ITEM NO. RA1

PUBLIC UTILITY COMMISSION OF OREGON
STAFF REPORT
PUBLIC MEETING DATE: September 10, 2019

REGULAR X CONSENT ____ EFFECTIVE DATE September 11, 2019

DATE: September 3, 2019

TO: Public Utility Commission

FROM: Anna Kim

THROUGH: Jason Eisdorfer and JP Batmale **SIGNED**

SUBJECT: OREGON PUBLIC UTILITY COMMISSION STAFF:
(Docket No. UM 1696) Energy Trust of Oregon Cost Effectiveness Exception Requests for DHPs.

STAFF RECOMMENDATION:

Staff recommends the Oregon Public Utility Commission (Commission or OPUC) grant exceptions to cost effectiveness guidelines for select ductless heat pump (DHP) measures, as requested by Energy Trust of Oregon (Energy Trust).

DISCUSSION:

Issue

Whether the Commission should grant cost effectiveness exception requests for DHP measures, as recommended by Staff.

Applicable Law

Order No. 94-590 in Docket No. UM 551 establishes guidelines for cost effectiveness of energy efficiency measures. Section 13 of the Order details seven conditions under which exceptions to Oregon's two cost effectiveness tests may be granted by the

Commission.[1] The exceptions are as follows:

a) The measure produces significant non-quantifiable non-energy benefits. In this case, the incentive payment should be set at no greater than the cost effective limit (defined as present value of avoided costs plus 10 percent) less the perceived value of bill savings, e.g., two years of bill savings.

b) Inclusion of the measure will increase market acceptance and is expected to lead to reduced cost of the measure.

c) The measure is included for consistency with other demand side management (DSM) programs in the region.

d) Inclusion of the measure helps to increase participation in a cost effective program.

e) The package of measures cannot be changed frequently and the measure will be cost effective during the period the program is offered.

f) The measure or package of measures is included in a pilot or research project intended to be offered to a limited number of customers.

g) The measure is required by law or is consistent with Commission policy and/or direction.

The current process to consider cost-effectiveness exceptions was reaffirmed in Docket No. UM 1622 and is as follows;[2]

- For minor exception requests, where the size and scope are limited, Energy Trust provides details to PUC Staff who review and if appropriate, provide approval through an email. A copy of the email is kept on file by the PUC Staff.

- For major exception requests, Energy Trust provides an official filing and requests an exception. PUC Staff makes formal recommendations to the Commission at a public meeting. Commissioners then make a decision on the exception request at the public meeting.

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[1] The cost effectiveness test required under Order No. 94-590 is the Total Resource Cost Test (TRC). *In The Matter Of An Investigation Into The Calculation And Use Of Conservation Cost-effectiveness Levels*, Docket No. UM 551, Order No. 94-590 (April 6, 1994). Energy Trust has used this test since its inception to guide what measures can be offered by Energy Trust programs. Orders entered in Docket No. UM 551 also allow for the use of other cost effectiveness tests. Energy Trust uses the Utility Cost Test (UCT) to set the maximum allowable incentive amount that can be offered to participants.

[2] *In the Matter of Energy Trust of Oregon, Request for Approval of Exceptions to Cost Effectiveness Guidelines,* Docket No. UM 1622, Order No. 14-332 (October 1, 2014).

The threshold by which Staff can consider minor exceptions was officially established in Docket No. UM 1696.[3] These orders codified a previous working arrangement in Docket No. UM 1622 whereby Staff could consider measure level cost-effectiveness exceptions under the following circumstances:

- The measure's TRC score is below 1 and above 0.8;
- The measure's savings do not comprise more than 5 percent of a program's annual savings; and,
- The measure's cost does not represent more than 5 percent of the program's annual budget.

If a measure does not meet all of the minor exception criteria, the request goes through the Commission's major exception request process.

Energy Trust has had major measure exceptions for DHPs since 2014.[4] The most recent exception was granted in 2017 in Order No. 17-457:

> Staff believes that the proposed efforts by Energy Trust and NEEA to lower DHP costs and increase market adoption are credible and should be given an opportunity to produce results. A two year exception is warranted under Docket No. UM 551 criteria B and C. However, if at the end of two years the cost of DHP program and/or Energy Trust's customer participation rates remain relatively unchanged another exception should not be granted.[5]

Analysis

Background

Energy Trust of Oregon (Energy Trust) provides incentives for DHPs across its service territory to electrically heated homes. Energy Trust supports and coordinates with Northwest Energy Efficiency Alliance (NEEA) on the development of the DHP market.

Cost-effectiveness is calculated based on housing type (single family, multifamily, manufactured), the equipment being replaced, and the amount of heating needed based on location, or "heating zones" Heating Zone 1 represents areas that require less heating and Heating Zone 2 represents areas that require more.

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[3] *In the Matter of Energy Trust of Oregon, Cost Effectiveness Exception Request for Electric Measures,* Docket No. UM 1696, Order Numbers 17-395 and 17-457.
[4] Docket No. UM 1696, Order No. 14-266 (July 22, 2014).
[5] Docket No. UM 1696, Order No. 17-457 Appendix A pg. 14 (November 8, 2017).

DHPs account for 17 percent of savings for Energy Trust's Home Retrofit program and 9 percent of savings for the Multifamily program. As savings are greater than 5 percent of savings for these programs, these measures do not meet the criteria for the minor measure process. Further, the TRC for these measures range from 0.6 to 0.8 and do not meet the TRC threshold of above 0.8 for minor measures. By exceeding these thresholds for savings and TRC, these measures require Commission review through the major measure exception process.

Of the DHPs installed in 2018, nearly three quarters of them are of the type that are proposed for exception. This is down from the 85 percent of 2016 installs needing exception. Given the amount of savings associated with this measure, exceptions will have a significant impact on future savings potential. See Attachment A for a breakdown by measure.

DHPs are an important part of Energy Trust's strategy because they are the only viable energy efficiency technology to replace resistance heaters. These types of equipment are inefficient and can have very long lives while alternative heating measures are significantly more expensive.

Resistance heat is more prevalent in low income and rural housing. In reviewing the Residential Building Stock Assessment data collected by NEEA, Energy Trust estimates that the share of multifamily housing with electric resistance heat is 75 percent[6] and 58 percent for manufactured homes.[7] Moderate-income single family homes were also significantly more likely to have resistance heat compared to other single family homes.[8] Rural areas that do not have gas service are also more likely to have resistance heat or rely on wood heat.[9]

Staff received the initial request for these exceptions on July 11, 2019, citing Criteria B and C. These are the same criteria identified in 2017.

b) Inclusion of the measure will increase market acceptance and is expected to lead to reduced cost of the measure.

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[6] NEEA's Residential Building Stock Assessment II Multifamily Homes Report. Appendix A pg. 24, available at: https://neea.org/img/documents/Residential-Building-Stock-Assessment-II-Multifamily-Homes-Report-2016-2017.pdf.
[7] NEEA's Residential Building Stock Assessment II Manufactured Homes Report. Appendix A pg. 23-24, available at: https://neea.org/img/uploads/Residential-Building-Stock-Assessment-II-Manufactured-Homes-Report-2016-2017.pdf.
[8] NEEA's Residential Building Stock Assessment II Manufactured Homes Report. Appendix A pg. 23-24, available at: https://neea.org/img/uploads/Residential-Building-Stock-Assessment-II-Single-Family-Homes-Report-2016-2017.pdf.
[9] NEEA's Residential Building Stock Assessment II Combined Database, available at: https://neea.org/resources/rbsa-ii-combined-database.

c) The measure is included for consistency with other demand side management (DSM) programs in the region.

Staff has engaged in ongoing correspondence and meet with Energy Trust a number of times to discuss the status of DHPs and review data.

Subsequent efforts to improve measure viability

Energy Trust has reviewed its DHP strategy and proposes to make some changes that are expected to improve the overall cost-effectiveness of DHP offerings. The calculations provided for 2020 reflect these product offering decisions. Going forward, Energy Trust proposes to:

- Require that the DHP is placed in the primary living space, which will result in more savings than if this were not a requirement.
- Discourage the installation of additional heads (outlets) which are unnecessary if the DHP is sized properly to the home.
- Incorporate summer cooling avoided costs whereas previous calculations were made assuming only a winter peak.
- Offer new measures for replacing wood heat with DHPs which are expected to be cost-effective due to the addition of non-energy benefits (NEBs) from the cost of fuel avoided.
- A fixed price offering to attract installers with guaranteed business coupled with a price ceiling.
- Targeting specific housing types and regions where the installations of DHPs are more likely to be cost-effective.

These actions are expected to increase market acceptance and improve costs over time (Criteria B) and are compatible with ongoing regional efforts conducted by NEEA and BPA (Criteria C).

Since the Commission issued Order No. 17-457, the anticipated cost-effectiveness has improved in some cases. Based on a recent evaluation, Energy Trust found that in cases where zonal heating is replaced with a DHP in manufactured homes, savings were 25 percent greater than previously estimated.[10] Additionally, the determination to require the DHP is placed in the main living space improves the outlook for single family DHPs replacing zonal heating and is expected to push units in Heating Zone 2 into cost-effectiveness. Only a fraction of total installed DHPs have become cost-effective.

[10] See Comparison of Ductless and Ducted Heat Pumps in Manufactured Homes, January 5, 2018, available at: https://www.energytrust.org/wp-content/uploads/2018/04/XMH-DHP-Billing-Analysis_Final_wSR.pdf.

Costs for DHPs have not changed significantly since Order No. 17-457. Energy Trust has attempted the cost-reduction efforts mentioned in the Order[11] but these efforts have not resulted in enough uptake to have an impact on overall costs to date. Similarly, market penetration has not improved. The sunset of Oregon Department of Energy Residential Energy Tax Credit (RETC) in 2017 had the predicted effect of causing a spike in installations followed by a drop-off and installation rates have not yet returned to post-sunset levels.

However, Staff has learned of two areas that warrant additional consideration: implications for Energy Trust's Diversity, Equity, & Inclusion ("DEI") initiative and demand response. Staff recommends that a major exception be granted based on Criteria G:

g) The measure is required by law or is consistent with Commission policy and/or direction.

At the August 27, 2019 Public Meeting,[12] the Commission approved DEI-specific performance metrics for Energy Trust. As mentioned previously, DHPs are an offering that has the potential to have a disproportionately positive impact on rural and low income housing and likely overlap with minority communities. One of the performance metrics approved by the Commission is about improving data available to answer questions about DEI impacts.[13] Information about the significance of DHPs is limited to general estimates. Staff believes that this is an area where low income, rural, and racially diverse customers may be disproportionately impacted by a decision to grant or refuse an exception. Staff recommends erring on the side of caution as additional benefits may be identified as a result of the data-enhancement performance measure.

Finally, in conversations with Portland General Electric Company (PGE), Staff believes there are opportunities that have not been fully explored yet to produce a combined energy efficiency and demand response offering.

DHPs have the potential to provide significant demand response benefits. If the benefits for demand response and energy efficiency are combined, the overall benefits may outweigh the costs, to the benefit ratepayers and participants, leading to improved cost-effectiveness and eventually to reduced costs and increased adoption. There is a strong possibility for a combined measure, but the possibility is not yet guaranteed: the potential interaction of energy efficiency, demand response, and other equipment that

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[11] Order No. 17-457 Appendix A pg. 13.
[12] *See In the Matter of Energy Trust of Oregon: Recommendations for Performance Measures,* Docket No. UM 1158, Staff Report for the August 27, 2019 Public Meeting.
[13] Ibid, pg. 8.

may be installed in homes is complicated, and a proven technical solution has not yet been identified, although there are promising candidates to evaluate.

Regardless, Staff believes there is promise in combining these sources of funding and learning more about how they interact so that savings are not double-counted. To this end, Staff recently provided Energy Trust guidance on how to calculate cost-effectiveness when combining funds. This guidance facilitated a combined offering for direct install thermostats. Staff believes this guidance is also applicable for a potential DHP offering utilizing PGE funds for earmarked for demand response.

Given the potential for future benefits in a combined energy efficiency/demand response measure, Staff recommends that Energy Trust be directed to conduct a market survey for suitable DHP controllers, and if qualified equipment is identified, work with PGE to conduct a field test in accordance with Energy Trust's field-testing procedures as a condition for measure exception extensions.

Conclusion

Based on the potential DEI impacts and the opportunities for demand response (Criteria G), improved cost-effectiveness, as well as an anticipated reduction in cost (Criteria B), and consistency with other programs in the region (Criteria C), Staff recommends granting exceptions through March 31, 2022, for the identified DHP measures under the conditions that Energy Trust will conduct a market survey for suitable DHP controllers, and if qualified equipment is identified, conduct a field test in collaboration with PGE and report back to the Commission on progress in each Q1 report during this exception period (2020, 2021, 2022).

PROPOSED COMMISSION MOTION:

Adopt Staff's recommendation to grant exceptions to cost effectiveness guidelines for DHP measures, as detailed in this memo.

Attachment A

This table describes the different ductless heat pump (DHP) energy efficiency measures. FAF stands for forced air furnace. Zonal refers to electric resistance heaters as each heater covers a limited range within the home. UCT stands for Utility Cost Test and TRC stands for Total Resource Cost test. The threshold for passing on these tests is 1 or higher.

Measures that continue to require exception	**Savings (kWh)**	**Maximum Incentive**	**2020 UCT at Max incentive**	**2018 TRC**	**2020 TRC**	**Percent of 2018 Installs**
Single family DHP replacing zonal in heating zone 1	2,212	$2,912	1.0	0.6	0.8	54.1%
Multifamily DHP replacing zonal or FAF in zone 1	1,429	$1,881	1.0	0.6	0.6	18.4%
Multifamily DHP replacing zonal or FAF in zone 2	1,571	$2,067	1.0	0.7	0.7	2.0%
Improved measures no longer needing exception	**Savings (kWh)**	**Maximum Incentive**	**2020 UCT at Max incentive**	**2018 TRC**	**2020 TRC**	**Percent of 2018 Installs**
Single family DHP replacing zonal in heating zone 2	2,756	$3,628	1.0	0.6	1.0	7.4%
Manufactured Home DHP replacing zonal in heating zone 1	3,894	$3,596	1.4	0.6	1.7	0.6%
Manufactured Home DHP replacing zonal in heating zone 2	3,894	$3,596	1.4	0.7	1.7	0.1%
Measures that continue to be cost-effective	**Savings (kWh)**	**Maximum Incentive**	**2020 UCT at Max incentive**	**2018 TRC**	**2020 TRC**	**Percent of 2018 Installs**
Single family DHP replacing FAF in heating zone 1	3,863	$4,148	1.2	1.0	1.3	11.9%
Single family DHP replacing FAF in heating zone 2	3,619	$4,148	1.1	1.0	1.3	1.1%
Manufactured Home DHP replacing FAF in heating zone 1	3,324	$3,360	1.3	1.3	1.7	4.0%
Manufactured Home DHP replacing FAF in heating zone 2	3,324	$3,360	1.3	1.3	1.9	0.5%

New 2020 Measures--for wood heat	Savings (kWh)	Maximum Incentive	2020 UCT at Max Incentive	2018 TRC	2020 TRC	Percent of 2018 Installs
Single family DHP replacing zonal in heating zone 1 - w/ wood heat	1,463	$1,926	1.0	NA	1.6	NA
Single family DHP replacing zonal in heating zone 2 - w/ wood heat	440	$580	1.0	NA	1.3	NA
Single family DHP replacing FAF in heating zone 1 - w/ wood heat	3,512	$4,148	1.1	NA	2.3	NA
Single family DHP replacing FAF in heating zone 2 - w/ wood heat	3,512	$4,148	1.1	NA	2.3	NA