Energy Trust Transition from Net to Gross Goal Setting and Reporting

Drafted January 2019; published November 2019.

ABSTRACT

Energy Trust efficiency goals are currently stated in net savings. This paper explains why we now use net savings, describes why estimation of net savings is increasingly difficult, explores possible solutions and makes a recommendation. Potential solutions include enhanced methods for estimating net savings, but also possible changes to Energy Trust's goal-setting and reporting process to employ gross savings instead of net savings. Energy Trust staff recommends the latter. This should make goal setting and reporting simpler and clearer, but it complicates the determination of whether Energy Trust programs were a critical determinant of added energy savings. A change to goal setting and reporting based on gross savings requires that Energy Trust clearly define a transparent process to decide when program incentives and services are no longer needed. Energy Trust has used such a process for specific measures and is committed to using this experience to develop and document an overall approach.

Contents

EXECUTIVE SUMMARY

Energy Trust plans, evaluates and reports net energy savings. Net savings occur when Energy Trust services and incentives influence customer decision-making and actions. This can include customers who respond to Energy Trust's market influence by making investments or taking management actions that save energy, even though they did not receive Energy Trust incentives. Net savings exclude savings from customers that receive Energy Trust services and incentives but would proceed with energy-saving improvements without this help.

Why does Energy Trust report net savings? There are economic forces that motivate customers to save energy. There are also programs and services in the market from other entities that help customers save energy. Energy Trust's job is to get *more* efficiency done than would otherwise occur without Energy Trust. To distinguish our impact from the savings that would have occurred without us, we try to be clear about which savings Energy Trust influenced. Net savings have also historically been a better match with utility load forecasts to create an idea of future utility energy requirements and provide a basis for assessing program effectiveness in changing efficiency levels.

Gross savings are the amount of energy saved by a customer through projects that use Energy Trust incentives or services. To report on savings for some efficiency measures, Energy Trust starts with an estimate of gross savings from energy-saving measures installed by program participants, and then adjusts that number to consider Energy Trust's influence on customer actions to arrive at net savings. This method is applied primarily for retrofit measures, where existing working equipment is replaced for efficiency reasons.

This paper asks whether the extra effort to research and then make this adjustment produces enough additional clarity about the impacts of Energy Trust's efforts to justify the cost, time and complexity. Other approaches are applied for other programs and no change is proposed for them.

Estimates of net savings have never been exact, but we believe they have been meaningful and useful for setting future savings goals, tracking achievements, serving as inputs for utility integrated resource plans (IRPs) and improving programs**. However, it has become more difficult to adjust from gross savings to net savings for many Energy Trust programs. Estimates of net savings have become less reliable**. The reasons include the following.

(1) To an increasing degree, energy users and customers consider Energy Trust to be part of the "normal" market for equipment and services, so they are less conscious of our unique contributions. Consequently, their estimates of our influence are less reliable and meaningful.
(2) Several measurement issues detailed in this paper make net savings estimation less viable.
(3) Energy Trust's increasing reliance on working with the supply chains for products and services in ways that are cost-efficient, but less visible to customers, makes it less feasible for customers to identify what influenced their decisions.

For these reasons, it is increasingly difficult to say that the gross-to-net adjustment, in aggregate, improves our understanding of Energy Trust's effectiveness on cost-effectiveness.

A recent study commissioned by Energy Trust surveyed best practices for estimating net savings among other program deliverers.[1] While the study suggested possible enhancements to Energy Trust's methods for assessing program influence, it also stated that:

> *….there is no silver bullet; there are no breakthrough techniques in net-to-gross analysis that would allow Energy Trust to calculate net savings with greater confidence and at reasonable cost than the self-report approach it is currently using. Instead, the NTG [net-to-gross] landscape remains a patchwork of methods and policies where most jurisdictions use the same self-report technique that they and their consultants recognize as flawed (page i)*.

The suggested improvements from the study have limitations, complications and costs. This memo complements the study by exploring whether it is appropriate to change how Energy Trust uses estimates of savings and presents several potential alternatives to the current approach.

Several possible strategies are offered for (1) simplifying the process of estimation, or (2) switching goal setting and reporting to gross savings. Among these options, **Energy Trust proposes that we set goals and report based on gross savings plus spillover for resource acquisition programs in areas where we now report net savings.** Where Energy Trust currently uses this approach for reporting market transformation savings, we propose to continue this practice as it provides the most complete picture of program savings.

We further recommend that Energy Trust continue to collect information on market influence for all programs and use it in a structured and transparent process to assess the prudence of continuing incentives and services for specific measures and programs. These recommendations and a path for transition will be explored with the Oregon Public Utility Commission, utilities and stakeholders.

DEFINITIONS

The following definitions are adapted from a study of options to improve estimates of net savings commissioned by Energy Trust and discussed elsewhere in this paper. [2]

Free Rider: Energy efficiency program participants who would have taken the recommended actions on their own, even if the program did not exist.

Gross Savings: All savings from program participants, regardless of whether they are free riders. Energy Trust reports all savings in net terms, not gross terms, unless otherwise stated in the publication.

Market Effects: A change in the market structure or in behavior of participants in a market that leads to increased adoption of energy efficiency measures, services or behavior and is attributed to program market intervention.

[1] Current Methods in Free Ridership and Spillover Policy Estimation- Draft Final, PWP, Inc. and Evergreen Economics, February 2017.
[2] PWP, Ibid

Net Savings: Savings adjusted for free riders, spillover and impact evaluation results. Energy Trust reports all savings in net terms, not gross terms, unless otherwise stated in the publication. Energy Trust also uses net savings for program and portfolio-level cost-effectiveness analysis.

Net-to-Gross: Net-to-gross ratios are equal to the net program load impact divided by the gross program load impact. Energy Trust applies these ratios to gross program savings to determine the program's net impact.

Spillover (Participant): Additional measures that were implemented by the program participant, but for which the participant did not receive an incentive. The participant undertook the project without Energy Trust support, but prior program participation influenced the decision.

Spillover (Non-Participant): Additional energy savings achieved when a non-participant implements energy efficiency measures or behavior due to the program's influence (for example, through exposure to the program).

For the purposes of this paper, we add four definitions:

Attribution: Savings are attributed to Energy Trust when we conclude that savings are a consequence of program intervention. This is the same as net savings, or savings result from program-induced market effects.

Baseline: The description of efficiency levels for equipment or management practices, as they would occur without help from Energy Trust efficiency programs.

Market-Driven Savings: These are energy efficiency savings that occur outside of those attributed to programs. They can be the result of consumer response to price, market changes, more efficient codes and standards not influenced by programs, or any other cause.

Frozen Efficiency Load Forecast: A utility forecast of electric or gas energy use that assumes no change after the start year in energy use patterns and efficiency building codes and equipment standards. In resource planning, this type of forecast is used alongside a forecast of gross savings because the pieces fit—savings in the gross savings forecast are not already embedded in the load forecast.

CURRENT SITUATION

Energy Trust uses net savings to set goals and report results

Energy Trust currently uses net savings to set goals and report results. In other words, we count savings in situations where we have evidence that we have a critical influence on the investment or actions that caused energy savings. Conversely, we do not count savings toward our goals where evidence does not point to influence, even if we provided services and financial incentives. Influence can include influencing equipment availability in markets, choice of equipment or practices at a single site, or transforming entire equipment markets

Currently, Energy Trust uses on of three methods to estimate market effects for resource acquisition programs, depending on the situation.

Participant Survey Approach. For many efficiency measures, free riders are estimated based on **Fast Feedback**, a telephone survey of a sample of participants. Energy Trust polls them within one or two months after project completion. A project's free ridership score is composed of two elements: a stated intent/project change score and an influence score. Energy Trust calculates these scores based on respondents' answers to two or three questions in Fast Feedback.[3] The use of this approach that is being reconsidered in this paper. In addition to reducing reported savings for free riders, net savings can incorporate spillover, as defined above, and as estimated through surveys. While measurement of net savings is never exact, we attempt to come up with a reasonable middle estimate based on the evidence in hand.

Baseline Comparison Approach. For other efficiency measures, particularly where efficient products are sold through retail channels (e.g., light bulbs, washing machines), we do not always have contact information for individual customers, and they may not be aware of our incentives. In these markets Energy Trust collects data on the proportion of product sales at various efficiencies and uses this to establish baseline (without program) efficiency. This sales data may be for a prior period or a different locale where programs are not available, although the latter approach is often infeasible or unaffordable. Energy Trust compares efficiencies between the times or regions where Energy Trust promotes the products and this baseline, Energy Trust reduces per-unit program savings as the baseline equipment efficiency estimate becomes more efficient. While this method addresses free riders to some extent, it does not address forward trends in efficiency nor does it distinguish baseline efficiency from the program's spillover. This paper does not consider any changes to this approach as the supporting data, while often imprecise, is not encountering the same issues as are discussed below for the first method.

Regarding spillover, Energy Trust has conducted limited research, which led to clear indications that spillover occurs, but the amount is highly uncertain. Since Energy Trust has not found precise or reliable approaches to spillover evaluation, it has limited its investment in spillover evaluation. Given the difficulties with the evidence, Energy Trust claims very modest spillover. Energy Trust estimates spillover of all types at 1 percent for most programs and 7 percent[4] for the Existing Buildings program.

To provide an example of how free riders and spillover are used to calculate net savings:

> *A program that saved 100 kWh of gross savings, but has 20% free riders and has 10% spillover, the savings would be calculated as 100 X (1-20%+10%) = 90 kWh.*

Market Transformation Approach. Programs that are designed to transform markets use a different process to reflect market effects. Energy Trust forecasts a "dynamic baseline." This baseline anticipates how much of the sales of the product in question would be efficient each year for several years into the future in the absence of program intervention. Then data is collected on the market share of efficient goods with the program in place. That data is compared year-by-year to this baseline forecast to estimate savings. This approach is suitable only for products and services with a clear product definition and a clearly delineated and well-studied and relatively uniform market. For example, we have found it difficult to establish a

[3] Energy Trust asks residential participants only two questions; not about budget availability in the absence of program incentives. For a detailed review of these methods, see https://www.energytrust.org/wp-content/uploads/2016/12/Energy_Trust_Free_Ridership_Methods.pdf.
[4] Energy Trust derived the 7% as 1% of program savings x the load from nonparticipants/the load from participants.

baseline for efficiency of home window sales, because the rate of change is modest (some current windows are 100 years old), erratic (some windows are replaced sooner than others), and data on efficiency of product sold outside of programs is difficult to collect.

Table 1 shows how much of 2015 savings were acquired using each of these three approaches. The "No Market Effects Assumed" column shows the proportion of the savings from measures where Energy Trust believes that market effects are near zero. These are generally either moderate-income occupants or measures that were introduced to the market through Energy Trust and NEEA efforts that likely would be unavailable without our sustained support.

TABLE 1. SAVINGS IN 2015 ADDRESSED BY VARIOUS MARKET EFFECTS APPROACHES

	Baseline Comparison	Participant Survey	Market Transformation	No Market Effects Assumed
Electric savings	27%	41%	32%	0.2%
Gas Savings	19%	50%	31%	0.04%

The participant survey method (where the net versus gross question is relevant) is employed for a significant proportion of Energy Trust savings, but other methods also are relevant.

Why employ net savings?
Energy Trust was created at a time when, as a result of more than 20 years of prior programs, there was already a significant volume of energy efficiency occurring from market actions, codes and standards. Energy Trust's job was to achieve more energy efficiency, not to count what efficiency efforts were already present.

Furthermore, from its inception, Energy Trust's role in utility planning was to provide savings that would reduce loads from those forecasted by utilities. Utility load forecasts at that time already included some aggregate, rough adjustments for market-based efficiency and established codes and standards. Therefore, Energy Trust plans for and reports on savings beyond those incorporated into load forecasts. Net savings is a better estimate of savings that are not already deducted from load forecasts[6] .

What does high free ridership tell us? What does low free ridership tell us?
High free ridership may indicate that there is not much more to gain from continuing a program or measure offering. This can happen when the market share for efficient products or services is as high as it will ever get, or close, and market conditions are such that it will stay high, or we have reached most eligible sites. To provide an example, Energy Trust ended its incentives for refrigerator recycling due to a combination of high free ridership and decreasing savings per refrigerator, as we had already removed most of the oldest and least efficient refrigerators from the market. The decision to end reflected the success of the program. This is an example of how free ridership often works in tandem with other factors and information to influence program decisions.

In other circumstances, free riders do not indicate that curtailing services is appropriate. Depending on the cost and value of savings, half or more of program participants may be free riders and a program can still be cost-effective and strategically important in reaching the

[6] This is true of all utilities except Pacific Power, which utilizes gross savings from Energy Trust.

remainder. Sometimes it takes years of program support to establish a stable pattern of efficient product purchases. One example that fits this description was Energy Trust's incentives for efficient gas furnaces. We continued the offer when the market share of efficient furnaces exceeded 50%. When the efficient market share persistently exceeded 80% and the incremental cost for efficiency decreased, we replaced the general market incentive with a targeted incentive for lagging markets (moderate-income, rentals and certain housing types). Additionally, some new products that are purchased by early adopters, such as smart thermostats, may experience free riders until the program reaches a broader segment of the market.

Low free ridership can be an indication of program influence and success. However, if program sales are low, low free ridership may be an indication of limited program influence on the target market.

LONG-STANDING CHALLENGES WITH NET SAVINGS

This section describes problems with analysis of net savings and the use of net savings in utility resource forecasting that have existed for many years, in some cases prior to Energy Trust's existence. We have created reasonable, albeit imprecise, estimates of net savings[7] by carefully managing these issues. The issues discussed in this section include load forecasting integration and uncertainty about customer responses. This section creates a backdrop for discussion in the following section of new or evolving issues regarding estimation of net savings.

Utility Resource Plan integration issues
In the past, utility load forecasts have included a reduction in forecast energy use due to anticipated market-driven efficiency improvements. Similarly, net savings estimates for Energy Trust programs are decreased for the share of program savings that would have occurred without the programs due to these same market forces. This makes the two a logical match because the reduction in energy use already in the load forecast is analogous to the reduction in savings in the gross-to-net adjustment.

While net savings and load forecasts that deduct market-driven savings are a good fit in theory, the treatment of market-driven efficiency in load forecasts is often neither detailed nor precise. Load forecasts often lack the detail on end use of energy needed to reflect savings related to specific phenomena. For example, in recent years, changes in efficiency have come significantly from new energy efficiency equipment standards and building codes.

So, while it is rationally consistent to match load forecasts that are reduced for market-driven savings with Energy Trust reporting of net savings, that rational correspondence is supported by only a very loose numerical correspondence. The importance of this issue has also diminished, as utilities are with increasing frequency marrying a "frozen efficiency" forecast, which does not build in market-driven efficiency, with Energy Trust programs. This provides consistency in a simpler way. While forecast integration methods are complex and often slightly different than one of the methods described in this paragraph, three utilities seem to be closer to the frozen efficiency method in recent IRPs.

[7] Energy Trust believes that our estimates of market effects have been good enough to show direction and magnitude of effect at the program level, and to estimate net savings combined across all programs.

Issues regarding customer responses[8]

Energy Trust applies established practices for accounting for savings that would not have happened without program intervention.[9] However, these practices are not precise. A recent study[10] commissioned by Energy Trust suggests several options for improving practices. Many options necessitate significant investments as the methods require more data and analysis or triangulation from multiple sources. Some of these proposed improvements may provide more information but may not provide a clearer consensus about net savings. If Energy Trust continues to estimate net savings, Energy Trust plans, at a minimum, to apply some of the simpler of the proposed improvements. However, the study[11] concludes that these are not a silver bullet. Many of the problems described below also apply to the more advanced methods.

Survey methods rely on perceptions. In situations where Energy Trust applies the Fast Feedback method to estimate market effect, we rely on the participants' statement of their own perception. There are many complications:

(1) Motivations for efficiency are complex and there are many reasons for acting.
(2) It is often difficult for respondents to say whether support from a program was critical.
(3) Personal biases influence responses.
(4) Respondents may have difficulty recalling how and why they made investment decisions.
(5) Asking people questions about what they would have done in a hypothetical past in which there is no program support is inherently speculative. We may hear what people would like to believe they would have done rather than what they actually would have done.
(6) For some efficiency investment decisions, there are many stages and many people involved (e.g., a new building design, or incorporating efficiency in a major industrial process upgrade).
(1) The respondent may have a limited view of what would have happened in the absence of a program. For example, a new building architect may think that all the efficiency features were part of the design, while the engineer on the same project may know that the developer would cut out some features because funds are insufficient without program incentives. For this type of transaction, the best evaluation efforts:
    a. use multiple interviews to identify the roles of each individual,
    b. create a decision model,
    c. ascertain the myriad ways in which Energy Trust influenced the decision through different points of the network,
    d. summarize this information to come up with a numerical conclusion about the influence on a range of measures.

    This approach requires that judgment be applied in multiple places. Energy Trust has experimented with this type of approach but does not used it regularly. It is expensive and not always conclusive.
(2) How the respondent thinks about the program is also important. We ask whether the entirety of services provided by the program changed the decision to install the efficiency

[8] A comprehensive review of these factors, based on social science theory, is provided in "Free-Ridership Measurement Is Out of Sync with Program Logic…or, We've Got the Structure Built, but What's Its Foundation?", *Jane S. Peters and Marjorie McRae, in Proceedings of the ACEEE 2008 summer study.*
[9] PWP, ibid
[10] PWP, ibid
[11] PWP, ibid

measure. However, the respondent may find it difficult to recall the entirety of Energy Trust assistance. It may be easier for the respondent to think only about the incentive.

Incremental measures. Some efficiency measures are a more efficient version of equipment that consumers would purchase regardless of efficiency concerns. For example, a customer needs a replacement heating system in a building or home because the old system is failing. In these situations, customer do not always know there was a choice of equipment (e.g., condensing furnace compared to non-condensing) and may not be able to distinguish incremental decisions about equipment features. Energy Trust may influence contractors to offer efficient systems but may not make the choice clear to customers. In our surveys, we do our best to make the distinctions between choosing standard and efficient equipment clear. Still, we are never sure how many customers can distinguish their overall decision to buy the new heating system from the incremental decision to buy an efficient system.

Cumulative influences. Program assistance for a single transaction sometimes occurs over multiple years (e.g., new building or major industrial project). A survey respondent may be thinking only about recent assistance or incentives.

Program year

Energy Trust uses net savings to report on our goals for a single program year. In this reporting system, we consider any impact of past assistance to be both a sunk cost (already spent) and the influence of that past year as already achieved. Energy Trust must decide whether to invest more money in the program in the given year.

Energy Trust often not only helps customers to complete specific projects, but also provides the experience and analytic tools to do more projects in ensuing years. Year-by-year accounting misses this influence on future years.

NEW AND EVOLVING ISSUES FOR NET SAVINGS

As the above points demonstrate, Energy Trust goal setting and reporting based on net savings has never been precise or easy. However, it has worked well enough to provide reliable estimates of total portfolio savings and inform whether specific programs and measures should continue. Net savings integrates readily into utility IRP planning, so it has in the past been more useful than answering a less relevant question (gross savings) more precisely.

However, with the passage of time, four factors have made net savings more difficult and less certain to estimate: (1) extended relationships with customers, (2) fast-moving markets, (3) multi-party initiatives and (4) midstream and upstream programs. Each of these is described in more detail below.

Extended relationships with customers

We have worked with some customers on multiple efficiency and renewable energy projects for 10 or more years and have consequently asked the customer similar market effects questions many times.[12] Three problems occur:

[12] Energy Trust may survey non-residential customers as often as every six months for businesses and residential customers as often as annually.

- The customer has been working with us so long that it is difficult to discern how our partnership has shaped their thinking. From the customer's perspective, is the free rider question about our cumulative influence or our influence through support for a single project?
- The second problem is the quality of response. Respondents may be less inclined to focus on the question if the respondent has answered it many times for different transactions over the years.
- The third is whether the customer is answering based on what they think will provide the greatest advantage in their ongoing relationship with us.

These issues are more difficult for Strategic Energy Management (SEM) initiatives for commercial and industrial customers, which have increased as sources of Energy Trust savings. The core of this program approach is enhancing customers' autonomous energy management capability. If Energy Trust succeeds, the customer is likely to see him or herself as the primary influence for savings under SEM and perhaps for later capital investments in efficiency.

Fast-moving markets

Important efficiency markets are changing so fast that it is difficult to establish a baseline efficiency level suitable for net savings analysis.[13] A prominent example is the retail market for LED lamps for homes. The best data to track market share of LEDs in retail stores is available four months after a year is complete, so on average is 10 months old when received. Energy Trust must plan for a program in the prior calendar year, so must make decisions based on data that is often more than a year old. In the last several years, market preferences for efficient lamps have changed significantly within a single year. Energy Trust is accelerating and perhaps extending the trend to acceptance of LED lamps, but by how much? It is difficult to say with the available market share data. Energy Trust has augmented this data with more frequent shelf surveys, but they do not cover as broad a market and provide only an indicator of sales.

To provide another example, there are similar questions on a smaller scale in the market for smart thermostats. There are multiple customer benefits from smart thermostats. These result in some sales without Energy Trust support. As a new class of product, it is difficult to predict future sales that would have occurred without Energy Trust marketing and incentives. Energy Trust programs will enhance this market, but estimating free ridership may be difficult because of the diversity of customer motivations.

Multi-party initiatives

Increasingly, efficiency programs are collaborative partnerships where public and private regional, local and national partners take different roles. One example is the advent of Architecture 2030 as a trade-based group working to expand the market for very low energy new buildings, progressing to net zero buildings. Energy Trust and NEEA have provided considerable indirect and direct support for their efforts. However, an architect responding to a market effects survey might be most likely to credit training help to Architecture 2030, even if Architecture 2030 is funded by Energy Trust or NEEA. The leaders at Architecture 2030 are likely to see themselves as the primary influence. With a variety of market actors working together to influence a customer's decision-making, how can the customer discern Energy Trust's influence in an interview response?

[13] This issue is about commodity product markets where we establish baseline efficiencies by observing sales patterns in markets, mostly for retail goods.

A second example is the efforts of the City of Portland to require ratings on buildings and homes. Energy Trust has spent years developing a functional scoring system for homes. NEEA and Energy Trust have worked with the City of Portland to advise the city on developing these initiatives for years and will continue to both provide technical support and use the initiative for lead generation. If the rating system results in efficiency actions in buildings that have not received direct incentives, was that a result of the City of Portland's efforts or Energy Trust's or both?

Collaboration is essential to an effective and cost-effective savings strategy, but it is difficult to draw any straight line between Energy Trust's support and the outcomes.

Midstream and upstream programs
Energy Trust is evolving its Residential program to sell as many products as practical through midstream incentives to distributors or large retailers. This keeps program costs affordable and broadens market impact. Midstream initiatives for business and government customers are also used for commodity measures such as replacement tubes for lighting fixtures. Incentives to midstream actors are sometimes more influential and cost-efficient than direct customer rebates.

Sometimes prices of goods to customers reflect the incentive, but Energy Trust's midstream incentives are not always clear to customers. In many of these programs, we do not have the name of the ultimate purchaser and user, so we cannot survey them as to the influences on their purchase.

For these initiatives, we often use the market baseline approach to estimate market effects, but data is not always available to do this.

HOW BROADLY ARE THESE PROBLEMS INFLUENCING REPORTING?

Of the savings adjusted through Fast Feedback, a significant share is subject to the new problems described above. Two examples are provided:

- In prior years, lighting was the source of more than one-half of Energy Trust's electric savings. A significant share of these savings comes from home and business lamps and tube sales, markets that are changing quickly. In addition, multi-party initiatives are likely to increase in importance as they gain maturity and impact.
- In 2015, 38% of the electric and 47% of the gas savings came from portions of the Existing Buildings and Production Efficiency programs that were subject to the Fast Feedback method of assessing market effects. The majority of savings in those programs came from large customers that often are involved in multiple transactions with Energy Trust and are subject to repeated interviews.
- In 2015, 17% of all electric savings came from Residential products. Most of those savings came from lighting measures, where, as discussed above, the market is moving fast, and it is difficult to collect current baseline efficiency data.

While these are not the only examples of where the new issues cited above are complicating the estimation of Energy Trust's influence, they are enough to show that this has become more difficult for a large proportion of Energy Trust's savings.

Tables 2 and 3 and Figures 1 and 2 show the difference over time between estimates of net and is savings based on our best assessments and subject to the data and analysis challenges discussed in this paper

Table 2. Gross vs. Net Electric Savings at Energy Trust (Average megawatt)

Year	Gross Savings*	Net Savings*	Difference*	% Difference
2010	40	45	5	12%
2011	42	48	6	15%
2012	50	54	4	9%
2013	49	55	6	13%
2014	48	56	8	17%
2015	45	52	7	15%
2016	54	58	4	8%
2017	56	63	7	12%
TOTAL				**12%**

*Numbers may not add exactly due to rounding

Table 3. Gross vs. Net Gas Savings at Energy Trust (Million Annual Therms)

Year	Gross Savings*	Net Savings*	Difference*	% Difference
2010	4.8	4.3	.5	12%
2011	5.9	4.9	1.0	19%
2012	6.2	5.5	.7	12%
2013	5.5	4.8	.7	14%
2014	6.2	5.5	.7	13%
2015	7.3	6.3	1.0	16%
2016	7.4	6.8	.6	8%
2017	7.6	6.8	.8	12%
Total				**13%**

*Numbers may not add exactly due to rounding

Figure 1 – Net and Gross Annual Electric Savings

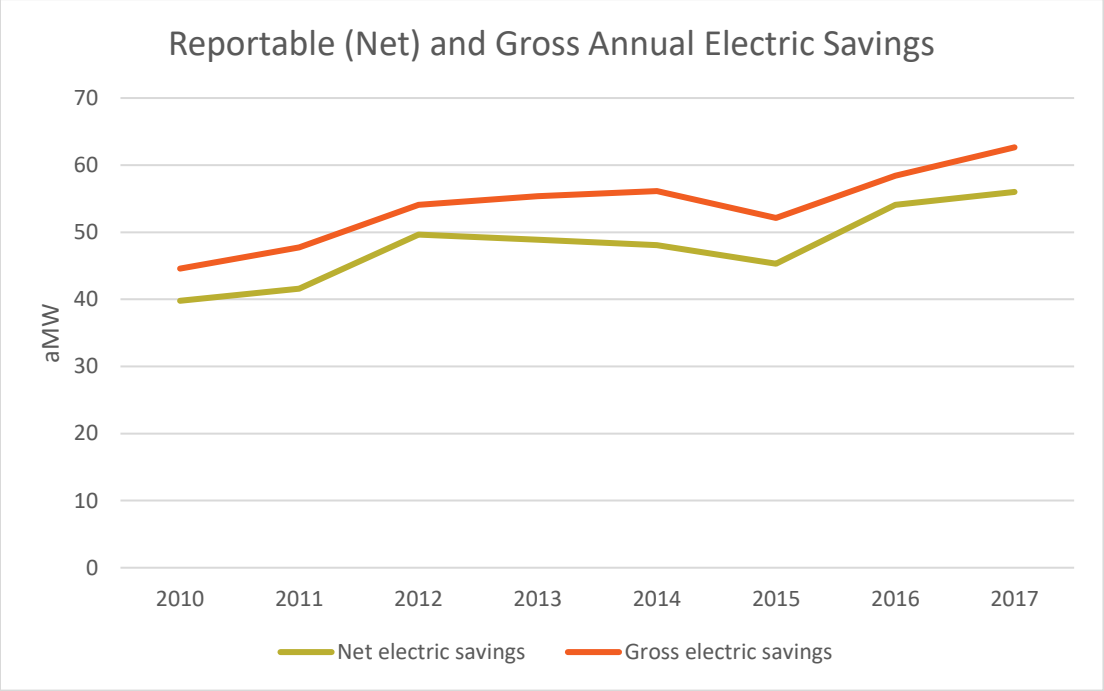
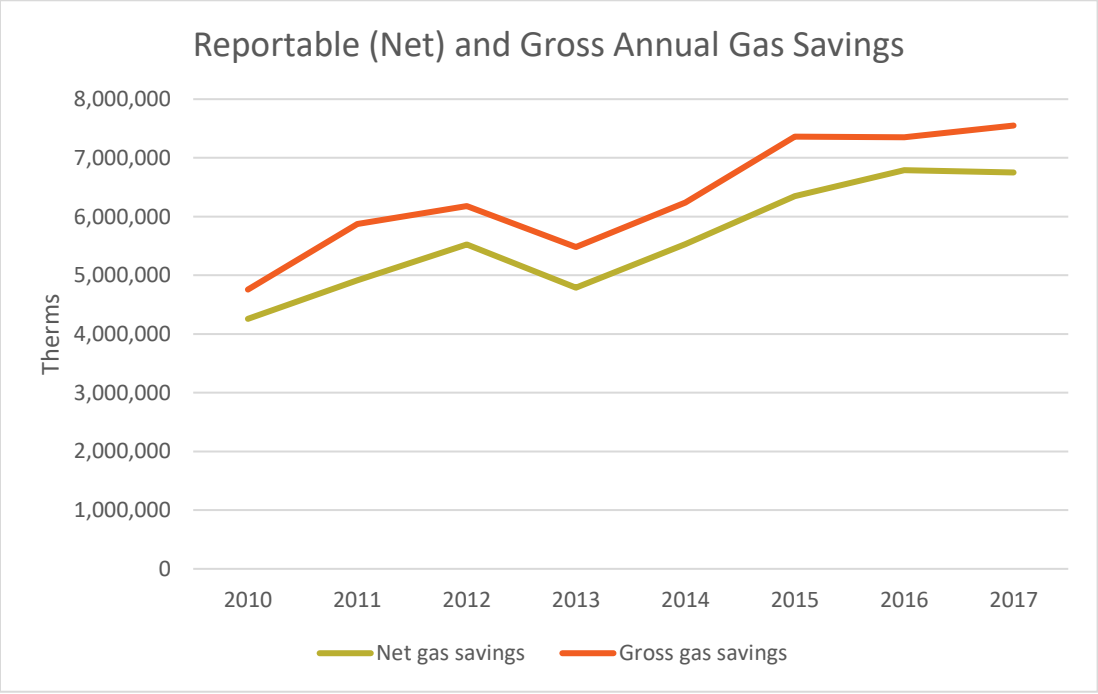


Figure 2 – Net and Gross Annual Gas Savings



WHAT DO OTHER JURISDICTIONS DO?

A 2014 survey of all U.S. states by the American Council for an Energy Efficient Economy found that:

- In roughly a quarter of states, program providers reported gross savings.
- In a majority of states, program providers reported net savings using simplistic methods, often using assumed or deemed estimates of free riders.
- A small number of states reported used more sophisticated techniques, with some incorporating spillover or market transformation.[14]

Jurisdictions that use gross savings often use a frozen efficiency forecast for their baseline in load forecasts. Gross savings estimates are layered onto this forecast to provide an accounting of loads remaining after all efficiency is considered, without double counting.

Most Northwest utilities use gross savings for goals and reporting, because public power goals and Washington investor-owned utility goals are tied to the Northwest Power Plan, which employs gross savings. Pacific Power also employs gross savings.

Northwest utilities do not commonly claim spillover, in part because of the difficulty of developing affordable and reliable estimates. California's commission in 2015 allowed utilities to apply a 5% portfolio wide adjustment to savings that includes spillover as well as market transformation.[15]

HOW HAS ENERGY TRUST MANAGED THESE ISSUES?

Energy Trust has addressed the difficulties of evaluating net savings with these strategies:

- Energy Trust selects a strategy between Fast Feedback, market studies and market transformation framework approaches based on the relevance and prospects of success in the specific market.
- Energy Trust does not calculate free riders in markets where there was clearly no efficient product in the market or negligible sales prior to promotion by Energy Trust and/or NEEA. For example, in the Northwest, air and duct sealing measures for homes had a very low market share before programs promoted them.
- Energy Trust assumes that free riders do not occur in markets where programs have enabled multiple advances in codes and standards, such as new homes and new buildings. In these cases, we assume that without programs, the market would have advanced much more slowly, and the current generation of measures would not be in common use. This gets tricky when new homes and new buildings incorporate measures that are achieving common market acceptance, such as LED lighting.
- Energy Trust assumes that free riders and spillover are negligible in moderate- and low-income existing homes, because of limited access to capital.

---

[14] Martin Kushler, Seth Nowak and Patti Witte, Examining the Net Savings Issue: A National Survey of State Policies and Practices in the Evaluation of Ratepayer-Funded Energy Efficiency Programs, ACEEE, report number U1401, January, 2014

[15] Decision Approving 2013-2014 Energy Efficiency Programs and Budgets (D. 12-11-015), California Public Utilities Commission, November 8, 2012.

- Energy Trust has assumed that there are no free riders for large industrial or commercial megaprojects because the process of developing those projects has included justification that the project would likely not go forward without Energy Trust's help.

OPTIONS FOR CHANGE

There are two overall options: 1) continue to set goals and report in net savings or 2) switch to gross savings. For each, this paper provides several specific strategies. For net savings, the strategies propose ways to manage the issues discussed in this paper. For gross savings, the strategies offer choices for what savings to include. No matter what decision is made, Energy Trust will continue research to understand program influence on customer actions and will make decisions that maximize the benefits of efficiency programs. Table 4 summarizes the options and strategies that are further discussed in the text below.

TABLE 4. OPTIONS FOR MODIFYING USE OF MARKET EFFECTS IN ENERGY TRUST GOALS AND REPORTING

	STRATEGY	ADVANTAGES	DISADVANTAGES
Option 1: Report Net Savings			
Strategy A	Status quo	No adjustments	All the problems cited in this paper continue
Strategy B	Simplify by accepting circumstantial evidence of attribution	We can reach a conclusion when interviews can't tell us	Requires more application of judgment
Strategy C	Simplify by using deemed net-to-gross adjustment	Reduces effort and process	Less credible; market effects may drift from deemed value over time
Option 2: Report gross savings			
Strategy D	Report gross savings for resource acquisition programs and market transformation savings for market transformation programs	Simplifies analysis for resource acquisition programs; accounts for market transformation	When free riders and spillover are out of balance, may overstate or understate program effects
Strategy E	Like D, but also include spillover for resource acquisition programs	Reports on all savings associated with Energy Trust programs and initiatives	Where free riders are large, may overstate savings

OPTION 1: CONTINUE TO PLAN AND REPORT BASED ON ESTIMATES OF NET SAVINGS

Strategy A: Status quo. Strategy A in Table 4 is to continue our current course, with modest process improvements, leaving all the issues cited in this paper unaddressed.

Strategy B: Accept circumstantial evidence of attribution in situations where direct customer statements are infeasible. This strategy keeps the same requirements for goal

setting, reporting and cost-effectiveness analysis, but reduces requirements of evidence of attribution.

In situations where collecting direct customer statements to estimate Energy Trust influence is problematic, savings may still be counted if the following conditions apply:

- A clear set of market barriers is shown to impede efficiency
- The program clearly addresses those barriers
- Customers buy efficient products or adapt efficient practices at increasing rates

This approach might be useful to address markets where direct attribution based on survey responses will not work, e.g., where we work upstream, in fast-moving markets and in multi-party markets. Energy Trust would still ask customers about Energy Trust influence to assess net savings in markets and situations where this was practical.

Strategy C: Deem spillover or deem both spillover and free riders. To "deem" means to use an assumed numerical factor. Strategy C proposes that we use historical evidence of net-to-gross to declare, or "deem", a net-to-gross factor without further research.

One example of how another jurisdiction addresses this (previously mentioned above) comes from California. That state's regulators have deemed a 5% spillover estimate for all programs. There were many studies but limited quantitative evidence to support the numbers. Energy Trust could follow suit or provide deemed numbers for both spillover *and* free ridership for all programs. This allows for some accounting of market effects to adjust total savings in a simplified way. There are several variants on this approach.

One variant would be, instead of picking a number like 5%, to use a weighted average of recent gross-to-net adjustments from programs. If we did this, we could use separate gas and electric numbers, as the measures and evaluated market effects are significantly different. Since we would not continue net-to-gross research at a level of effort suitable for adjusting claimed savings, these estimates would remain indefinitely.

The main advantage of this approach is that it avoids efforts to squeeze more precision out of ongoing attribution research. The main disadvantage is that the estimates may become stale and not relevant over time. It also reduces the incentive for programs to manage to maximize market impact by maximizing spillover and minimizing free riders, because there would be no measurement to show these benefits.

OPTION 2: PLAN AND REPORT BASED ON GROSS SAVINGS

Strategy D. Report gross savings for market transformation programs. Continue to count market transformation savings where applicable. This would considerably simplify Energy Trust reporting but may reduce confidence in the quantification of the efficiency resource for some stakeholders. While this is a concern, the approach appears to be working successfully in most of the Northwest. The underlying premise is that for many resource acquisition programs the considerable effort to estimate net savings does not significantly improve the aggregate portfolio-wide estimate of savings. Gross savings overestimate net savings sometimes (because of free riders) and underestimate other times (because of spillover). Furthermore, the total savings in the market may be the most useful thing to know for load forecasting and integrated resource planning purposes.

The approach to integrated resource planning could follow precedents set in Washington, by the Northwest Power and Conservation Council and by Pacific Power. We would apply all efficiency to a load forecast where efficiency levels are frozen at those for existing practices, building codes and equipment efficiency standards.

Why include use of the market transformation approach where appropriate? This savings estimation approach is applied extensively by NEEA, and the estimates of savings are well-accepted in the region. To estimate all market transformation without considering market effects seems like a contradictory concept, as the programs and measurement are built around market change.

Gross savings estimates require estimates of baseline efficiency to compare to efficiency measures. Currently, Energy Trust updates baseline efficiency annually where changes occur. The Power Council updates baseline every five years. We think that annual updates are still appropriate when there are significant market changes to keep Energy Trust in synch with markets and with IRP forecasts. These are intended to reflect current market conditions. Energy Trust works with several utilities each year on IRPs.

On the negative side, the key purpose of savings reported by Energy Trust is to show the value we provide for Oregonians. With gross savings, that connection will become slightly less direct. We will be reporting on savings we touched, plus any market transformation savings, assuming that is a close approximation to the estimate of savings we caused. If we keep baselines current, and still apply a rigorous analysis to assess whether program investments are prudent, this difference may not be large.

Another negative is that this approach does not report on spillover, so it is not a complete accounting of savings engaged by or influenced by the programs.

Under this, like all other options, Energy Trust proposes that we would continue to assess the influence of programs on customer actions, to help Energy Trust decide when to change or discontinue incentives and other assistance. Doing this without using the data to quantify market effect has the advantage that it may be able to rely more directly on less precise data to make decisions. This will allow the use of more diverse and immediate information. It has a joined-at-the-hip disadvantage: it is more difficult to set a standard for judgment transparently and consistently based on qualitative data. It may be more difficult to show that we balanced the pressure to continue programs to meet goals with the need to spend ratepayer money wisely.

Strategy E: Report gross savings plus spillover and market transformation. This differs from Strategy D in that we would count spillover for markets where we do not analyze market transformation. This provides all savings directly or indirectly related to a program.

Like Strategy D, this would best complement a frozen efficiency load forecast to avoid double-counting. The main advantage is simplicity and clarity - this is everything we touched. This provides IRP with the most complete view of efficiency engaged by or influenced by programs. One added disadvantage is that this estimate, by including spillover but not deducting free riders, may be viewed as unbalanced.

Another negative; neither options D nor E provide load forecasters with a complete view of efficiency; there is market-driven efficiency and efficiency from codes and standards that are not influenced by Energy Trust and NEEA programs that are excluded from this accounting. Energy

Trust sometimes has information on market-driven efficiency and codes and standards because it is important to estimating the efficiency resource. Energy Trust shares this information with utilities when there is an opportunity. For example, the transition currently underway of most business and residential lighting to LEDs will profoundly influence utility lighting loads in the next several years. While Energy Trust programs are helping to accelerate this transition, a significant share will occur outside of programs. Through NEEA, Energy Trust is working to track overall market share of LED products and is experimenting with ways to incorporate that information in deployment scenarios provided for utility resource planning.

RECOMMENDATION

Energy Trust staff recommends that we establish goals and report against gross savings beginning with our 2020 Annual Budget and 2020-2021 Action Plans. This reflects our belief that the amount of useful information that Energy Trust can collect about net savings is diminishing, and options to improve the information are likely to have marginal benefits. We believe that the success of most of the Northwest in working with gross savings indicates that the issues surrounding this change are surmountable. Moreover, we believe that by assessing program influence qualitatively in the process of making program decisions, we will use the information we have on markets in a way more appropriate to its nature.

The recommendation to shift for 2020 planning provides time to plan changes to tracking systems, goals and IRP integration. A 2020 start also coincides with Energy Trust's strategic planning cycle, which will provide for clear goals for 2020 through 2024.

We further recommend Strategy D, where gross savings are reported including market transformation, but excluding spillover. This reflects the importance and well-accepted nature of market transformation savings estimates, primarily provided by the NEEA. This also reflects the uncertainty of data about spillover and the very small amount of estimated spillover savings that Energy Trust has historically reported. Outside of market transformation situations (where it is addressed under Strategy D as part of market transformation), it cannot be estimated with precision. Excluding it does not materially change savings estimates and it avoids unnecessary effort and contention.

HOW INFORMATION WILL BE USED DIFFERENTLY IF WE REPORT GROSS SAVINGS

The three primary uses of Energy Trust net savings are (1) to set goals and track progress against our goals, (2) to provide forecast and reported savings that can be factored into utility integrated resource plans, and (3) as a signal to programs to indicate which initiatives have greater or lesser market influence.

Goal-setting and reporting would continue in a similar but simpler manner than currently employed. Changes would be required to Energy Trust's tracking systems, goals and planning estimates.

It would be important for each utility that funds Energy Trust programs to consider how they can best incorporate Energy Trust savings estimates with load forecasts. Some utilities may need to adjustment load forecasts or savings estimates.

PLANNING FOR PROGRAM TRANSITIONS IN THE ABSENCE OF NET SAVINGS ESTIMATES

If Energy Trust sets goals and report in gross savings, it is important that we continue to examine whether specific product efficiency incentives are useful and when they should stop. Today, program managers regularly reassess the need for incentives, guided by: the level and relative value of the savings, the utility cost test, market response, utility and trade ally feedback, shifting baselines, evaluations, comparison to other service territories and multi-year trends in free riders.

While the trend in cost-effectiveness is the most obvious and critical driver in any examination of whether and how much to support a measure, we also look for reinforcing and aligning information from these other sources to identify when and how to change incentive levels, delivery mechanisms and/or exit strategies. In practice, the trend in free rider estimates has rarely been the key driver to changing or ending a measure incentive. It is almost always one of the other factors that drives a change or elimination of incentives and does so before the free-rider trend is at a certain and sizable level. Switching to gross savings decouples free rider data from the savings estimate but does not change any of the other important considerations noted above.

In a net savings calculation, if free rider estimates increase, the contribution of a measure toward goals decreases. If Energy Trust reports results as gross savings, this mathematical feedback disappears. However, the issues that program managers face in deciding when to revise or discontinue a measure offering and its stream of savings remains essentially the same. The decision is more explicitly based on the other factors. These factors have historically carried more weight in influencing the decision. Energy Trust will bring this information forward in a systematic way to signal changes needed to begin exiting markets. The most significant change will be to bring this question forward sooner than we have in the past.

As part of this proposal, Energy Trust will develop a set of general market milestones or trigger points that first signal the need to consider exiting or re-directing a measure. Development of these criteria would be achieved as a separate, follow-on exercise after a measure is reviewed in the development process. Program staff will establish the metrics. They will include various market fundamentals that drive individual measures, including but not limited to: measure cost, changes in savings or baseline, market share, geographic differences, participation rates and other market signals unique to the measure. The scale of the criteria would match the significance of the measure to a program and its relative uptake in a market.

When we have more complete market experience with a measure or we have other information that a measure is shifting (e.g., evaluations, standards, manufacturing practices, etc.) the state of the market relative to these expected trigger points and milestones would be examined and reported as part of the budget review processes. This could be done once every three years but potentially more frequently for significant measures in dynamic circumstances, in line with the current measure review efforts for such measure as the current residential LED market.

In developing and applying these considerations, a decision to amend, target or narrow a measure is likely to be a frequent outcome, as opposed to deciding to exit the measure.

A market check-in process would include the following elements:

- Define when a market exit plan is needed, and the review process for the measure.

    - Decision process: once the indicators show a potential opportunity to exit, lay out how Energy Trust will decide and who will be consulted
- Determine what will be tracked, in addition to cost-effectiveness and baseline conditions, to define continued support for a measure.
    - Criteria for exit, with market indicators and conditions
- Determine the possible triggers or other considerations for continued support.
    - Other factors that may be important in the decision, e.g., vendor relationships, customer engagement to market other products, market stability
- Create documentation and notification plan.

Having these elements in place in advance of decisions will narrow the scope of later discussions and make the decision-making more transparent and credible.

NEXT STEPS

This proposal has been discussed with the evaluation and policy committees of the board, with utilities, with the OPUC staff and commissioners, with the board as a whole, with the Conservation Advisory Council and with other stakeholders. The proposal has met with general support. The OPUC has requested, before providing final support, that Energy Trust further define how it will plan for reduction or ending of incentive offers for measures in the absence of analysis of Free Riders. Energy Trust committed to providing this information as part of its 2018 annual report to the OPUC in April 2019, after consultation with OPUC staff. Meanwhile, Energy Trust is beginning to develop the changes to planning, tracking, and reporting systems needed to employ gross savings.