

PUBLIC UTILITY COMMISSION OF OREGON  
STAFF REPORT  
PUBLIC MEETING DATE: October 10, 2017

REGULAR  X  CONSENT \_\_\_\_\_ EFFECTIVE DATE  Upon Approval

DATE: October 4, 2017

TO: Public Utility Commission

FROM: JP Batmale *JPB*

THROUGH: *Sefa SE* Jason Eisdorfer and *JC* John Crider

SUBJECT: OREGON PUBLIC UTILITY COMMISSION STAFF:  
(Docket No. UM 1893) Recommendation to open an investigation into the methodology and process for developing avoided costs used in energy efficiency cost-effectiveness tests.

**STAFF RECOMMENDATION:**

Staff recommends the Oregon Public Utility Commission (OPUC or Commission) open an investigation into the methodology and process for developing and updating avoided costs used in cost-effectiveness tests for electric and natural gas energy efficiency. The investigation would explore the processes currently used for establishing avoided costs and evaluate changes to improve transparency, accuracy and the process for updating and developing avoided costs.

**DISCUSSION:**

Issue

Whether the Commission should open an investigation into the process for developing and updating avoided costs used in cost-effectiveness tests for electric and natural gas energy efficiency, with Staff reporting back to the Commission with a proposed process for future updates.

Applicable Law

Under ORS 756.515(1), whenever the Commission believes that an investigation of any matter relating to any public utility or telecommunications utility or other person should be made, the Commission may, on its own motion, investigate any such matter.

## Analysis

### *Background*

Measures of cost-effectiveness are relevant to the design of conservation programs and integrated resource planning. Integrated resource planning is governed by OAR 860-027-0400 and the Guidelines adopted in Docket No. UM 1056, Order No. 07-002, corrected by Order No. 07-047. The Energy Trust of Oregon (Energy Trust) is the current administrator of conservation programs funded through the public purpose fund established under ORS 757.612.

The avoided costs of energy efficiency are a key component to determining cost-effectiveness. ORS 469.631(4) defines "cost-effective" for utility energy conservation programs and states:

*"Cost-effective" means that an energy conservation measure that provides or saves a specific amount of energy during its life cycle results in the lowest present value of delivered energy costs of any available alternative. However, the present value of the delivered energy costs of an energy conservation measure shall not be treated as greater than that of a non-conservation energy resource or facility unless that cost is greater than 110 percent of the present value of the delivered energy cost of the non-conservation energy resource or facility.*

Oregon Administrative Rule (OAR) 860-030-0010 builds upon the definition of cost-effectiveness for utility energy conservation program by stating that:

*(1) "Cost-effective," as defined in ORS 469.631(4), relates an energy conservation measure's cost, life cycle, and the cost of alternative energy facilities. An energy utility's cost-effectiveness calculations should be consistent with the utility's most recently acknowledged least-cost plan pursuant to Order No. 89-507.*

See also OAR 860-027-0310.

In terms of establishing avoided costs and their application in tests for cost effectiveness, Commission Order No. 94-590 in Docket No. UM 551<sup>1</sup> is the seminal document that still provides guidance in program design, implementation, and evaluation for the Commission and Energy Trust. It provides certain parameters for identifying avoided costs, but does not specify a particular methodology for specific programs. In summary, with references to the utilities now applicable almost entirely the current program administrator Energy Trust, the Order states the following:

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<sup>1</sup> For public convenience, a copy of Order No. 94-590 is available on the Commission's website, edockets page, under Docket UM 1622 (posted October 18, 2012).

- The total resource cost test (TRC) must be used to determine if energy efficiency measures and programs are cost effective.<sup>2</sup>
- In cost effectiveness calculations a minimum value of ten percent should be used to account for risk and uncertainty.<sup>3</sup>
- A utility should calculate cost savings and other non-energy benefits if they are significant and there is a reasonable and practical way for calculating them.<sup>4</sup>
- Utilities should set demand-side acquisition targets to minimize total resource costs.<sup>5</sup>
- If a utility considers rate impacts in setting its demand-side targets, it should justify the decision in its least-cost plan (now called Integrated Resource Plan (IRP)).<sup>6</sup>
- Utilities should offer incentives to end-users sufficient to meet or exceed acknowledged least-cost plan conservation targets.<sup>7</sup>
- Measures that are not cost-effective could be included in utility programs if one of the following can be demonstrated:<sup>8</sup>
  - a) The measure produces significant non-quantifiable non energy benefits. In this case, the incentive payment should be 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 DSM programs in the region.
  - d) Inclusion of the measure helps to increase participation in a cost effective program.

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<sup>2</sup> *In the Matter of Calculation and Use of Cost-effectiveness Levels for Conservation*, Docket No. UM 551 Order No. 94-590, response to item 11 and 12 on page 14 (April 6, 1994).

<sup>3</sup> *Ibid.*

<sup>4</sup> *Ibid.*, response to item 11 and 12 on page 15.

<sup>5</sup> *Ibid.*

<sup>6</sup> *Ibid.*

<sup>7</sup> *Ibid.*

<sup>8</sup> *Ibid.*, response to item 13 on page 18.

- 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 conditions above apply both to measures and programs with the exception of item (d) above.<sup>9</sup>
  - Energy Trust should show that one or more of these factors offsets the likely costs associated with applying measures that are not cost-effective.<sup>10</sup>
  - The present value of measurement and evaluation costs should be levelized over the expected program life for TRC calculations.<sup>11</sup>
  - Utilities lost revenue should not be included in the calculation of the TRC, because they represent transfer payments from consumers.<sup>12</sup>
  - Demand-side resources can provide the utility with increased reliability before new resources are brought on line. The value of demand side resources is reasonably represented by the price of sold or purchased wholesale firm energy/commodity capacity.<sup>13</sup>

The current program administrator, Energy Trust, is a non-profit organization that delivers the energy efficiency and renewable programs for Oregon's investor-owned electric and gas companies to over 1.6 million ratepayers across the state. In 2001, Energy Trust entered into a grant agreement with the OPUC and officially began operations in 2002. The 2005 Grant Agreement currently in effect between the Commission and Energy Trust includes Guideline 5.e., on page 14, which states:

*Individual conservation programs will be designed to be cost-effective and will be independently evaluated on a regular basis. This guideline should not, however, restrict investment in pilot projects, educational programs, demonstrations, or similar endeavors.*

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<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid, response to Item 14 on page 19.

<sup>12</sup> Ibid, response to Item 15 on page 20.

<sup>13</sup> Ibid, response to Item 4 on page 6.

OPUC Staff has worked with Energy Trust in establishing and implementing cost-effective efficiency programs. Attachment A to this Staff report contains the policy detailing Energy Trust’s approach to cost-effectively investing rate payer funds.

*Current Avoided Cost Methodology*

Avoided costs are a key input into all cost-effectiveness calculations. An efficiency measure’s avoided cost generally represents the largest quantifiable benefits in a cost-effectiveness test, as avoided costs represent the costs the utility system would have incurred to generate and deliver an equivalent amount of energy but is otherwise saved through implementation of an energy efficiency measure or program.

In practice, several data points are combined into an algebraic formula that create the avoided cost for an energy efficiency measure. Energy Trust currently uses the following data points or elements in its electric and gas efficiency avoided cost formulas:

Electric AC Elements	Gas AC Elements
Forward Market Prices (Energy)	Forward Market Prices (Energy)
Line Losses	Supply & Distribution Deferral *
Transmission & Distribution (T&D) Deferral Value	Avoided Interstate Gas Pipeline Charges *
Generation Capacity Deferral Value	Carbon Policy Compliance *
Risk Reduction Value	Risk Reduction Value
10% Power Act Credit	10% Power Act Credit

\* - New for 2018; Northwest Natural only per LC 64

Electric Efficiency AC formula combining elements:

$$((Energy * Line Losses) + Avoided T\&D + Generation Deferral) * 10\% Credit + Risk Reduction Value$$

Gas Efficiency AC formula combining elements:<sup>14</sup>

$$(Energy + S\&D Deferral + Avoided Trans.) * 10\% Credit + Carbon Compliance + Risk Reduction Value$$

Avoided costs values vary by energy efficiency measure. An electric measure that provides more efficient heating in the winter will, in theory, capture the higher values from Avoided Transmission and Distribution (T&D). Thus, an efficiency measure’s “load shape” – while not an explicit element in the avoided cost formulas – can play a critical role in determining avoided cost value. Additionally, efficient equipment with a long

<sup>14</sup> This formula is only applicable to Northwest Natural’s gas AC for 2018, per the Company’s Integrated Resource Plan, Docket No. LC 64. Cascade Natural Gas and Avista Corporation currently use only three elements in their AC formula: Gas Forecast; Risk Reduction Value; and, 10 percent credit.

measure life that lasts into a utility's capacity "deficiency period" allows it to capture the utility's Generation Capacity Deferral value. The timing and value of this element is established by a utility's IRP.

Since 2013, Energy Trust has updated the inputs for both electric and gas efficiency avoided costs every two years. The methodology for both avoided costs has remained relatively the same.

Energy Trust has conducted this update as an internal project in the past. The utilities have provided the data that Energy Trust has requested and have reviewed the final product. OPUC Staff has also provided review of the final product.

In 2013 and 2015, outside stakeholders were not involved in the development and updating of Energy Trust's avoided costs. In 2017, Energy Trust did involve some stakeholders in the avoided costs update process.

#### *Need for an Investigation*

Energy Trust's avoided cost methodology was generally designed to reflect power cost trends in the energy market. The forward market prices for electricity and for natural gas have dropped over the past seven years while the value of utility's capacity has risen.<sup>15</sup> The avoided cost methodology for energy efficiency was not necessarily optimized to value other benefits, such as capacity contribution, which used a simplified approach to assessing value. Thus energy efficiency's value has fallen over the past years with declining energy values. An update to avoided costs would address this.

More generally, Staff believes that Oregon ratepayers would benefit from an investigation into the processes behind the development of energy efficiency avoided costs. Staff has observed the following:

1) *Updating Existing Element Methodologies*

The PUC can leverage its resources, information and perspective from other dockets and regional entities, and general authority when making updates to methodologies of current elements. An example is the work done by the Northwest Power and Conservation Council in establishing a new approach to assessing the capacity value of energy efficiency in the Seventh Power Plan.

2) *Greater Stakeholder Interest in Updating Avoided Costs*

The current approach to reviewing and updating avoided costs was effective when it first began and still reflects the good work of the parties involved. Yet, as more stakeholders have sought visibility into the process and raised questions about the depth and granularity of potential inputs it has become clear that a

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<sup>15</sup> See In the Matter of Portland General Electric, Request for General Rate Revision, Docket UE 319, PGE/1400, Cody-Macfarlane/4 (February 28, 2017): PGE's respective capacity and energy percentages used in allocating its generation revenue requirement are now at 36.4 percent and 63.6 percent. In 2013, they were 32.8 percent and 67.2 percent.

different type of forum and approach to avoided cost updates would be in the better interest of stakeholders and ultimately ratepayers.<sup>16</sup> Similar investigations into the benefits of resources to the utility system – like the Northwest Power and Conservation Council’s RTF work for energy efficiency measures and the Commission’s own process around updating avoided costs for Qualifying Facilities – provide opportunities for stakeholder comment through regular and well documented transparent proceedings. As more parties are interested in how distributed energy resources (DERs), including energy efficiency, provide value to the utility system and how that value is quantified and applied to investment decisions, evolving Oregon’s avoided cost update into a different type of forum and proceeding is appropriate.

3) Framework for Exploring New Elements into Avoided Costs

Staff believes that any future process to update avoided costs should include a framework for exploring and evaluating new elements that could better reflect energy efficiency’s true value to the system and ratepayers. These may include elements like an avoided Renewable Portfolio Standard (RPS) benefit, demand reduction induced price effects (DRIPE), and marginal cost of ancillary services. The proactive work done by the staff of Northwest Natural (NWN) in its 2016 IRP is a good example of updating avoided costs to better reflect energy efficiency’s value to the NWN system and ratepayers. Currently though, there is no public process whereby stakeholders can propose exploring the development and/or adoption of new elements in the methodology for avoided costs. Development of such a framework will be valuable to EE in Oregon.

4) Leveraging Other Activities Exploring DER Value at Commission

Staff is currently exploring the values associated with other DER resources through our investigations into the resource value of solar (RVOS), energy storage, transportation electrification and demand response. In each investigation, Staff is looking into resource benefits by assessing multiple elements of their respective avoided costs. At a minimum, any resulting updates to the energy efficiency avoided cost methodology would be informative of work in these other areas. There is also the potential for future cross-functional benefits of lessons and values from one DER avoided cost docket being applicable to another.

*Phases of Investigation*

Staff proposes that this investigation take place within a non-contested case proceeding with recommended findings brought to the Commission at a future public meeting and implemented across two phases:

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<sup>16</sup> See Sierra Club Comments at 24 (January 24, 2017) and NW Energy Coalition Initial Comments at 4 (January 24, 2017), in PGE’s IRP, LC 66.

Phase 1 (three - six months)

Host a series of stakeholder workshops with goals including:

- Review and documentation of current elements, methodologies to value each element, and methodology to combine elements;
- Consideration of need to adjust the timing and type of resource avoided and valued for the capacity value for electric resources to align with the NW Power Council's approach;
- Determination of an on-going public framework to explore and evaluate new elements for electric and gas avoided cost methodologies, ensure that the methodology represents industry best practices and continues to properly reflect avoided utility system values;
- Determine ongoing process for updating values (e.g. information utilities provide to Energy Trust and the timing for updates);
- This investigation *is limited only to avoided costs determination and therefore will not address:*
  - Cost effectiveness methodologies or their application;
  - Incorporation of currently unquantified, non-energy benefits; and
  - Quantification of non-energy benefits.

Staff intends to present a report on the findings from the workshops and recommended findings to the Commission at a public meeting before February 28, 2018, including consideration of the following changes for electric and gas efficiency avoided costs:

- Data gathering and production for updates;
  - Process for updating now;
  - Process for updating values and methodology in the future.
- Phase 2 (three months)  
Work with stakeholders to implement Commission approved Phase 1 changes in time for the development of Energy Trust's 2019 budget.

After the completion of Phase 2, Staff envisions a regular Staff-managed process to update avoided costs every other year, or as needed.



### Conclusion

This investigation would bring together multiple stakeholders to update the process used for developing and refining energy efficiency avoided costs and determine a regular update cycle for future opportunities to review and update energy efficiency avoided costs as needed. The work products from this investigation would complement other initiatives at the Commission that are attempting to establish the value of DERs like demand response and energy storage. Staff proposes to complete workshops and the update in two phases over a total of eight to nine months and report back to the Commission with a proposed process for future updates.

### **PROPOSED COMMISSION MOTION:**

Open an investigation into the process for developing and updating avoided costs used in cost-effectiveness tests for electric and natural gas energy efficiency. Staff will report back to the Commission with a proposed process for future updates.

## APPENDIX A

This document can be found at <http://www.energytrust.org/wp-content/uploads/2016/11/4.06.000.pdf>



### 4.06.000-P Cost-Effectiveness Policy and General Methodology for Energy Trust of Oregon

History			
Source	Date	Action/Notes	Next Review Date
Board Decision	February 27, 2002	Approved (R83)	March 22, 2002
Board	March 22, 2002	Reviewed, Revised	April 3, 2002
Board	April 3, 2002	Reviewed, Revised (Minutes)	April 2005
Board	September 7, 2005	Revised (R353)	September 2008
Board	February 13, 2008	Revised (R464)	February 2011
Board	December 16, 2011	Revised (R596)	December 2014

#### Introduction

The Energy Trust of Oregon seeks a future that includes sufficient, stable, and affordable power available to all customers through sustained investment in energy efficiency and renewable resources that reduce the economic and environmental costs of using gas and electricity. To properly evaluate such investments, Energy Trust compares the cost of energy-saving programs and measures to the cost of alternative sources of natural gas and electric energy. The cost of alternative sources is known as "avoided cost". The Oregon Public Utility Commission (PUC), the Washington Utilities and Transportation Commission (WUTC), the Northwest Power and Conservation Council (NPCC) and the Northwest Energy Efficiency Alliance (Alliance) use similar approaches and assumptions to analyze the cost-effectiveness of energy efficiency investments. Consistent with these approaches, this policy encompasses two tests to determine cost-effectiveness and describes the key variables or economic model inputs that define these tests in Energy Trust analysis.

The Oregon Renewable Energy Act of 2007 (SB 838) allows supplemental energy efficiency funding, i.e., more than the three-percent public purpose charge authorized in the 1999 law. The 2007 Act, together with the agreements that fund Energy Trust natural gas efficiency programs in Oregon, support Energy Trust programs that help utilities meet goals that are determined through Integrated Resource Planning. In that process, the OPUC reviews and may acknowledge avoided cost forecasts from each utility. Because Energy Trust funding is significantly affected by this process, the following policy is designed to be consistent with OPUC guidance and, to the extent practical, with utility integrated resource plans. Energy Trust may consider prospective costs and benefits over a period of more than one year, as appropriate, for emerging technologies and market transformation ventures.

#### Policy

Energy Trust adopts the Utility System and Societal tests, as described below, as its primary determinants of whether efficiency investments meet cost-effectiveness criteria. The economic comparison will be presented as a benefit-to-cost ratio. Programs and

measures that pass both tests, or are likely to over time, are eligible for Energy Trust investment. Both tests consider energy impacts on customers who are influenced by the program, and long term market effects of programs and measures (e.g., sales, or efficacy of efficient technologies beyond the direct program participants) where such effects are significant and likely. The difference between the Utility System and Societal tests is that the Societal Test includes all costs (not just Energy Trust costs) and savings of program participants and others who were influenced to act by Energy Trust programs. The Utility System Test includes Energy Trust costs only, and savings from program participants and others who were influenced to act by Energy Trust programs.

For programs and measures that pass these cost-effectiveness tests, in configuring programs Energy Trust may consider other factors identified in its strategic plan and action plans.

#### **Costs**

The societal cost definition is in alignment with the OPUC docket no. UM-551's definition of Total Resource Cost (Societal) perspective as including total costs and total benefits in cost effectiveness calculations.<sup>[1]</sup> The following costs will be included in the societal perspective:

1. Total cost of efficiency measures and actions,<sup>[2]</sup> including costs to Energy Trust and participants
2. Energy Trust administrative costs
3. Energy Trust program management costs

The utility system test includes only the Energy Trust incentives and items 2 and 3, above, i.e., all Energy Trust efficiency costs, not those paid by consumers.

Costs excluded: The value of Oregon and/or Federal tax credits will be deducted from the cost of measures because similar tax credits are not included in avoided costs used by Energy Trust. Program administration or management costs of local programs that are paid by federal or state agencies will not be included, as they are often associated with non-energy considerations such as equity, employment, etc., and are not included in the benefit/cost tests under PUC guidance.

#### **Benefits**

In the societal test, Energy Trust will include the following benefits:

1. The value of the electrical and/or gas energy saved based on the avoided cost forecasts of the utilities whose customers are served by the Energy Trust, as reviewed and approved by the PUC.<sup>[3]</sup> Periodically, Energy Trust will work with the utilities and PUC to develop an average, or merged cost forecast. This will be done separately for the electric utilities and gas utilities, so that Energy Trust program decisions are based on a single set of price

<sup>[1]</sup> In Washington, the primary cost/benefit criterion is the societal test, applied to entire programs. In addition to following this guidance, Energy Trust will continue to apply the test to specific measures to assure consistency of programs across states (for administrative efficiency) and optimal rate payer value.

<sup>[2]</sup> For equipment or structures that would be purchased regardless of efficiency actions, this is the incremental cost of upgrading the efficiency of the purchase beyond common practice.

<sup>[3]</sup> This includes the value of avoided peak energy use.

forecasts for each fuel. Energy Trust may include factors such as hedge value, if not considered in the utility forecasts, based on agreement with the utilities and PUC.

2. Non-energy benefits will be quantified by a reasonable and practical method. Unless and until the OPUC develops an alternative approach, Energy Trust may use proxies for these benefits where research shows that the benefits are large, they cannot be practically quantified, and they clearly influence consumer decisions.
3. For electricity, both line losses and avoided Transmission and Distribution construction.
4. Natural gas capacity benefits and benefits from reduced transmission and delivery losses will be included where significant and quantifiable.
5. In addition, the Energy Trust will apply in its analysis the 10% credit for energy efficiency as required under the Northwest Power Act and OPUC docket no. UM-551. This credit recognizes the benefits of conservation in addressing risk and uncertainty.

Avoided costs based on integrated resource planning will be provided to the Energy Trust by utilities. The utility system test will include items 1, 3, 4 and 5, above.

Currently, utility avoided costs include the forecast value of reduced carbon dioxide emissions. Oregon PUC guidance provides that other environmental pollutant costs may be considered only when specified by the PUC.

#### *Discount rates*

Energy Trust will revise avoided costs and discount rate from time to time to be consistent with the cost of capital used in the utilities' Integrated Resource Plans.

In analysis and reporting, Energy Trust will use a discount rate based on OPUC-reviewed integrated resource planning discount rates used by the utilities whose customers are served by the Energy Trust. Periodically, Energy Trust will work with the utilities and OPUC to derive a single discount rate close to those employed by the utilities. This discount rate will be used to compare the costs and benefits of efficiency investments to other investments.

In conclusion, Energy Trust programs and measures will be reviewed using both the Utility System and the Societal tests. If the benefit-to-cost ratio is greater than 1.0, a program should be considered cost-effective and may be considered for Energy Trust efficiency funding.