

**PUBLIC UTILITY COMMISSION OF OREGON  
STAFF REPORT  
PUBLIC MEETING DATE: May 5, 2020**

REGULAR  CONSENT  EFFECTIVE DATE May 6, 2020

**DATE:** April 27, 2020

**TO:** Public Utility Commission

**FROM:** Anna Kim

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

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

**STAFF RECOMMENDATION:**

Grant exceptions to cost effectiveness guidelines for manufactured home replacement measures, as requested by Energy Trust of Oregon (Energy Trust).

**DISCUSSION:**

Issue

Whether the Commission should grant cost effectiveness exception requests for manufactured home replacement 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.<sup>1</sup> 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;<sup>2</sup>

- 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 a public meeting. Depending on the impact of the decision or the interest of stakeholders, there may be an additional comment period

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<sup>1</sup> 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.

<sup>2</sup> *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).

between when the measures are brought before the Commission and the final decision by the Commission.

The minimum threshold by which Staff can consider minor exceptions was officially established in Docket No. UM 1696.<sup>3</sup> 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, or otherwise warrant additional review, the request goes through the Commission's major exception request process.

### Analysis

Staff first presented the topic of these measure exceptions at the April 7, 2020 Public Meeting, where the Commission approved the schedule for submission of public comments and for Staff to return with final recommendations at the May 5, 2020 Public Meeting.<sup>4</sup> This memo will summarize the first memo, discuss stakeholder comments, and present final recommendations.

### *Background*

Energy Trust requested a Major Exception for manufactured home replacement energy efficiency measures in order to continue funding the manufactured home early replacement pilot which explores the costs and benefits of manufactured home replacements.

A significant component of this pilot was developing new relationships and bringing together support, particularly funding sources, to complete projects. Energy Trust partnered with Craft3, a regional not-for-profit lender, to introduce a loan product to support owner-occupied replacement projects. Energy Trust partnered with Oregon Housing and Community Services (OHCS) to provide grants towards low income

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<sup>3</sup> *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.

<sup>4</sup> Order No. 20-112.

weatherization. Energy Trust worked with CASA of Oregon, NeighborWorks Umpqua, and St Vincent de Paul of Lane County toward preserving manufactured home parks as a source of affordable housing.

Energy Trust requests an exception to continue with the manufactured homes replacement pilot. On a measure level, the energy efficiency measures fail the TRC for cost-effectiveness, with a range of scores, including very low ones. Please see Attachment A for a list of proposed measures. Energy Trust proposes a budget of \$500,000 through 2021. At roughly \$250,000 a year over the two years of the exception, this amounts to half a percent of the residential program's annual budget and will have a very minor impact on the cost-effectiveness of the residential program.

As outlined in the previous memo, Staff determined that this exception met multiple criteria: the opportunity to learn about non-energy benefits (Criteria A), potential for improvements on cost-effectiveness (Criteria B), the research opportunities (Criteria F), and potential DEI impacts, (Criteria G),

On March 26, 2020, Energy Trust hosted a webinar to present the situation to interested stakeholders, which drew wide attendance across utilities, pilot partners, and low income advocacy groups. During the webinar, it appeared that there were a number of questions about the details on how the pilot would operate, and particularly about the financing component. Based on Staff's analysis, and stakeholder responses to Energy Trust's presentation, Staff proposed a schedule to allow the filing of public comment on the exception request through April 21, 2020. This schedule was adopted by the Commission.

#### *Stakeholder Engagement*

On April 9, 2020, Energy Trust held a second webinar to discuss the financing component of the pilot in more detail. It was clarified that a loan is not required for participation, but is an option for participants, and is available to cover the remainder of the costs for home replacement beyond Energy Trust's incentives and any other funding that is applied.

Craft3 presented its involvement and processes for loan design and review. In this meeting, Craft3 is a nonprofit lender that attempts a more holistic assessment of costs and risks to the ratepayer, as well as factors that may indicate credit-worthiness that are not considered by conventional lenders. Staff notes that, in addition to clarifying questions on the product, many of the questions were about protections for customers and controls that were in place to avoid potential discrimination.

The deadline for comments for inclusion in Staff's memo was April 21, 2020. Ten comments were filed in response to the request for comments by the deadline. The following stakeholders submitted written comments:

- St. Vincent de Paul of Lane County
- Jason Sweely
- State Representative Pam Marsh
- Craft3
- Northwest Energy Coalition (NVEC)
- Network for Oregon Affordable Housing
- Cascade Natural Gas Corporation (Cascade)
- Portland General Electric (PGE)
- CASA of Oregon
- Neighborworks Umpqua

Staff is grateful for the public interest in this topic and the time that stakeholders took to review this proposal. Northwest Energy Coalition in particular took time to speak with several stakeholders to understand their perspectives on the pilot.

Of the ten responses on the pilot, two of them were neutral (Cascade and PGE), and the other eight responses were supportive, with many highlighting the benefits to affordable housing.

In addition to an overall neutral response, Cascade had a number of thoughtful comments worth discussing. Cascade's comments fell into three categories: Pendleton flood relief, cost-effectiveness exception criteria, and considerations for low income customers.

#### **Cascade's comments on Pendleton**

Cascade mentions Energy Trust's potential involvement in assisting in rebuilding in Pendleton as part of a flood relief effort. Cascade cautions Energy Trust to make deliberate and careful partnerships to ensure the best outcomes for the flood victims, and that the Craft3 loan option should be offered only if there are no better alternatives.

Staff response: In early February 2020, Pendleton experienced a catastrophic flood event that damaged many homes. Soon after this event, different organizations reached out to Energy Trust to find out if there was any assistance available, particularly through the manufactured homes pilot. Energy Trust did not commit at this time and waited for a more organized relief effort to form, to avoid complicating the situation.

Recently, Pendleton was able to secure state and federal funding to assist in rebuilding, and with these monies available, Energy Trust will be able to offer incentives at a cost-

effective level to assist in the rebuilding. This offer is independent of any loan and does not involve Craft3. Since this offer is cost-effective, there will be no need for measure exceptions for these activities. The offer will also provide additional data that may assist in answering some of the questions addressed by the pilot by providing additional opportunities to calculate costs and benefits. Staff believes that Energy Trust is working carefully with state and local organizations and will be able to assist while minimizing any potential harm to customers.

**Cascade's comments on cost-effectiveness**

Criterion A: Cascade agrees with Staff that there are non-quantifiable non-energy benefits, but requests more detail on what costs and benefits are calculated to ensure that the full range of costs and benefits are considered.

Staff response: Staff agrees and recommends that Energy Trust explore this topic with stakeholders during the workshops previously recommended by Staff.

Criterion B: Cascade generally agrees with Staff that exceptions would lead to greater market acceptance and reduced costs.

Staff response: Staff agrees that reduced overall costs are not a certainty, but believes the costs associated with implementing these measures will decrease.

Criterion F: Cascade agrees with Staff that these measures are being offered in a pilot to a limited number of customers.

Criterion G: Cascade agrees with Staff that this effort is consistent with past Commission direction.

**Cascade's comments on working with low income customers**

Cascade provides a variety of suggestions for ways to bolster protections for low income customers that may be considering participation. Cascade is particularly concerned about ensuring that customers fully understand the terms of a loan and preventing any unintended consequences through future costs or penalties that may not appear immediately.

Staff response: Staff takes these considerations very seriously and understands that there is a higher obligation for oversight when providing services to low income customers, where unintended consequences have a larger impact. Regarding unintended consequences, Staff believes that Energy Trust has taken many steps to mitigate these possibilities by working with many local partners who work with low income customers. Staff believes that the workshops Staff has proposed will be an

appropriate forum to discuss these concerns and provide input on ways to identify and mitigate risks.

In communicating with customers, Energy Trust currently partners with Neighborworks Umpqua, CASA of Oregon, and St. Vincent de Paul of Lane County. These organizations discuss Energy Trust's incentives and Craft3's loan offer with prospective customers and provides the third party communication. Energy Trust acknowledges that, in moving its work beyond rental housing and towards owner-occupied housing, there is a gap in outreach. Energy Trust will seek to fill if it moves beyond the pilot phase into a more permanent offer.

#### *Staff Recommendations*

After discussions with stakeholders and reviewing written comments, Staff maintains its initial recommendations to grant exceptions for manufactured home replacement energy efficiency measures based on Criteria A, B, F, and G. Staff also recommends that Energy Trust hold a dedicated stakeholder workshop prior to the launch of the pilot, and at key points in the project plan to inform stakeholders on how the pilot is being implemented, solicit feedback, and review results. Staff proposes four meetings by the end of the exception period.

#### Conclusion

Based on the opportunity to learn about non-energy benefits (Criteria A), potential for improvements on cost-effectiveness (Criteria B), the research opportunities (Criteria F), and potential DEI impacts, (Criteria G), Staff recommends that the Commission grant an exception through December 31, 2021, for the identified manufactured homes measure. Staff also recommends that Energy Trust hold four stakeholder workshops during the exception period.

#### **PROPOSED COMMISSION MOTION:**

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



Commission.<sup>1</sup> 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.
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- 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 a public meeting. Depending on the impact of the decision or the interest of stakeholders, there may be an additional comment period

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between when the measures are brought before the Commission and the final decision by the Commission.

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- 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, or otherwise warrant additional review, the request goes through the Commission's major exception request process.

### Analysis

The following request is a Major Exception request because many of the requested measures have TRCs below 0.8. Staff proposes to schedule a comment period due to the interest expressed to Staff by stakeholders for additional review. Therefore, Staff presents its initial recommendation herein, but asks only that the Commission approve the proposed schedule for public comment and allow Staff to present its final recommendation at a later public meeting.

This analysis will cover some background on the manufactured homes pilot, the exception request, Staff's assessment of each exception criteria, and addresses stakeholder opportunity for comment.

### *Background*

The manufactured home early replacement pilot began in 2017. The intent was to develop a standard offering to assist in replacing aging manufactured homes with new manufactured homes that exceed energy code. As the first pilot of this kind in Oregon, Energy Trust set out to answer a series of research questions, addressing quantifying costs, benefits, and cost-effectiveness, and also identifying components of a sustainable model. See Attachment A for a list of research questions.

<sup>3</sup> *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.

A significant component of this pilot was developing new relationships and bringing together support, particularly funding sources, to complete projects. In December 2018, Energy Trust partnered with Craft3, a regional not-for-profit lender, to introduce a loan product to support owner-occupied replacement projects. Energy Trust partnered with Oregon Housing and Community Services (OHCS) to provide grants towards low income weatherization. Energy Trust worked with CASA of Oregon, NeighborWorks Umpqua, and St Vincent de Paul of Lane County toward preserving manufactured home parks as a source of affordable housing.

Once these relationships were in place, home replacement projects began in July 2019. Around the same time, Oregon HB 2896 was passed, committing \$2.5 million for decommissioning grants and capital to support home replacement financial products.<sup>4</sup> OHCS will administer this program and is in the process of developing a request for proposals to implement this program.

Energy Trust, with its partners, has replaced 26 homes to date, and is just under the initial limit of \$500,000. The typical house accepted for the pilot would receive \$7,500 to \$18,000 in incentives towards home replacement, depending on the size, age, and heating climate zone of the home. At this point, Energy Trust is required to attain Commission approval before spending beyond that threshold over the life of a single pilot.

Prior to establishing additional funding sources such as through the future HB 2896 program, these projects are not cost-effective. The offering is structured to pass the Utility Cost Test (UCT) but currently do not pass the Total Resource Cost test (TRC). TRC scores range significantly based on size, age, and heating climate zone, but are all not cost-effective. This means that these investments would provide an overall benefit to the ratepayer as a system reduction in energy efficiency by passing the UCT, but failing the TRC indicates that it is not a beneficial investment for the participant *solely for the purpose of energy savings*. These tests do not currently capture the non-energy benefits to the customer of replacing an aging home. A list of energy efficiency measures by home type is available in Attachment B.

Energy Trust has not been able to answer its research questions within the monetary cap under which it has discretion. It took time to establish new partnerships, and new opportunities are being explored while interest in participation has increased. In particular, Energy Trust wishes to be in the market testing this offering when OHCS's manufactured home decommissioning program launches, to be able to support the program and provide co-funding.

<sup>4</sup> House Bill 2869 can be found at <https://olis.leg.state.or.us/liz/2019R1/Downloads/MeasureDocument/HB2896/Enrolled>.

Energy Trust wishes to pursue this pilot because Energy Trust believes that it is worth the investment to find a pathway to invest in energy efficient manufactured home replacement and to gain data on the costs and benefits of such projects. Since replacements only began in July 2019, initial energy impacts will not be available until late 2020, as it is necessary to review at least 12 months of post-installation usage. It is also noted that there may be non-energy benefits that can be quantified through this work. Energy Trust can include non-energy benefits towards cost-effectiveness tests if the benefits are quantifiable, and this pilot may provide an opportunity to quantify certain benefits.

If the pilot is extended, Energy Trust proposes to focus on working with owner-occupied housing sited on leased land, as the majority of participants to date have been rental housing. This would provide information on the two most common scenarios that will be encountered for low income manufactured homes.

*Exception Request*

Energy Trust requests an exception to continue with the manufactured homes replacement pilot. Energy Trust has spent \$487,132 on this pilot to date and requests an exception to spend another \$500,000 over the course of the next two years. On a measure level, the energy efficiency measures fail the TRC for cost-effectiveness, with a range of scores, including very low ones.

Energy Trust proposes a budget of \$500,000 through 2021. The table below provides a breakout by delivery, evaluation, and incentives.

**Q2 2020 to Q3 2021 Forecasted Budget**

Delivery	Evaluation	Incentives	Total
\$100,000	\$30,000	\$370,000	\$500,000

At roughly \$250,000 a year, this amounts to half a percent of the residential annual budget and will have a very minor impact on the cost-effectiveness of the residential program, impacting UCT by -0.01 and TRC by -0.02.

Staff received the initial request for the exception on March 17, 2020, citing Criterion F:

- 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.

In discussions with Energy Trust, it was determined that Criteria A, B, and G are also appropriate considerations:

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

#### *Staff Assessment*

The first criterion addresses the pilot nature of this offering:

- 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.

The request fulfils this standard as these measures are included in a pilot and the offering is limited in budget and will only reach a couple dozen participants. Staff finds the information that could potentially be gained to be compelling. See Attachment A for a list of research questions.

The next criterion addresses non-energy benefits:

- A) The measure produces significant non-quantifiable non-energy benefits.

Energy Trust is able to incorporate quantifiable non-energy benefits. Currently, for these measures, the quantified benefits are negligible, but clearly there are significant benefits to the customers in seeing aging affordable housing replaced that extend far beyond the energy benefits. Staff agrees that there likely are significant benefits to comfort, health, and possibly other benefits, and this work may lead to quantifying some of them. Staff believes it is important to take this opportunity to potentially quantify additional benefits to include in future calculations.

The next criterion addresses reducing costs:

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

Staff agrees that these measures may also fall under this standard; by establishing a pathway to replacing manufactured homes, learnings will lead to improved delivery and success may attract additional funding, including a potential partnership on decommissioning costs with OHCS.

The next criterion addresses the need for consistency with other laws and Commission policies:

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

As discussed in Order No. 19-301, the Commission approved DEI-specific performance metrics for Energy Trust at the August 27, 2019, Public Meeting.<sup>5</sup> This pilot works specifically with partners that advocate for affordable housing, as well as other organizations that provide services to low-income customers. Of particular note is Energy Trust's partnership with Craft3, a not-for-profit lender. Staff believes that this pilot will help Energy Trust meet its DEI goals directly through the pilot, as well as provide learnings that will extend Energy Trust's DEI efforts going forward.

*Stakeholder Opportunity for Comment*

On March 26, 2020, Energy Trust hosted a webinar to present the situation to interested stakeholders, which drew wide attendance across utilities, pilot partners, and low income advocacy groups. Most stakeholders were supportive, but there were a number of questions about the details on how the pilot would operate. These details would not require specific Commission approval, as they relate to details of design and delivery. Stakeholders wanted to ensure that the pilot was run in such a way as to avoid harming any low income customers affected by these activities.

Staff greatly appreciates the interest and scrutiny of these stakeholders, many of which are new to Commission activities. Staff believes this is a great opportunity to engage with these new stakeholders and incorporate their feedback and see to their ongoing engagement. Energy Trust will provide additional background and details to stakeholders prior to the posting of this memo. Staff also recommends that Energy Trust hold a dedicated stakeholder workshop prior to the launch of the pilot, and at key points in the project plan. Staff proposes four meetings by the end of the exception period.

Based on Staff's analysis, and stakeholder responses to Energy Trust's presentation, Staff proposes a schedule to allow the filing of public comment on the exception request through April 21, 2020. This will allow stakeholders two weeks after the April 7, 2020, Public Meeting to review and respond. Staff will receive and compile comments, and return at the May 5, 2020, Public Meeting with its final recommendation.

**Proposed Schedule:**

Event	Date
Public Comment to be Filed in UM 1696 on Major Exception Request	April 21, 2020
Staff's Final Recommendation to Commission	May 5, 2020

<sup>5</sup> 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.

## Conclusion

Based on the opportunity to learn about non-energy benefits (Criteria A), potential for improvements on cost-effectiveness (Criteria B), the research opportunities (Criteria F), and potential DEI impacts, (Criteria G), Staff's initial recommendation is that the Commission grant an exception through December 31, 2021, for the identified manufactured homes measure. Staff requests that the Commission approve the schedule above for submission of comments and its final recommendation.

## **PROPOSED COMMISSION MOTION:**

Adopt Staff's proposed schedule for submission of stakeholder comments and for Staff's final recommendation on Energy Trust's request for a major exception to cost-effectiveness for an energy efficiency measure for manufactured home replacement.

### **Attachment A: Pilot Research Questions**

These are the research questions that Energy Trust seeks to answer through continued work on the Manufactured Homes Replacement Pilot.

#### Determining Savings, Cost, and Cost Effectiveness:

1. What are the energy savings? (Improve upon assumptions derived from Residential Building Stock Assessment)
2. What are the costs? (Further itemization of costs, corroborating project data provided by pilot partners)
3. How does the application of ratepayer funding influence decision making? What's the influence point?
4. Are incremental or full costs and savings appropriate for cost-effectiveness analysis given Energy Trust's influence point? If incremental is appropriate, how should this be defined?
5. What are the existing conditions of the homes being retired?
6. What are the non-energy benefits? Which are difficult to quantify?

#### Establishing A Replicable Program Model:

7. What are the critical design elements for a replicable program? How can ratepayer efficiency programs effectively partner with other organizations?
8. What are the characteristics of effective financing models?
9. What are the financial and non-financial barriers to uptake?

### Attachment B: Manufactured Homes Measures

The measure names in these tables are in the following format: (Heating fuel) (Retrofit or Incremental) MHR – (existing home size) to (new home size) – (new home efficiency rating), (existing home vintage), (heating zone) (territory type if there are unclaimable savings). The costs used for these screenings do not include any complementary funding. SW is a single wide home, DW is a double wide home. NEEM 1.1 and 2.0 are the Northwest Energy Efficiency Manufactured Home energy efficiency specifications for newly constructed homes.<sup>6</sup>

Measure	Savings (kWh)	Savings (therm)	UCT BCR at Max Incentive	TRC BCR
Electric Retrofit MHR – SW to SW – NEEM1.1, Pre-1976, HZ1	7,937	0	1.0	0.2
Electric Retrofit MHR – SW to SW – NEEM1.1, Pre-1976, HZ2/3	14,935	0	1.0	0.5
Electric Retrofit MHR – SW to SW – NEEM1.1, 1976-1994, HZ1	4,723	0	1.0	0.1
Electric Retrofit MHR – SW to SW – NEEM1.1, 1976-1994, HZ2/3	9,695	0	1.0	0.3
Electric Retrofit MHR – SW to SW – NEEM2.0, Pre-1976, HZ1	8,268	0	1.0	0.2
Electric Retrofit MHR – SW to SW – NEEM2.0, Pre-1976, HZ2/3	15,367	0	1.0	0.5
Electric Retrofit MHR – SW to SW – NEEM2.0, 1976-1994, HZ1	5,054	0	1.0	0.2
Electric Retrofit MHR – SW to SW – NEEM2.0, 1976-1994, HZ2/3	10,127	0	1.0	0.3
Electric Retrofit MHR – DW to DW – NEEM1.1, Pre-1976, HZ1	15,148	0	1.0	0.3
Electric Retrofit MHR – DW to DW – NEEM1.1, Pre-1976, HZ2/3	27,656	0	1.0	0.6
Electric Retrofit MHR – DW to DW – NEEM1.1, 1976-1994, HZ1	9,653	0	1.0	0.2
Electric Retrofit MHR – DW to DW – NEEM1.1, 1976-1994, HZ2/3	18,696	0	1.0	0.4
Electric Retrofit MHR – DW to DW – NEEM2.0, Pre-1976, HZ1	15,739	0	1.0	0.3
Electric Retrofit MHR – DW to DW – NEEM2.0, Pre-1976, HZ2/3	28,407	0	1.0	0.6
Electric Retrofit MHR – DW to DW – NEEM2.0, 1976-1994, HZ1	10,245	0	1.0	0.2

<sup>6</sup> Details about NEEM specifications can be found at: <https://www.neemhomes.com/>

Measure	Savings (kWh)	Savings (therm)	UCT BCR at Max Incentive	TRC BCR
Electric Retrofit MHR – DW to DW – NEEM2.0, 1976-1994, HZ2/3	19,447	0	1.0	0.4
Electric Retrofit MHR – SW to DW – NEEM1.1, Pre-1976, HZ1	6,731	0	1.0	0.2
Electric Retrofit MHR – SW to DW – NEEM1.1, Pre-1976, HZ2/3	13,140	0	1.0	0.3
Electric Retrofit MHR – SW to DW – NEEM1.1, 1976-1994, HZ1	3,518	0	1.0	0.1
Electric Retrofit MHR – SW to DW – NEEM1.1, 1976-1994, HZ2/3	7,901	0	1.0	0.2
Electric Retrofit MHR – SW to DW – NEEM2.0, Pre-1976, HZ1	7,323	0	1.0	0.2
Electric Retrofit MHR – SW to DW – NEEM2.0, Pre-1976, HZ2/3	13,891	0	1.0	0.3
Electric Retrofit MHR – SW to DW – NEEM2.0, 1976-1994, HZ1	4,110	0	1.0	0.1
Electric Retrofit MHR – SW to DW – NEEM2.0, 1976-1994, HZ2/3	8,651	0	1.0	0.2
Electric Retrofit MHR – DW to SW – NEEM1.1, Pre-1976, HZ1	16,353	0	1.0	0.5
Electric Retrofit MHR – DW to SW – NEEM1.1, Pre-1976, HZ2/3	29,450	0	1.0	0.9
Electric Retrofit MHR – DW to SW – NEEM1.1, 1976-1994, HZ1	10,858	0	1.0	0.3
Electric Retrofit MHR – DW to SW – NEEM1.1, 1976-1994, HZ2/3	20,490	0	1.0	0.6
Electric Retrofit MHR – DW to SW – NEEM2.0, Pre-1976, HZ1	16,684	0	1.0	0.5
Electric Retrofit MHR – DW to SW – NEEM2.0, Pre-1976, HZ2/3	29,882	0	1.0	0.9
Electric Retrofit MHR – DW to SW – NEEM2.0, 1976-1994, HZ1	11,189	0	1.0	0.3
Electric Retrofit MHR – DW to SW – NEEM2.0, 1976-1994, HZ2/3	20,922	0	1.0	0.6
Gas Retrofit MHR – SW to SW – NEEM 1.1+, Pre-1976, HZ1	130	294	1.0	0.1
Gas Retrofit MHR – SW to SW – NEEM 1.1+, Pre-1976, HZ2/3	204	718	1.0	0.3
Gas Retrofit MHR – SW to SW – NEEM 1.1+, 1976-1994, HZ1	108	223	1.0	0.1
Gas Retrofit MHR – SW to SW – NEEM 1.1+, 1976-1994, HZ2/3	214	762	1.0	0.3
Gas Retrofit MHR – DW to DW – NEEM 1.1+, Pre-1976, HZ1	166	553	1.0	0.2

Measure	Savings (kWh)	Savings (therm)	UCT BCR at Max Incentive	TRC BCR
Gas Retrofit MHR – DW to DW – NEEM 1.1+, Pre-1976, HZ2/3	261	1,303	1.0	0.4
Gas Retrofit MHR – DW to DW – NEEM 1.1+, 1976-1994, HZ1	138	432	1.0	0.1
Gas Retrofit MHR – DW to DW – NEEM 1.1+, 1976-1994, HZ2/3	274	1,379	1.0	0.4
Gas Retrofit MHR – SW to DW – NEEM 1.1+, Pre-1976, HZ1	114	241	1.0	0.1
Gas Retrofit MHR – SW to DW – NEEM 1.1+, Pre-1976, HZ2/3	185	637	1.0	0.2
Gas Retrofit MHR – SW to DW – NEEM 1.1+, 1976-1994, HZ1	92	170	1.0	0.0
Gas Retrofit MHR – SW to DW – NEEM 1.1+, 1976-1994, HZ2/3	196	682	1.0	0.2
Gas Retrofit MHR – DW to SW – NEEM 1.1+, Pre-1976, HZ1	178	606	1.0	0.2
Gas Retrofit MHR – DW to SW – NEEM 1.1+, Pre-1976, HZ2/3	275	1,384	1.0	0.5
Gas Retrofit MHR – DW to SW – NEEM 1.1+, 1976-1994, HZ1	150	484	1.0	0.2
Gas Retrofit MHR – DW to SW – NEEM 1.1+, 1976-1994, HZ2/3	288	1,460	1.0	0.5
Gas Retrofit MHR – SW to SW – NEEM 1.1+, Pre-1976, HZ1 Gas Only	0	294	1.0	0.1
Gas Retrofit MHR – SW to SW – NEEM 1.1+, Pre-1976, HZ2/3 Gas Only	0	718	1.0	0.3
Gas Retrofit MHR – SW to SW – NEEM 1.1+, 1976-1994, HZ1 Gas Only	0	223	1.0	0.1
Gas Retrofit MHR – SW to SW – NEEM 1.1+, 1976-1994, HZ2/3 Gas Only	0	762	1.0	0.3
Gas Retrofit MHR – DW to DW – NEEM 1.1+, Pre-1976, HZ1 Gas Only	0	553	1.0	0.2
Gas Retrofit MHR – DW to DW – NEEM 1.1+, Pre-1976, HZ2/3 Gas Only	0	1,303	1.0	0.4
Gas Retrofit MHR – DW to DW – NEEM 1.1+, 1976-1994, HZ1 Gas Only	0	432	1.0	0.1
Gas Retrofit MHR – DW to DW – NEEM 1.1+, 1976-1994, HZ2/3 Gas Only	0	1,379	1.0	0.4
Gas Retrofit MHR – SW to DW – NEEM 1.1+, Pre-1976, HZ1 Gas Only	0	241	1.0	0.1
Gas Retrofit MHR – SW to DW – NEEM 1.1+, Pre-1976, HZ2/3 Gas Only	0	637	1.0	0.2
Gas Retrofit MHR – SW to DW – NEEM 1.1+, 1976-1994, HZ1 Gas Only	0	170	1.0	0.0

Measure	Savings (kWh)	Savings (therm)	UCT BCR at Max Incentive	TRC BCR
Gas Retrofit MHR – SW to DW – NEEM 1.1+, 1976-1994, HZ2/3 Gas Only	0	682	1.0	0.2
Gas Retrofit MHR – DW to SW – NEEM 1.1+, Pre-1976, HZ1 Gas Only	0	606	1.0	0.2
Gas Retrofit MHR – DW to SW – NEEM 1.1+, Pre-1976, HZ2/3 Gas Only	0	1,384	1.0	0.5
Gas Retrofit MHR – DW to SW – NEEM 1.1+, 1976-1994, HZ1 Gas Only	0	484	1.0	0.2
Gas Retrofit MHR – DW to SW – NEEM 1.1+, 1976-1994, HZ2/3 Gas Only	0	1,460	1.0	0.5