Briefing Paper
Energy Efficiency Programs

June 8, 2012

Summary

This paper reviews how Energy Trust efficiency programs have performed so far, what it will take to achieve our 2014 Strategic Plan goals, and strategic opportunities and challenges beyond 2014. This paper and the board discussion are meant to help us shape the Energy Trust budget and action plan for 2013-2014.

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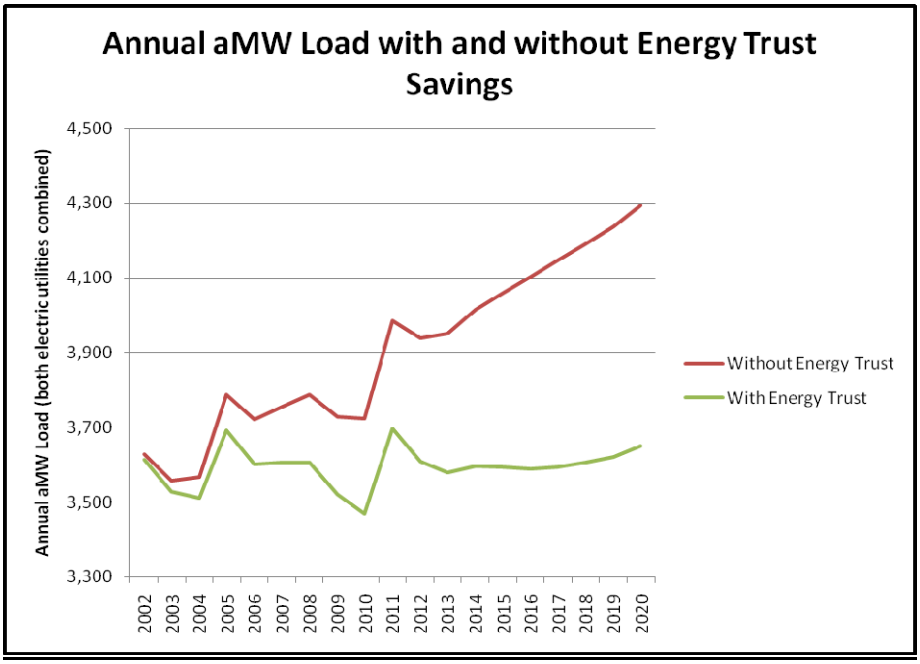
Discussion

1. <u>What it will take to achieve 2014 goals</u>

   A. <u>How are we doing? Energy efficiency performance compared to 2014 goals</u>

We are making a real difference. Here is a snapshot of what Energy Trust programs have done to electric demand, and what they are expected to do:

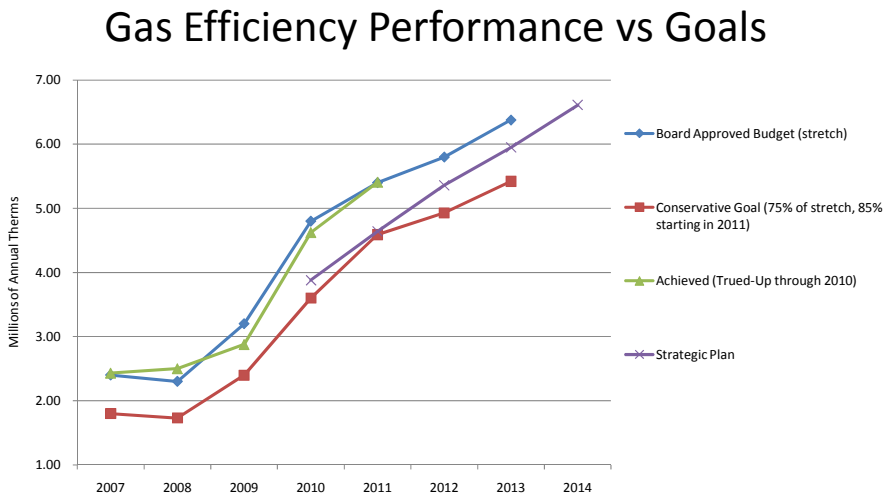


In 2011, we saved energy at a faster clip (about 30% faster) than the Northwest Power & Conservation Council's Sixth Power Plan's target for our service territory. While the Plan's targets accelerate, we plan to meet or beat them at least through 2014..

1) Gas programs

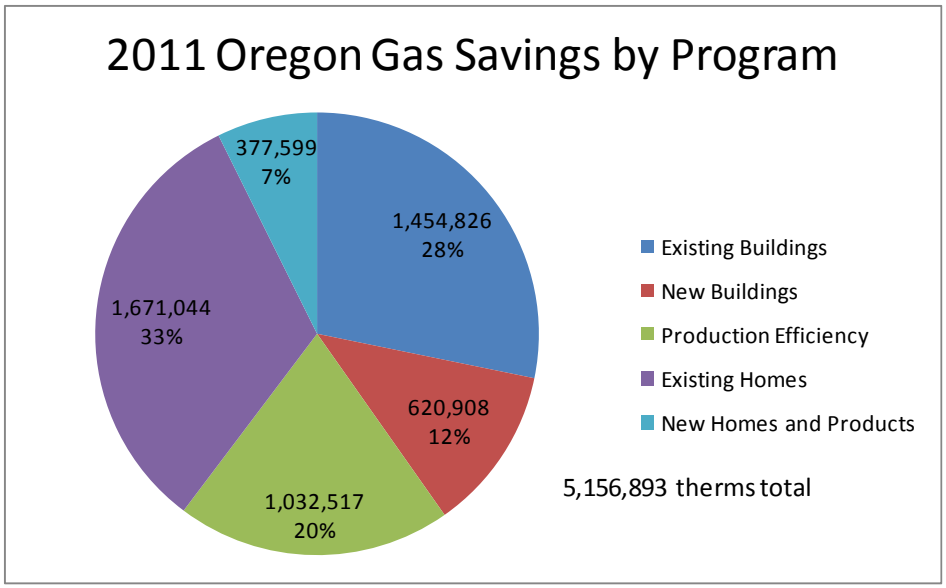
Gas efficiency programs are exceeding strategic plan goals and are expected to continue to do so. Since the strategic plan was last updated in 2009, we have set more ambitious stretch goals, and come close to or exceeded them in several successive years. Our current aspirations are for continued steady growth in gas savings as shown by the budget line (blue). Our firm commitments (conservative case) are represented by the red line. The fact that we have two lines reflects continued uncertainty about overall savings due to economic and market issues.

Taking Stock:



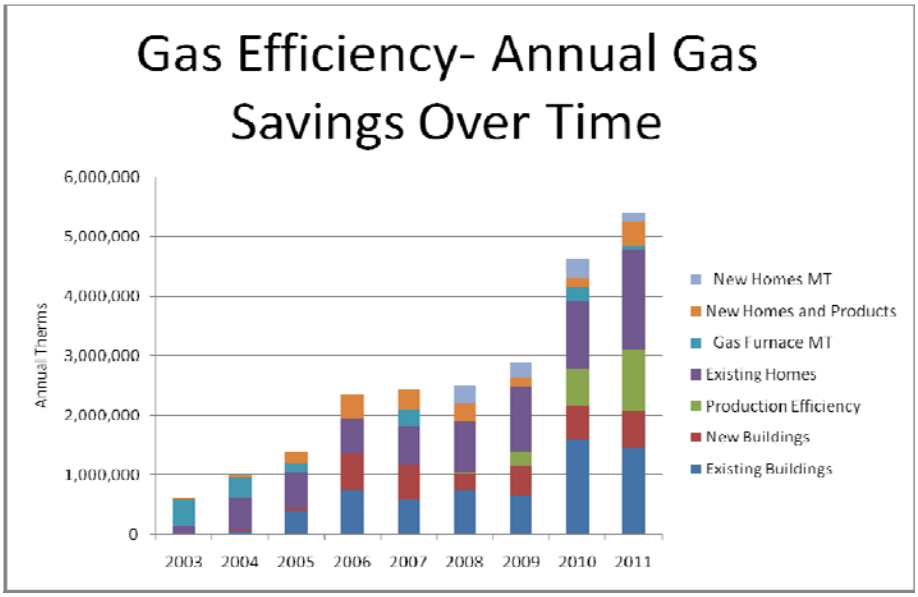
The gas portfolio is robust, with significant savings coming from commercial, industrial, and residential programs (Figure 1). Our programs are currently reducing our gas loads by about eight tenths of a percent and growing! Continued acceleration has come from broadening our market reach, both in terms of customers and geographic areas, and reaching customers that want to do more measures at once.

Figure 1



Over the years, industrial savings from the Production Efficiency program have become an increasingly important part of the gas portfolio (Figure 2).

Figure 2

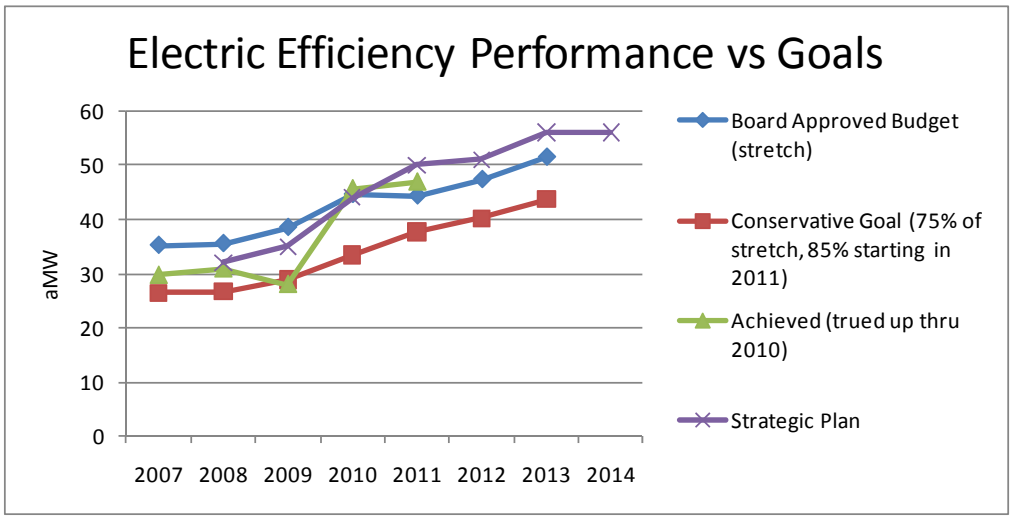


2) <u>Electric programs</u>

For this year's electric budget, our stretch goals are lower than those of the Strategic Plan (figure 3). This reflects a variety of factors, some of which were previewed at last year's retreat: loads have not grown as forecast, we have learned more about key efficiency markets; we have fully deployed more key measures; measures that have been incorporated into codes and standards (savings are achieved, but not always attributed to our programs); and the difficult-to-assess impact of reduced tax credits on markets. We continue to plan, in our stretch case, for savings growth.

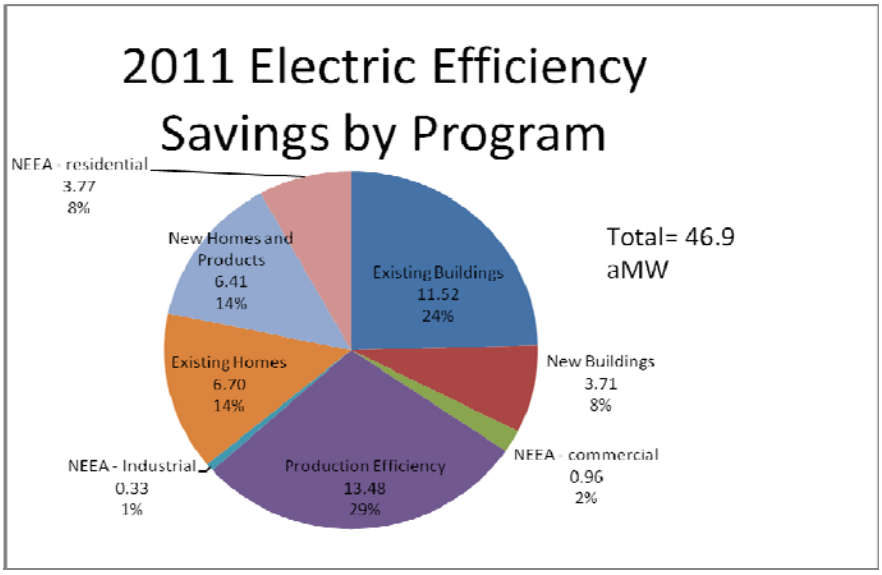
In 2012, we expect to meet our savings goals with a mix of measures, including some where we expect to saturate markets in the next few years (e.g., low-flow showerheads) and a number of expanding innovative projects (e.g., Strategic Energy Management, commercial rooftop HVAC tune-ups, O-Power pilot, ENERGY STAR water heaters.) We are working to reduce transaction costs and improve follow-through rates.

Figure 3



Electric savings come from a variety of business and home programs. (Figure 4)

Figure 4

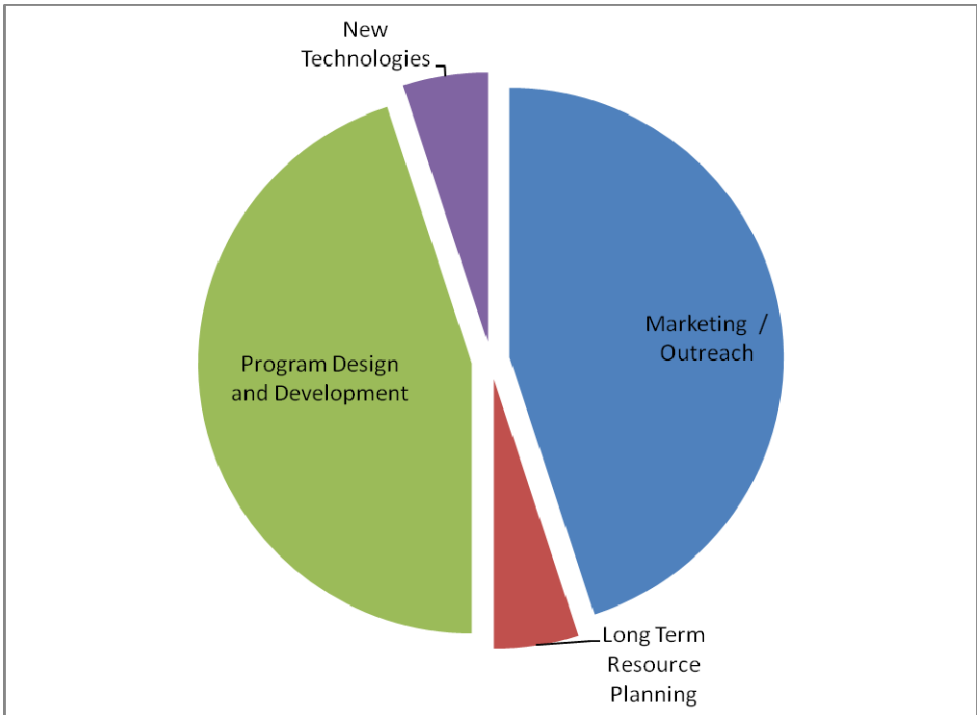


In the above chart, "NEEA" refers to the Northwest Energy Efficiency Alliance, a regional electric efficiency market transformation organization that Energy Trust co-funds, along with public utilities serving other parts of Oregon, and utilities in Montana, Idaho, and Washington.

B. How do we meet the growth in energy savings forecasted in the Strategic Plan?

We have learned that the key to successfully meeting goals is informed innovation coupled with flexibility and nimbleness in market response. Continuing to run the same programs without adapting to customer needs or advances in new technologies would result in continued savings but not at the level and pace we need. Figure 5 illustrates how we manage our innovation resources across the organization.

Figure 5: Energy Trust Innovation Resources



The two largest segments represent marketing and outreach and program design and development, both critical to continued short-term success. We discuss them in the next two sections. The remaining two segments, long term planning and new technologies, require resources that are beyond the two-year action plan horizon. We explore them in sections 3 and 4.

1) Marketing and outreach

We continue to differentiate customer markets and work with supply chains to “meet people where they are,” i.e., to offer them services in a way that makes it easy for them to take advantage of our help. We have a number of initiatives and pilots (~30) underway to do this:

- Expanded outreach: rural communities, schools and other public sector customers, tribes, and other self-identifying communities
- Toolkits to work with community-based efforts

- Local initiatives, such as our work the Rogue Valley Council of Governments on purchase and delivery of ductless heat pumps.
- Special tracks to serve small businesses, and continue to develop specialized services for different types of commercial and industrial trade allies
- Incorporating realtors into trade ally network
- Cross-marketing among efficiency programs and between efficiency and renewable programs
- Expanded efforts to reach smaller architectural firms for new buildings
- Highly-targetable opportunities such as data centers
- Coordination with utilities on customized information campaigns through utility channels
- A pilot to test different informational and incentive approaches 90 days after a home review
- A customer engagement strategy for weatherization that sorts incoming queries to see if they need a home visit, a phone audit, direct referral to contractors, or other services
- Trade ally ratings and localized trade ally recommendations
- Cross-referrals between Clean Energy Works Oregon and other Energy Trust home-efficiency tracks.

2) Program design and development: alternative delivery approaches and deep retrofits

Policymakers are considering ways to greatly accelerate energy efficiency by encouraging more customers to engage in deeper, single-transaction retrofits of homes and buildings. The theory is that we can capture more savings at less cost by doing everything in one transaction, as compared to doing measures incrementally over time.

a. Deep residential retrofits: Home Performance, Clean Energy Works and cost-effectiveness

We have two deep-retrofit initiatives in the residential sector. We are evaluating them to see how they might help meet our savings goals.

Home Performance. This track of the Home Energy Savings-Existing Homes programs has trained contractors to perform home tests, computerized audits, do more quality control, and market and package measures in ways that sell more measures per transaction.

Home Performance has increased measures per transaction, earned a high level of customer satisfaction, and produced relatively few free riders (people who would have made the investment without our incentive). See Table 1.

At the same time, Home Performance appears to cost the customer more per measure than the standard approach. So far, evaluations do not show that Home Performance saves more per measure than the standard approach.

Energy Trust continues to support Home Performance, but plans to do so in a less resource-intensive fashion appropriate to an established market vehicle. We expect it become one of several options for achieving energy savings.

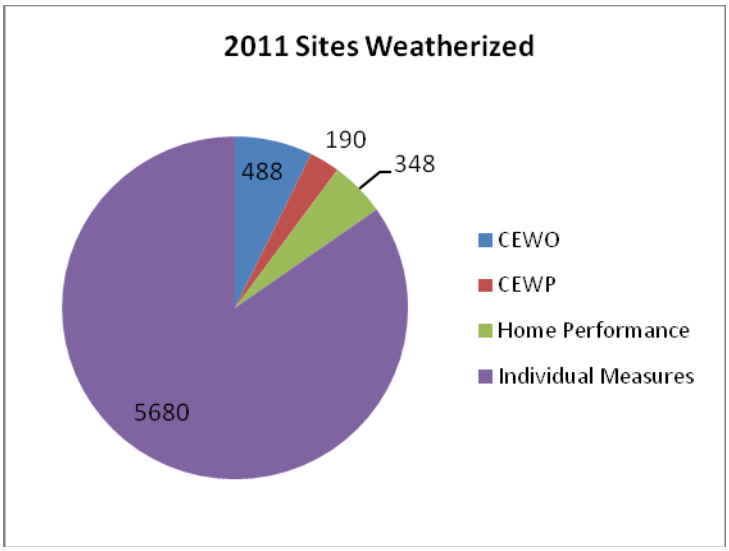
Clean Energy Works Oregon. Clean Energy Works, "CEWO," is a non-profit that secured a $20 million federal grant a couple of years ago to create family-wage jobs in clean energy. Energy Trust provides incentives, technical support, and evaluation for efficiency projects that CEWO generates. CEWO uses on-bill financing (i.e., a customer borrows money for energy conservation improvements and repays the loan on his or her utility bill), helps customers with contractor selection, and provides advice. In keeping with its federal requirements, CEWO also has recruited minority and woman contractors, and requires a minimum pay level for its contractors. CEWO appears to be on the road to achieving several thousand retrofits. It seems to produce more measures per home than Energy Trust's conventional program or Home Performance at a higher cost than either other track for some measures.

Table 1

Approach	**Measures per transaction**
Conventional	1.6
Home Performance	3 to 3.25
Clean Energy Works	4.1 to 4.5

The questions underlying these deep-retrofit approaches are: (1) Does installing multiple measures at one time save more energy overall, or merely accelerate the time when we save energy; (2) if the latter, how much value is there in saving energy earlier, and (3) what is the value to Oregon of CEWO's approach to labor? These questions are quite difficult to assess, and the evidence to date does not allow us to draw conclusions. Home Performance and CEWO are modest portions of the Energy Trust's weatherization program at this point:

Figure 6



CEWP is Clean Energy Works' Portland pilot project.

How much these approaches will grow in future years is difficult to assess, and will depend to some degree on the answers to the above questions. CEWO plans significant growth.

b. Deep retrofits in commercial buildings: is there a role for innovative financing?

In Energy Trust's retrofit programs for business, government, and nonprofit buildings (Building Efficiency- Existing Buildings) customers often choose to install a limited number of measures at once. Customers often retrofit their buildings incrementally, with an additional efficiency retrofits every so often. It may be a set of lighting measures this year, replacing a heating and cooling system in a few years, then cooking equipment, a controls system, an enhanced building management approach, etc.

There is increasing policy interest in programs that retrofit an entire building at once. There are several arguments for this approach:

- It can make more measures affordable. For example, if windows are retrofit at the same time that a heating and cooling system is changed out, it might be possible to downsize the heating and cooling plant, and the money thus saved could help make expensive windows measures cost-effective.
- It is possible that because deep retrofit programs would involve a single transaction, they would reduce transaction costs.
- Larger, all-at-once transactions may be more feasible for businesses that are not organized to pay attention to smaller efficiency projects.

However:

- We would expect there to be a small number of cases where combining measures makes some more affordable, and that they would add little to the overall savings from Energy Trust's commercial sector programs.[1]
- These would be larger and more complex transactions, with higher costs compared to simpler transactions.
- During and after installation, we would expect these projects to place larger management demands on property owners.
- Because these projects would be more costly, financing them may be more complex.

Energy Trust and NEEA are working together to develop technical analysis approaches, project planning tools, and special incentives to encourage and evaluate more deep retrofit projects. A demonstration project in Oregon has been proposed.

In addition, the Oregon PUC is reviewing an innovative model using what is called an "Energy Efficiency Power Purchase Agreement." This would be a form of performance contracting in which an energy service company (ESCo) would enter into an agreement with the building owner and the utility. The ESCo would upgrade the building. The building's utility would promise to pay for saved energy at or close to the utility's full avoided cost (the cost it would pay to acquire energy from the market). The utility's promise to pay would make it possible for the energy service company to attract capital investors to finance the building improvements. The utility also might become the source of capital. The utility or the ESCo would also own the efficiency measures so that the owner would not incur debt.

Building owners would participate because they pay nothing for the efficiency improvements, they do not have to use their equity to secure debt, and they would have a more desirable, green building.

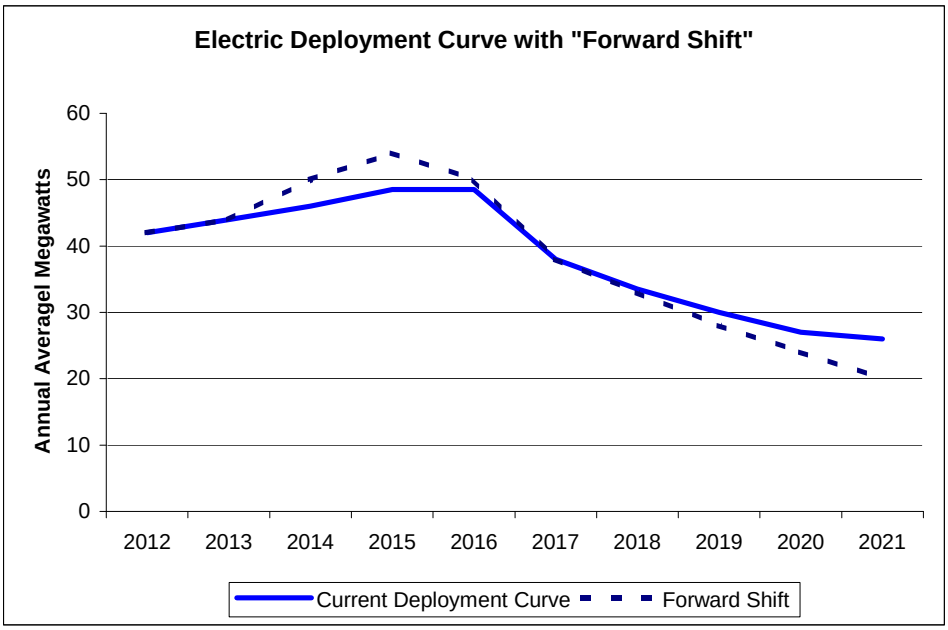
This is one of several types of innovative financing available to building owners (see Appendix). The market for this type of arrangement is difficult to assess in part because it is complex, hypothetical and untested, and it competes with other approaches. It may particularly appeal to owners with limited ability to finance due to high dept/equity ratios on their property, or who wish to use their financial leverage for other purposes.

There is public discussion of the value of this and other innovative approaches in accelerating retrofit. One way to explore the idea of further accelerating retrofit would be to develop two

[1] For example, window upgrades are currently about 2.5 aMW of the estimated commercial conservation supply for electric and 2.1 million therms for gas. If deep retrofit succeeded in making more window measures cost-effective, the results may be larger, say, 10 aMW. The added savings would occur over many years, as HVAC systems can last from 15-30 years, and few owners will replace a fully functional HVAC system. Over 15-30 years, these savings would be much less than 1 aMW/year, a small fraction of our 2012 goals of 48.8 aMW 5.9 million annual therms for all programs.

scenarios: (1) the rate at which current programs are expected to save energy; and (2) the potential effect of deep-retrofit initiatives in further accelerating savings.

Figure 7: Two scenarios of acquisition



We don't know exactly what it will cost to accelerate, or how much we can accelerate. We would expect significant acceleration to be significantly more costly. Still, the scenario analysis would help judge the value of saving more energy sooner. We could provide these scenarios for utilities to consider in least-cost planning. They could assess whether, if innovative financing scenario accelerates efficiency, its costs would be warranted.

Questions:

- How much of its attention should Energy Trust devote to deep retrofit of commercial buildings, compared to other emerging technology efforts and efforts to broaden program participation?
- How important is it to test unconventional financing as a component of deep retrofit efforts?

3) <u>Energy Trust financing initiatives</u>

Access to financing is a common theme in the deep-retrofit initiatives outlined above. In the Appendix, we provide a fuller picture of the range of energy efficiency financing nationally. Here, we summarize financing programs in which Energy Trust is engaged and the strategic issues they raise.

Table 2: Energy Trust Financing Initiatives

Type	Initiative
Conventional sources (i.e., loans by private third parties, off-bill	• Umpqua GreenStreet • Lender Allies • Referrals to lenders from trade allies (a common practice that can occur without extensive help from Energy Trust)
On-bill financing programs	• Energy Efficiency and Sustainable Technology (EEAST) Pilot Program • Clean Energy Works Oregon • Savings Within Reach financing product (under development) • MPower
Virtual utilities	• Energy efficiency power purchase agreements pilot discussions
State and municipal loans	• Cool Schools • State Energy Loan Program o 2002 Energy Trust SELP loan buy-down pilot
New Energy Trust Approaches	• Renewable Construction Loan

Several policy issues underlie these initiatives:

First, given the many choices for reaching additional markets and prove additional resources, how much effort and risk should Energy Trust employ in developing or testing financing initiatives? In making these choices, we bear in mind that lack of capital is an obstacle for some, not all sectors.

Second, what role should Energy Trust play going forward:

- Provider of information/education resources regarding financing options generally?
- A link between participants and a range of third-party lending options?
- Support credit by helping to fund loan-loss reserve accounts to reduce risk to lenders willing to reach a broader range of participants?
- Different roles in different market segments?

4) <u>Energy and non-energy rationales for accelerating efficiency</u>

Energy Trust's goals are to save energy and help develop renewable generation. Several of the deep-retrofit and financing models discussed have broader rationales reflecting other policy priorities. Jobs, economic development and CO_2 reduction are most often mentioned. Because

our work overlaps with these programs, there is recurring discussion about whether we should modify our goals to reflect these other benefits. While in some ways this discussion sounds theoretical, it can drive programmatic and budget decisions and for this reason, we need to be clear about it.

We believe the evidence shows that programs that generate or save the most energy save the most CO_2. There is variation depending on the fuel and timing of the resources our programs displace (coal versus natural gas). But in general it is fair to say that the more energy we save, the less CO_2 there will be in the air. If there is a finite amount of funding for efficiency and we save energy at lower cost, we will avoid more CO_2. For this reason, if deep-retrofit or financing programs save comparable amounts of energy at higher cost, they can save more CO_2 only if overall efficiency budgets significantly increase.

Similarly, Energy Trust has studied the jobs impacts of efficiency and renewables, using a contractor's input-output model (Implan). The major lesson from this exercise is that reducing the cost of electricity and gas, which is what cost-effective efficiency programs do, has the largest effect on job creation. The reduction in utility costs is passed on to ratepayers, who in turn buy other goods and services with a large portion of the savings. Additional jobs are created from the conservation program activity itself (auditing, buying and installing equipment, etc). However, these are a small fraction of the overall job impact of efficiency. The most important job driver is delivering efficiency at a lower cost than electricity and gas.

Thus, by funding all cost-effective measures, and attempting to do so at the lowest possible cost, Energy Trust is maximizing job impact. Changing our goals would not alter this.

5) Cost-effectiveness of gas weatherization

Although we see ample gas efficiency opportunities if we can afford them, there is an emerging issue regarding the cost-effectiveness of gas weatherization measures. In most gas-heated homes, wall and floor insulation, duct sealing, and possibly air sealing do not pass the societal cost-effectiveness test. In general, we need a societal benefit/cost ratio of 1.0 or better to justify supporting a measure. The societal benefit/cost ratios for floor insulation, and possibly air sealing are about .6, and duct sealing is considerably lower.[2] These four measures constitute about 20% of our gas weatherization savings. While we could run a gas weatherization program without these measures, the program would be less comprehensive, involve smaller transactions, and therefore harder to finance. CEWO and Home Performance would be feasible, but not much different from our conventional approach.

We are exploring different ways of looking at this dilemma, working with the gas utilities and Oregon and Washington commissions. For example:

- There are non-energy benefits from these measures: comfort, ventilation-related health issues, etc. If customers are fully informed of the relatively long pay-backs of these measures based on energy savings and still invest in them, is this evidence that they are choosing because of other reasons? Should the PUC's approach to the societal test consider this as evidence that the measures are beneficial to society?

[2] The measures are more cost-effective for *electrically heated* single family homes, due to the higher value, per BTU, of electric savings.

- Our cost savings estimates include forecast costs for compliance from CO_2 and other air-quality regulations. These are based on utility avoided-cost forecasts: essentially a market-based forecast of the cost of compliance with future regulations. Should we factor in a higher value for reducing gas emissions?

- If the lowest-cost contractors currently deliver these measures cost-effectively (or nearly so), and we encourage lower costs by informing customers of energy paybacks, will average prices fall to cost-effective levels? If so, lower initial cost-effectiveness may be justifiable.

- Other considerations such as the exclusion of employment benefits and related costs in the societal test, the appropriate discount rate for expensed programs, and the value of gas efficiency in dampening gas price and price volatility, may warrant discussion.

6) Energy efficiency funding for large electric customers

In setting the 2014 Strategic Plan goals, we assumed we could reach all cost-effective savings for large electric customers (over one average megawatt users). Yet the Plan also noted that funding these savings may require a change in law.

Energy Trust's electric programs are funded under two Oregon laws, SB 1149 and SB 838. SB 1149, adopted in 1999, provided electric funding from a three-percent charge on PGE and PacifiCorp Oregon rates. SB 838, adopted in 2007, was enacted when the electric utilities' integrated resource plans indicated that SB 1149 funding would not allow them to acquire all cost-effective energy savings.[3] SB 838 allows the utilities to collect supplemental funds to meet integrated resource plan energy efficiency goals. This additional funding is currently more than half of Energy Trust's electric efficiency funding.

However, the large electric customers (those using more than one average megawatt (aMW) per year at a site) did not want to be included in this arrangement. The utilities are therefore not permitted to collect these supplemental charges from over-1 aMW customer sites, and these large users are not allowed to benefit from SB 838 funds.

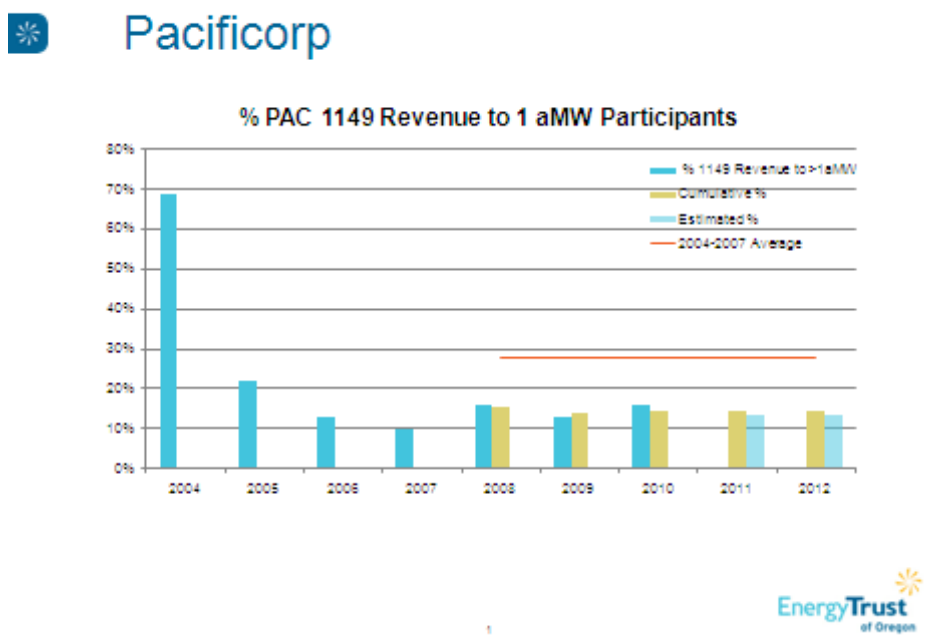
In response, Energy Trust limits funding for over-1 aMW sites to the percentage of all SB 1149 funding that this customer class was provided before SB 838.[4] Energy Trust tracks spending trends and reduces marketing to these customers if SB 1149 funding for this group appears to be growing past historic levels. Because of data and data sharing issues, Energy Trust currently only has an approximate estimate of this proportion, as shown on the two graphs below. In judging this, we look at average funding, over a period of years.

We do not see this threshold affecting PacifiCorp customers anytime soon. Large-customer funding after SB 838 is well below its historic SB 1149 funding (figure 8).

[3] Energy efficiency funding is just one aspect of this complex legislation as both SB1149 and SB838 covered many other issues.

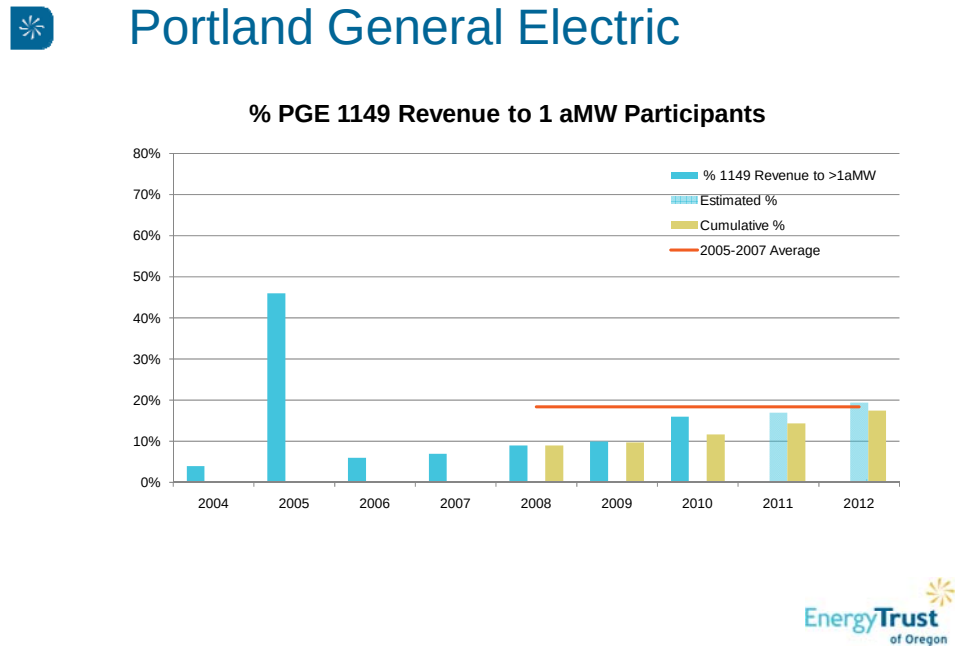
[4] SB1149 funding for efficiency is a fixed percent of electric revenues to the utility. It grows only when loads or rates grow. Funding shrunk slightly during the worst of the recession and is projected to grow slightly in the future.

Figure 8



In contrast, PGE appears to be approaching the funding threshold in the near term (figure 9). This reflects both the low level of spending by this group prior to SB 838 and growth in large-customer participation in recent years. A large project currently underway and plans for several others exacerbate these trends.

Figure 9



A significant share of our efficiency resource comes from these large customers. If Energy Trust were to reduce marketing to this group of PGE customers, it would likely bring funding in line with SB 838 limits, and it would also complicate our ability to meet integrated resource planning goals.

The SB 838 funding limitation is not in Energy Trust control. It could take a change in law to allow larger rate collections for this customer class. Absent such changes, we may need to revisit our 2013 or2014 goals.

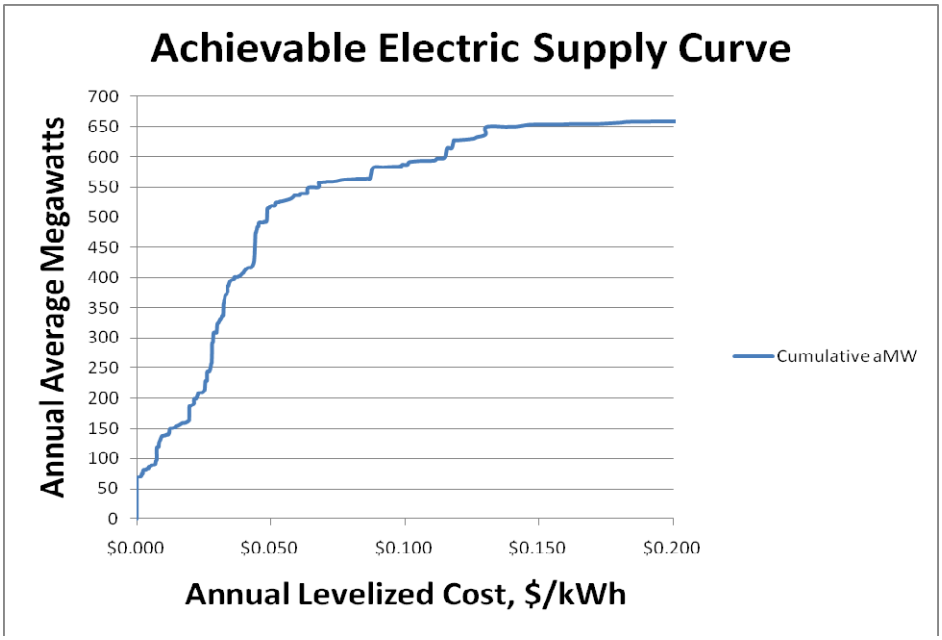
2. Positioning Energy Trust post-2014

Post-2014, we face two basic challenges, which require different kinds of innovation. We need to plan for an uncertain future in which efficiency opportunities are likely to be more limited; and augment efficiency resources with new technologies and management practices as best we can.

A. The projected 2017 drop in efficiency resources: what does it signify and how should we manage the uncertainty?

In integrated resource planning, Energy Trust estimates how much efficiency we can get over time, and at what cost. Energy Trust estimates are based on “supply curve models.” These models estimate typical cost, savings, and measure life for a wide array of currently-available efficiency measures. Here is an example of achievable electric potential cumulatively by cost over the next 20 years:

Figure 10

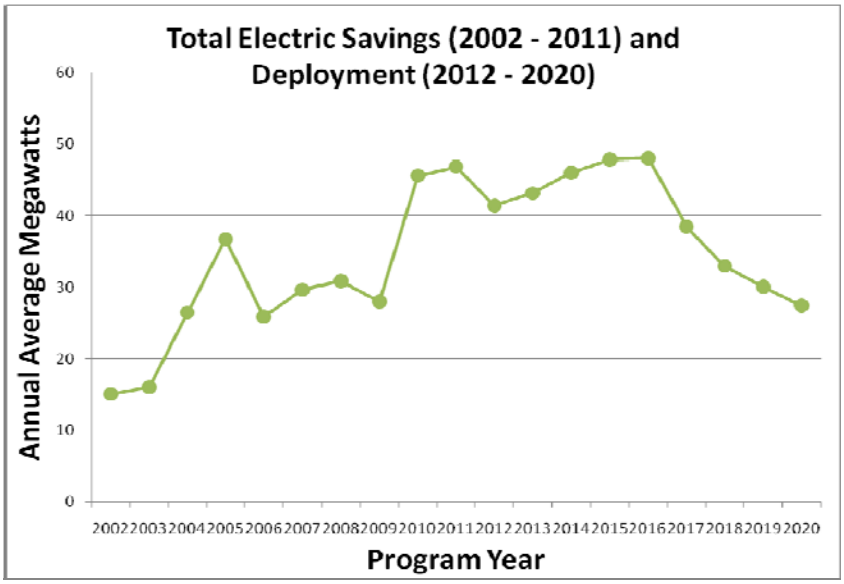


We multiply these numbers by the total number of homes, building square feet, units of industrial load, etc., to estimate potential savings overall. Typically, our funding utilities' integrated resource plans select all of the efficiency that we think is less costly than generation. Energy Trust then develops "deployment curves" showing how fast we can get the savings at reasonable cost. We have provided deployment curves that accelerate efficiency acquisition at an aggressive rate.

These estimates are based on the efficiency measures and costs we know about at the time of the estimate. Based on historic experience with energy conservation programs, we also know that new technologies and methods will develop. When we project five or ten years out, our supply and deployment curves miss these measures. The problem, however, is that we don't know when or how much of these currently unknown measures will materialize.

At this point, here is how the electric deployment curve looks without accounting for new technologies or methods:

Figure 11

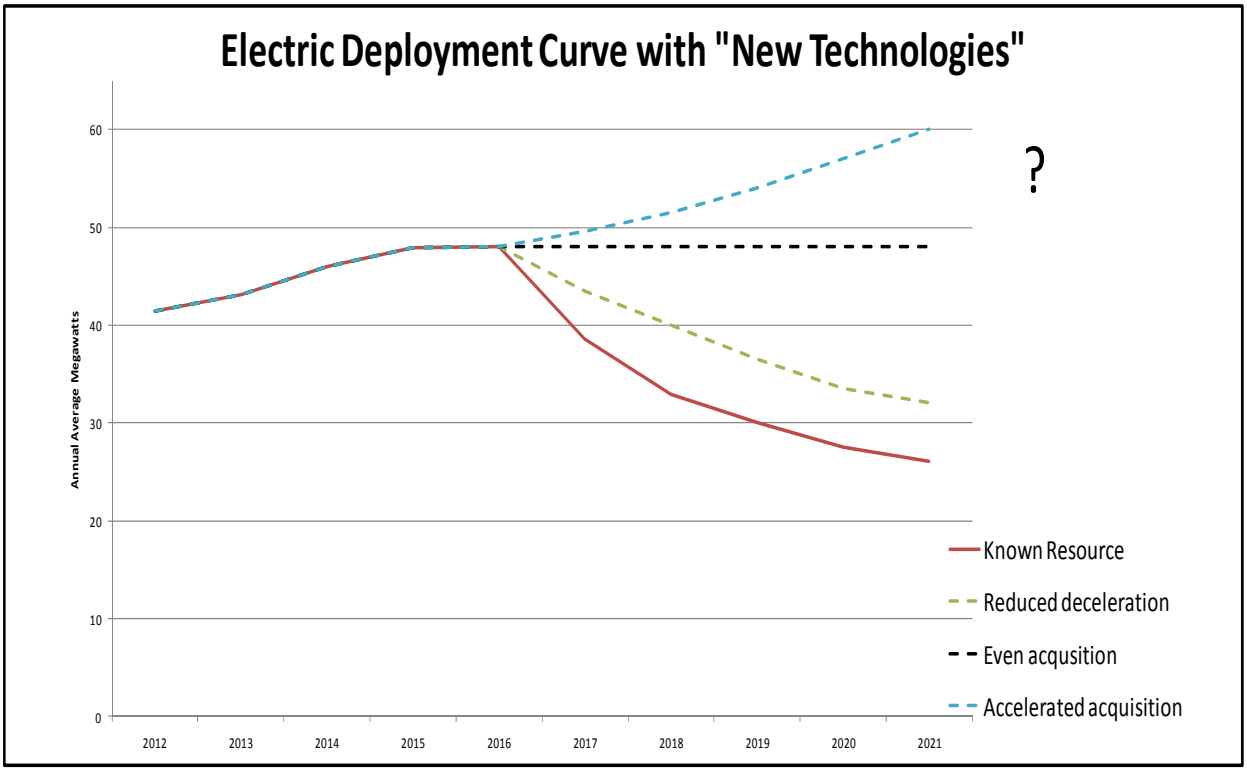


In the past, there has been a large enough supply of known conservation resource that we did not need precise modeling to be confident that we could deliver high volumes of savings on an ongoing basis. This fueled the rapid growth in savings plotted in the Strategic Plan. At the current rate, we reduce electric loads by roughly 1.4% of the loads that would have occurred without us, and gas non-transport loads by about .7% each year.

At some point, however, known efficiency resources peak and begin to drop off. The above graph shows the peak in 2016, followed by a rather sharp decline. The decline reflects that the diminishing pool of savings comes from smaller customers and those facing complex market barriers. Savings will cost more on average, and it will take longer to mine them out. The gas peak will be later, reflecting a shorter history of aggressive gas efficiency programs.

Like all projections, we expect the above prediction to be wrong, we just don't know by how much, and we must plan for several possibilities (figure 12).

Figure 12



Of the futures in this graph, the “accelerated acquisition” case would be most difficult to achieve and may be the least likely. And to a great degree, the line that occurs will depend on how much, how fast and at what cost new efficiency technology develops.

B. Adding new efficiency resources

Historically, Energy Trust diversified its portfolio of efficiency measures by developing both mass market and specialized approaches. We will need to continue on this path, and in fact are engaged in an unprecedented number of pilots and experiments with new technical services, measure bundling, financing initiatives and other elements of program design.

As discussed extensively at last year’s board retreat, we are succeeding in transitioning many of our most popular efficiency measures to federal and state equipment standards and building codes. For some other low-cost, high-impact measures such as showerheads, we expect to achieve market saturation within three years. The question is how much of this we can replace, by when and at what cost.

To continue to grow the scale of savings in the next five years, we need to increase our emphasis on innovation in several areas, including new technologies. We have a large number of pilot projects underway.

Currently, NEEA aims to introduce 300 aMW of new potential savings every five years, or about 60 aMW per year. Non-NEEA savings programs acquired about four times that much in 2011:

275 aMW. Thus, NEEA plans to prove new efficiency measures at a much lower rate than savings are being acquired. Other new measures are expected from channels other than NEEA, but they are unlikely to provide enough to meet our long-term rate objectives. This raises a question of whether Energy Trust can continue growing savings at our current rate in the longer term.

We don't want to overstate the concern. Many of the major sources of savings in 2011 were not predicted ten years prior. We did not predict the widespread use of Energy Information Systems for industrial strategic energy management. Over the past year alone, Energy Trust added ductless heat pumps and heat pump water heaters to electric supply curves. We have hopes for behavioral measures in homes and commercial businesses, advanced gas water heaters, even more efficient appliances, and so on. But it will take a great deal of new resource to offset the resources we expect to "lose" in the years ahead, and the uncertainty is enormous.

Utility integrated resource planning deals with many uncertainties -- fuel prices, plant down-time, loads and others, and so far has treated efficiency as an entirely predictable resource. Predicting energy conservation is risky in both directions: if we consider only "firm" efficiency resources (commercial and affordable today) and ignore the likelihood that efficiency supplies will grow, utilities could over-purchase of fossil resources. On the other hand, if we over-predict and under-deliver conservation, we put utilities in a position of under-supply.

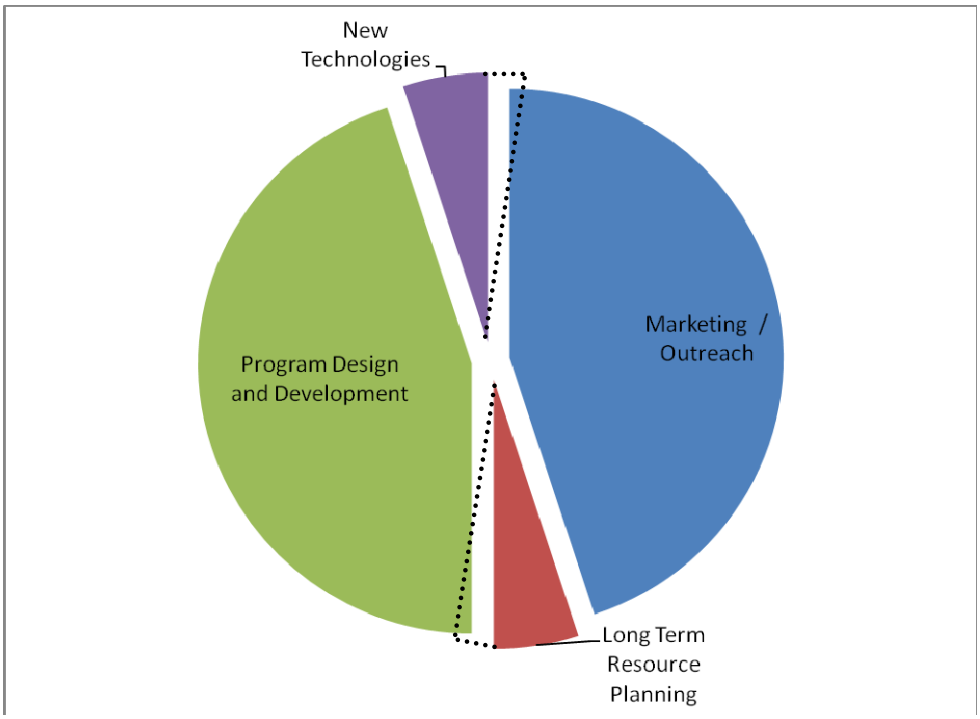
We have discussed these issues with utilities. One utility provided a "higher efficiency scenario" but did nothing with it in their risk or cost analysis. Another utility (with our support) has assumed simply that we will find new resources and programs will decelerate only modestly. Neither of these exercises had rigorous analysis behind them. Because 2016 is getting closer, we can't delay putting additional focus on our understanding of the long-term resource potential. We need to provide reliable deployment scenarios to utilities that are using efficiency growth assumptions to decide how much to invest in new generation.

To improve how we deal with these variables, Energy Trust proposes the following for future integrated resource plans:

- Energy Trust would develop a "possible additional future conservation" scenario, by looking at national studies, the regional R&D queue and Energy Trust pilots, and estimating what additional savings from added technologies might be. We have never done this in a systematic way, but based on NEEA's work and past experience, hundreds of aMW and several million annual therms seem plausible.
- We wouldl arbitrarily (because it can't be predicted) assign a price, say two-thirds of the cost-effective limit.
- We will work with utilities to find ways to incorporate these estimates of "non-firm" efficiency into their resource planning.

C. 2013-2014 priorities: How should we deploy our resources to resource planning, program innovation, marketing and outreach, and new technologies?

The chart below shows in rough terms how Energy Trust currently deploys staff resources to build innovation, and where we would put greater emphasis in the future.



If we are to continue to increase our impact over the next five years, we need to put more emphasis in new technologies and long-term resource planning.

APPENDIX

Energy Trust Financing Strategies
June 8, Board Retreat

Introduction

Programs that offer financing or link participants to financing assistance for energy efficiency projects are not new to Oregon nor other parts of the country despite the recent spike in popularity and growth in the industry. PacifiCorp was a pioneer in the 90s, offering on-bill, low rate financing for credit worthy applicants. When the company offered the option of a project incentive or a loan in the early 2000s, incentives ended up driving up participation, leading Pacific to discontinue the loan option. On bill financing programs launched during the same time period in California and New England are still considered successful today and are being joined by more ARRA funding seeding loan programs across the country.

Virtually all Energy Trust and other rebate programs involve consumer financing. Energy Trust paid about $82M in efficiency and renewable incentives in 2011. To proceed, project developers and program participants found a multiple of that $82M to invest, from cash flow, lines of credit, savings, conventional loans, working capital, and other sources. The question at hand is whether there could be broader, deeper, or faster participation in programs if there are additional sources of financing to address those who currently lack access, or are unwilling to invest on available terms. Interesting target markets include:

- Commercial owners who are fully leveraged and have no equity to back investments or have higher priorities for that equity.
- Larger transactions than are typically financed through conventional sources (e.g., deep home and business retrofit.
- Homeowners and landlord who lack access to capital due to limited incomes or other financial circumstances.

“Streamlined financing” and “utility bill financing” are also seen as ways of getting around the transactional barriers that keep people with credit from borrowing, by making it a simpler process, and in the case of bill financing, by showing the energy savings and the loan payment on the same piece of paper, to make it clear that the savings come from the investment.

Today, more than 20 states see financing options as an important component to reducing the first cost market barrier to efficiency project participation. By increasing participation in efficiency projects, other benefits of economic development and jobs creation are expected. Although growing in popularity in the policy world, participation levels are still quite low. Less than 1% of projects participate in an official financing program, but it’s unknown how much activity is supported with standard line of credit loans or other general purpose loans.

Because many new financing programs were created with federal and state dollars that are aimed at economic development, those dollars are associated with goals beyond energy savings or installed renewable generation metrics. The High Road approach to workforce development is an example of an added consideration to ensure that historically underrepresented communities and populations are included in the delivery and receipt of these services. As the economic decline shifted construction from new buildings to retrofits, opportunities were seen for expanding the diversity of the retrofit workforce. This broadening of

the workforce ideally could translate to deeper penetration of typically hard to reach communities by having contractors local to area improve their neighbors' homes.

Other capital dollars often tapped by loan pool programs are tied to community missions beyond energy savings. CDFIs or Community Development Financial Institutions, of which there are about 20 in Oregon, are mission driven institutions that provide financial products and services to underserved communities Craft 3, Network for Affordable Housing, and Mercy Enterprise Corporation are examples. Large banks are the main source of low cost funds as they need to meet Community Reinvestment Act (CRA) requirements.

Financing Models

ESCOs, or energy service company financing models have been the only efficiency model to reach a sizable scale yet have mainly only met the needs of the MUSH market (municipal, university, school and hospital markets). Table 1 summarizes the range of new financing mechanisms, the target markets where they are thought to be most successful and the current barriers to their growth.[5]

Model	Description	Applicable Market	Barriers to Growth
Energy Efficient Mortgage	Adds EE debt to normal mortgage, vast potential but serious barriers. 'Save Act' could provide lift. May not often increase buyer leverage enough to make a desired home purchase feasible, but may be a low cost source or lending	Residential, multifamily, commercial	Real estate market still recovering from economic downturn.
On-bill Finance	Loan repayment via utility bill, variety of sources behind the capital	Widely applicable, all markets	In many states, cooperation of utility not required
PACE	Property Assessed Clean Energy bonds allow repayment through municipal property tax	Residential and Commercial	Senior lien status not favorable to many mortgage providers. Issues may be fewer for business loans
State, municipal loans	Existing funds but with low participation, rates are not as attractive, bonds and ARRA funds used	Residential, commercial, industrial	Reliant on government support, funds dwindling post stimulus. Oregon is managing its level of debt to maintain bond rating.
Efficiency services agreement	Viewed as a hedge on utility rates for business owner by offering price certainty	Commercial, Industrial	Complex mechanism, legal accounting treatment under review, significant transaction costs.
Virtual utilities, EEPPA	Utility pays for energy saved via ESCO type arrangement	Residential, multifamily, commercial, public	Requires regulatory support, complex mechanisms with potentially high transaction costs.

Table 1: Efficiency financing models and applicable markets

[5] Bloomberg New Energy Finance, 2012 "Is Debt Financing Opening up for Energy Efficiency?"

Energy Trust Activity in Financing

Energy Trust has found that financing is not a silver bullet for increasing participation across the board. Rather, there are specific applications and market segments for which it can be a tool to make participation easier. We see opportunities to reach people who can't access affordable financing today if we can offer better terms or simpler transactions. These can facilitate greater participation in our programs.

Since 2007, Energy Trust has been increasingly active in linking participants to 3rd party financing and continues to look for roles we can play to facilitate project financing. So far we've collaborated with lenders and financing pilots not as the bank or capital pool source but through offering our regular incentives and outreach and delivery structure to help facilitate the new financing component.

Financing programs in which we've played a role or are currently working to design our role includes;

On-bill financing programs
- Energy Efficiency and Sustainable Technology (EEAST) Pilot Program
- Clean Energy Works Oregon
- Savings Within Reach financing product (under development)
- MPower

Third party private off-bill (aka: loans from more conventional sources)
- Umpqua GreenStreet
- Lender Allies
- Referrals to lenders from trade allies (a common practice that can occur without extensive help from Energy Trust)

Virtual Utilities
- Energy efficiency power purchase agreements pilot discussions

State, municipal loans
- Cool Schools
- State Energy Loan Program
    - 2002 Energy Trust SELP loan buy-down pilot

New Energy Trust Approaches
- Renewable Construction Loan

<u>Energy Efficiency and Sustainable Technology EEAST Pilot Program</u>

Under the 2008 Energy Efficiency and Sustainable Technology Act (EEAST, HB 2626) long-term loans to support energy efficiency and renewable energy projects in homes and businesses may be repaid on utility bills. The legislation called for a series of pilot projects to test the feasibility of the concept and include community-focused outreach with greater assistance to participants along with financing. The law designated the Oregon Department of Energy as the

party responsible for conducting pilot activities in non-investor-owned utility service territory. It further designated the Energy Trust to conduct pilots in investor-owned service territory.

The first pilot under EEAST, Clean Energy Works Portland (CEWP), launched in July 2009. The City of Portland, Energy Trust, Enterprise Cascadia, NW Natural, Portland General Electric, Pacific Power and others shared pilot goal of making 500 homes more energy efficient by providing favorable loans and utility on-bill repayment.

The City of Portland was able to direct $2.5M in ARRA funds and other resources to support the effort. Enterprise Cascadia offered $2M and the Portland Development Commission provided a grant of $3.5M. Energy Trust staff and contractors enrolled and served the participants while Enterprise Cascadia managed the financing and loans. The evaluation firm Research into Action completed a full report on the pilot in October 2010. Results from pilot homes were compared to homes over the same period served through the standard program. After receiving an assessment, 66% of pilot homes followed through with measure compared to 25% standard program homes. Pilot homes installed 3 times as many measures as standard program homes and saved twice as much electricity and five times as much gas.

Although most of the emphasis on EEAST pilots has been in the residential sector so far, the Oregon Department of Energy had $5M in Federal stimulus funding for local commercial pilot programs opportunities as well. One pilot in Salem focused on lighting was not considered successful.

Clean Energy Works Oregon

Based on the successful model of Clean Energy Works Portland, a $20 million ARRA stimulus grant awarded to the City of Portland on behalf of the State of Oregon allowed a new non-profit organization, Clean Energy Works Oregon, to be dedicated to upgrading 6,000 homes and commercial buildings over 3 years.

Basic components of the program are as follows;

- Provides decision-making assistance in the form of Energy Advocates
- Recommends whole house upgrades that deliver greater benefits to customers sooner and results in three times the number of measures being installed
- The loan rates vary (5.5% - 6.25% as of 3/30/12 for Portland area options) as do terms, 5-20 years by loan total
- Credit requirements vary by lender (Min 590 credit score, pay payment history, credit report, etc), 2days to 2 weeks approval, no origination fees
- Median project costs are just under $10,000 at $9,800, averaging approximately $60/mo repayment

PGE, PacifiCorp and NWN work with Craft 3 (previously Enterprise Cascadia) to facilitate the on bill coordination and collections of the loan.

The most likely candidates for CEWO are consumers with good bill paying history who are interested in large scale whole home retrofit, taking on debt and taking the time to learn about the program and work with the Energy Advocate. The home needs to meet specific criteria to make a financing package for the overall improvements make sense. Many older homes require basic repair and improvement work before efficiency measures can be installed, including new

wiring. Having a financing package helps home owners overcome the high upfront expense required to make the efficiency improvements.

CEWO has High Road Workforce standards as a core value which focuses their contractor outreach and training on diversity. As a recipient of federal, state, county and foundation funds, they are focused on quantifying and reporting additional economic development and job creation outcomes from broader home performance services.

Umpqua GreenStreet

In 2008, Energy Trust and Umpqua Bank began a marketing relationship for a group of loan products targeting clean energy projects for consumers and small businesses. The product offerings have since matured and today, consumers are offered three products: 1) a home equity loan at 6.5% for loans $5,000-$100,000 over 15 years and 2) an unsecured home improvement loan between $1,000-$50,000 at 6.75% over 5 years, and 3) a home equity line of credit up to $100,000 at prime +05%. Each product includes preferred loan rates compared to other non-energy related loans Umpqua offers. Origination fees and closing costs are waived. Based on the success of GreenStreet in Oregon with the Energy Trust relationship, Umpqua is planning to expand the program into other states.

Similar products are available to businesses for energy efficiency, solar and small wind projects. Businesses can apply for one of two products: 1) a commercial real estate improvement loan of $5,000-$250,000 at 5% (floor) -18% (ceiling) for loans over 15 years and 2) a business term loan of $5,000-$250,000 at 6.5% over 7 years. Like the residential products, origination fees and closing costs are waived and preferred loan rates are available when compared to other non-energy related loans offered by Umpqua. Also similar to the residential products, loans can be use for any improvement project as long as more than 50% of project costs are related to efficiency or solar costs.

To date they have seen 56 large commercial loans, 31 small commercial loans averaging $94,000, and 198 residential loans averaging $14,000 per loan for a total portfolio of $30M. The overall approval rate is in line with Umpqua's other loan products and defaults. Energy Trust trade allies have shown support for the GreenStreet program. In their annual survey responses, many were happy to have a loan program to point customers toward for assistance. Although similar to regular loan products, Umpqua is familiar with efficiency and solar energy projects and how Energy Trust programs work. This places them in a positive role ahead of other similar lending institutions. Trade allies have also reported that when some participants heard about GreenStreet, they decided to approach their credit union or bank and ask if they would lend for these projects. Word of mouth and demand creation may encourage other banks to follow suit.

The overall approval rate of 44% is in line with Umpqua's other loan products. Energy Trust trade allies have shown support for the GreenStreet program. In their annual survey responses, many were happy to have a loan program to point customers toward for assistance. Although similar to regular loan products, Umpqua is familiar with efficiency and solar energy projects and how Energy Trust programs work. This places them in a positive role ahead of other similar lending institutions. Trade allies have also reported that when some participants heard about GreenStreet, they decided to approach their credit union or bank and ask if they would lend for these projects. Word of mouth and demand creation may encourage other banks to follow suit.

As of fall 2010, Umpqua Bank and Energy Trust concluded their exclusive contracting relationship. This allows Energy Trust to encourage other lenders to offer similar products if deemed useful. Green Street provides Energy Trust customers with a financing option with a lender familiar with supporting clean energy investments. The model is highly replicable with other lending institutions but current rates are comparable to other loans and are therefore not in themselves a powerful tool for increasing program participation. The recent adjustment to rates and continuation of no fees may attract more participation going forward. Because underwriting criteria is the same as a typical home or commercial loan, consideration is not given to lower utility bill payments as is done with other credit enhancement programs. As a result, paperwork and timing for approval operates like a regular home equity or commercial loan, with no program streamlining benefits.

Savings Within Reach Loan Product

In mid 2012, Energy Trust is planning to launch a pilot program offering on bill financing of efficiency projects to 300 Savings Within Reach (SWR) program participants. SWR is a program track for existing residential participants with moderate income levels offering enhanced energy efficiency incentives for typical home efficiency improvements such as weatherization and heating equipment upgrades. This program track has grown steadily in its first three years, reaching 440 participants within 2011. A SWR-specific financing product that eliminates out-of-pocket customer costs is identified as a means to significantly scale up participation.

The loan product is intended for smaller-scale projects ($5,000 or less) comprised of building envelope improvements. Eligibility will be limited with respect to heating and hot water equipment. Focus is on measures whose energy savings yield the most cost-effective savings, thus driving toward a net neutral loan product. Customers whose project needs exceed $5,000 after incentives would be directed to the standard CEWO path.

Although the concept is still in the design stage with lender Craft 3, one proposal is for Energy Trust to cover 50% of a loan loss reserve pool (~$60,000) which would lower the risk to Craft 3, allowing them to provide an unsecured loan rate of 5.99%. CEWO may be able to contribute a similar scale of ARRA funds to contribute to the loan loss reserve as well. This would be a new use of Energy Trust funds, not tested before. Since many existing lending products require somewhat restrictive underwriting reviews, many participants from our programs may be limited in ability to access loans. The primary advantage is that other sources of capital may be willing to participate knowing that Energy Trust would effectively cover defaults through the loss reserve. Because the default rate on utility bills in general is < 1%, the risk is quite low to ratepayers across a pool of participants compared to the one on one underwriting through typical lender transactions.

MPower

Similar to Savings Within Reach, the MPower program is targeted at a historically underserved community but focused on the affordable multifamily market. Led by staff from the City of Portland Housing Bureau, this idea started with a collaboration of NGOs dedicated to achieving energy savings in affordable multifamily housing stock through building retrofits and implementation of energy management best practices. Network for Affordable Housing (NOAH), Green For All, Enterprise Community Partners, are proposing the program with financing support of Craft 3 and Energy Trust's technical expertise and incentive support for energy efficiency projects. The program overcomes the tenant split incentive problem by providing with

no upfront cost to customers coupled with a 10 year fixed monthly efficiency surcharge on the utility bill. The charge is calculated so that the tenant "pays" 75% of the savings back to the fund each year for 10 years.

Funding for the MPower capital pool is a combination of HUD grant funds, low cost debt, foundation grants and Energy Trust incentives. Energy Trust and Enterprise Community Partners are working together to develop tenant education and outreach to ensure success of the program. The program requires owners to commit to implementing best practices and continual education of property managers and building managers. Community workforce and diversity standards expand the goals of the program beyond participants to contractors doing the work.

The first 8 buildings received audits in winter 2012 and are now reviewing project options with implementation expected spring and summer 2012. The next round of building audits are scheduled throughout 2012 with project implementation 2013 and 2014. This model is already gaining national attention because it addresses an affordable housing market has been difficult to reach with traditional efficiency programs.

Cool Schools

In 2011, the Oregon House passed HB2960, establishing a Clean Energy Deployment Fund to help pay for energy efficiency and seismic upgrades in K-12 schools throughout Oregon. The money comes from a variety of sources including SELP and makes capital available to school districts in the form of low-interest loans and grants. Energy Trust and ODOE are working together to identify schools that are interested implementing projects. Energy Trust's program management contractor is working directly with these schools to help guide them through the process of determining the best opportunities for their schools, and where appropriate Energy Trust is providing support with audits and development of implementation plans. Energy Trust also helps augment schools public purpose funding with Energy Trust funding for measures that fall outside the schools funding allotment.

Lending Allies

Still in the early stages of development, the residential and commercial programs are also focusing on creating stronger connections with private lending professionals through the concept of lender allies. This group of lenders will be developed as a financial alternative for customers who do not qualify for programs such as Clean Energy Works Oregon, Salem's lighting loan program, energy efficient loans for schools, or federal Small Business Administration energy efficiency loans. The goal of creating lender allies is to provide a group of financial institutions who offer a discounted interest rate on loans for energy efficient or renewable energy projects. The lenders will gain more visibility through our website, program staff, trade allies, and outreach efforts, and have access to Energy Trust marketing materials for their customers. In turn, they will provide referrals to Energy Trust and promote our services and incentives. We will offer their information to contractors and customers, providing new customers for their services. The end result will be more financing options for project owners, or for trade allies to present to their customers. Development of this category will also generate more interest in "green lending" among financial institutions if the marketplace gains experience with these products. So far Umpqua and Banner Bank are lending allies.

Related to this effort, in summer 2012, residential programs plan to undertake a comprehensive review of all the stakeholders involved in the home purchase process from assessors to insurance brokers to lenders. The real estate professional and home mortgage markets will be particular target segments for the residential programs. We expect to learn from this process which new approaches or products Energy Trust can support going forward.

Renewable Construction Loan

During the economic downturn, the difficulty small scale renewable project owners faced in securing financing was recognized as a significant barrier to their ability to complete projects. Energy Trust staff saw an opportunity to better meet project needs by shifting all or a portion of our above market cost incentive earlier in the process, during construction in the form of a loan. After receiving board approval in June 2010 to start a financing pilot, we saw little opportunity team with projects. In part this was because the developers were too focused on securing uncertain state and federal tax credits and grants. To date just one project was very close to receiving our loan but had a change in ownership structure and design that obviated the need for our loan. As other tax credit and grant programs stabilize it is likely that developers will be looking for additional sources of leverage. Energy Trust may want to explore enhancing this offer to be a standard offer for smaller scale projects and/or to consider variations, such as taking early equity positions in projects.

Scale of resources is an issue. Energy Trust renewable energy budgets are limited, especially in PacifiCorp territory where renewable resources are more diverse and abundant.

Energy Efficiency Power Purchase Agreements

EEPPAs were the topic of a recent OPUC led workshop in which Energy Trust participated, joining several other regional industry representatives in trying to determine how a recent EEPPA proposal could work in Oregon. The central principle is that a utility or energy service company would install equipment in a commercial building using their capital, possibly own the equipment and then the utility would collect funds by purchasing the ‘negawatts” of power that the project produces, from the customer. The “negawatt payments” would then pay off the cost of the project, leaving the owner with no financial commitment. The Oregon PUC held a workshop to explore this arrangement, and is currently writing a report to the legislature assessing its merits and recommending next steps. The EEPPA involves several novel transactions. Among the outstanding questions:

- What is the most attractive market? The EEPPA appears to be designed for property owners and managers who have limited capital resources to dedicate to efficiency.
- Will relying on utility borrowing lower the cost of capital?
- Will the stream of benefits from energy savings be sufficient to finance relatively expensive deep retrofits?
- How will this appeal to tenants?
- Will owners be happy to hand over the value of energy savings in exchange for building improvements?
- What is the utilities’ interest? Will they require a rate of return on capital to make this work? If so, how does this change the current system, whereby Energy Trust has primary responsibility for delivering efficiency?
- If the utility or ESCo owns the improvements, does this limit the scope of the retrofit to removable equipment? How does this impact property taxation?

In some respects the EEPPA resembles the utility bill financing programs of the 1990's, except for the idea that by having someone other than the property owner own the improvements, there may be an ability to address customers who lack leverage or have higher priorities for its use.

There are other new transactions entering the commercial building market, including a new sort of shared savings arrangement that can include water, sewer, solid waste, and other savings in the "payback stream", and proposed new criteria for loan valuation.

Issues for discussion

- Given the many priorities for enhancing programs to reach additional markets and prove additional resources, how much effort and risk should Energy Trust employ in developing or testing additional financing initiatives?

- What should be the role for Energy Trust going forward when considering financing options
    - Provider of education resources
    - A link between participants and a range of 3rd party options
    - Resource to credit enhancement through support of loan loss reserve account to reduce risk to broader range of lenders and participants
    - Variety of roles depending on market segment

- New financing programs are often linked to additional economic and societal goals beyond acquisition of energy savings. Although we see significant benefit in collaborating with other organizations in savings energy and generating renewable power, our goals may appear secondary to others. To what extent do we feel comfort in relaxing our priority?

Product	Target Market	Description	Energy Trust Role	Achievement to Date	What's Next
Clean Energy Works Oregon (expansion of CEW Portland to other parts of the state with $20M ARRA funding)	Residential, whole home retrofit, average~ $10k per loan	EEAST pilot, on-bill financing 6,000 homes in 3 years	Sustainable Energy Project Manager for pilot, subset of trade allies form the network, project incentives defined and provided to CEWO capital pool	– Meeting participation goals – Expanded to Bend and So Or – Able to provide additional incentives through federal funding to increase participation – Recent expansion of lender options (Banner, Umpqua, Craft3)	Will continue as an independent nonprofit, aligned with Energy Trust HES offerings for 2013, possibly expanding into commercial market next
MPower	Multifamily affordable housing, Portland focus master metered PGE to start then expand to unit metering and other regions	On bill tariff designed to provide 5% net savings compared to prior billing for 10 years	Steering committee member, program design and technical assistance, site audits, project incentives, tenant education and outreach and evaluation	8 audits complete for Phase 1 of 3 Phases, PGE master metered site first, then to expand to tenant billed	Next round of audits to start once 1st projects underway
Savings-Within-Reach Loan Product	Moderate income throughout Energy Trust territory	Reasonable to low interest rate on bill financing loan product capped at $5,000, 10 yr term	Energy Trust PPC funds provide 50% of loan reserve pool to keep risk level manageable for Craft 3 to provide financing to pooled participants at a low interest rate for unsecured	In design phase with Craft 3, CEWO, OHCS, CSG – May board meeting	Launch summer 2012, goal of 300 loans this year
GreenStreet (Umpqua loan products	Residential and small commercial market, efficiency, PV, and small wind	3rd party off bill improvement loans and line of credit, secured and unsecured projects with varying loan rates and terms	2008-2010 marketing relationship with Umpqua, ETO and trade allies continue to refer projects to Umpqua's program	Umpqua continues to offer a revised product and are happy with the participation rates	The Lender Ally concept has replaced the original type of relationship.

Product	Target Market	Description	Energy Trust Role	Achievement to Date	What's Next
Lender Allies	Lending professionals, banks, credit unions	Energy Trust created market framework of clean energy knowledgeable lenders offering preferred rates for Energy Trust participating projects	Coordinating and facilitating the expansion of a market framework of clean energy knowledgeable lenders, with potential to expand to insurance agents, assessors, realtors, etc	Creation of lender ally guidelines	Summer 2012 project plan to assess the market for roles Energy Trust can play or products we should create or support, expanding to real estate lending professionals
Efficiency power purchase agreement (EEPPA)	Commercial office buildings with potential for multiple measures, shell, HVAC upgrades and downsizing plus lighting	State directed pilot with OPUC oversight, utility pays retail tariff rate to building owner via ESCO for efficiency provided through deep retrofits.	Developing our own, similar pilot with technical design savings leveraging concepts but ***without*** the financing portion, enhanced incentives only, testing if financing is critical	Test of pilot concept, 2-3 sites?	TBD
Renewable Construction Loan	Custom renewable project developers (>$1M, 12mo+ construction period)	All or a portion of Energy Trust's above market cost incentive provided prior to project completion as a construction loan, forgiven upon meeting performance criteria	Created and offered a construction loan product with limited success.	Offered to one 1.5MW biogas project that ended up having to pull out and renegotiate with a new equity partner, beyond Energy Trust's ability to influence the outcome	Explore greater need for smaller scale construction loans, smaller projects or equity position concept