORPORATION, 2018 Integrated Resource Plan. Order No. 18-279 Appendix p. 7-8.

Section III: 2019 Filing Results for 2021 Planning

To facilitate the review of data and provide a 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 2021 planning.

Electric costs have changed only slightly overall from the costs in use for 2020. Generation capacity values have decreased and forward market prices have increased in similar proportions, effectively canceling out the impacts of these changes.

Natural gas costs have seen more change than electric, resulting in higher prices overall. Several values have increased, most notably distribution capacity costs and environmental compliance forecasts. Higher costs for distribution capacity result in higher value of energy efficiency measures that contribute to the system peak. Heating most impacted across sectors.

Please see Attachment 2 and Attachment 3 for more details.

Conclusion

Based on this analysis, Staff believes the attached data are ready for Commission approval and for use by Energy Trust in planning for 2021 activities and for the preparation for their 2021 budget.

PROPOSED COMMISSION MOTION:

Approve the attached energy efficiency avoided cost data for use by Energy Trust.

REG2 EE AC Data

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

Forward Market Prices Electric

Date	PacifiCorp HLH Total ($/MWh)
1/1/2021	$ 28.97
2/1/2021	$ 28.27
3/1/2021	$ 25.67

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

4/1/2021	$	19.30
5/1/2021	$	19.62
6/1/2021	$	19.48
7/1/2021	$	48.32
8/1/2021	$	52.61
9/1/2021	$	47.36
10/1/2021	$	24.46

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

11/1/2021	$	24.21
12/1/2021	$	28.06
1/1/2022	$	28.35
2/1/2022	$	30.96
3/1/2022	$	27.38
4/1/2022	$	22.24
5/1/2022	$	22.51

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

6/1/2022	$	23.67
7/1/2022	$	51.09
8/1/2022	$	56.16
9/1/2022	$	51.44
10/1/2022	$	25.66
11/1/2022	$	29.59
12/1/2022	$	31.54

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

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12/1/2070	$	158.23

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

PacifiCorp LLH Total ($/MWh)	PGE HLH Total ($/MWh)
$ 24.16	$ 24.58
$ 26.11	$ 24.86
$ 23.62	$ 22.31

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

$ 16.54	$ 17.29
$ 12.35	$ 15.78
$ 9.55	$ 15.49
$ 27.99	$ 20.83
$ 32.49	$ 22.62
$ 31.22	$ 23.44
$ 21.70	$ 22.22

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

$ 20.35	$ 24.18
$ 22.31	$ 25.91
$ 23.49	$ 40.34
$ 24.21	$ 40.26
$ 23.86	$ 36.58
$ 16.59	$ 33.83
$ 12.40	$ 30.50

UM 1893, Attachment 1.xlsx E Market

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$	14.00	$	27.25
$	32.43	$	36.58
$	37.08	$	39.19
$	35.45	$	40.97
$	22.20	$	40.56
$	25.27	$	40.09
$	26.59	$	41.84

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

$	126.87

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

PGE LLH Total ($/MWh)
$ 22.82
$ 22.12
$ 20.37

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

$	15.52
$	14.22
$	12.24
$	16.91
$	18.88
$	20.72
$	20.68

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

$	21.47
$	23.56
$	38.39
$	37.24
$	34.58
$	31.58
$	26.17

UM 1893, Attachment 1.xlsx E Market

Electronic Version Available Upon Request...

$	24.31
$	32.95
$	35.39
$	37.62
$	38.36
$	37.94
$	39.33

Attachment 2

Memo

To: Anna Kim, Oregon PUC

From: Jack Cullen, Energy Trust of Oregon

Date: November 7, 2019

Re: DRAFT 2021 Electric Avoided Cost Update Summary

This memo provides a summary of the updates to Energy Trust's DRAFT 2021 Electric Avoided Cost buildup, including an overview of the utility inputs provided, a discussion of the results, and a comparison of the DRAFT updated blended values to current 2020 Avoided Cost values.

Utility Provided Inputs and PUC Direction

Pursuant to AR621, each funding utility provides Energy Trust with avoided cost inputs for use in 2021 DRAFT Blended Avoided Costs. Each utility provides each component in the table below from the most recently acknowledged IRP (IRP Column) and an optional additional input for the OPUC to consider (Update Column). Table 1 below shows the value currently utilized in 2020 avoided costs, the inputs provided by each electric utility from their most recently acknowledged IRPs and updated submissions for consideration in 2021 avoided costs. The final column for each utility identifies the initial direction from OPUC staff as to which of the various submittals Energy Trust should incorporate into the DRAFT 2021 Avoided Costs.

Table 1. Utility Inputs Pursuant to AR 621 for use in DRAFT Energy Trust 2021 Blended Avoided Costs

	Avoided Cost Element	Pacific Power				Portland General Electric			
		PAC Current (2020 AC)	PAC 2017 IRP Submission	PAC Updated Submission	Final Inputs for 2021 Avoided Cost	PGE Current (2020 AC)	PGE 2016 IRP Submission	PGE Updated Submission	Final Inputs for 2021 Avoided Cost
Global Assumptions	Inflation Rate	2.22%	2.22%	2.28%	IRP	2.00%	2.00%	2.05%	Update
	Real Discount Rate	4.26%	4.26%	4.54%	IRP	4.48%	4.48%	4.41%	Update
	Regional Act Credit	10.00%	10.00%	10.00%	IRP	10.00%	10.00%	10.00%	Update
T&D Line Losses	Transmission Loss Factor	4.53%	4.53%	4.53%	IRP	2.11%	1.90%	1.90%	Update
	Distribution Loss Factor, Commercial	5.06%	5.06%	5.06%	IRP	4.74%	4.15%	4.15%	Update
	Distribution Loss Factor, Industrial	2.59%	2.59%	2.59%	IRP	2.85%	1.45%	1.45%	Update
	Distribution Loss Factor, Residential	5.48%	5.48%	5.48%	IRP	4.74%	4.74%	4.74%	Update
Transmission Capacity Value	Transmission Deferral Credit	$5.94	$5.94	$4.16	IRP	$9.38	$9.38	$9.38	Update
	Seasonal Capacity Split - Summer	0%	48%	50%	Update	0%	0%	50%	Update
	Seasonal Capacity Split - Winter	100%	52%	50%	Update	100%	100%	50%	Update
	Deficiency start year	2020	2018	2018	IRP	2020	2021	2021	Update
Distribution Capacity Value	Distribution Deferral Credit	$7.63	$7.63	$9.20	IRP	$24.39	$24.39	$24.39	Update
	Seasonal Capacity Split - Summer	0%	57%	50%	Update	0%	0%	50%	Update
	Seasonal Capacity Split - Winter	100%	43%	50%	Update	100%	100%	50%	Update
	Deficiency start year	2020	2018	2018	IRP	2020	2021	2021	Update
Generation Capacity Value	Generation Capacity Credit	$102.19	$82.38	$83.76	IRP	$120.67	$120.67	$103.33	Update
	Seasonal Capacity Split - Summer	100.0%	99%	92%	Current	50.0%	50%	50%	Update
	Seasonal Capacity Split - Winter	0.0%	1%	8%	Current	50.0%	50%	50%	Update
	Deficiency start year	2021	2030	2026	Current	2020	2021	2021	Update
Other Values	Risk Reduction Value	$4.33	$4.33	$4.10	IRP	$4.78	$4.78	$3.00	IRP
	Forward Market Prices	See Graph for Comparison			IRP	See Graph for Comparison			IRP

Energy Trust took these inputs and blended them according to the methodology that has been previously communicated to stakeholders.

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 2021$ for use in the 2021 avoided costs.
2) The PacifiCorp seasonal capacity split values for Transmission and Distribution are labeled as updated because the OPUC advised using a simple 50/50 split for this round. This 50/50 split overrode the actual updated values provided by PacifiCorp.
3) PacifiCorp updated values represent their recently submitted 2019 IRP and Portland General's updated values represent their 2019 IRP submitted in the Spring of 2019, which is still under review.
4) PacifiCorp's Current Generation Defferal Credit represents a wind resource, not thermal.

Table 2 below provides a comparison of the blended 2020 Avoided Cost Component Values to the updated DRAFT 2021 Avoided Cost Component values and their percent change from 2020. Please note that additional changes to methodlogy may also be a driver of differences in updated 2021 Avoided Costs by load profile.

Table 2: Comparison of Component Values from 2020 Avoided Costs to DRAFT 2021 Avoided Costs

Avoided Cost Component	2021 AC (Updated) Blended Value	2020 Blended Value	Percent Change
Inflation Rate	2.12%	2.09%	**1.37%**
Real Discount Rate	4.50%	4.50%	**0.00%**
Northwest Power Act 10% Credit	10.00%	10.00%	**0.00%**
Risk Reduction Value ($/MWh) ($ 2021)	$5.03	$5.02	**0.30%**

Transmission Loss Factor	2.92%	3.00%	**-2.65%**
Transmission Loss Credit ($/kW-yr.) ($ 2021)	$8.43	$8.40	**0.42%**
Distribution Loss Factor, Commercial	4.50%	4.87%	**-7.53%**
Distribution Loss Factor, Industrial	1.89%	2.75%	**-31.04%**
Distribution Loss Factor, Residential	5.03%	5.03%	**-0.13%**
Distribution Credit ($/kW-yr.) ($ 2021)	$18.67	$18.51	**0.87%**
Generation Deferral Credit ($/kW-yr.) ($ 2021)	$98.64	$121.49	**-18.81%**
Forward Market Prices	Varies	Varies	**NA**

DRAFT Results Summary

Once the updated values provided by Electric Utilities were blended, Energy Trust compared each of the electric loadshapes updated 2021 Avoided Costs to the current 2020 iteration of avoided costs and compared the overall impact of the changes based on 2018 and 2019 YTD program savings achievements. **Overall, draft 2021 electric avoided costs decreased by 1.5 percent** compared to current 2020 avoided costs, when weighted by the 2018 and 2019 YTD savings achievements**.**

On a per loadshape basis, the contribution of each individual Avoided Cost component is different dependent on how much that loadshape contributes to peak savings. To help to illustrate the overall impact of the changes to each componenet, Energy Trust also developed a weighted average percent change of each component of the avoided cost stack based on Energy Trust 2018 and 2019 YTD savings. Figure 1 below shows how the individual components contributed to the 3 percent decrease (changes below total to the negative 100% of observed change in avoided costs). This shows that the decrease in generation capacity value was the largest driver of the decrease in avoided costs, but that the increase in forward market prices mitigated that decrease in generation capacity value.

Figure 1. Contribution of Each Component to Overall Weighted Average Avoided Cost Changes

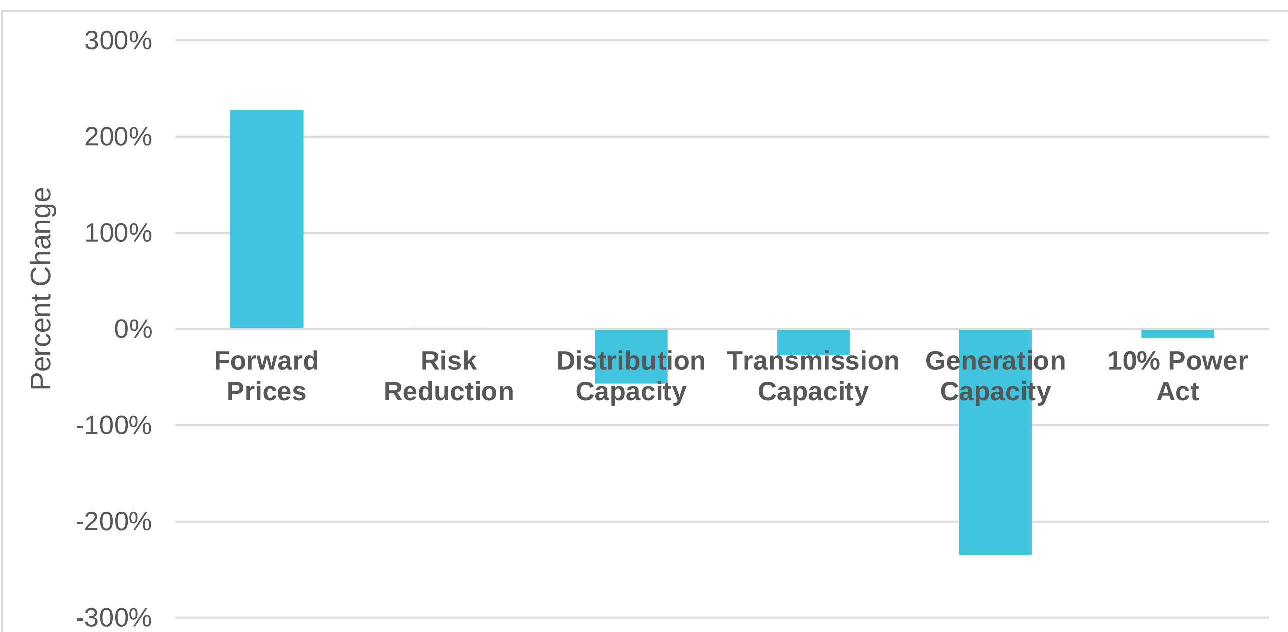
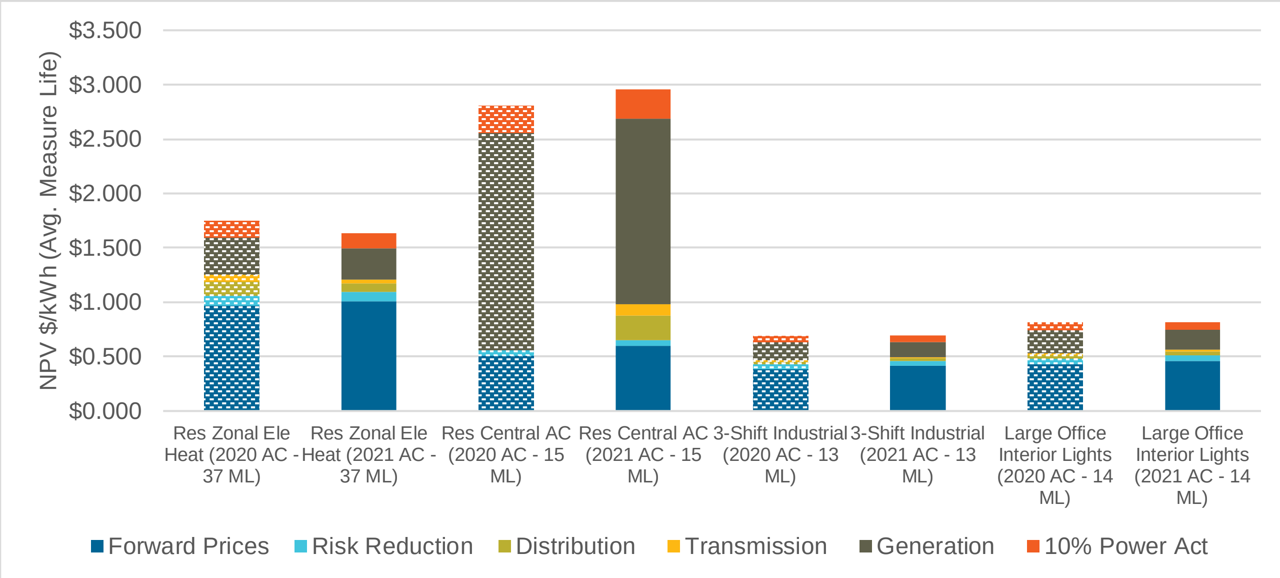


Figure 2 below also illustrates the differential impact of the individiual component parts of the avoided costs based on a sample of end use load profiles. The load profiles shown in this graph are meant to show differential impacts and do not necessarily represent loadshapes that make up a large portion of Energy Trust's portfolio.

Figure 2. Comparison of Load Shape Value by Component



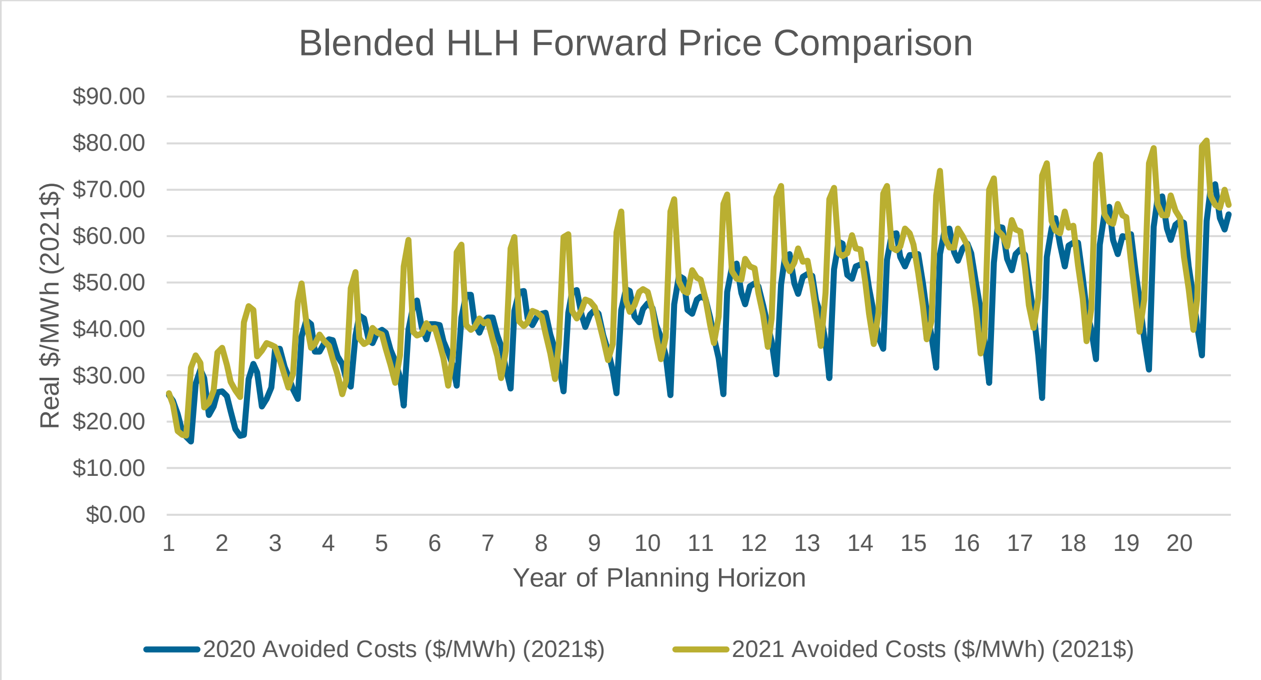
The next section of this memo details the changes to each component of the avoided costs update.

DRAFT Electric Avoided Cost Component Changes and Impacts

Forward Market Prices

Forward market prices increased about 8% compared to 2020 Avoided Cost inputs on a weighted average basis using 2018 and 2019 YTD savings. This is mostly due to spikier summer prices in future years. The increase in forward market prices offset much of the decreases seen in other components detailed below.

Figure 3. Blended Forward Price Comparison - Heavy Load Hours



Generation Capacity

Generation capacity deferral value shows the largest decrease in value. Changes in generation capacity value account for most of the 1.5% overall decrease in avoided cost values in 2021. Both utilities submitted generation deferral values about 15-20% lower than are currently utilized in the 2020 avoided costs (see Table 1).

Transmission & Distribution Capacity

Transmission and Distribution deferral credit values remained relatively similar in updated 2021 submissions when compared to the 2020 avoided cost values. However, as an outcome of UM1893 proceedings, a seasonal 50% summer/50% winter split of the value was utilized in the updated 2021 avoided costs whereas the 2020 avoided cost values assumed that 100% of the value was in winter. This change in methodlogy caused an overall decrease in value. Additionally, changes in transmission and distribution losses also contributed to the decrease in these componenet values in the 2021 avoided cost update.

Risk Reduction & NW Power Act Credit

The same risk reduction values were utilized in the 2021 avoided costs as the 2020 avoided costs and therefore there was no change in this value. The NW Power Act Credit is applied to each of the avoided cost components (except risk reduction) and therefore it's impact is relative to the changes in other indivudual components of each loadshape.

Measure Level Impacts

On a measure level, the overall effect of the avoided cost changes varies significantly by measure and load profile. The overall effect on measures reflects both changes to the submitted values and the change in methodology for valuing Transmission and Distribution in both summer and winter.

Previously, it was assumed that all transmission and distribution value was coincident with the NWPCC regional winter peak. Now 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.

This change in methodlogy is highlighted in Figure 2 when comparing the component values of a 2020 versus 2021 Residential AC measure. The generation value of this measure dropped (as it did for all measures), but because now half the transmission and distribution deferal value is valued in the summer, for 2021 avoided costs this measure now has value for the transmission and distribution components; it did not in 2020 avoided costs because all transmission and distribution value was applied in the winter when AC has no peak contribution savings. Overall, this change in methodology caused the Res AC measure to increase in value by 5%.

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 the majority of savings within each sector.

Figure 4. Residential Avoided Cost Comparison of Representative Measures

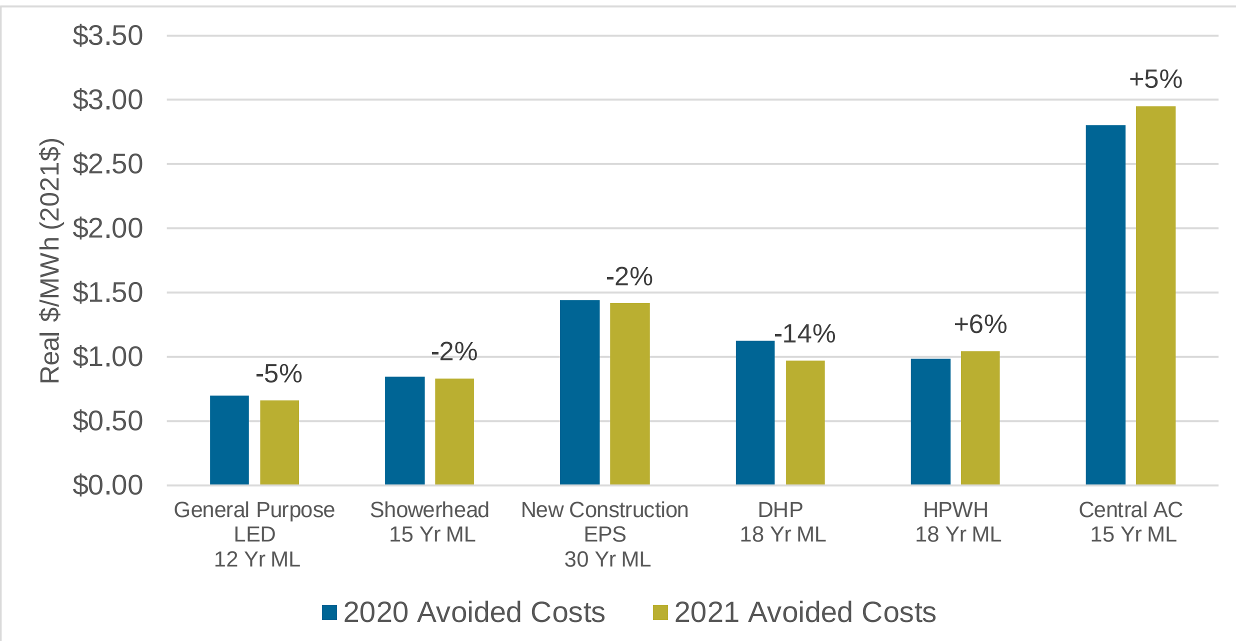


Figure 5. Commercial Avoided Cost Comparison of Representative Measures

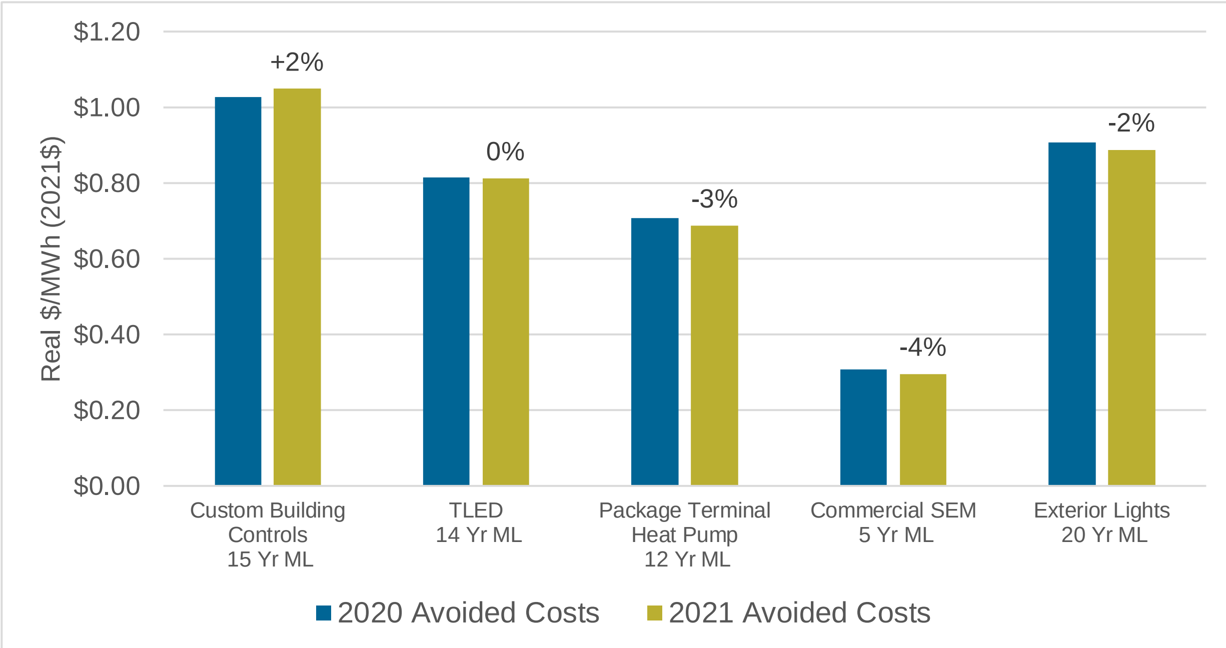
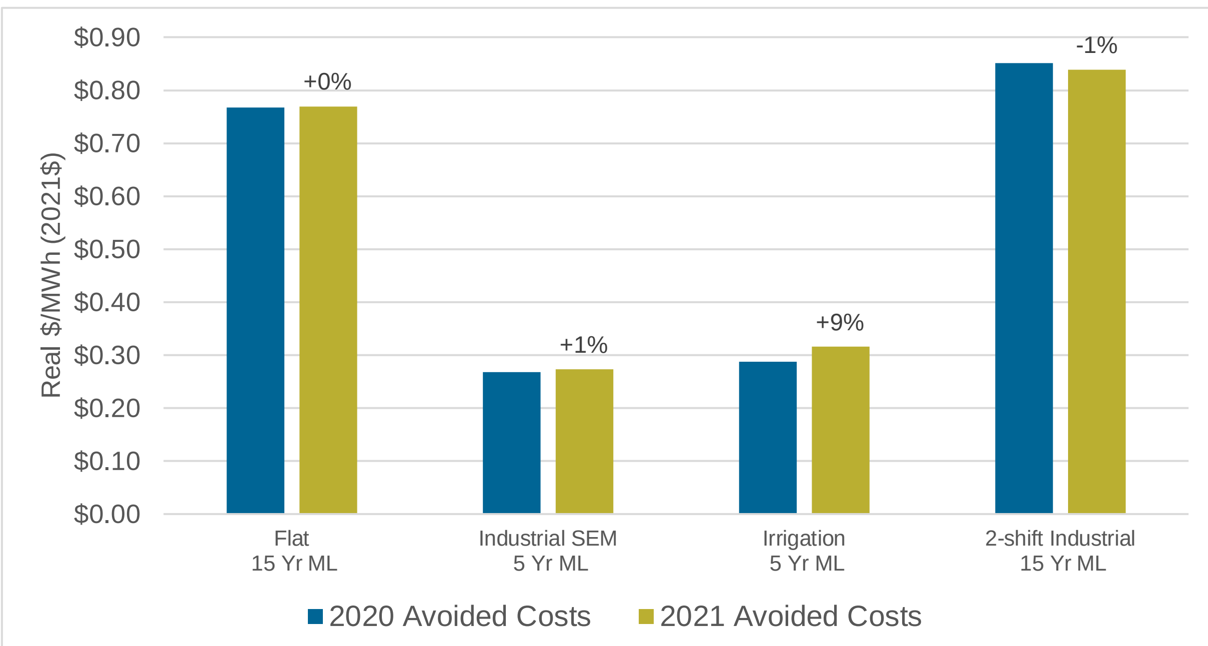


Figure 6. Industrial Avoided Cost Comparison of Representative Measures



Memo

To: Anna Kim, Oregon PUC

From: Peter Schaffer, Energy Trust of Oregon

Date: November 22, 2019

Re: DRAFT 2021 Natural Gas Avoided Cost Update Summary

This memo provides as summary of the updates to Energy Trust's DRAFT 2021 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 2020 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 2021 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 value currently utilized in 2020 avoided costs, the inputs provided by each electric utility from their most recent IRPs and updated submissions for consideration in 2021 avoided costs, as well as the initial decision from OPUC staff as to which of the various submittals Energy Trust

Table 1. Utility Inputs Pursuant to AR 621 for use in DRAFT Energy Trust 2021 Blended Avoided Costs

		Northwest Natural			Cascade Natural Gas				Avista			Energy Trust	
Avoided Cost Element	**Units/Description**	**NWN 2018 IRP**	**Prior UM 1893 Input ($2020)**	**Current Inputs for 2021 Avoided Cost**	**CNG 2018**	**CNG Alternative**	**Prior UM 1893 Input ($2020)**	**Current Inputs for 2021 Avoided Cost**	**AVI 2018 IRP**	**Prior UM 1893 Input ($2020)**	**Current Inputs for 2021 Avoided Cost**	**Prior UM 1893 Blend ($2020)**	**Current Blend for 2021 Avoided Cost**
Inflation rate	Percentage	1.96%	1.96%	1.96%	3.60%	3.68%	2.01%	3.60%	2.00%	2.00%	2.00%	1.97%	2.14%
Real Discount rate	Percentage	4.91%	4.91%	4.91%	6.35%	7.33%	6.35%	6.35%	4.36%	4.34%	4.36%	4.50%	4.50%
Regional Act Credit	Percentage of avoided cost total	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Commodity and Transport	$/Therm	**See Figure 3**											
Distribution Capacity - Hourly	$/Therm/Year	$237.09	$33.29	$237.09	$0.00	$1.27	$0.00	$1.27	$0.00	$0.00	$0.00	See table 3	$210.23
Supply Capacity	$/Therm/Year	$11.02	$9.07	$11.02	$45.12	N/A	$39.17	$45.12	$0.07	$0.33	$0.07	$12.03	$14.04
CO2 Compliance	$/therm	$0.16	$0.10	$0.16	$0.30	$0.27	$0.24	$0.15	$0.17	$0.08	$0.17	$0.10	$0.16
Risk Reduction	$/therm	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Energy Trust took these inputs and blended them according to the methodology that has been previously communicated to stakeholders.

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 2021$ for use in the 2021 avoided costs.
2) The distribution capacity value for this update relies on a hourly valuation instead of the daily valuation used in the prior 2020 avoided costs.
3) All values rely on the latest IRPs submitted by utility's with the exception of Cascade's and Avista's hourly distribution value and Cascade's carbon compliance value.

Table 2 below provides a comparison of the blended 2020 Avoided Cost Component Values to the updated 2021 Avoided Cost Component values and their percent change from 2020. Please note that additional changes to methodlogy may also be a driver of differences in updated 2021 Avoided Costs by load profile.

Table 2: Comparison of Component Values from 2020 Avoided Costs to DRAFT 2021 Avoided Costs

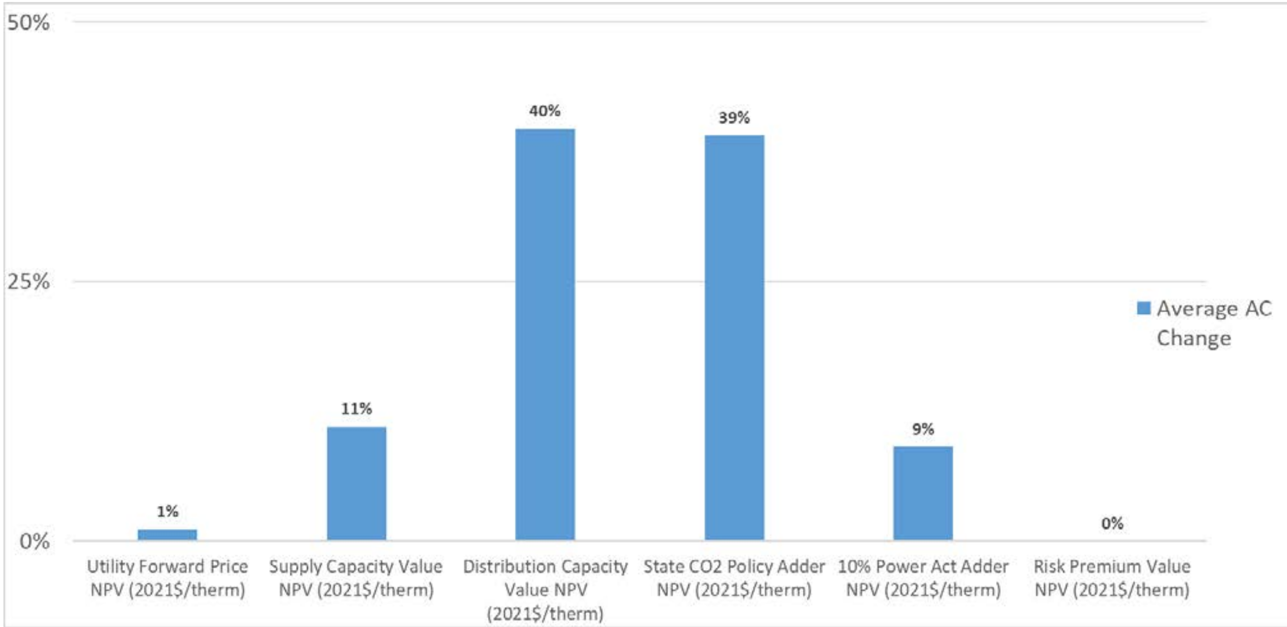
Avoided Cost Component	**2021 AC (Updated) Blended Value**	**2020 AC Blended Value**	**% Change**
Inflation rate	2.14%	1.97%	**8%**
Real Discount rate	4.50%	4.50%	**0%**
Regional Act Credit	10.00%	10.00%	**0%**
Commodity and Transport Prices	Varies	Varies	**N/A**
Distribution Capacity - $/Therm/Year ($2021)	$210.23	See table 3	**N/A**
Supply Capacity - $/Therm/Year ($2021)	$14.04	$12.03	**17%**
CO2 Compliance - $/Therm ($2021)	$0.16	$0.10	**61%**
Risk Reduction	$0.00	$0.00	**0%**

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 2021 Avoided Costs to the current 2020 iteration of avoided costs and compared the overall impact of the changes based on 2018 program savings achievements. **Overall, 2021 natural gas avoided costs increased by 27 percent** compared to current 2020 avoided costs, when weighted by the last full year, 2018 savings achievements**.**

On an end use basis represented per loadshape, the contribution of each individual Avoided Cost component is different dependent on how much that loadshape contributes to peak savings. To help to illustrate the overall impact of the changes to each componenet, Energy Trust also developed a weighted average percent change of each component of the avoided cost stack based on Energy Trust 2018 savings. Figure 1 below shows how the individual components contributed to the 27% percent increase (changes below total to 100% of observed increase in avoided costs).

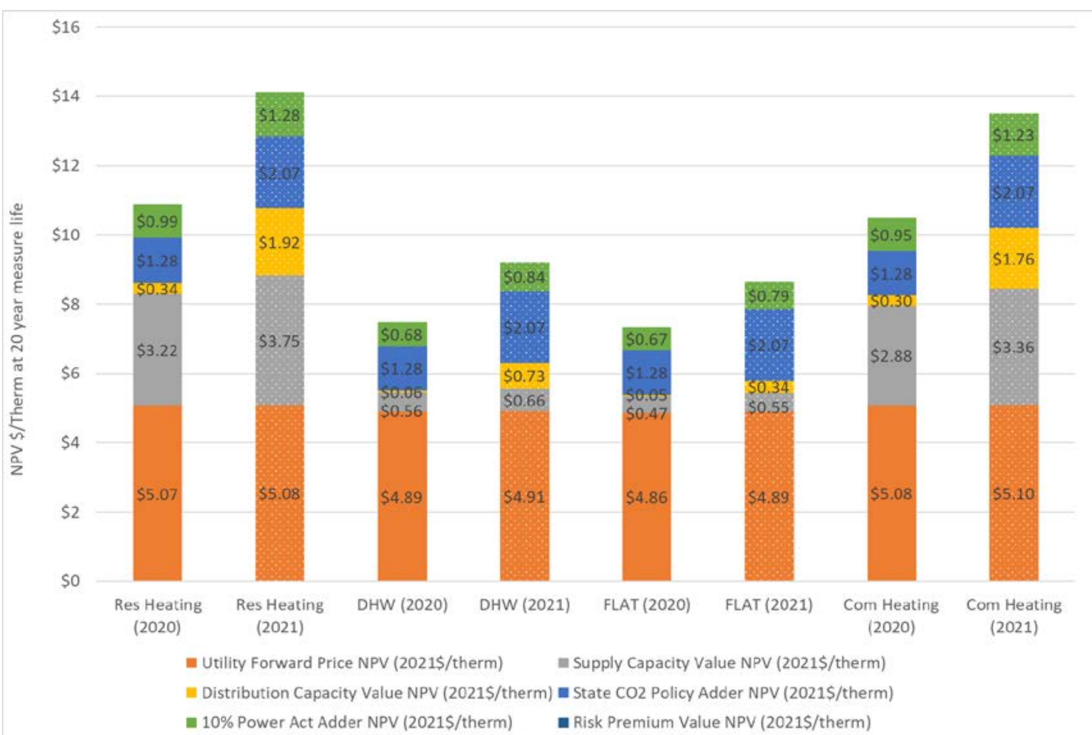
*Figure 1. Overall Contribution to Avoided Cost Changes by Component**



*Components of Figure 1 sum to 100% of avoided cost change.

Figure 2 below also illustrates the differential impact of the individiual component parts of the avoided costs based on on end use load profiles. The load profiles shown in this graph are assumed to represent a 20 year measure life and show differential impacts. These figure does not necessarily represent the proportion of loadshapes that make up a Energy Trust's portfolio.

Figure 2. Comparison of Load Shape Value by Component



The next section of this memo details the changes to each component of the avoided costs update.

Natural Gas Avoided Cost Component Changes and Impacts

Forward Market Prices

Figure 3 compares blended commodity and tranport prices from 2020 Avoided Cost inputs and 2021 Avoided Cost inputs. Overall blended commodity and transport prices went up slightly by approximately 0.4%.

Figure 3. Blended Commodity and Transport Price Comparison

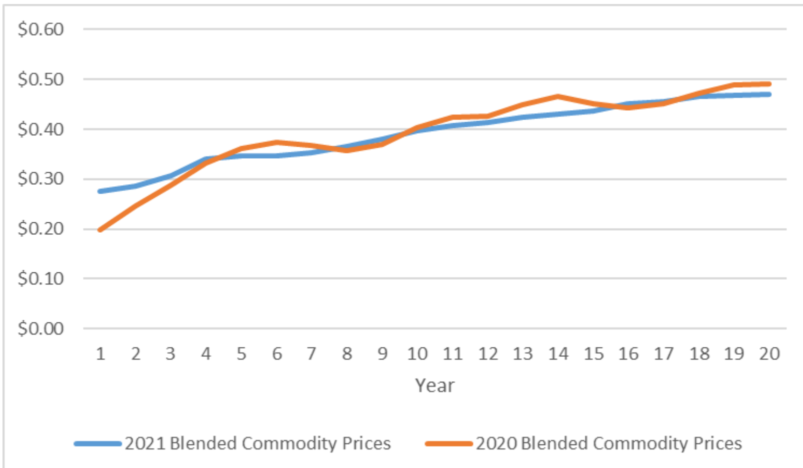
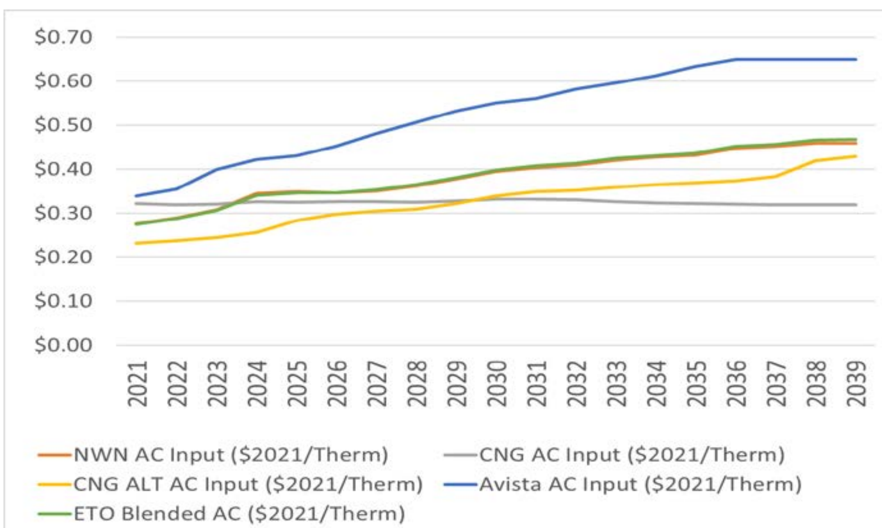


Figure 4. Utility Comoodity and Transport Price Comparison by Utility for 2021 Avoided Cost



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 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. A peak hour is assumed to be 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 2021 avoided costs and their respective sources.

Table 3 – Daily Peak Factors for 2021 Avoided Costs

End-use Load Profile	Peak Day Factor	Source
Residential Space Heating	**2.1%**	Northwest Natural
Commercial Space Heating	**1.8%**	Northwest Natural
Domestic Hot Water	**0.4%**	NWPCC
Flat	**0.3%**	NWPCC
Clotheswasher	**0.2%**	NWPCC

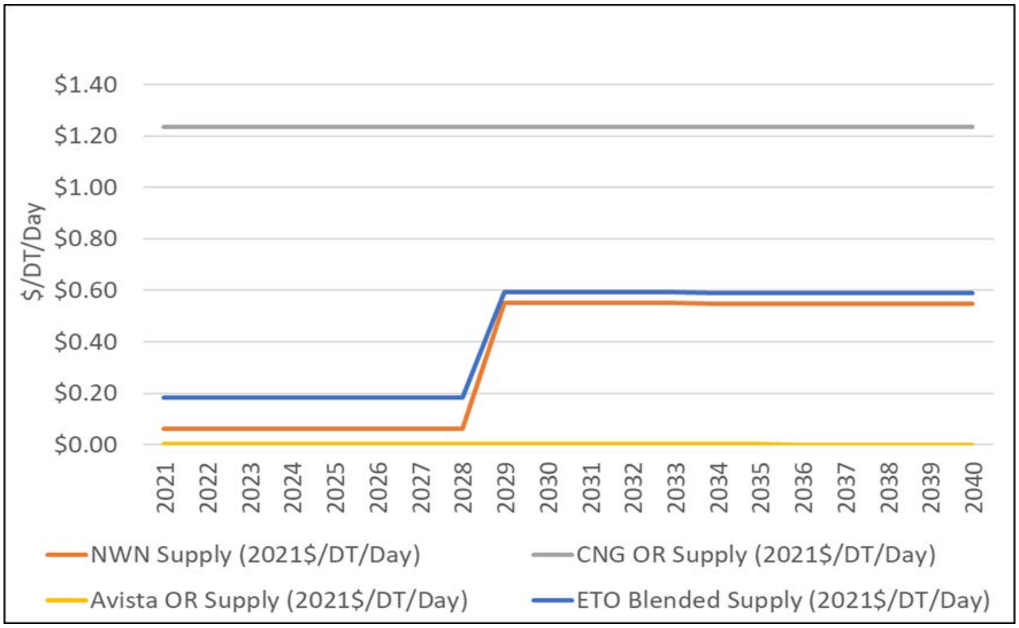
Table 4 – Hourly Peak Factors for 2021 Avoided Costs

End-use Load Profile	Peak Hour Factor	Source	Electric Analog Profile
Residential Space Heating	**0.07%**	NWPCC	R-All-HVAC-ER-All-All-E
Commercial Space Heating	**0.06%**	NWPCC	Commercial-All Com-Heat
Domestic Hot Water	**0.03%**	NWPCC	Residential-Res-Water Heating
Flat	**0.01%**	NWPCC	FLAT
Clotheswasher	**0.02%**	NWPCC	R-All-WH-Cwash-All-All-R

Supply Capacity

The blended supply capacity values increased by 17% from the prior round of avoided costs submissions. Utility values used in the 2021 avoded cost calculation are illustrated in Figure 5.

Figure 5. Utility Supply Capacity Values for 2021 Avoided Costs



Distribution Capacity

Distribution capacity represent the most substantive changes in both methodology and value compared to the prior year's avoided costs submission. As an outcome of UM1893 proceedings and per OPUC direction, Energy Trust used hourly distribution capacity values in this avoided cost update instead of the previous daily distribution capacity values. Each of these values relies on a corresponding peak factor (daily or hourly) to calculate the proportion of annual value that lands on the peak day or peak hour. In order to make a like comparison between the prior and current values, Energy Trust applied the corresponding peak factors to each load shape and provided the average over possible measure lifetimes (70 years) for distribution capacity value from the current and prior year. Table 5 illustrates the change in distribution capacity costs from 2020 blended avoided costs to the current 2021 blended avoided cost.

Table 5. 70 Year Average Blended Distribution Capacity Value by Loadshape

	DHW	FLAT	Res Heating	Com Heating	Clotheswasher
2020 Avoided Cost - Daily	$0.07	$0.06	$0.40	$0.36	$0.04
2021 Avoided Cost - Hourly	$0.87	$0.41	$2.29	$2.09	$0.77

For 2021, both Northwest Natural and Cascade provided hourly distribution capacity values for use in Energy Trust's avoided cost. Through discussions with each NWN and CNG, Energy Trust determined their provided values were caluclated with slightly different methodologies. This required Energy Trust to treat these values differently in the avoided cost calcuations, but Energy Trust was still able to accommodate each value in its avoided costs and represent each utility's distribution capacity value on a consistent basis, as described below:

- 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 defferal 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.

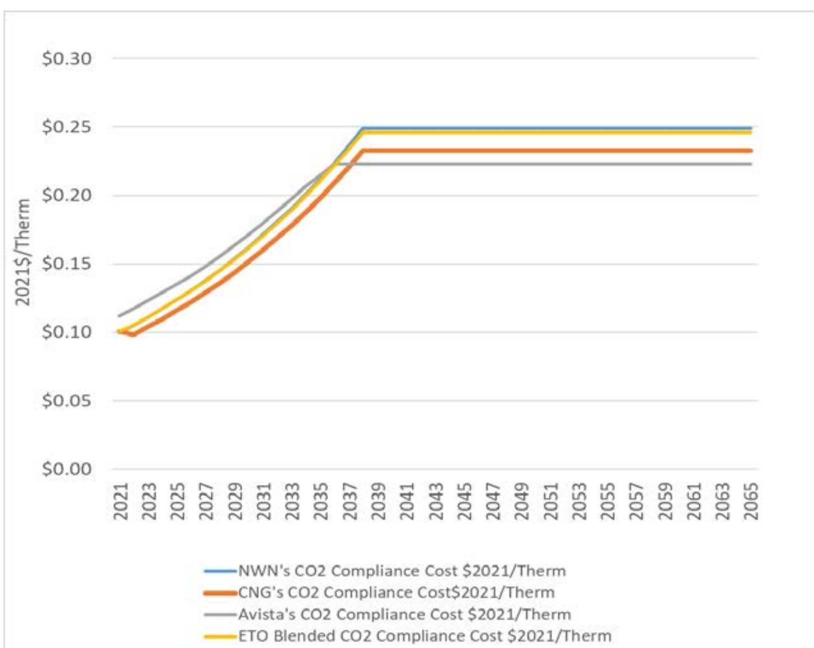
- Northwest Natural's estimate of distribution capacity value was represented as the cost of serving an additional dekatherm on a peak hour. Energy Trust then annualized that value and applied end-use specific peak hour factors to determine each end-use profile's coincidence on that peak hour.

- Avista did not have a distribution capacity value in their latest IRP for use in 2021 avoided cost.

Carbon Policy Compliance Value

Carbon compliance values increased by 61% from the prior submission from a blended value of $0.10 per therm to $0.16 per therm. Figure 6 illustrates the respective values used for each natural gas utility and the blended value for use in Energy Trust avoided cost.

Figure 6 Utility Carbon Compliance Values for 2021 Avoided Costs



Risk Reduction & NW Power Act Credit

Risk reduction values stayed the same as the prior 2020 avoided costs with a value of $0; 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 indivudual 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 7. Residential Avoided Cost Comparison of Representative Measures

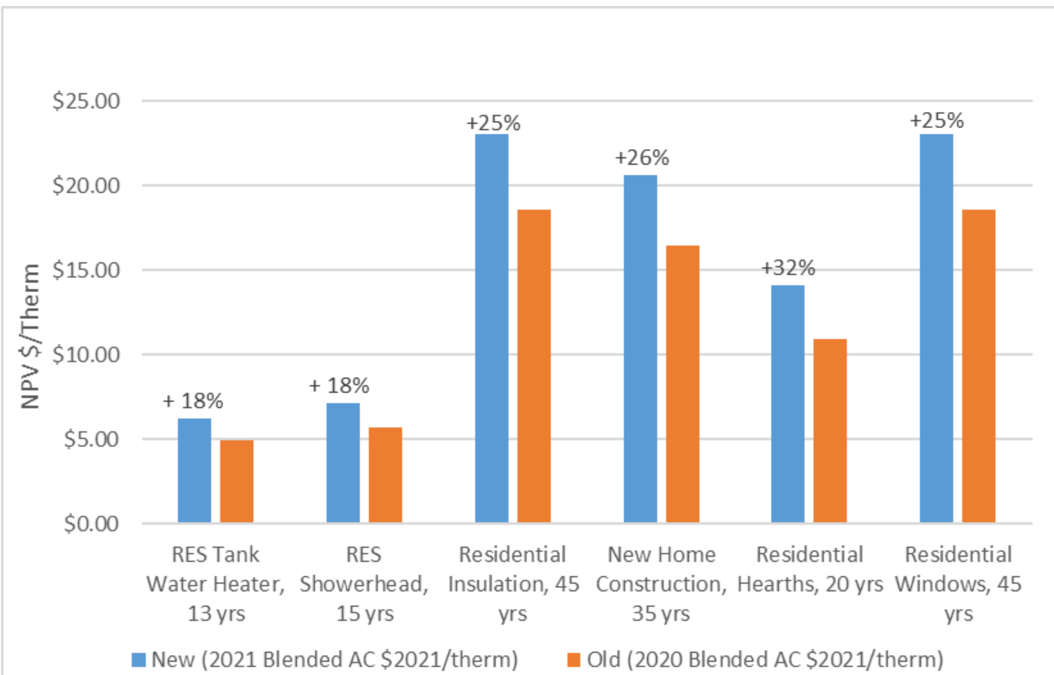


Figure 8. Commercial Avoided Cost Comparison of Representative Measures

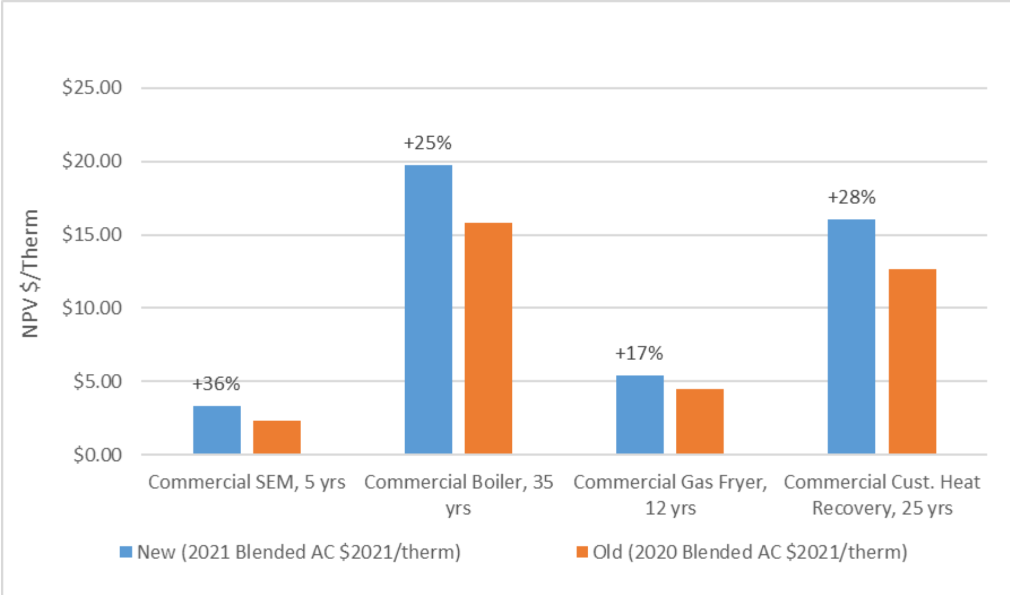


Figure 9. Industrial Avoided Cost Comparison of Representative Measures