

Evolving Approaches to Evaluating the Costs and Benefits of Energy Efficiency

Board Learning Paper

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Oregon's traditional framework used to evaluate the avoided cost and cost-effectiveness of clean energy investments have guided the design of Energy Trust's incentive-based programs since our inception. The resulting programs made efficiency opportunities available – but not necessarily affordable – for all customers. As state policy focuses more on equity and responding to climate change, the application of these tools has evolved.

This paper reviews the evolution of the economic framework, the resulting achievements and ongoing shortcomings. It also compares Oregon's approach to other states. The paper then considers how an enhanced and expanded approach might change the way Energy Trust designs and delivers clean energy programs in the coming years.

The Role of Cost-Effectiveness Testing

Cost-effectiveness tests are threshold tests that determine whether Energy Trust is permitted to make specific investments in energy efficiency under Oregon and Washington utility commission rules for spending ratepayer funds.¹ These tests act in concert with other elements of commission guidance, including performance measures for levelized costs and savings and rules governing budgeting, to guide Energy Trust investments. Cost-effectiveness tests do not impact how funding from other sources are invested. These metrics and tests, along with guidance from the commissions and discussions with utilities and other stakeholders, have focused Energy Trust on providing large volumes of energy efficiency at a lower cost than the cost of power generation or natural gas.

Cost-effectiveness analysis is used to forecast benefits from Energy Trust investments compared to costs at budget time and report annually in program results. Utility avoided costs are used as part of the numerator in cost-effectiveness calculations. These costs are derived from an analysis of each utilities Integrated Resource Plan. Consequently, the application of cost-effectiveness test results is consistent with utility planning and generally selects for the amount of efficiency that utilities are relying on Energy Trust to provide. This helps assure the reliability of the utility systems at least cost and least risk.

Energy Trust's approach to cost-effectiveness is defined by rules and guidance from the Oregon Public Utility Commission (OPUC), which prescribes two tests:

Utility Cost Test: The UCT compares the cost of delivering Energy Trust programs (e.g. incentives, program management and allocated administrative costs) to the benefits they bring to the utility system. These benefits include costs avoided by buying less power or building fewer power plants (for electricity), fuel (for electricity and gas), avoided transmission and distribution system investment, plus carbon compliance costs, and a risk reduction value. All values also receive an additional 10% adder that is the result of a provision in the Pacific Northwest Electric Power Planning and Conservation Act. Also included are the avoided power and gas losses as electricity or gas are delivered through the utility system to the customer. These costs are in combination called "avoided costs."² The forecasts of costs avoided for the utility system are provided by utilities. We use a weighted average of values from the electric utilities we serve and a separate weighted average for the gas utilities. Avoided costs include the cost for utilities for complying with carbon regulations and are higher for measures that save energy during peak hours when power costs and delivery losses increase.

Total Resource Cost Test: The TRC includes these costs and benefits, but also considers the costs and benefits to the participating customer. The customer may pay costs for equipment, services and maintenance for efficient systems, and Energy Trust often pays only a portion of these costs. Costs paid by government programs or charitable nonprofits can be deducted from TRC costs for cost-effectiveness purposes, as these often reflect other values in addition to the value of energy savings.

For both the TRC and the UCT, the energy benefits are estimated for the utility system (the utility cost to procure and deliver power). The TRC can also incorporate any other benefits to the customer that can readily be quantified (e.g., water savings from efficient showerheads). Benefits that are significant but difficult to quantify are considered through the OPUC's exception process. We may request exceptions for difficult-to-quantify benefits other than energy or other

¹ Under Oregon law, Energy Trust's renewable energy investments are subject to a completely different investment test called the above-market cost. That system is not discussed in this paper. This paper also focuses on cost-effectiveness tests as applied in Oregon, where most of the customers served by Energy Trust reside. Rules in Washington are more liberal and because they do not require measures to individually pass cost-effectiveness tests.

² When planning a product to avoid or delay local distribution system investment (e.g., a substation or gas pipeline) a location-specific avoided cost is used to reflect the cost of the specific investment being avoided along with system-wide costs.

considerations such as the difficulty in stopping and starting incentives too often or the prospect that a measure will become less expensive over time.

In Oregon, each efficiency measure must pass both tests. Exceptions are generally considered only for the TRC.³ The broader societal benefits of investing in energy efficiency, such as employment benefits, are not included. Environmental effects, such as carbon emissions, are included where there are laws in place that make the utility address the issue, so there is a utility cost.⁴

The OPUC has also provided additional flexibility for Energy Trust to operate pilot projects that are exempted from benefit/cost testing. Oregon utilities, the OPUC and Energy Trust are, through a series of pilot efforts, learning how to quantify the value of location-based savings where efficiency avoids costly local investment in power lines or distribution transformers.

The Impact of Performance Measures on Program Design and Delivery

Oregon's approach to cost-effectiveness has been one of the primary forces that shaped our programs, acting in concert with levelized cost performance metrics, staffing and administrative cost limits, and budget negotiations. Together, these elements of OPUC governance ensure Energy Trust programs produce the intended benefits. However, the complexity of measure-by-measure analysis and the exceptions process limit what Energy Trust can do when there are important non-energy benefits. The tests have kept our focus on energy system and energy costs and benefits at a time when some stakeholders and Oregon's broader policies are focused extensively on climate change mitigation, environmental justice and social justice.

Together, these guidelines have created a system that encourages Energy Trust to minimize transactional costs associated with project implementation, which limits community and customer interactions. Extensive interactions are often important for reaching customers who have not yet participated in our programs due to cultural, language, trust or access barriers. Since Energy Trust began, building codes, equipment standards and other initiatives have achieved much of the available energy savings over the past decades; as a consequence, Energy Trust is finding fewer large volume, low-cost sources of energy efficiency. Now, we are focusing more on customers where there are barriers to participation, particularly rural, low income and ethnically diverse residential customer groups, renters and small businesses. The diminishing efficiency resource in Energy Trust's historically large energy savings markets, coupled with barriers in the remaining markets, are creating challenges for maintaining energy savings at high volumes. At the same time, state carbon regulation has led to a heightened interest in accelerating efficiency. Together these issues have led to significant reflection among Energy Trust, OPUC staff and other stakeholders about the entire system of Energy Trust governance.

Since its inception, Energy Trust's energy-efficiency offers have been available to all customers, and there have been equity-focused initiatives for lower income, rural and ethnically diverse customers. For example, one of our initial 2002 pilot programs provided free air and duct sealing to residents of manufactured homes who typically have low to moderate incomes. However, these efforts under the existing investment guidance have led to proportionally slower penetration of these markets compared to mainstream markets in order for programs as a whole to remain cost-effective. Program participation from small commercial building markets has also been proportionally far less than in other buildings. This imbalance has raised questions about fairness

³ Currently, the New Buildings program is operating under an exception where only the UCT is required and tests are done at the building level, reflecting some unique difficulties in estimating costs of efficiency under Oregon's new building energy code.

⁴ Primary and secondary cost-effectiveness practices vary considerably by state, with most states relying on the TRC, the UCT and/or the Societal Test. Some states also consider benefit/cost from a participant perspective and/or rate impact, usually as secondary considerations: <https://www.nationalenergyscreeningproject.org/state-database-dsp/database-of-state-efficiency-screening-practices/>

given revenues come from all customers. It has also become increasingly important to address these markets to meet savings targets.⁵

Cost-effectiveness rules and changes to them reflect both specific decisions by the OPUC and the scope of its mission. The legislature recently directed the OPUC to incorporate social justice into its mission, and the OPUC is actively exploring how to do this in its broader work and in its oversight of Energy Trust. Climate change mitigation, including the reduction of greenhouse gas emissions, is a priority for the state government as a whole but has not been incorporated into the OPUC's enabling legislation. Thus, costs considered in the tests are limited to utility regulatory compliance costs.

At the program level, cost-effectiveness limits are having the greatest impact on the residential program and the multifamily part of the Existing Business program because the cost per kilowatt-hour and therm saved tend to be higher due to the smaller average project size and the significant transactional cost per site in these programs, especially for income-qualified initiatives. Industrial programs tend to have lower average costs per kilowatt-hour or therm saved due to relatively high average savings per project (with the exception of smaller sites), and so the test is less of an issue. Commercial programs have to design cost-effective implementation strategies to serve a broad range of customers and project sizes, and cost-effectiveness limits constrain some prescriptive measures and custom projects.

Energy Trust and the OPUC are well aware of the primary shortcomings of cost-effectiveness testing in its current form and have engineered workarounds for situations where the test would constrain investments that are consistent with the test's objectives. These include:

- OPUC authorization to run pilot programs (called Program Delivery Pilots and Coordinated Research Projects) without passing a cost-effectiveness test
- OPUC procedures for approving exceptions
- not applying the test on an annual basis to NEEA
- deducting funding from non-ratepayer sources from costs for cost-effectiveness testing

This system is flexible yet limited, because the process is detail-focused and requires a customized exception in the midst of constraints on OPUC and Energy Trust staff and commissioner time. Only about 5% of Energy Trust's annual efficiency investments are for measures under exception; pilot programs are even less.

Energy Trust's cost-effectiveness policy acknowledges and supports the governance by the Oregon and Washington commissions pertaining to cost-effectiveness regulation. As Energy Trust develops contracts with additional funders, investments under those contracts are governed by the objectives and contract terms of those funding agreements, which may differ from the cost-effectiveness tests that apply to ratepayer funding.

How Cost-Effectiveness Methodologies are Changing

There are many options for refining our cost-effectiveness criteria. Here are some evolving approaches to cost-effectiveness testing that Oregon could consider:

Modernize the process for updating avoided costs: The OPUC is considering options for accelerating how updates move from the utility forecasting process into approval for Energy Trust use, and possibly incorporating some changes in 2024. These updates could lead to significantly higher avoided costs and thus ease cost-effectiveness constraints on programs.

⁵ If funds become available for limited income programs from other sources, such as the Inflation Reduction Act or Portland Clean Energy Community Benefits Fund, it may be more feasible under current rules to invest sufficiently to produce higher volume of low-income retrofits.

Stop applying tests to individual measures, perform tests at the building or program level, apply them at the portfolio level only: In discussions on the 2024 budget and action plan, Energy Trust has suggested moving to portfolio-only tests, as is done in Washington. Another option is to keep the measure tests where it is practical, end OPUC review of program tests, but rely on the portfolio test.

Separate low-income investments from other energy resource investments and subject them to different investment criteria: This is one of the changes made in California under the System Benefits Test rubric, creating a separate bucket for equity investments. Oregon House Bill 2475, passed two years ago, creates a legal framework to do this. OPUC is considering how to implement separate ratepayer-based funding. Using this mechanism in California, these investments are not tested for utility system cost-effectiveness on their own but are subject to other criteria.⁶

Separate market support costs from program costs: In California, market support program costs are also separated from program costs and not directly subjected to cost-effectiveness testing. These are programs with a primary objective of supporting the long-term success of the energy-efficiency market by educating customers; programs for training contractors; and efforts to move beneficial technologies toward greater cost-effectiveness.⁷ Market support and equity programs in California are in combination capped at 30% of the cost for the efficiency portfolio.⁸

Use the Societal Test instead of the Total Resource Cost test: This would incorporate benefits to society that are not specific to ratepayers, participants or the utility system such as the societal benefits of carbon reduction beyond the compliance costs avoided by the utility, employment benefits, or social justice. Several states use this test. The societal test might include a wider array of pollution costs beyond carbon dioxide emissions.

Quantify more non-energy benefits of efficiency: Under the current OPUC process, Energy Trust may quantify those benefits where this takes reasonable effort and provides a reasonable range of uncertainty. Energy Trust is exploring how to quantify health benefits from weatherization programs and other benefits that can be estimated with reasonable effort and with confidence. Other more difficult-to-quantify benefits are considered through the exception process.

What This Means for Energy Trust

Cost-effectiveness tests are part of a broader system of metrics and guidance used by state utility commissions to guide Energy Trust activities. In Oregon and Washington, the overall system is evolving to encourage more efficiency and more attention to equity. The cost-effectiveness tests have opportunities to evolve in concert with these other changes.

There are opportunities to improve the mechanics of the system to establish avoided costs, which determine efficiency value. There are also opportunities that concern the policy for estimating costs and benefits. Several changes of each type may significantly increase the avoided costs and efficiency value in the tests. This could help:

- justify investments that now appear marginal
- significantly impact how much we can invest to acquire energy savings
- expand the measures we can offer cost-effectively

Decisions on these issues will be made by the Oregon and Washington utility commissions. Energy Trust has a significant role in informing the commissions on the options and their potential

⁶ [California is changing the way it values energy efficiency to look beyond resource savings](#) Utility Dive, May 26, 2021.

⁷ [Item-06-Energy-Efficiency-Goals-and-Portfolio-Process-Reform-Decision.pdf \(ca.gov\)](#)

⁸ Utility Dive, Ibid

impacts. Energy Trust also has an important role in defining how these tests will be implemented. These decisions will align with other policies and initiatives in each state and be limited by the powers vested in the commissions by each state legislature.

Given finite commission and Energy Trust staff time, changes that have a bigger financial impact and that can be implemented more quickly might be considered more important. Getting the existing process to work better and faster may prove faster and easier than changing laws or established rules and may have a significant impact.